10 CFR 50.90
10 CFR 50.91

Maria L. Lacal
Vice President, Nuclear
Regulatory & Oversight

Palo Verde
Nuclear Generating Station
P.O. Box 52034
Phoenix, AZ 85072
Mail Station 7605
Tel 623.393.6491

102-07109-MLL/JR
September 4, 2015

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS) Unit 2**
Docket No. STN 50-529
Exigent License Amendment Request to Amend Technical Specification Surveillance Requirement 3.1.5.3 for Control Element Assembly 88 for the Remainder of Unit 2, Cycle 19

In accordance with 10 CFR 50.90, Arizona Public Service Company (APS) hereby requests to amend Renewed Operating License No. NPF-51 by revising the Technical Specifications (TS) that are incorporated as Appendix A to the Renewed Operating License for PVNGS Unit 2. As detailed further in the Enclosure to this letter, the proposed amendment would add a note to Surveillance Requirement (SR