DPO Case File for DPO-2017-001 and DPO-2017-002

The following pdf represents a collection of documents associated with the submittal and disposition of two differing professional opinions (DPOs) from an NRC employee involving the NRC's approval of two emergency amendments for Palo Verde 3 involving emergency diesel generator outage times.

Management Directive (MD) 10.159, "NRC Differing Professional Opinion Program," describes the DPO Program. https://www.nrc.gov/docs/ML1513/ML15132A664.pdf

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 (or the Commission, for those offices that report to the Commission).

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 reviewed and considered by the NRC.

It is important to note that the DPO submittal includes the personal opinions, views, and concerns by an individual NRC employee. The NRC's evaluation of the concerns and the NRC's final position are included in the DPO Decision.

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

Document 1: DPO Submittal (DPO-2017-001)
Document 2: DPO Submittal (DPO-2017-002)
Document 3: Memo Establishing DPO Panel
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Document 1: DPO Submittal (DPO-2017-001)

NRC FORM 680
(09-2015)
NRCMD 10.159

U.S. NUCLEAR REGULATORY COMMISSION

DIFFERING PROFESSIONAL OPINION

DPO Case Number: DPO-2017-001

Date Received: 12/28/2016

Name and Title of Submitter	Organization	Telephone Number (10 numeric digits)
Troy Pruett, Director Reactor Projects, Region IV	Region IV	(817) 200-1248
Name and Title of Supervisor	**Organization**	**Telephone Number (10 numeric digits)**
Kriss Kennedy, Regional Administrator	Region IV	(817) 200-1227

When was the prevailing staff view, existing decision or stated position established and where can it be found?

Date: December 23, 2016 Where (i.e., ADAMS ML#, if applicable): ML16358A676

Subject of DPO

Approval of Emergency Amendment for Palo Verde Unit 3

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?	☐ No	☑	Yes, (Explain on continuation page(s) or attach Word document).
Is the issue directly relevant to a decision pending before the Commission?	☑ No	☐	Yes, Reference Document (I.e., ADAMS ML#)
☑ Informal discussions took place (Identify with whom and time frame of discussions) Joe Giitter, NRR, DRA (12/21 to 12/23) George Wilson, NRR, DORL (12/21 to 12/23) Kriss Kennedy, Region IV (12/21 to 12/23)		☐	Extenuating circumstances prevented informal discussions

Proposed panel members are (in priority order):

1. MICHAEL FRANOVICH, NRR
2. JOHN GIESSNER, REGION III
3. KEVIN COYNE, RES

☐ No names of potential panel members will be provided.

When the process is complete, I would like the DPO case file: ☐ Non-Public ☑ Public

SIGNATURE OF SUBMITTER: [signature] DATE: 12/28/16

SIGNATURE OF CO-SUBMITTER (If any): DATE:

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: Renee Pedersen DATE: 1/4/2017

Delete Continuation Page ☒ DPO accepted ☐ DPO returned Add Continuation Page

SUBJECT: Differing Professional Opinion (DPO) Regarding Agency Approval of Emergency Circumstances Amendment to Technical Specification 3.8.1 for Palo Verde Nuclear Generating Station Dated December 23, 2016

Summary of staff decision:

The NRC approved the extension of an emergency diesel generator (EDG) allowed outage time from 10 days to 21 days to allow for continued troubleshooting and repair. The 21 day total is not sufficient to return the EDG to an operable status. NRC staff acknowledge a second emergency amendment will be needed that provides sufficient time to complete repairs while the unit remains at full power. NRC staff have verbalized a willingness to approve the second amendment.

Extent of Discussions with NRC staff:

The areas of concern described in this paper were discussed with George Wilson, NRR; Joe Giitter, NRR; Kriss Kennedy, Region IV; and Scott Morris, Region IV. Kriss Kennedy and Scott Morris each had communications with their respective peers in headquarters.

The decision to use the DPO process in lieu of the nonconcurrence process was discussed with Renee Pedersen, OE; and Margret Sewell, OE. Because of the exigent nature of this case, the traditional nonconcurrence process was not feasible and thus, not in the best interest for all those involved and the agency.

Potential Outcomes for DPO:

Withdraw approval for Palo Verde license amendment 199.

Develop rules/guidance for processing allowed outage time extensions, including imposition of maximum allowed outage times.

Discontinue the practice of extending allowed outage times beyond a preset limit using emergency amendments. Extended allowed outage times should be reviewed as part of a publicly involved risk informed technical specification submittal.

Improve guidance for acceptance of compensatory actions that replace automatic actions.

Institute a process for public involvement during exigent and emergent licensing actions.

Improve guidance for writing license amendment approval letters.

Perform a root cause analysis for training program failures.

Reason for DPO:

The agency's action regarding the approval of the Palo Verde EDG emergency amendment is inconsistent with the NRC Mission, NRC Vision, NRC Safety Objectives, NRC Regulatory Effectiveness Strategies, NRC Openness Strategies, and the Principles of Good Regulation.

A. The NRC conducts licensing actions to protect public health and safety.

The amendment does not protect public health and safety. The amendment fails to provide reasonable assurance of plant safety. In the event of certain design basis accident the consequences would severely impact public health and safety, and the environment.

B. As a trusted, independent, transparent, and effective nuclear regulator, the NRC must not only excel in carrying out its mission, but must do so in a manner that engenders the trust of the public and stakeholders.

The licensee's interests were evident during the non-public pre-submittal call. The licensee stated, "It would be a shame to take 1400 megawatts off the grid." The licensee's motivations are purely financial. The NRC's interests, as noted by a senior NRC manager on December 20, 2016, were, "This will be a good test of how can we better blend risk insights with deterministic principles in making a reasonable assurance determination." This and other statements biased the NRC review process towards approval from the onset. Even though senior NRC management knew the licensee could not assess common cause potential and knew of several similar EDG failures, they were supportive from the onset of the two-step emergency amendment approach. Neither the licensee nor the NRC could make an argument to rule out common cause failure. Yet, the NRC approved the amendment based on uncertain information. This amendment does not engender the trust of the public because the consequences of the inability to mitigate certain design basis accidents are significant. Additionally, emergency amendments bypass upfront public involvement, even though the agency has the ability to allow for public participation. (Regulatory Principles: OPENNESS, CLEAR, INDEPENDENCE)

C. NRC Safety Objective 1 is to, "Prevent and mitigate accidents and ensure radiation safety." Several Safety, Regulatory, and Openness strategies were developed to meet the objective or relate to the objective. The NRC is to minimize the likelihood of accidents and reduce the consequences should one occur. Design basis accidents have the potential to release significant amounts of radioactive material to the environment and expose workers and the public to high radiation levels. The following paragraphs are associated with a variety of strategies described in the NRC Strategic Plan.

The NRC did not inform the approval using insights from lessons learned. The NRC failed to consider what happens when the event occurs. The NRC depended heavily on probabilistic risk analysis (PRA) insights and credit for staging of portable EDGs. NRC staff discounted design basis accident events because they have a low likelihood of occurrence. The vast majority of risk management and compensatory actions described in the approval letter are already mandated by Technical Specifications for the existing 10 day allowed outage time and should not have been credited to further support what could be a 600 percent increase in the allowed outage time. (Not met: Safety and Regulatory Strategies) (Regulatory Principles: RELIABLE)

The NRC and licensee ignored the loss of coolant accident (LOCA) consequence element. Longer outage times increase the vulnerability to a design basis accident involving a LOCA with a loss of offsite power (LOOP) event with a failure of Train A equipment. As noted in the approval letter, Palo Verde is a 16 hour station blackout coping plant because of actual LOOP events. NRC staff know Palo Verde is susceptible to LOOP related events. Should this accident sequence occur, the licensee would not be able to meet criteria for emergency core cooling, containment cooling, and mitigation

of offsite radiological releases. The licensee and NRC staff stated that by NRC guidance, failures of Train A equipment did not need to be considered if the allowed outage time is extended. (Not met: Safety and Regulatory Strategies) (Regulatory Principles: RELIABLE)

NRC staff stated the probability of a LOCA is very low and therefore did not need to be considered. The portable EDGs require manual starting and connection to the emergency bus. The manual actions cannot serve as an equivalent compensatory measure. The Train B EDG auto starts and loads all safety equipment in 40 seconds. The manual actions take at least 20 minutes, if not significantly longer. (Not met: Safety and Regulatory Strategies) (Regulatory Principles: RELIABLE)

The NRC did not use a stable and predictable process to extend the allowed outage time. The approval is an emergency amendment and bypasses public involvement. The pre-submittal call occurred on a "non-recorded" line. NRR staff debated the merits of the call in a headquarters staff only discussion. Note that Notice of Enforcement Discretion calls are done on recorded lines. Additionally, sufficient social media tools are available to immediately post updates regarding emergency amendment requests and to schedule publically available pre-submittal calls. As noted above, senior NRC staff considered this to be a "test case" with the rules for allowed outage times to be developed in process. The NRC has no guidance on setting maximum allowed outage time limits. In the Palo Verde case, the NRC will likely approve what could be a 600 percent increase in the allowed outage time for an EDG. Maximum limits are needed because no amount of risk informed analysis and deterministic thought can predict the many ways people and equipment will fail. (Not met: Safety, Regulatory, and Openness Strategies) (Regulatory Principles: OPENNESS, CLEAR)

The NRC did not ensure that the licensee's compensatory actions maintain acceptable safety margins. In particular, when approving manual actions for automatic actions the NRC typically seeks manual actions that are essentially redundant to the automatic action that are simple to initiate. For example, a dedicated operator in communication with the control room is stationed to manually open a valve. The action involves few steps and can be performed within the accident analysis timelines. The use of manual start portable EDGs is a complicated process requiring multiple operators, numerous procedure steps, and specialized training. The actions cannot be performed in a time sequence consistent with the Palo Verde accident analysis. (Not met: Safety and Regulatory Strategies) (Regulatory Principles: RELIABLE)

The NRC is not implementing and refining the Reactor Oversight Process to ensure safety issues are identified. This aspect involves a breakdown in the training and certification program for individuals responsible for licensing and inspecting reactor facilities. This training breakdown could have contributed to the wrongful determination to grant the allowed outage time extension (See Human Capital Gaps below for training concerns). (Not met: Safety and Regulatory Strategies) (Regulatory Principles: INDEPENDENCE, EFFICIENT, RELIABLE)

The wording in the approval letter is misleading. The letter states this is a "one time" request. In reality, the NRC expects to receive a second request and expects to approve an even longer allowed outage time. The new Technical Specification wording is, "Restore the Inoperable DG to OPEABLE within 21 days." This condition cannot be

met, the reviewers knew it cannot be met, and yet the NRC approved the amendment. (Regulatory Principle: CLEAR)

D. Human Capital Gaps

Human Capital Strategies involve, in part, maintaining qualified staff; hiring staff to meet mission critical occupations; and improving knowledge management. The NRC has allowed the technical expertise of staff to degrade over an extended period. Many staff no longer have the ability to consider all relevant information to make informed decisions. This knowledge gap may have contributed to the poor decision to approve the Palo Verde EDG emergency amendment.

NRC's inspection and licensing of risk important items is ineffective. NOT ONE of the 25 Yellow and Red findings reviewed were identified thorough timely and thorough NRC inspection (See list of significant issues below). Almost all were the result of "after-the-fact" NRC inspection. The NRC has arguably missed every significant finding issued by the NRC. More troubling is the NRC has not evaluated the missed NRC opportunities in order to improve the technical expertise of the staff.

The NRC frequently states, "NRC inspections at nuclear facilities are only a small sample of the activities that occur. Licensees are expected to implement robust programs to ensure safety is always maintained." Instead of addressing inspection program shortcomings, the NRC tends to not take responsibility for inadequate oversight, and does not attempt to identify the root causes for deficient oversight.

NRC hired inexperienced staff as part of efforts to lower the age demographic of the agency. The NRC failed to adjust the training program to raise their technical knowledge level. The NRC continued to implement a program designed for staff with over 10 years of nuclear experience and failed to recognize the needs of inexperienced personnel.

The NRC does not have a certification standard for staff responsible for the administration of the Manual Chapter 1245 qualification program. There are no defined success criteria for completion of Independent Study Assignments or On the Job training. Standards and knowledge vary considerably between staff that certify trainees. The training program focuses on regulatory processes and fails to establish the minimum technical expertise requirements for an inspector or license reviewer. In this case, a license amendment approval occurred even though many NRC staff involved in the process may not possess a broad technical knowledge of nuclear.

List of significant issues:

Arkansas Nuclear One Stator Drop (2013-Yellow): A newly designed and untested lifting rig collapsed during movement of the stator resulting in significant damage to plant equipment. Why didn't the NRC recognize the high risk associated with the activity and verify the acceptability of the lifting rig?

Arkansas Nuclear One Flooding (2013 Yellow): During the stator drop event numerous weaknesses in the licensee's flood mitigation program were revealed. Why did prior inspections by the NRC fail to identify flood program weaknesses?

Browns Ferry Operator Manual Actions (2009-Yellow): A longstanding issue involving all units, for which the agency delayed and deferred regulatory action to ensure the facility was operated

safely. Why didn't the agency implement a more timely safety focused regulatory position at arguably the most significant "fire protection is important" facility in the nation?

Browns Ferry RHR Isolation Valve Failure (2010-Red): The NRC only became involved after the valve failed to function properly. Historical test data, which was not reviewed by the NRC, showed the valve was nonfunctional. Why wasn't test data for a high risk valve not inspected until after a special inspection was completed and a reinvestigation initiated?

Calvert AFW Turbine Failure (2001-Yellow): The NRC only became aware after the turbine failed during testing from the use of excess bearing sealant. The NRC does not inspect maintenance activities; therefore, there is essentially no opportunity for identification.

Davis Besse Containment Sump Blockage (2003-Yellow): The licensee reported this condition to the NRC in a Licensee Event Report. Why didn't NRC identify this longstanding deficient condition?

Davis Besse Vessel Head Degradation (2002-Red): Self revealing loss of vessel head material and significant boric acid corrosion. The NRC had multiple failed opportunities to address this significant issue.

Farley RHR Valve Failure (2007-Yellow): RHR valve failed during IST. NRC did not address resolution following a prior valve failure. Why wasn't the issue resolved by the NRC following the initial valve failure?

Fort Calhoun Switchgear Fire – Breaker Failure (2012-Red): NRC inspected following a significant fire event. No inspection of high risk modification to switchgear system was performed by the NRC. Why didn't NRC inspect and review this high risk modification before the system was restored to an operable status?

Fort Calhoun Flood Mitigation (2010-Yellow): Longstanding flood protection issues at the facility. The change in flood protection requirements was noted in the licensee's IPEEE update years before but the NRC did not review or recognize the change. Why didn't the NRC resolve the issue years ago?

Indian Point Steam Generator Tube Leak (2001-Red): The post event review determined that testing data showed degraded tube wear. Why didn't the NRC's inspection program note the degraded indications before the steam generator failed?

Indian Point High Operator Exam Failures (2001-Yellow): The licensee provided the results to the NRC following the issuance of the requalification exam. Why didn't the NRC's inspection program identify training program weaknesses before the failures?

Kewanee Potential Flooding Concern 2005-Yellow): Longstanding issue not identified by the NRC. NRC reviewed the licensee's condition report initiated in May 2003 in September 2004. Why did the NRC wait for over a year to ensure a significant issue was resolved following the licensee's identification of the concern? Why didn't the NRC's inspection program identify the flooding concern?

Kewanee Diesel Generator Fuel Leak (2007-Yellow): The initial leak was discovered by the licensee on June 28 yet the NRC did not push for resolution. 51 days elapsed before the diesel

was repaired. Why didn't the NRC ensure an appropriate operability assessment was performed? Why wasn't repair of the diesel implemented in a timely manner?

Kewanee Failure of Alert Notification System (2000-Yellow): NRC inspected after a performance indicator revealed degraded performance. The after-the-fact inspection noted problems with maintenance programs and use of the corrective action program. Why didn't the NRC's inspection program identify and resolve these areas before the public's notification system became degraded?

Oconee Reactor Coolant Makeup Line Failure (2010-Yellow): NRC inspected after a self-revealing failure of the system. Why didn't the NRC ensure prior debris loading concerns were resolved?

Oconee Pressurizer Heater Breaker Failure (2011-Yellow): NRC completed after-the-fact inspection following identification by the licensee. Why didn't the NRC identify this 20 plus year old significant concern?

Palisades Failure of Electrical Distribution Panel (2011-Yellow): Self revealing maintenance issue. The NRC does not inspect maintenance activities; therefore, there is essentially no opportunity for identification.

Palo Verde Containment Sump Voiding (2004-Yellow): NRC inspected after issue was identified by the licensee. Why was this longstanding significant issue not identified by the NRC?

Point Beach AFW Air Operated Valve Concern (2001-Red): NRC inspected after issue was identified by the licensee. Why was this longstanding significant issue not identified by the NRC?

Point Beach AFW Air Operated Valve Concern (2002-Red): NRC inspected after issue was identified by the licensee. Why was this longstanding significant issue not identified by the NRC?

Point Beach AFW Recirculation Line Concern (2003-Yellow U1, Red U2): NRC inspected after issue was identified by the licensee. Why was this longstanding significant issue not identified by the NRC?

Saint Lucie Air Intrusion (2009-Yellow): NRC inspected after the event. Why didn't the NRC identify this longstanding design flaw in the instrument air system?

Columbia Generating Station Inadequate Protective Action Recommendations (2001-Yellow): Why did this condition last for almost 4 years? Why didn't the inspection program recognize this public safety issue sooner?

Wolf Creek Loss of Offsite Power (2012-Yellow): NRC inspected after the event. The licensee identified an improper wiring assembly (maintenance issue). The NRC does not inspect maintenance activities; therefore, there is essentially no opportunity for identification.

Document 2: DPO Submittal (DPO-2017-002)

NRC FORM 680
(09-2015)
NRCMD 10.159

U.S. NUCLEAR REGULATORY COMMISSION

DIFFERING PROFESSIONAL OPINION

DPO Case Number: DPO-2017-002

Date Received: 1/9/2017

Name and Title of Submitter	Organization	Telephone Number (10 numeric digits)
Troy Pruett, Director of Reactor Projects	Region IV	(817) 200-1248
Name and Title of Supervisor	**Organization**	**Telephone Number (10 numeric digits)**
Kriss Kennedy, Regional Administrator	Region IV	(817) 200-1227

When was the prevailing staff view, existing decision or stated position established and where can it be found?

Date January 4, 2017 **Where (i.e., ADAMS ML#, if applicable):**

Subject of DPO

Approval of 600 percent increase in the allowed outage time for an emergency diesel generator.

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?	☐ No	☑	**Yes, (Explain on continuation page(s) or attach Word document).**
Is the issue directly relevant to a decision pending before the Commission?	☑ No	☐	**Yes, Reference Document (i.e., ADAMS ML#)**
☑ **Informal discussions took place (Identify with whom and time frame of discussions)** George Wilson, NRR Joe Giitter, NRR		☐	**Extenuating circumstances prevented informal discussions**

Proposed panel members are (in priority order):

1. [redacted] KEN O'BRIEN, RIII
2. John Giessner, RIII
3. Kevin Coyne, RES

☐ **No names of potential panel members will be provided.**

When the process is complete, I would like the DPO case file: ☐ **Non-Public** ☑ **Public**

SIGNATURE OF SUBMITTER [signature] **DATE** 1/9/2017

SIGNATURE OF CO-SUBMITTER (If any) **DATE**

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 Renée Pedersen **DATE** 1/18/2017

Delete Continuation Page ☐ **DPO accepted** ☐ **DPO returned** Add Continuation Page

SUBJECT: Differing Professional Opinion (DPO) Regarding Agency Approval of a Second Emergency Circumstances Amendment to Technical Specification 3.8.1 for Palo Verde Nuclear Generating Station Dated January 4, 2017

Summary of staff decision:

The NRC approved two extensions of an emergency diesel generator (EDG) allowed outage time from 10 days to 62 total days (600% increase) to allow for continued repair. The initial DPO was submitted on December 28, 2016, following the first extension. This additional DPO should be reviewed in conjunction with the prior DPO.

Extent of Discussions with NRC staff:

The areas of concern described in this paper were discussed with Joe Giitter, NRR; Kriss Kennedy, Region IV; and Scott Morris, Region IV. Kriss Kennedy and Scott Morris each had communications with their respective peers in headquarters. Because of the exigent nature of this case, the traditional nonconcurrence process was not feasible and thus, not in the best interest for all those involved and the agency.

Potential Outcomes for DPO:

Withdraw approval for Palo Verde license amendment 200.

Continue to review DPO submittal involving license amendment 199.

Reason for DPO:

In addition to the reasons provided in the December 28, 2016, DPO regarding license amendment 199:

The agency's action regarding the approval of the Palo Verde EDG emergency amendment continues to be inconsistent with the NRC Mission, NRC Vision, NRC Safety Objectives, NRC Regulatory Effectiveness Strategies, NRC Openness Strategies, and the Principles of Good Regulation.

A. The NRC conducts licensing actions to protect public health and safety.

   The amendment does not protect public health and safety. The amendment fails to provide reasonable assurance of plant safety. In the event of certain design basis accidents the consequences would severely impact public health and safety, and the environment.

B. NRC Safety Objective 1 is to, "Prevent and mitigate accidents and ensure radiation safety." Several Safety, Regulatory, and Openness strategies were developed to meet the objective or relate to the objective. The NRC is to minimize the likelihood of accidents and reduce the consequences should one occur. Design basis accidents have the potential to release significant amounts of radioactive material to the environment and expose workers and the public to high radiation levels. In particular:

   The NRC staff appears to have failed to understand the purpose of Technical Specifications (TSs). Federal Register Notice dated July 31, 2012, provides a good

summary. General Design Criteria (GDC) and the TS differ in that the GDC specify NRC's requirements for the design of nuclear power reactors, whereas the TS are included in the license and specify requirements for the operation of nuclear power reactors. Design requirements, such as GDCs or similar requirements, are typically included in the licensing basis for every nuclear power plant. GDCs, according to Appendix A to 10 CFR Part 50, establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components (SSCs) important to safety." As such, the GDCs cover a broad category of SSCs that are important to safety, including those SSCs that are covered by TS. Both the design capability of the facility to meet the GDC (or a plant-specific equivalent) and the operational restrictions, which are to be included in the TS, are described in the final safety analysis report (FSAR). The staff safety evaluation documents the acceptability of these analyses, and it is the combination of the FSAR analyses and the staff safety evaluation that forms the bases from which the TS are derived. It is important to note that the GDCs cover a broader scope of SSCs than the TS because the TS establish, among other things, the limiting conditions for operations (LCOs). LCOs are the "lowest functional capability or performance levels of equipment required for safe operation of the facility." Section 182 of the Atomic Energy Act of 1954, as amended and as implemented by 10 CFR 50.36, requires that those design features of the facility that, if altered or modified, would have a significant effect on safety, be included in the TS. Thus, TS are intended to ensure that the most safety-significant design features of a plant, as determined by the safety analysis, maintain their capability to perform their safety functions.

10 CFR 50.36 requires limiting safety system settings for nuclear reactors for automatic protective devices related to those variables having significant safety functions. Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor. The NRC inappropriately approved a 600% AOT extension knowing that emergency core cooling criteria cannot be met for certain design basis accidents. The NRC knew the 600% AOT extension would lead to an inability to meet certain GDC.

10 CFR 50.36 requires limiting conditions for operation for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met. In the approval for license amendments 199 and 200, the NRC referenced NUREG 0800, BTP 8.8, as a basis for approving the 600% extension (62 days) to the EDG AOT. BTP 8.8 describes the basis for maximum EDG AOTs. The maximum period, with portable EDG's available, is 14 days. Specifically, the NUREG states: "The EDG AOT should be limited to 14 days to perform maintenance." Additionally, "An EDG or offsite power license amendment of more than 14 days should not be considered by the staff for review." Clearly the NRC failed to implement the Commission approved guidance described in NUREG 0800, BTP 8.8. Additionally, it is abundantly clear that in license amendments 199 and 200, the 600% AOT extension is to conduct activities that go far beyond a typical "maintenance activity." License amendments granted on an emergency basis that preclude Commission involvement and public input violate regulatory principles, undermine the value of TSs, and severely damage the credibility of the regulator.

The GAO noted in prior reports that to achieve NRC's safety mission, it is critical that the Commission maintain a high degree of confidence in its regulatory program's ability to ensure that the nuclear industry performs to high safety standards. Determining the safety of plants is difficult because NRC does not precisely define safety. Instead, NRC presumes that plants are safe if they operate within their approved designs and in accordance with NRC's regulations. NRC's statutory obligation when it grants an operating license is to require sufficient information from the licensee to enable NRC to "provide adequate protection to the health and safety of the public." For license amendments 199 and 200, the NRC chose to define safety on-the-fly and ignore the fact that the licensee would operate the facility outside the design for 2 months. This is a failure to provide adequate protection for public safety.

The need for the 600% AOT extension was caused by the licensee and could have been prevented by the licensee. The licensee chose the repair method for a failure of the same EDG in 1986. The licensee's chosen repair method did not allow for an alignment check of the crankshaft. Had the alignment check been performed, the EDG would likely not have failed in December 2016. Additionally, the licensee vibration test data indicated erratic behavior of the EDG for several years. However, the licensee did not implement corrective actions to resolve the causes of the abnormal vibrations. Past NRC practice has been to disapprove requests to extend AOTs when the licensee was at fault.

In the approval letter for license amendments 199 and 200, the NRC acknowledged the licensee extending all required testing and maintenance to the maximum allowed by the TSs 1.25 grace period. All other maintenance and testing is being deferred until after the EDG is returned to service. The TSs allow for an extension to 1.25 times the specified frequency to allow for operational concerns. The 1.25 extension was never intended to be used to allow for the reconstruction of an EDG at power. This is a failure to provide adequate protection for public safety and undermines the credibility of the TS requirements.

The NRC violated the public trust. The NRC was more focused on the profit margin of the licensee than on protecting the interests of the public with respect to radiological safety. Unit 3 at Palo Verde was not needed to support stable and reliable grid operations. Nevertheless, the NRC expeditiously and enthusiastically approved this profit motivated request. Could the decision have been influenced by the need to maintain good favor with the nuclear industry and nuclear industry lobbyists? Internal NRC email messages and phone calls celebrate how efficiently the NRC approved the second amendment and the great team effort in working over the holidays to get the amendment approved. The NRC needs to stop yielding to financial pressure concerns pitched by the industry and establish a hard line for protecting the lowest functional capability and performance levels of equipment required for safe operation of the facility (Protect, Preserve, and Defend Technical Specifications). This case is an indication that the safety of the public does not appear to be a driving principle within the NRC.

The NRC continues to fail to consider what happens when the event occurs. The NRC and licensee focused on loss of offsite power (LOOP) scenarios, including seismic and fire induced. Compensatory measures primarily focus on mitigation of LOOP events. The NRC continued to ignore the consequences from the full spectrum of design basis events. Longer allowed outage times increase the vulnerability to a design basis accident with a failure of Train A equipment. The fear of a Train A failure during a

design basis accident is the concern that resulted in the deferral of maintenance and testing activities during the 600% extended AOT. A best, this is a textbook example of duplicitous action. On the one hand we required maintenance to be deferred for safety reasons, while on the other hand we state there is no safety concern because design basis accidents will not happen.

The NRC did not ensure that the licensee's compensatory actions maintain acceptable safety margins. Manual actions continue to not be sufficient for the full spectrum of design basis accidents.

Document 3: Memo Establishing DPO Panel

January 19, 2017

MEMORANDUM TO: James Andersen, Panel Chairperson
Office of Nuclear Security and Incident Response

William Cook, Panel Member
Region I

Kevin Coyne, Panel Member
Office of Research

William Reckley, Panel Member
Office of New Reactors

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 APPROVAL OF EMERGENCY AMENDMENTS FOR PALO VERDE UNIT (DPO-2017-001 and DPO-2017-002)

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; Bill Dean, Director, Office of Nuclear Reactor Regulation; and the DPO submitter; you are being appointed as members of a DPO Ad Hoc Review Panel (DPO Panel) to review two DPOs submitted by an U.S. Nuclear Regulatory Commission (NRC) employee.

The DPOs (Enclosures 1 and 2) involve the NRC's approval of two emergency amendments for Palo Verde 3 involving emergency diesel generator outage times. The DPOs have been forwarded to Mr. Dean for consideration and issuance of a DPO Decision.

CONTACTS: Renée Pedersen, OE
(301) 287-9426

Marge Sewell, OE
(301) 287-9428

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 these DPOs 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. In this case, the second DPO was accepted for review on January 18, 2017, and therefore, the timeliness goal for issuing this DPO Decision is May 18, 2017.

Process Milestones and Timeliness Goals for these DPOs are included as Enclosure 3. 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. Dean 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. Dean 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 DPOs with their co-workers as part of the evaluation; however, as with other predecisional processes, employees should not discuss details of the DPOs 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 a thorough and objective review of these DPOs. 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 Sewell. We look forward to receiving your independent review results and recommendations.

Enclosures:
1. DPO-2017-001
2. DPO-2017-002
3. Process Milestones and Timeliness Goals

cc: w/o Enclosures:
B. Dean, NRR
M. Evans, NRR
B. McDermott, NRR
S. West, NSIR
J. Yerokun, RI
M. Thaggard, RES
J. Segala, NRO
T. Pruett, RIV
S. Morris, RIV
P. Holahan, OE
M. Sewell, OE

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Enclosures:
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S. Morris, RIV
P. Holahan, OE
M. Sewell, OE

ADAMS Package: ML17019A278
MEMO: ML17019A285
Enclosure 1 – ML17004A074
Enclosure 2 – ML17019A275
Enclosure 3 – ML17019A287 OE-011

OFFICE	OE: DPO/PM	OE: D
NAME	RPedersen	PHolahan
DATE	1/19/2017	1/19/2017

OFFICIAL RECORD COPY

Document 4: DPO Panel Report

June 5, 2017

MEMORANDUM TO: William M. Dean, Director
Office of Nuclear Reactor Regulation

FROM: James Andersen, DPO Panel Chair **/RA/**
Kevin Coyne, DPO Panel Member
William Cook, DPO Panel Member
William Reckley, DPO Panel Member

SUBJECT: DIFFERING PROFESSIONAL OPINION PANEL REPORT REGARDING TWO EMERGENCY LICENSE AMENDMENT REQUESTS RELATED TO DIESEL GENERATOR ALLOWED OUTAGE TIME (DPO-2017-001 and DPO-2017-002)

In a memorandum dated January 19, 2017, we were appointed as members of a Differing Professional Opinion (DPO) Ad Hoc Review Panel (DPO Panel) to review two DPOs regarding the NRC staff's approval of two emergency license amendments for Palo Verde Unit 3 involving diesel generator outage times. Specifically, the NRC staff approved (1) a one-time extension from 10 days to 21 days of a Technical Specification (TS) allowed outage time (AOT) for the purpose of providing additional time to troubleshoot a failed diesel generator, and (2) a second one-time risk-informed license amendment that extended the AOT from 21 days to 62 days in order to provide sufficient time to restore the failed diesel generator to service and avoid a unit shutdown. The DPO Panel reviewed both DPOs in accordance with Management Directive 10.159, "The NRC Differing Professional Opinions Program." The DPO Panel's report is enclosed for your consideration.

The DPO Panel was not unanimous in concluding that Palo Verde License Amendments 199 and 200 should have been approved by the staff. The principle bases for some DPO Panel members concluding the license amendment requests (LARs) should not have been approved are discussed further under the DPO Panel's review of Concern #5 and involve the staff not strictly adhering to available guidance, not documenting the basis for the deviations from this guidance, and inconsistently applying the guidance based upon past staff approval or denial of similar LARs. The DPO Panel was unanimous in concluding that additional guidance is needed in several areas for reviewing emergency license amendment AOT extension requests for inoperable diesel generators, as well as guidance for deterministic license amendment requests with supplemental risk information, how and whether precedents should be used, and how and whether independent verification using independent risk tools should be used.

During the review, the DPO Panel was aware of a 10 CFR 2.206 Petition involving the same two emergency LARs. The DPO Panel review of the petition and associated rejection letter dated March 30, 2017, identified some inconsistencies between the Petition Review Board's (PRB) decision and observations and conclusions developed by the DPO Panel. A summary of the differences will be shared with you by separate correspondence for information and action, as appropriate.

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

Enclosure:
DPO Panel Report

Cc: P.Holahan, Director, OE
R.Pedersen, DPOPM

MEMO TO BILL DEAN CONCERNING DIFFERING PROFESSIONAL OPINION PANEL REPORT ON TWO EMERGENCY LICENSE AMENDMENT REQUESTS RELATED TO DIESEL GENERATOR ALLOWED OUTAGE TIME (DPO-2017-001 and DPO-2017-002)

DATE: JUNE 5, 2017

ADAMS Accession No.: ML17153A216

OFFICE	DPO/PC	DPO/PM	DPO/PM	DPO/PM
NAME	J.Andersen	K.Coyne	W.Cook	W.Reckley
DATE	6/5/17	6/1/17	6/1/17	5/31/17

OFFICIAL RECORD COPY

Differing Professional Opinion (DPO)
Regarding Two Emergency License Amendment Requests Related to Diesel Generator Allowed Outage Time
(DPO-2017-001 and DPO-2017-002)

DPO Panel Report

/RA/

_____

James Andersen, Panel Chair

Date: June 5, 2017

Introduction

Differing Professional Opinions (DPO-2017-001 and DPO-2017-002) were received on December 28, 2016, and January 9, 2017, respectively. The concerns involved two NRC staff approved emergency license amendments for Palo Verde Unit 3 related to a failed diesel generator (DG). The first was approved on December 23, 2016, and the second was approved on January 4, 2017. A memorandum from the Senior Differing Professional Views Program Manager, Office of Enforcement, establishing the DPO Panel was issued on January 19, 2017. The memorandum tasked the DPO Panel to conduct a review of the issues, maintain the scope within those identified by the original written DPOs, provide monthly status reports, and issue a report. The DPO Panel established a concise statement of concerns (see below), however, due to the submitter's request, the DPO Panel did not formally interact with the submitter or gain the submitters approval for the statement of concerns. During the course of the review, the DPO Panel conducted NRC document reviews and interviewed key staff members who were involved in the approval of the emergency license amendments.

Statement of Concerns

Based on a review of the two DPO packages, the following concerns as expressed by the submitter were identified by the DPO Panel:

1. The license amendment used a two-step process with a shorter duration deterministically-based initial licensee amendment request (LAR) used to provide time for the licensee to develop a risk-informed longer duration follow-up LAR. The initial LAR was approved by the NRC with full knowledge that the licensee would not complete the necessary repairs within 21 days.

2. The use of the emergency provisions of 10 CFR 50.91(a)(5) for the license amendment review process bypassed public and Commission involvement even though some engagement with the Commission and public was possible.

3. The circumstances at Palo Verde did not meet emergency license amendment criteria of 10 CFR 50.91(a)(5) because the licensee could have avoided the emergency situation.

4. Safety margins were not maintained due to inappropriate compensatory measures being credited, routine maintenance and surveillances on other equipment inappropriately being extended, and operator actions that cannot be accomplished consistent with the accident analyses. Specific issues included the following:

    - Manual actions were credited (e.g., use of manual start of FLEX DGs) that could not be accomplished in a time frame consistent with the accident analysis
    - Compensatory measures focused primarily on loss of offsite power (LOOP) events rather than a full spectrum of design basis events
    - Compensatory and risk management actions specified in the LAR were already mandated by technical specifications (TS) and should not have been credited with providing additional margin
    - The potential for common cause failure (CCF) was not ruled out before the first LAR was approved
    - An excessively long allowed outage times (AOT) precludes performance of routine maintenance and standard TS surveillance for the operable train

- TS allowances for increasing surveillance frequencies by 25% were not intended to support repair of a failed safety-related structure, system, or component (SSC)

5. The license amendment was approved contrary to internal NRC guidance on the maximum AOT for DGs. In particular, the LARs were approved contrary to staff guidance (Standard Review Plan (SRP), Branch Technical Position 8-8 (BTP 8-8)) that would preclude extensions of DG AOTs beyond 14 days. Additionally, the NRC has no guidelines for establishing maximum AOT limits.

6. Inappropriate assumptions were made with respect to the safety evaluation (SE) including the elimination of consideration of a single failure on the operable train despite the long allowed completion time (62 days vice the initial TS time of 10 days) and exclusion of certain design basis events due to low likelihood (e.g., loss of coolant accident (LOCA), LOOP).

The DPO Panel also identified three issues that were considered too general in nature for DPO Panel review and/or involve potential misconduct or mismanagement of NRC programs. The DPO Panel was advised by the DPO Program Manager that both DPOs were provided to the Office of Inspector General. The three issues identified were:

1. The NRC was more focused on financial considerations than safety.
2. The NRC's inspection program is ineffective at identifying risk-important issues.
3. The NRC's inspection program relies on a high level of inspector knowledge and the NRC training programs are not effective in providing that to new inspectors and staff.

Evaluation of Concerns

Concern 1:

The license amendment used a two-step process with a shorter duration deterministically-based initial LAR used to provide time for the licensee to develop a risk-informed longer duration follow-up LAR. The initial LAR was approved by the NRC with full knowledge that the licensee would not complete the necessary repairs within 21 days.

Conclusions and Discussion:

Amendment 199 to the Renewed Facility Operating License for Palo Verde Nuclear Generating Station (PVNGS), Unit 3 dated December 23, 2016, extended the Completion Time (CT) for Required Action B.4, "Restore DG to Operable Status," for Limiting Condition for Operation (LCO) 3.8.1, "AC Sources – Operating," for the Train B DG from 10 days to 21 days. The extension was reflected in the TS by adding the following note to the CT column for Action B.4:

> For the Unit 3 Train B DG failure on December 15, 2016, restore the inoperable DG to OPERABLE status within 21 days

The LAR dated December 21, 2016, described the circumstances associated with the amendment request as follows:

> To complete repairs and testing of the DG, it is expected that additional time beyond the 21-day extended AOT will be needed. After establishing the cause of failure and confirmation that a common mode failure does not affect the Unit 3

> train A DG, a risk-informed license amendment request will be submitted for the duration of the repair of the U3 [Unit 3] train B DG.
>
> APS [Arizona Public Service Company] requests approval of the LAR on an emergency basis prior to the expiration of the current 10 day completion time, which expires at 3:56 am, December 25, 2016. APS will implement the TS amendment immediately following NRC approval. Absent approval, PVNGS, Unit 3 would be required to begin shutdown, pursuant to TS 3.8.1, Condition H.

The licensee completed assessments and submitted a second LAR on December 30, 2016, to further extend the CT and allow repairs to the damaged DG. The NRC issued Amendment 200 to the Renewed Facility Operating License for PVNGS, Unit 3 on January 4, 2017, inserting the following note to the CT column for Action B.4:

> For the Unit 3 Train B DG failure on December 15, 2016, restore the inoperable DG to OPERABLE status within 62 days

The DPO Panel noted an extenuating circumstance associated with the DG failure and related LARs was that they occurred in late December 2016, a time period during which availability of NRC staff can be limited. The sequence of events in relation to the DG failure, amendments, and the holiday season is shown below (note amendment is abbreviated Amd):

Sun	Mon	Tues	Wed	Thur	Fri	Sat
11 Dec	12	13	14	15 **DG Failure**	16	17
18	19	20	21 LAR # 1	22	23 Amd # 199	24
25 CT w/o Amd	26 HOLIDAY	27	28	29 Telecon	30 LAR # 2	31
1 Jan	2 HOLIDAY	3	4 Amd # 200	5 CT - Amd 199	6	7

Figure 1

The DPO Panel discussed with the NRC staff involved with the amendments the sequence of events and interactions between the staff and licensee. Based on those interactions, it is the DPO Panel's understanding that the licensee's decision to address the DG failure by using two LARs was based on the interactions with the staff. The approach was developed in recognition that it would be challenging for the NRC staff to complete a risk-informed LAR within the remaining five days of the 10-day AOT and thus avoid a plant shutdown on December 25, 2016. A particular concern the staff shared with the licensee involved the NRC's ability to review and complete within the time available a risk-informed licensing action prepared and reviewed in accordance with Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decision-Making: Technical Specifications." Office of Nuclear Reactor Regulation (NRR) procedure LIC-101, "License Amendment Review Procedures," Section 7.2.1 specifically states the Division of Risk Assessment, PRA Licensing Branch (APLA) staff evaluation

of a licensee's probabilistic risk assessment (PRA) per RG 1.177 three tiered review process cannot generally be completed under the time constraints of an emergency amendment request. The resultant two-step approach involved the submittal and NRC review of a first request following deterministic approaches and a second request based on the risk-informed aspects of the decision-making process described in RG 1.177. During review discussions with the staff, the staff noted that ongoing activities such as TS Initiative 4b, "Flexible Completion Times," could reduce the need for amendment requests under emergency circumstances and had it been in place for Palo Verde would have likely obviated the need for the two-step approach. The DPO Panel understands the fact that the NRC staff was reviewing an amendment request for Palo Verde to adopt Initiative 4b was fortuitous in this case because relevant information about the licensee's PRA and the plant's risk profile was available to the staff in reviewing both amendments.

Although not necessarily a common practice, the DPO Panel found the handling of multiple related amendment requests from a licensee or the NRC staff issuing multiple licensing actions related to a single application does occur. Like the current example, the separation of licensing actions, either by a licensee or the NRC staff, usually occurs in response to issues related to schedule and resources. The practice of breaking down larger projects into more manageable tasks is a common practice in other NRC activities. The general ability of licensees or the NRC staff to integrate or separate activities where useful to reach desired outcomes was not identified as an issue during the DPO Panel's discussion with the staff involved with the amendments. If the staff's assessment of the lessons learned from the Palo Verde emergency amendment finds that the practice of splitting or combining license amendment requests is a more frequent occurrence, additional guidance should be provided in LIC-101 or other appropriate office instruction. **[Observation #1]**

The staff's Federal Register notice and SE for Amendment 199 do not mention the planned submittal of the second LAR and need for more than 21 days to complete repairs. The DPO Panel discussed this concern with the staff involved with the amendment. Based on that discussion, the staff indicated that the language in documentation of Amendment 199 reflects an emphasis on the fact that each LAR was to be reviewed and decided upon based on the merits for each requested extension. The two-step approach and use of the added time afforded by Amendment 199 to perform assessments and prepare a second LAR was described in the licensee's submittals and in the staff's documentation related to Amendment 200. However, the DPO Panel noted that the staff's thought process for a two-step approach could have been made clearer in Amendment 199 in the interest of transparently providing a complete record of the staff's decision basis to the public, particularly in the case of emergency circumstances where public interaction is limited. **[Observation #2]**

Based on the discussions with staff and review of related documents, the DPO Panel finds that the two-step approach is an appropriate solution to the problems introduced by the unplanned need for a license amendment and the need for prompt agency response to the requests. However, the DPO Panel is not unanimous in concluding that this particular application was appropriate or that the staff's decision basis for the two-step process was adequately documented.

Concern 2:

The use of the emergency provisions of 10 CFR 50.91(a)(5) for the license amendment review process bypassed public and Commission involvement even though some engagement with the Commission and public was possible.

Conclusions and Discussion:

The DPO Panel reviewed the regulatory requirements and staff guidance related to this concern and found that the processing of a typical license amendment includes the publication of a notice in the Federal Register. The notice announces the public's opportunity to request a hearing on the proposed change to a facility's operating license, including a plant's TS. A hearing, if requested, may be held after the NRC's issuance of the change to the license if the staff has determined that the amendment involves no significant hazard consideration as defined in 10 CFR 50.92, "Issuance of amendment." The notice for a typical amendment request therefore also provides an opportunity for the public to comment on the staff's no significant hazards consideration determination.

10 CFR 50.91, "Notice for public comment; State consultation," includes the following provision for issuing amendments under emergency situations:

> (a)(5) Where the Commission finds that an emergency situation exists, in that failure to act in a timely way would result in derating or shutdown of a nuclear power plant, or in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level, it may issue a license amendment involving no significant hazards consideration without prior notice and opportunity for a hearing or for public comment. In such a situation, the Commission will not publish a notice of proposed determination on no significant hazards consideration, but will publish a notice of issuance under § 2.106 of this chapter, providing for opportunity for a hearing and for public comment after issuance. The Commission expects its licensees to apply for license amendments in timely fashion. It will decline to dispense with notice and comment on the determination of no significant hazards consideration if it determines that the licensee has abused the emergency provision by failing to make timely application for the amendment and thus itself creating the emergency. Whenever an emergency situation exists, a licensee requesting an amendment must explain why this emergency situation occurred and why it could not avoid this situation, and the Commission will assess the licensee's reasons for failing to file an application sufficiently in advance of that event.

10 CFR 50.91(a)(6) addresses situations where the Commission must act quickly and that time allows for a shortened comment period but does not permit the typical Federal Register notice and 30 days for prior public comment. These are referred to as exigent circumstances. In such cases, the staff can issue a Federal Register notice with an abbreviated comment period or can use local media to provide notice to the public about the amendment and no significant hazards consideration determination. LIC-101 provides additional information and guidance related to processing amendment requests under exigent circumstances. LIC-101 notes that internal procedures, processing of documents in Agencywide Documents Access and Management System (ADAMS), and arranging publication of a notice in local media typically requires a period of seven working days from the receipt of a LAR to issuance of the amendment for an effective processing of an amendment using the exigent provisions of 10 CFR 50.91(a)(6).

The DPO Panel believes the conditions associated with Palo Verde Unit 3 met the criterion for a failure to act in a timely way resulting in a derating or shutdown of a nuclear power plant. The staff appropriately prepared and published with Amendment 199 the final no significant hazards consideration determination, thereby satisfying the second criterion defined for use of the emergency provisions of 10 CFR 50.91. The DPO Panel believes there was insufficient time for Amendment 199 to use the noticing process for exigent circumstances. It is the DPO Panel's understanding that the staff explored the possible processing of the second LAR using the exigent provisions but limitations for both the NRC and media outlets were not supportive of that option. The issued Federal Register notices announced the opportunity for the public to request a hearing on the issued amendments. No requests for hearings were received.[1]

Another concern identified in the DPO relates to the communications within the NRC, including with the Commission, about the amendments. The DPO Panel discussed internal agency communications with the staff involved with the amendment. The nature of the emergency amendments and failure of the Palo Verde DG resulted in communications within NRR and between NRR and offices such as Region IV and the Office of the General Council. The failure of the DG was itself the subject of an event notification and declaration of an Alert at the time of the failure on December 15, 2016. The DPO Panel notes that such notices and emergency declarations are brought to the attention of senior management and the Commission. The subsequent issuance of the amendments using the provisions for emergency situations was likewise discussed with senior managers and Commission staff. The communications with senior managers and the Commission included a Note to Commissioners' Assistants issued on December 28, 2016.

The DPO Panel also explored whether the process would have been better served by treating a teleconference on December 29, 2016, between the NRC and licensee as a public meeting and whether less formal NRC communication tools such as web postings, blogs, emails, or social media could have been used. For example, a notice could have likely been posted on the NRC's public meeting notification system one or two days ahead of the teleconference to inform the public of an opportunity to listen to the teleconference. However, the DPO Panel notes that while it may have been possible for the staff to make information available to the public about the teleconference and invite participation, the staff's decision not to do so is consistent with agency policy that includes balancing the NRC's objective of openness and the public's interest in attending or participating in NRC meetings against the need for NRC staff to exercise its regulatory and safety responsibilities without undue administrative burden. The DPO Panel notes that the staff did issue a summary of the teleconference to provide the agency and public with a record of the interaction. The staff also considered the use of the informal communication tools available to make information available to the public. The use of such tools involves a degree of judgment based on public interest and other factors. There are no indications in terms of public feedback that call into question the staff's decisions to use only the required systems of public notifications. As discussed in the NRC's Strategic Plan, the NRC considers public involvement in, and information about, its activities to be a cornerstone of strong, fair regulation of the nuclear industry. Therefore, the DPO Panel observes that there may be opportunities to more effectively communicate with the public, including the use of less formal communications tools, during emergency LARs, and suggests that guidance and training be considered in this area**. [Observation #3]**

[1] Although no requests for a hearing or inquiries were received from the public, two NRC staff members expressed concerns. One through the DPO process and another through the process defined in 10 CFR 2.206, "Requests for action under this subpart."

Based on the discussions with staff and review of related documents, the DPO Panel finds that the processing of the amendments using the emergency provisions of 10 CFR 50.91 was appropriate and necessary. The event and related staff actions were appropriately communicated within the agency, including with the Commission, and reasonable decisions were made regarding communications with the public.

Concern 3:

The circumstances at Palo Verde did not meet emergency license amendment criteria of 10 CFR 50.91(a)(5) because the licensee could have avoided the emergency situation.

Conclusions and Discussion:

The DPO Panel reviewed the regulatory requirements and staff guidance related to this concern and found that the use of the emergency provisions of 10 CFR 50.91 can be denied if the NRC determines that the licensee has abused the emergency provision by failing to make timely application for the amendment and thus itself created the emergency. The DPO Panel notes that whenever an emergency situation exists, a licensee requesting an amendment must explain why this emergency situation occurred and why it could not avoid this situation, and the staff will assess the licensee's reasons for failing to file an application sufficiently in advance of that event. In the case at hand, the Unit 3 DG had a catastrophic failure on December 15, 2016, and the licensee immediately entered into the required TS actions, which included a requirement to restore the DG to operable status or shut down the plant within 10 days. The DPO Panel understands that the licensee immediately undertook repairs, performed assessments, and initiated discussions with the NRC staff regarding regulatory options.

The DPO Panel notes that a possible consideration in deciding on the issuance of notices of enforcement discretion or emergency license amendments is whether a licensee's actions unreasonably contributed to the emergency condition. In the case of the Palo Verde Unit 3 DG, a previous repair of the DG was found to be a contributing factor to the catastrophic failure in December 2016. The licensee event report (LER) for the event includes the following explanation:

> In 1986, the 3B DG experienced a significant mechanical failure of the #9 master rod during pre-operational testing. A manufacturing process flaw was identified as the root cause of the PVNGS 1986 master rod failure. The articulated rod pin bore on the #9 master rod was initially oversized during manufacturer machining and repaired by the manufacturer using an iron-plating process. The electroplated iron was more brittle than the base material and was found dis-bonded in some locations during the root cause investigation. A fatigue crack originated near the center oil hole of the articulated rod pin bore and propagated through the ligament into the crank pin bore of the master connecting rod precipitating the master connecting rod failure. This high cycle fatigue failure occurred after approximately 100 hours of engine runtime. There was engine centerframe and block damage which was repaired in situ, and damaged parts were replaced, as necessary. However, the engine repairs in 1986 did not include crankshaft main bore alignment checks.

> As a corrective action and in addition to replacement of the failed #9 master rod in 1986, the 3B DG #2 master rod was also replaced during the engine repair as it had received an iron-plating repair. A 10 CFR Part 21 report was issued to the NRC documented under letter ANPP-40058, dated February 9, 1987, for the flawed manufacturer's connecting rod iron-plating repair process. Subsequent inspection of the other five PVNGS DGs identified that the #9 master rod in the Unit 2 "A" train DG also had an iron-plating repair, which was replaced in 1987. This issue of iron-plating repairs performed during connecting rod manufacturing was addressed for all PVNGS DGs and did not contribute to the 3B DG 2016 failure.

The LER describes the cause of the December 2016 failure as follows:

> The direct cause of this event was high cycle fatigue of the #9 master rod ligament. The preliminary cause analysis determined the 3B DG had a misaligned crankshaft bore that resulted from a previous failure of the 3B DG that occurred in 1986. The misalignment of the crankshaft bore resulted in sufficient cyclic stresses at the #9 master rod ligament to initiate and propagate a fatigue crack. Refer to Attachment 1 for a figure of the master rod configuration and the location of the ligament crack.
>
> Evidence indicates the 3B DG crankshaft bore misalignment was due to the previous 1986 connecting rod failure and subsequent repair, which did not include a check of the crankshaft main bore alignment. The other five DGs at PVNGS have not had a connecting rod failure or any other mechanical event that could have introduced such misalignment. Therefore, the failure mechanisms that caused the 1986 and 2016 3B DG failures are not present in the 3A DG or any other PVNGS DG.

The DPO Panel discussed the history of the Palo Verde Unit 3 DG and apparent cause of the catastrophic failure with the staff involved with the review and issuance of Amendments 199 and 200. The staff was well aware of the above information as well as surveillance data on the DG prior to its failure. The staff stated they considered the available information and concluded that the licensee had followed vendor recommendations and that successful operation of the DG for the last 30 years was sufficient to justify considering the LAR under the emergency provisions of 10 CFR 50.91(a)(5).

NRC Region IV performed a special inspection at Palo Verde to further investigate potential generic implications for the industry and determine whether plant operators' response to the event was appropriate.[2] The inspection report concluded:

> The team determined the licensee's programs for maintenance, testing, and performance monitoring of the emergency diesel generators were appropriate, met applicable regulatory requirements, and did not contribute to this failure. The team determined that the licensee's root cause assessment reached appropriate conclusions based on factual data. The direct cause of the Emergency Diesel Generator 3B failure was a high cycle fatigue crack in the master rod ligament between the crankpin bore and articulated rod pin bore (see Attachment 3). The

[2] Palo Verde Nuclear Generating Station – NRC Special Inspection Report 05000528/2017008, 05000529/2017008 AND 05000530/2017008, dated April 10, 2017

crack initiated as fretting in areas between the master rod and the backside of the crankpin bearing and then propagated as a fatigue crack. The fretting in the master rod ligament was caused by a crankshaft bore that was out of alignment. At the time of the inspection, the most probable cause for the high cycle fatigue failure of the cylinder 9 master rod in Emergency Diesel Generator 3B on December 15, 2016, was centerframe main bore misalignment from a 1986 master connecting rod failure event. This condition was not detectable by normal manufacturing or in-service inspections and was not reasonably within the licensee's ability to foresee and prevent.

Based on the discussions with staff and review of related documents, the DPO Panel finds that the processing of the amendments using the emergency provisions of 10 CFR 50.91 was appropriate. The licensee did not abuse the emergency provision by failing to make timely applications for the amendments following the catastrophic failure on December 15, 2016, nor did the operating history of the Unit 3 "B" DG provide sufficient warning to initiate preventive actions by the licensee to preclude the need for the amendment.

Concern 4:

Safety margins were not maintained due to inappropriate compensatory measures being credited, routine maintenance and surveillances on other equipment inappropriately being extended, and operator actions that cannot be accomplished consistent with the accident analyses. Specific issues included the following:

a. Manual actions were credited (e.g., use of manual start of FLEX DGs) that could not be accomplished in a time frame consistent with the accident analysis
b. Compensatory measures focused primarily on LOOP events rather than a full spectrum of design basis events
c. Compensatory and risk management actions specified in the LAR were already mandated by TS and should not have been credited with providing additional margin
d. The potential for CCF was not ruled out before the first LAR was approved
e. An excessively long AOT precludes performance of routine maintenance and standard TS surveillance for the operable train
f. TS allowances for increasing surveillance frequencies by 25% were not intended to support repair of a failed SSC

Conclusions and Discussion:

The DPO Panel reviewed the regulatory requirements and staff guidance related to this concern and identified the following:

a. <u>Manual actions were credited that could not be accomplished in a timeframe consistent with accident analysis</u>

   As discussed in the DPO Panel's review of Concern #6, it is not required to apply an additional single failure to the design basis accident analyses while operating under a TS CT. Therefore, the DPO Panel concluded that all design basis accident analysis

requirements continued to be met using the operable Unit 3A DG[3] without the need to credit additional manual actions. However, in order to ensure that an adequate level of defense in depth exists, Palo Verde identified additional manual actions for both Amendment 199 and 200.

For Amendment 199, the licensee identified two manual actions associated with existing FLEX equipment:

- Manual start and alignment of three portable DGs to provide additional capability to bring Unit 3 to cold shutdown in the event of a LOOP coincident with a single failure during the 3B DG completion time. This manual action is intended to provide an equivalent level of defense-in-depth as provided by the station blackout generators (SBOGs). The portable generators were used since the two SBOGs (which are shared among the three Palo Verde units) could not be credited to support safe plant shutdown of Unit 3 based on BTP 8-8 guidance. Per the Palo Verde station blackout coping strategy, a SBOG must be started and connected to provide an alternate AC power source within the first hour following a loss of power. Although a specific task analysis was not included in the LAR, as a result of a staff request for additional information related to the ability to align the portable DGs within the required time frame of one hour, the licensee identified a formal regulatory commitment to place a dedicated auxiliary operator with no other assigned duties on shift to start the portable generators and monitor their operation.

- Manual start and alignment of the diesel-driven FLEX steam generator (SG) makeup pump to mitigate a loss of auxiliary feedwater (AF) coincident with a LOOP event. Neither the LAR nor the staff's SE for Amendment 199 specified a timeframe for completion of this action, but the staff's evaluation did note that FLEX strategies were reviewed in response to EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events." The licensee also noted the ability to cross connect AF with the fire protection (FP) system, but this capability was not discussed or evaluated in detail for Amendment 199.

In their application for Amendment 199, the licensee stated that these compensatory measures were not credited in the PRA and therefore were not needed to demonstrate that the increase in risk associated with a 21 day completion time was acceptable.

To support the formal risk-informed review process for Amendment 200, the licensee included the above manual actions, but refined the timing requirements for connection of the portable DGs and included additional actions associated with FP and cross connection of AF to the FP system. The additional timing requirements and actions for Amendment 200 included the following:

- Manual start and alignment of the three portable DGs to a safety-related bus which has lost power in approximately 30 minutes. The timing requirement for this action is driven by the need to restore AF following a station blackout (SBO). The task analysis included the time required for the operators to determine that the SBOGs

[3] Both Amendment 199 and 200 contained a formal regulatory commitment for the licensee to verify the operability of the 3A DG (along with all of its required systems, subsystems, trains, components, and devices) as required by TS and to perform no discretionary maintenance activities on the 3A DG.

have failed to start and restoration of power to an AF pump via the portable generators. The time needed to start and load the portable DGs was reduced by (1) use of a dedicated auxiliary operator, and (2) maintaining the portable DGs in a warm standby status to facilitate a fast start.

- Cross-connection of FP system and AF system. This action aligns any one of three 100 percent capacity firewater pumps (one electric-driven and two diesel-driven) to provide low pressure SG makeup. The time requirement for this action is within 75 minutes of a loss of all feedwater event based on best-estimate thermal-hydraulic analysis. The time window is based on a partial LOOP, which allows the reactor coolant pumps (RCPs) to continue to operate (which in turn, increases the heating of the reactor coolant system). The licensee stated that for a complete LOOP, the tripping of the RCPs extends the time requirement to 126 minutes. The licensee demonstrated the feasibility of completing this action in the 75 minute time frame based on a task analysis and human reliability analysis.

- Posting of a continuous fire watch (with a fire extinguisher) in fire zone FCCOR2 (120' Corridor Building) to improve the fire detection and response time for this plant area.

The DPO Panel concluded that the times to implement these manual actions were adequately reviewed by the staff and were reasonable based on the system requirements defined by the PRA and the supporting formal regulatory commitments identified in the associated amendments (e.g., use of a dedicated auxiliary operator, deployment of FLEX equipment).

The DPO Panel notes that design basis accident requirements could not be met if a single failure is assumed during the 3B DG CT (e.g., in the event of a failure of the 3A DG, the portable diesels could not be aligned in time to meet LOCA accident analysis assumptions during a LOOP). However, as discussed under Concern #6, single failure considerations are temporarily relaxed while operating under a TS AOT; therefore, the DPO Panel concluded that it is not necessary to demonstrate that manual actions associated with defense-in-depth considerations be accomplished in the same time frame required of the normal Class 1E onsite power system for design basis accidents. (The topic of design basis accident considerations, defense-in-depth, and staff consistency is further discussed under Concern #5 and #6)

b. <u>Compensatory measures focused on LOOP events rather than a full spectrum of design basis events</u>

The DPO Panel reviewed the formal regulatory commitments and license conditions identified in Amendment 199 and 200. In Amendment 199, the licensee committed to a number of compensatory measures:

- Suspension of discretionary maintenance on the Unit 3 main and unit auxiliary transformers, SBOGs, startup transformers, Salt River Project switchyard or Unit 3's 13.8 kV power supply lines and transformers
- Dispatch of a local operator at the SBOG should a severe weather warning be issued for the local area that could affect the Salt River Project switchyard or the offsite power supply
- Prohibition against using the SBOGs for non-safety functions (power-peaking)

- Deployment of the three AC portable DGs at Unit 3, including connection to the train 'B' FLEX 4.16 kV AC connection box
- Deployment of the diesel driven FLEX makeup pump at Unit 3
- Assessment and management of all maintenance activities per 10 CFR 50.65(a)(4) and control such that a YELLOW risk management action level is voluntarily entered
- Control and approval of transient combustibles and hot work for Unit 3 by the Outage Control Center
- Protection of the steam driven emergency feedwater pump

Amendment 200 included similar compensatory measures as Amendment 199, but included an additional license condition to protect the following equipment with signage and chains for the duration of the extended CT:

- Both SBOGs
- Unit 3 train A DG
- Train 'A' engineered safety features switchgear, DC equipment, and DC battery rooms
- Three AC portable DGs deployed at Unit 3 and their connections to the train 'B' FLEX 4.16 kV AC connection box
- Diesel driven FLEX makeup pump deployed at Unit 3
- Turbine driven AF pump
- Fire pumps, diesel and electric

The license condition for Amendment 200 also required that if any of the above equipment became unavailable, the licensee would shut down the Unit and enter Mode 3 within 6 hours. The licensee also made several additional formal regulatory commitments in Amendment 200, including:

- Establishment of transient combustible and hot work exclusion zones
- Continuous fire watch in fire zone FCCOR2
- Addition of a dedicated auxiliary operator to implement the AF cross tie and support operation of the portable DGs.

Although the DPO Panel agrees that many of the compensatory actions associated with Amendments 199 and 200 were associated with minimizing the potential of a LOOP or mitigating a LOOP should one occur, these actions would also help to maintain AC power during other design basis events. Additionally, other compensatory measures were intended to minimize fire risk or enhance the reliability of providing alternate means of feedwater to the SGs. It is not unexpected that compensatory measures associated with a failed onsite emergency AC power source would focus on loss of power initiating events, and the DPO Panel concluded that the licensee identified and implemented reasonable compensatory measures to mitigate loss of power events. In addition, the DPO Panel also concluded that compensatory measures included consideration of risk significant events identified through PRA, including certain fire scenarios and reliability of AF. Therefore, the DPO Panel concluded that the identified compensatory measures were not narrowly focused on LOOP events and included a number of risk significant actions consistent with PRA insights.

c. <u>Compensatory and risk management actions were already mandated by TS</u>

In reviewing the Palo Verde TS, the DPO Panel did not identify any specific compensatory measures required for an out of service DG other than operability verifications for other AC

power supplies. The DPO Panel notes that the requirements of 10 CFR 50.65(a)(4) requires licensee to assess and manage the increased risk associated with maintenance activities, but these requirements are not prescriptive. Therefore, the DPO Panel did not find evidence to substantiate this concern.

d. Potential for CCF not ruled out before first LAR approved

The DPO Panel considered how the review process for Amendment 199 addressed the potential for CCF affecting the operable 3A DG in Palo Verde Unit 3. In the SER for Amendment 199, the staff noted:

> The completion time extension will allow for continued repairs and for the engineering team to perform the root cause investigation, understand the cause of the failure and evaluate the extent of condition. Following this analysis, a determination on the potential existence of a common mode failure will be made. The duration to collect and analyze data is not expected to exceed a total of 21 days.

Based on this statement and interviews with NRC staff, the DPO Panel agreed that the potential for CCF for DG A was not ruled out when Amendment 199 was issued. Although interviews conducted by the DPO Panel indicated the circumstances associated with the 3B DG failure were evaluated by the NRC staff in order to provide a level of assurance that the 3A DG was capable of performing its safety functions, the basis for the staff's conclusion in this regard was not documented in the associated SE. Specifically, the SE stated only that the "train A DG, SBOGs, and the portable DGs are all of diverse design, thus reducing the potential for common mode failures." Although the DPO Panel agreed with the conclusion that the SBOGs and the portable DGs were of diverse design, the 3A DG is of identical design to the failed 3B DG. Therefore, the focus of the SE appeared to be the potential for CCF among the three remaining power sources (i.e., the FLEX portable diesels, the SBOGs and the 3A DG), rather than the potential for the failure cause for the 3B DG to propagate to the 3A DG. However, in response to staff request for additional information, the licensee stated in a supplemental letter dated December 23, 2016 (ML16358A715), that if causal analysis determined that a common mode failure existed in the redundant Unit 3A DG, then TS actions for two inoperable DGs would be followed. Although this information addressed the potential for the 3A DG to be impacted by the same failure cause as the 3B DG, the DPO Panel noted that no license condition or formal regulatory commitment was placed on Amendment 199 to enforce this consideration. In contrast, Amendment 200, which was issued after the licensee completed significant follow-up to the 3B DG failure, included a specific license condition to shut down Unit 3 if a common mode failure existed. During interviews, the staff was not able to provide a sufficient basis as to why a similar condition was not included with Amendment 199. **[Observation #4]**

It was also not clear to the DPO Panel how the increased potential for CCF of the redundant onsite Class 1E power supply was accounted for in establishing the 21 day completion time[4] for Amendment 199. The LAR for Amendment 199 stated that the "common cause failure probability term for both DGs failing to run was adjusted from its nominal value to the alpha common cause factor (i.e., an increase in probability of 7.6)." However, the licensee did not specifically describe how this increase of 7.6 was applied to the PRA to determine if CCF was addressed in a manner consistent RG 1.177 guidance. Although, the incremental

[4] The DPO Panel noted that the 21 day CT time exceeds the guidance contained in BTP 8-8 – this issue is discussed under Concern #5.

conditional core damage frequency (ICCDF) reported by the licensee in the LAR for Amendment 199 appeared to be consistent with a completion of up to 26 days[5], the LAR did not provide either a risk-informed or deterministic basis for the requested completion time. Additionally, the total baseline core damage frequency reported by the licensee in the subsequent Amendment 200 was approximately 10% higher than what was reported in Amendment 199 (6.2E-5/ry vice 5.7E-5/ry), which could indicate that PRA information used to support a 21 day completion time for Amendment 199 was non-conservative. Based on interviews with the NRC staff and review of the SE, the DPO Panel determined that the staff did not perform a detailed review of the PRA information supporting Amendment 199 and did not have a consensus position on the technical basis of the 21 day CT. This highlighted an issue raised in several interviews conducted by the DPO Panel that guidance for the review and approval of LARs that reference risk information but are not formal risk-informed licensing submittals under the RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," process could be enhanced. Additionally, the DPO Panel observed that the SE lacked sufficient documentation to objectively identify the staff's decision basis in several key areas, including how the potential for CCF of the 3A DG was evaluated and the basis for a 21 day CT. **[Observation #5]**

e. Excessively AOT precludes performance of routine maintenance and surveillances on operable train

The SE for Amendment 200 noted the following with regard to surveillance testing:

> The licensee stated that surveillance tests conducted during the 62-day period that will cause the tested equipment to be inoperable can be completed within the specified 4-hour CT specified by TS 3.8.1.8.2. The testing elements that require this equipment to be declared inoperable during testing relate to use of temporary testing instruments or valve alignments that can be quickly restored, if needed.

Although the limited time that routine surveillance would render tested equipment inoperable would mitigate the risk impact of these activities, the DPO Panel agreed that extended operation under an excessively long AOT could, in general, limit the ability of the licensee to complete planned maintenance and required surveillances. However, this condition, in and of itself, may not constitute a regulatory issue provided TS requirements can continue to be met.

The DPO Panel also reviewed the PRA basis for Amendment 200 and noted that the PRA results were based on a zero test and maintenance assumption (i.e., no equipment other than the failed 3B DG was assumed to be unavailable). In the SE, the NRC staff concluded that the use of an average test and maintenance unavailability was conservative in light of controls being taken by the licensee to eliminate unavailability of equipment for planned maintenance, in addition to the low likelihood of corrective maintenance occurring during the 62-day repair period. However, the DPO Panel noted that the formal regulatory commitments for Amendment 200 only precluded voluntary entry into a YELLOW Risk Management Action Level, rather than a prohibition of all planned maintenance. Given the minimal margin that existed between the risk increase associated with the 62 day CT and

[5] The licensee reported an ICCDF of 1.4E-04/reactor year. Based on the RG 1.177 acceptance guideline of 1E-05 (with compensatory measures), this ICCDF translates to a risk-informed CT of 26 days.

the RG 1.177 acceptance guidelines[6], voluntary maintenance, even with a risk level below the YELLOW action level, might result in a risk condition that exceeds RG 1.177 acceptance guidelines. The licensee did conduct a sensitivity study using an average test and maintenance model, which would be more consistent with the regulatory commitment to preclude voluntary entry into a YELLOW risk action level, but biased this study by combining it with credit for the portable DGs. Specifically, the sensitivity cases included the following results:

Sensitivity Case	ICCDP
Base Case (no credit for portable DGs and zero test and maintenance)	9.8E-06
Credit for the portable DGs using the zero test and maintenance model	2.7E-06
Credit for the portable DGs with an average test and maintenance model	6.7E-6

Although the combining of sensitivity cases in this manner makes interpretation of the uncertainty drivers more difficult, these results indicate that use of an average test and maintenance assumption could more than double the ICCDP compared to the base case. The DPO Panel notes that Section C.2.3.3.1 of RG 1.177 states that "[c]omponent unavailability models should include contributions from random failure, CCF, test downtime, and maintenance downtime." Therefore, the DPO Panel concluded that the use of a zero test and maintenance PRA model was not consistent with RG 1.177 guidance and the regulatory commitment put in place for Amendment 200 for the conduct of routine maintenance and surveillance was not consistent with PRA assumptions. Furthermore, the practice of biasing each sensitivity case by applying credit for the portable DGs[7] masks the sensitivity of the PRA results to potentially adverse risk drivers. **[Observation #6]**

The DPO Panel does agree with the underlying concern that operation under a TS CT does represent a degradation in the level of safety for the plant since surveillance intervals may be extended, preventative maintenance may be deferred, and single failure consideration for the accident analysis are temporarily relaxed. For short duration CTs, the reduction in safety is minimal and likely offset by the avoidance of the risk arising from unnecessary plant transients and shutdowns. However, very long CTs may allow a plant to operate for an extended time without the same level of safety normally afforded by the plant licensing basis. As further discussed under Concern #5 and highlighted as a DPO Panel recommendation, additional guidance should be evaluated with respect to defense-in-depth, the adequacy of long duration CTs (one-time AOT extensions), and whether there should be a backstop (maximum AOT) even with supporting risk information. **[Observation #7]**

f. <u>TS allowances for increasing surveillance frequencies by 25% were not intended to support repair of a failed SSC</u>

The DPO Panel reviewed the TS requirements for Palo Verde Unit 3 and noted that Surveillance Requirement (SR) 3.0.2 states that:

[6] The PRA for the 62 day CT resulted in an ICCDP of 9.8E-6. This represented only a margin of 2% to the RG 1.177 expanded acceptance guideline of 1E-5 (when compensatory measures are identified).
[7] The DPO Panel also notes that the NRC has not yet endorsed guidance for crediting FLEX equipment in PRAs.

> The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency as measured from the previous performance or as measured from the time a specified condition of the Frequency is met.

Many of the surveillance frequencies in the Palo Verde TS are controlled under a Surveillance Frequency Control Program and are not explicitly listed in the TS SR. However, TS 5.5.18, "Surveillance Frequency Control Program" notes that the provisions of SR 3.0.2 are applicable to the frequencies established in the Surveillance Frequency Control Program. The DPO Panel found no requirement that limited the conditions under which the extension of surveillance frequencies by 25% could be performed. Therefore, the DPO Panel concluded that the 25% surveillance frequency extension could be applied to support the repair of a failed SSC.

Concern 5:

The license amendment was approved contrary to internal NRC guidance on the maximum AOT for DGs. In particular, the LARs were approved contrary to staff guidance (BTP 8-8) that would preclude extensions of DG AOTs beyond 14 days. Additionally, the NRC has no guidelines for establishing maximum AOT limits.

Conclusions and Discussion:

The DPO Panel reviewed the regulatory requirements and guidance related to this concern and found that BTP 8-8 provides guidance for reviewing license amendment requests for one-time and permanent AOT extensions for the DGs and offsite power sources. Although not explicitly stated, the DPO Panel understands that this guidance is used by the Electrical Engineering Branch (EEEB) for both deterministic and risk-informed LAR reviews. Per BTP 8-8, extensions of AOTs for DGs and offsite power sources from the current AOT up to 14 days may be approved, provided the extended AOT is supported by additional compensatory measures and a risk evaluation. BTP 8-8 guidance also states that "more than 14 days <u>should not</u> be considered by the staff." Additionally, the guidance states that extended AOTs are allowed for pre-planned maintenance activities, but could be used for corrective maintenance on a limited basis, provided the licensee meets risk-informed criteria, related maintenance rule availability/reliability requirements, and compensatory measures outlined in the BTP 8-8 guidance.

Based upon DPO Panel interviews and examination of the Palo Verde Amendment 199 and 200 SEs and referenced precedent LARs and amendment SEs, the DPO Panel concluded that the BTP 8-8 guidance was <u>not</u> strictly adhered to for Amendments 199 and 200 by the staff. **[Observation #8]** This conclusion recognizes that SRP guidance is not a substitute for NRC regulations and compliance with the SRP is not required. However, the SRP does generally provide the staff with sufficient guidance to ensure a consistent methodology and standard by which to judge the adequacy of a licensee's submittal. Therefore, deviations from established guidance should be documented and include a basis.

DPO Panel interviews with staff involved with the review and approval of these two emergency LARs identified that the staff consensus opinion is that the BTP 8-8 (February 2012) guidance is "out-of-date" and that the 14-day AOT extension limit (or hard stop) is not applicable to one-time amendment requests, only to permanent amendment requests. The DPO Panel notes that BTP 8-8 (February 2012) as written, does not clearly support this staff interpretation, and in the

opinion of the DPO Panel, the guidance should be applied to both or be revised to reflect the above stated consensus view. Interviews revealed that deterministic based LARs for one-time AOT extensions of greater than 14 days, if not rejected for failure to satisfy deterministic criteria, are reviewed by APLA staff for extension time period acceptability. The DPO Panel concluded that the EEEB staff considered the adequacy of the first Palo Verde LAR AOT extension beyond 14 days (21 days requested and approved) to be dependent upon the licensee's supporting risk evaluation and the acceptance of that evaluation by the APLA staff. In contrast, DPO Panel interviews with the APLA staff determined that their review of the supporting risk evaluation in the LAR, as stated in Amendment 199 SE, "it is not a risk-informed LAR and a risk evaluation is not needed." This observation is supported by LIC-101 guidance (reference the Table and accompanying note on page 34 of 59) which states that the APLA staff review is limited, specifically it states that:

> APLA performs a cursory review of supplemental risk information and clarifies in the SE that risk information was not reviewed/approved. Per SRP 19.2, when the licensee' proposed change is consistent with the currently approved staff position, reviewers generally should reach their determination solely on the basis of traditional engineering analysis without recourse to risk information.

However, the DPO Panel found that the SE does state that the licensee's risk evaluation ICCDP and incremental conditional large early release probability (ICLERP) estimates are below the risk acceptance guidelines of RG 1.177. The DPO Panel confirmed that the SE for Amendment 199 did not include an independent verification of the licensee's risk evaluation using the NRC Palo Verde Standardized Plant Analysis Risk (SPAR) Model. The DPO Panel also confirmed that the licensee's supporting risk assessment was accepted in the SE without staff evaluation. **[Observation #9]**

DPO Panel comparison of the Amendment 199 and 200 SEs identified similarities and differences beyond the obvious deterministic based versus risk-informed LAR submittals. Both SEs provide a summary description (reference Section 3.0 "Technical Evaluation") of the PVNGS AC electrical system and SBO coping capabilities, as well as, the need for the proposed TS change and associated AOT extension durations. Neither SE included an EEEB staff discussion of the capability of the PVNGS AC electrical system to comply with a design basis LOOP event coincident with a LOCA and a worst case single failure (from a defense-in-depth perspective). Neither SE included a discussion by the APLA staff of an independent risk assessment using the NRC SPAR Model. The balance of the technical evaluations differ considerably in content and format as would be expected for a deterministic versus risk-informed submittal and review. However, the DPO Panel identified that Amendment 200 SE follows SRP Section 16.1 guidance and uses the five key principles format with the risk-informed three tiered review approach outlined in RG 1.177. The DPO Panel viewed this format and notes it is inconsistent with SRP 16.1 guidance, which states that SRP 16.1 and RGs 1.177 and 1.174 apply only to permanent (as opposed to temporary or "one-time") changes to TS requirements. **[Observation #10]**

While the previous paragraph SE format differences alone do not represent a significant concern with the adequacy of the staff's review, it is the DPO Panel's belief that they do demonstrate inconsistent implementation by the staff of available guidance and/or the absence of guidance for review of emergency LARs to ensure appropriately thorough and consist staff consideration of the licensee's request. The following additional DPO Panel observations support this conclusion:

- On May 30, 2015 (approximately 18 months prior to the subject LARs) the EEEB staff arrived at a different conclusion with respect to the BTP 8-8 14 day limit, and denied a DC Cook LAR for very similar emergency circumstances involving the failure of an emergency diesel generator (EDG). Specifically, on May 28, 2015, an emergency, one-time, risk-informed LAR was submitted for the DC Cook Unit 1 AB EDG crankshaft failure. On May 30, 2015, the NRC internally concluded the LAR should be denied and informed the licensee of their intentions. On June 1, 2015, the licensee withdrew the LAR. The DPO Panel reviewed the correspondence between Indiana Michigan Power Company and the NRC staff; and the July 8, 2015, non-public memorandum (reference ML15150A035) documenting the highlights of the staff's review leading to the licensee's decision to withdraw the emergency LAR. The DPO Panel notes that this memo is required per LIC-101, Section 6.3. The DPO Panel identified that unlike the Palo Verde review, the EEEB staff closely adhered to the BTP 8-8 guidance and denied the licensee's request based upon the conclusion that the licensee "would not be able to mitigate the consequences of a LOOP and LOCA with a single failure of the operable EDG during the proposed CT extension period." The DPO Panel noted that the current DC Cook TS single EDG out of service AOT is 14 days and the requested extension was for 65 days. The EEEB staff's deterministic review concluded that the proposed 51-day AOT extension "would result in an unacceptable decrease in the margin of safety and defense-in-depth, because a LOOP with a LOCA would lead to core damage without an adequate power supply." Similar to Palo Verde, DC Cook had implemented supplemental power sources and compensatory measures consistent with the BTP 8-8 guidance. The DPO Panel sees no discernable deterministic differences between the DC Cook request and the Palo Verde request. However, the staff appears to have arrived at different conclusions, based upon different interpretations of the deterministic guidance of BTP 8-8. **[Observation #11]**

- Another inconsistency identified by the DPO Panel, comparing the DC Cook and Palo Verde LARs, was the use of the SPAR Model by the APLA staff to independently verify the DC Cook risk evaluation. As documented in the DC Cook LAR withdrawal memo, the SPAR Model was used by the APLA staff to independently assess the increase in plant risk associated with the EDG AOT extension. As stated in the memo, the APLA staff concluded that the quality of the licensee's internal events PRA was sufficient to support the extended CT request. However, results of the SPAR Model internal events risk evaluation were calculated at 2.4E-5; higher than the RG 1.174 acceptance criteria of <1E-5 and higher than the licensee's submitted value. The licensee's internal events estimate was 4.9E-6, slightly below the 1E-5 threshold. Based upon the SPAR Model independently derived risk estimate and other APLA staff stated concerns with the DC Cook risk evaluation (CCF considerations and Configuration Risk Management Program concerns) the APLA staff concluded the LAR should not be approved. DPO Panel examination of the Palo Verde risk evaluation identified ICCDP and ICLERP values just below the RG 1.174 acceptance criteria. Notwithstanding the narrow margin to the acceptance criteria, no independent verification by the APLA staff using the Palo Verde SPAR model was documented. In the DPO Panel's opinion, the Palo Verde risk evaluation estimates warranted closer scrutiny. However, interviews of the APLA staff identified that there is no guidance for when to use the SPAR Model for independent verification and it appears to be at the discretion of the reviewer(s). **[Observation #12]**

- Palo Verde's first LAR (Amendment 199) referenced an LAR approved for Comanche Peak in 2015, as precedent for their request. The DPO Panel found no practical similarities with the Palo Verde LAR. In particular, the Comanche Peak LAR was not an

emergency amendment request, the AOT extension was for 14 days (not beyond the BTP 8-8 limit), and the requested change involved planned maintenance, not unplanned corrective maintenance. The improper referencing and/or use of "precedent" LAR by either a licensee or the NRC staff could cause the use of unnecessary resources. Further, LIC-101, Section 4.2 states that, "Decisions to not apply specific precedents, especially precedents cited by a licensee, should be clearly explained in the SE (to avoid the appearance of being arbitrary and/or inconsistent)." The DPO Panel observed that the SEs did not address the licensee's referenced precedents. **[Observation #13]**

- Palo Verde's second LAR (Amendment 200) referenced an LAR approved for South Texas Project (STP) in 2003, as precedent for their request. The DPO Panel found that the two-step LAR process used in 2003 by STP to be very similar in circumstance to the Palo Verde situation. Specifically, the STP LAR involved an emergency request and the failure of an EDG. The two-step approach was similarly needed by the licensee and staff in order to properly prepare, submit and review the needed LARs. However, the electrical plant of STP (three redundant trains) and Palo Verde (two trains) are notably different. In the STP Amendment SE, the EEEB staff specifically addressed the LOOP/LOCA with single failure design basis accident scenarios and the reduction in safety margin associated with postulated large break LOCAs.

  Statements from both Palo Verde SEs do not fully address this design basis consideration. Specifically, from Amendment 199, "The staff did not find **any** (emphasis added) adverse impact on continued compliance with these regulatory requirements [GDC 17, GDC 18, 10CFR50.36, etc.]. Therefore, the staff finds that reduction in margin of safety will be **minimal**." From Amendment 200, "The NRC staff finds that the above license conditions and commitments provide adequate risk management for the safety of the plant, and **enhance** the defense-in-depth aspects of the plant." The DPO Panel could not reconcile these statements with respect to LOOP/LOCA and single failure scenario consideration documented in the SEs for the CTs that were approved. The DPO Panel did identify a reference to large and medium break LOCA scenarios in both Palo Verde SEs in Section 2.0 "Regulatory Evaluation" that lists the regulatory guidance documents used by the staff. Under the reference for BTP 8-8, the staff makes a statement that more defense-in-depth is needed for SBO scenarios than LOCA scenarios because of a higher likelihood of occurrence. The DPO Panel review of BTP 8-8 found no such statement or reference to design basis accident likelihoods in the deterministic criteria of the guidance. **[Observation #14]**

- The DPO Panel determined from interviews that there is no established guidance for how APLA reviewers should judge the adequacy of risk evaluations provided, if needed, in support of deterministic AOT extension requests. **[Observation #15]** During the Palo Verde and NRC conference call of December 20, 2016, the staff discouraged the licensee's initial request to submit a risk-informed LAR because the APLA staff could not turnaround a thorough review product (per RG 1.177) in the remaining AOT (5 days remaining in a 10 day LCO). The staff's discouragement of the licensee's initial request was consistent with LIC-101, Section 7.2 guidance that states, "Evaluating the scope, level of detail, and technical adequacy (e.g., compliance with RG 1.200) of a PRA is a resource-intensive process that cannot generally be completed under the time constraints of an emergency amendment request." The DPO Panel concluded that LIC-101, BTP 8-8, and RG 1.177 guidance can be improved with respect to how the APLA staff should evaluate supporting risk assessments specified in BTP 8-8 for AOT extensions of 14 days or more. As documented above, interviews by the DPO Panel

identified a lack of clarity in the available review guidance and inconsistencies in understanding between the EEEB and APLA staffs on their responsibilities for review of these two emergency LARs. **[Observation #16]**

Concern 6:

Inappropriate assumptions were made with respect to the safety evaluation including the elimination of consideration of a single failure on the operable train despite the long allowed completion time (62 days vice the initial TS time of 10 days) and exclusion of certain design basis events due to low likelihood (e.g., LOCA, LOOP).

Conclusions and Discussion:

Regarding this concern, the DPO Panel reviewed Generic Letter (GL) 80-30, dated April 10, 1980. The GL states that:

> The NRC's Standard Technical Specifications (STS) were formulated to preserve the single failure criterion for systems that are relied upon in the safety analysis report. By and large, the single failure criterion is preserved by specifying Limiting Conditions for Operation (LCOs) that require all redundant components of safety related systems to be OPERABLE. When the required redundancy is not maintained, either due to equipment failure or maintenance outage, action is required, within a specified time, to change the operating mode of the plant to place it in a safe condition. The specified time to take action, usually called the equipment out-of-service time, is a temporary relaxation of the single failure criterion, which, consistent with overall system reliability considerations, provides a limited time to fix equipment or otherwise make it OPERABLE. If equipment can be returned to OPERABLE status within the specified time, plant shutdown is not required.

The DPO Panel also reviewed BTP 8.8, the purpose of which is to provide guidance from a deterministic perspective in reviewing one-time or permanent AOT extensions for emergency diesel generators. The BTP discusses the defense-in-depth aspects for onsite and offsite power sources and states that:

> A supplemental power source should be available as a backup to the inoperable EDG or offsite power source, to maintain the defense-in-depth design philosophy of the electrical system to meet its intended safety function. The supplemental source must have capacity to bring a unit to safe shutdown in case of a loss of offsite power (LOOP) concurrent with a single failure during plant operation.

In the SE for Amendment 199 (Section 3.4.1), the staff evaluated this defense-in-depth issue and determined that there were multiple diverse means of supplying electrical power to the safety buses to safety shutdown Unit 3 and maintain the plant in a cold shutdown condition. The SE also stated that the portable DGs have the capacity and capability to support the loads necessary to mitigate a LOOP event and bring the unit to cold shutdown in case of an extended LOOP concurrent with a single failure of the train A DG during plant operation. In the SE for Amendment 200 (Section 3.3.2.1), the staff came to the same conclusion.

Based on the above, the DPO Panel finds the staff's consideration of single failure during the extended outage period met the guidance in GL 80-30 and BTP 8.8 and was appropriate.

However, the DPO Panel believes additional guidance needs to be evaluated for reviewing long completion times. **[Observation #17]**

Regarding the exclusion of certain design basis events due to low likelihood, the DPO Panel found no evidence that the staff failed appropriately to consider low likelihood design basis events. As previously noted, it is not necessary to apply a single failure when operating under a TS LCO. Therefore, the Palo Verde 3A DG remained available to meet all design basis accident requirements. Furthermore, the PRA analysis supporting Amendment 200 considered a full spectrum of initiating events, including low likelihood events such as large break LOCAs.

Additional Discussion Based on Review of Documents:

Precedents

The DPO Panel notes that LIC-101 (page 17) discusses precedents and states:

> Decisions to not apply specific precedents, especially precedents cited by a licensee, should be clearly explained in the safety evaluation (to avoid the appearance of being arbitrary and/or inconsistent). The staff should assess any change in a prior staff position to ensure that the safety or regulatory issue is consistent with the NRC principles of good regulation (e.g., efficiency, clarity, and reliability).

Several precedents were used, or changed in the Palo Verde emergency LARs. Specifically:

- Multi-step licensing approach – should there be criteria for evaluating when a multi-step licensing approach should be used?
- Approach to long AOT extensions – is the precedent DC Cook, STP, or Palo Verde: or is it parts of each?
- Use of a risk-informed license amendment request (RG 1.177) for an emergency license amendment – does the staff have sufficient time to review or should there be criteria for when the staff would accept one?

The DPO Panel believes that a critical post-amendment lessons learned review should be conducted after significant or first of a kind licensing actions to determine if the action should be used as future precedent and/or whether there should be specific attributes identified that future staff should evaluate before using the precedent. **[Observation #18]**

Overall Conclusion:

The DPO Panel was not unanimous in concluding that Palo Verde License Amendments 199 and 200 should have been approved by the staff. The principle bases for some DPO Panel members concluding the license amendment requests (LARs) should not have been approved are discussed further under the DPO Panel's review of Concern #5 and involve the staff not strictly adhering to available guidance, not documenting the basis for the deviations from this guidance, and inconsistently applying the guidance based upon past staff approval or denial of similar LARs. The DPO Panel was unanimous in concluding that additional guidance is needed in several areas for reviewing emergency license amendment AOT extension requests for inoperable diesel generators, as well as guidance for deterministic license amendment requests

with supplemental risk information, how and whether precedents should be used, and how and whether independent verification using independent risk tools should be used.

Recommendations:

Based on the DPO Panel's review, the following recommendations are provided for consideration by NRR:

1. There may be opportunities to more effectively communicate with the public during emergency LARs, including the use of less formal communications tools. Suggest that guidance and training be considered in this area. [See Observations 2 and 3]

2. Due to inconsistent interpretations related to the BTP 8.8 guidance, this guidance should be evaluated to determine if the following issues require clarification: [See Observations 5, 8, 11, and 14]
    a. use of a 14 day backstop for deterministic evaluations
    b. applicability of the guidance to one-time and permanent CT extensions
    c. defense-in-depth consideration, particularly with respect to mitigating the consequences of a LOOP/LOCA with a single failure

3. It was not clear how the LIC-101 guidance discouraging resource intensive reviews of risk-informed LARs submitted under emergency circumstances was considered by the staff. Additional guidance appears to be warranted in this area. [See Observation 10]

4. Development of guidance should be evaluated for reviewing deterministic-based LARs with supplemental risk information provided (such as Amendment 199) to ensure these types of risk evaluations receive a minimally acceptable review for validity and consistency. [See Observations 9, 15, and 16]

5. Evaluation of whether a standardized method for using insights from independent risk tools (e.g., SPAR model) to support the review of LARs should be considered to ensure an objective, consistent and independent verification of the licensee's risk evaluation. [See Observation 12]

6. Additional guidance should be evaluated that would require a critical lessons learned review be conducted after first of kind licensing actions to determine, in part, whether this application and/or SE should be used going forward as a precedent. [See Observations 1, 8, 11, 13, and 18]

7. Additional guidance should be evaluated on the conduct of PRA sensitivity studies. [See Observation 6]

8. Due to inconsistent interpretations, guidance should be evaluated to determine if the following issues require clarification: [See Observations 7 and 17]
    a. acceptability of long duration CTs for one-time extensions
    b. maximum AOTs (i.e., a firm completion time backstop), even when supported with risk information, to limit the amount of time operation without single failure protection is permitted

Document 5: DPO Decision

June 28, 2017

MEMORANDUM TO: Troy Pruett, Director
Division of Reactor Projects
Region IV

FROM: William M. Dean, Director ***/RA/***
Office of Nuclear Reactor Regulation

SUBJECT: DIFFERING PROFESSIONAL OPINION REGARDING TWO EMERGENCY LICENSE AMENDMENT REQUESTS RELATED TO DIESEL GENERATOR ALLOWED OUTAGE TIME (DPO-2017-001 and DPO-2017-002)

On December 28, 2016, and January 9, 2017, in accordance with Management Directive 10.159, "The NRC Differing Professional Opinions Program," you submitted two differing professional opinions (DPO) regarding two emergency license amendment requests submitted by Palo Verde Nuclear Generating Station (PVNGS) that were approved by the U.S. Nuclear Regulatory Commission (NRC) related to diesel generator allowed outage time (DPO-2017-001 and DPO-2017-002). Specifically, your DPOs raised concerns that the approval of the emergency license amendments was inconsistent with the NRC Mission, NRC Vision, NRC Safety Objectives, NRC Effectiveness Strategies, NRC Openness Strategies, and the Principles of Good Regulation. The purpose of this memorandum is to respond to your DPO.

While I value your views regarding the emergency license amendments, I must respectfully disagree with the summary statement above. I not only believe the staff did the right thing from a safety perspective, but I also believe the approach used by the staff is a model for how we should continue to move forward with risk-informed decision making (RIDM). We have highlighted this to the staff as a major success in demonstrating our ability to use risk insights in conducting licensing activities. Not only was this the right action to take, it was outstanding safety work on the part of the staff. However, you identified several areas where our procedures and guidance documents are unclear or don't seem to support the actions taken by the NRC, and we will work to address those issues.

On January 19, 2017, a DPO Ad Hoc Review Panel (the Panel) was established and tasked to meet with you, review your DPO submittal, and issue a DPO report, including conclusions and recommendations to me regarding the disposition of the issues presented in your DPO. You

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opted not to meet with the Panel. On June 5, 2017, after reviewing the applicable documents, conducting internal interviews of relevant individuals and completing their deliberations, the Panel issued their report to me (Enclosure 1).

I also note that, as part of the Panel's deliberations, they made some observations in the report concerning a related *Title 10 of the Code of Federal Regulations* 2.206 petition regarding differences in how the staff treated a similar emergency license amendment request (LAR) from D.C. Cook in 2015. The Panel chairman also discussed this with me as a separate matter. The Panel incorrectly notes that the D.C. Cook emergency LAR was denied (the licensee withdrew the request prior to a formal action by the staff). While the staff had created a draft denial of the LAR, this had not received senior management review and thus did not reflect a formal agency position. That being said, there were notable differences between the D.C. Cook and the PVNGS emergency LARs. To help clarify this situation, I have enclosed a table highlighting several of these differences (Enclosure 2).

In order to make a decision with regard to your DPO, I reviewed your DPO submittal, the Panel's report, and met with the Panel Chairman.

What follows is a summary of the Panel's findings, recommendations, and my decision.

Statement of Concern

Based on a review of the DPO package, the following concerns were summarized by the Panel as your concerns:

1. The license amendment used a two-step process with a shorter duration deterministically-based initial licensee amendment request (LAR) used to provide time for the licensee to develop a risk-informed longer duration follow-up LAR. The initial LAR was approved by the NRC with full knowledge that the licensee would not complete the necessary repairs within 21 days.

2. The use of the emergency provisions of 10 CFR 50.91(a)(5) for the license amendment review process bypassed public and Commission involvement even though some engagement with the Commission and public was possible.

3. The circumstances at PVNGS did not meet emergency license amendment criteria of 10 CFR 50.91(a)(5) because the licensee could have avoided the emergency situation.

4. Safety margins were not maintained due to inappropriate compensatory measures being credited, routine maintenance and surveillances on other equipment inappropriately being extended, and operator actions that cannot be accomplished consistent with the accident analyses. Specific issues included the following:

    a. Manual actions were credited (e.g., use of manual start of FLEX DGs) that could not be accomplished in a time frame consistent with the accident analysis;
    b. Compensatory measures focused primarily on loss of offsite power (LOOP) events rather than a full spectrum of design basis events;
    c. Compensatory and risk management actions specified in the LAR were already mandated by technical specifications (TS) and should not have been credited with providing additional margin;
    d. The potential for common cause failure (CCF) was not ruled out before the first LAR was approved;
    e. An excessively long allowed outage time (AOT) precludes performance of routine maintenance and standard TS surveillance for the operable train; and
    f. TS allowances for increasing surveillance frequencies by 25% were not intended to support repair of a failed safety-related structure, system, or component (SSC).

5. The license amendment was approved contrary to internal NRC guidance on the maximum AOT for DGs. In particular, the LARs were approved contrary to staff guidance (Standard Review Plan (SRP), Branch Technical Position 8-8 (BTP 8-8)) that would preclude extensions of DG AOTs beyond 14 days. Additionally, the NRC has no guidelines for establishing maximum AOT limits.

6. Inappropriate assumptions were made with respect to the safety evaluation (SE), including the elimination of consideration of a single failure on the operable train despite the long allowed completion time (62 days vice the initial TS time of 10 days) and exclusion of certain design basis events due to low likelihood (e.g., loss of coolant accident (LOCA), LOOP).

The Panel also noted that you had identified three issues that were considered too general in nature for Panel review and/or involved potential misconduct or mismanagement of NRC programs. The Panel was advised by the DPO Program Manager that both DPOs were provided to the Office of Inspector General. The three issues identified were:

1. The NRC was more focused on financial considerations than safety;

2. The NRC's inspection program is ineffective at identifying risk-important issues; and

3. The NRC's inspection program relies on a high level of inspector knowledge and the NRC training programs are not effective in providing that to new inspectors and staff.

DPO Panel Review

The Panel concluded the following:

1. The two-step approach is an appropriate solution to the problems introduced by the unplanned need for a license amendment and the need for prompt agency response to the requests. However, the Panel is not unanimous in concluding that this particular application was appropriate or that the staff's decision basis for the two-step process was adequately documented;

2. The processing of the amendments using the emergency provisions of 10 CFR 50.91 was appropriate and necessary. The event and related staff actions were appropriately communicated within the agency, including with the Commission, and reasonable decisions were made regarding communications with the public; and

3. The processing of the amendments using the emergency provisions of 10 CFR 50.91 was appropriate. The licensee did not abuse the emergency provision by failing to make timely applications for the amendments following the catastrophic failure on December 15, 2016, nor did the operating history of the Unit 3 "B" DG provide sufficient warning to initiate preventive actions by the licensee to preclude the need for the amendment.

4. Regarding safety margins:

    a. The Panel concluded that the times to implement these manual actions were adequately reviewed by the staff and were reasonable based on the system requirements defined by the probabilistic risk analysis (PRA) and the supporting formal regulatory commitments identified in the associated amendments (e.g., use of a dedicated auxiliary operator, deployment of FLEX equipment);
    b. The Panel concluded that the identified compensatory measures were not narrowly focused on LOOP events and included a number of risk significant actions consistent with PRA insights;
    c. Regarding compensatory and risk management actions were already mandated by technical specifications (TS), the Panel did not find any evidence to substantiate this concern;
    d. The Panel agreed that the potential for CCF for DG A was not ruled out when Amendment 199 was issued, determined that the staff did not perform a

detailed review of the PRA information supporting Amendment 199 and did not have a consensus position on the technical basis of the 21 day CT, and observed that the SE lacked sufficient documentation to objectively identify the staff's decision basis in several key areas, including how the potential for CCF of the 3A DG was evaluated and the basis for a 21 day CT;

e. The Panel concluded that the use of a zero test and maintenance PRA model was not consistent with RG 1.177 guidance and the regulatory commitment put in place for Amendment 200 for the conduct of routine maintenance and surveillance was not consistent with PRA assumptions. Furthermore, the practice of biasing each sensitivity case by applying credit for the portable DGs masks the sensitivity of the PRA results to potentially adverse risk drivers. The Panel does agree with the underlying concern that operation under a TS CT does represent a degradation in the level of safety for the plant since surveillance intervals may be extended, preventative maintenance may be deferred, and single failure consideration for the accident analysis are temporarily relaxed; and
f. The Panel concluded that the 25% surveillance frequency extension could be applied to support the repair of a failed SSC.

5. The Panel concluded that LIC-101, BTP 8-8, and RG 1.177 guidance can be improved with respect to how the APLA staff should evaluate supporting risk assessments specified in BTP 8-8 for AOT extensions of 14 days or more.

6. The Panel finds the staff's consideration of single failure during the extended outage period met the guidance in GL 80-30 and BTP 8-8 and was appropriate. However, the DPO Panel believes additional guidance needs to be evaluated for reviewing long completion times.

The Panel was not unanimous in concluding that PVNGS License Amendments 199 and 200 should have been approved by the staff. The principal bases for some Panel members concluding the LARs should not have been approved are discussed further under the Panel's review of Concern #5 and involve the staff not strictly adhering to available guidance, not documenting the basis for the deviations from this guidance, and inconsistently applying the guidance based upon past staff approval or denial of similar LARs. The Panel was unanimous in concluding that additional guidance is needed in several areas for reviewing emergency license amendment AOT extension requests for inoperable diesel generators, as well as guidance for deterministic license amendment requests with supplemental risk information, how and whether precedents should be used, and how and whether independent verification using independent risk tools should be used.

Based on these conclusions, the Panel made the following recommendations:

1. There may be opportunities to more effectively communicate with the public during emergency LARs, including the use of less formal communications tools. Suggest that guidance and training be considered in this area;

2. Due to inconsistent interpretations related to the BTP 8-8 guidance, this guidance should be evaluated to determine if the following issues require clarification:

    a. Use of a 14 day backstop for deterministic evaluations;
    b. Applicability of the guidance to one-time and permanent Completion Time

(CT) extensions; and
c. Defense-in-depth consideration, particularly with respect to mitigating the consequences of a LOOP/LOCA with a single failure.

3. It was not clear how the LIC-101 guidance discouraging resource intensive reviews of risk-informed LARs submitted under emergency circumstances was considered by the staff. Additional guidance appears to be warranted in this area;

4. Development of guidance should be evaluated for reviewing deterministic-based LARs with supplemental risk information provided (such as Amendment 199) to ensure these types of risk evaluations receive a minimally acceptable review for validity and consistency;

5. Evaluation of whether a standardized method for using insights from independent risk tools (e.g., SPAR model) to support the review of LARs should be considered to ensure an objective, consistent and independent verification of the licensee's risk evaluation;

6. Additional guidance should be evaluated that would require a critical lessons learned review be conducted after first of kind licensing actions to determine, in part, whether this application and/or SE should be used going forward as a precedent;

7. Additional guidance should be evaluated on the conduct of PRA sensitivity studies; and

8. Due to inconsistent interpretations, guidance should be evaluated to determine if the following issues require clarification:

   a. acceptability of long duration CTs for one-time extensions; and
   b. maximum AOTs (i.e., a firm completion time backstop), even when supported with risk information, to limit the amount of time operation without single failure protection is permitted.

Director's Decision

After considering all the information, I strongly believe that the staff was correct in issuing PVNGS License Amendments 199 and 200. I also align in principle with the recommendations provided by the Panel with three exceptions. They have thoroughly and conscientiously endeavored to address your well-thought out and articulated concerns to lay out an approach that will be appropriately responsive.

Regarding recommendation 1, the emergency LAR process has been used successfully numerous times in the past. Given that the process is time-critical and is designed to provide opportunities for public comment after issuance of the emergency LAR, I believe the transparency of the current process is appropriate. While some minor improvements may be possible in certain unusual circumstances, given the current resource issues facing the agency, I do not intend to have the staff take any actions regarding this recommendation.

Regarding recommendation 5, I do not support use of SPAR models as an independent tool for review of LARs. In general, licensee PRA models are more current and accurate with respect to

the facility and are therefore more appropriate for use in a risk-informed licensing decision. The NRC has relied on a well-established process for conducting risk-informed licensing reviews that emphasize the need for PRA technical adequacy commensurate with the regulatory decision being made. I can envision some unique circumstances where using the SPAR model may be appropriate and will ask the Office of Nuclear Reactor Regulation (NRR) staff to evaluate this recommendation. But what is primarily needed is enhanced guidance for the staff on how to use PRA models that are not Reg Guide (RG) 1.200 compliant, as described in recommendation 4. Of note is the ongoing industry initiative to enhance their PRAs so as to take advantage of several risk-informed licensing actions such as risk-informed completion times. I believe this will result in higher quality PRA models throughout the fleet.

Regarding recommendation 7 (and conclusion 4e in the DPO Panel Report), sufficient guidance already exists for conducting PRA sensitivity studies in RG 1.174, RG 1.200 and NUREG-1855. Development of additional guidance would be counterproductive by adding another layer of redundancy and formalities that could lead to less effective and efficient reviews. More specifically, the statement in Observation 6 “Therefore, the DPO Panel concluded that the use of a zero test and maintenance PRA model was not consistent with RG 1.177 guidance and…” is inaccurate. RG 1.177 states that if a licensee chooses to use the zero maintenance PRA model, then an explanation stating so should be part of the submittal. Consistent with RG 1.177, the licensee used the zero maintenance PRA model and provided justification in the LAR for its use. The staff’s evaluation of the licensee’s justification is discussed in the associated safety evaluation. Use of the average test and maintenance PRA model would be considered conservative based on controls being taken to eliminate unavailability of equipment for planned maintenance and the low likelihood of corrective maintenance occurring during the 62-day period. Since the use of the zero maintenance PRA model could potentially underestimate the risk results, the licensee performed a sensitivity study using the average test and maintenance PRA model and credited the portable diesel generators (DGs) to reflect the actual operational practices of the plant during the CT, which is appropriate. The licensee’s sensitivity analysis showed that the licensee met the RG 1.177 risk acceptance guidelines by a large margin. The margin would have been even greater if the sensitivity study accounted for prohibited maintenance on risk-significant equipment. However, I plan to ask NRR staff to evaluate the guidance in the four pertinent documents discussed above to determine if better harmonization is appropriate.

Regarding the remaining recommendations, I will task the staff to review the applicable guidance documents and internal procedures to ensure that the staff has the best tools and guidance available to deal with similar issues in the future. Such efforts are consistent with direction currently being developed as part of NRR’s focus on enhancing its ability to use risk information in making regulatory safety decisions.

A summary of the DPO will be included in the Weekly Information Report (when the case is closed) to advise interested employees of the outcome. The package will be made publicly available if this is an action you support.

Thank you again for raising the issues in your DPOs. An open and thorough exploration of how we carry out our regulatory processes is essential to keeping these programs effective. Your

willingness to raise concerns with your colleagues and managers and ensure that your concerns are heard and understood is admirable and vital to ensuring a healthy safety culture within the Agency.

Enclosures:
1. DPO Panel report, dated June 5, 2017
2. D.C. Cook /Palo Verde Emergency LAR Comparison

cc: B. McDermott, NRR
M. Evans, NRR
P. Holahan, OE
R. Pedersen, OE
G. Toledo, OE
K. Kennedy, RIV
S. Morris, RIV
M. Johnson, OEDO

SUBJECT: DIFFERING PROFESSIONAL OPINION REGARDING TWO EMERGENCY LICENSE AMENDMENT REQUESTS RELATED TO DIESEL GENERATOR ALLOWED OUTAGE TIME (DPO-2017-001 and DPO-2017-002) DATED: June 28, 2017

ADAMS Accession No.: ML17178A311

OFFICE	NRR
NAME	WDean
DATE	6/28/17

OFFICIAL RECORD COPY

D.C. Cook/Palo Verde Comparison

Major differences:

- Uncertainty as to whether RG 1.177 risk acceptance guidelines were met for D.C. Cook
- PVNGS installed 3 portable DGs
- Potential for common cause failure ruled out at PVNGS

Basis for Denial	**D.C. Cook**	**Palo Verde**
Risk Acceptance Guidelines	The licensee made several modifications to its PRA, resulting in the licensee's risk assessment meeting the appropriate risk acceptance guidelines in RG 1.177. However, there was insufficient time for the NRC staff to complete a thorough investigation into the modifications made by the licensee to its PRA.	N/A
Common Cause	The cause of the wiped bearing was unknown. While it is likely that the failed bearing was a direct result of the maintenance performed on the Unit 1 AB emergency diesel generator (EDG), the potential for a common failure mode on the remaining EDGs could not be eliminated.	The NRC agreed with the determination by APS that the cause of failure of the 3B DG is attributed to high-cycle fatigue and that the mode of failure is not common to the "A" train DG or the DGs in Units 1 and 2.
Sufficient Justification	NUREG-0800, BTP 8-8 states that the staff should not review any license amendment requests for EDG allowed outage times (AOTs) greater than 14 days. The licensee did not provide sufficient justification for allowing an extension beyond the 14-day AOT.	As noted on page 11 of the staff's safety evaluation, "the portable DGs have the capacity and capability to support the loads necessary to mitigate a loss of offsite power (LOOP) event […] in case of an extended LOOP concurrent with a single failure of the train A DG during plant operation, and meet the intent of BTP 8-8."
Single failure in concurrence with LOOP and LOCA	The draft safety evaluation implied that this was not met. However, per Generic Letter 80-30, single failure need not be considered when in a Technical Specification Limiting Condition for Operation.	Risk results for internal events PRA that include loss of coolant accident met the RG 1.177 guidelines by a large margin for Palo Verde. Per Generic Letter 80-30, single failure need not be considered when in a Technical Specification Limiting Condition for Operation.
Additional power supply sources	Lower capacity FLEX DG	Higher capacity FLEX DGs. Three Palo Verde portable DGs provided substantial defense-in-depth.
License Conditions	N/A	NRC imposed license conditions to enhance safety and provide defense-in-depth provisions.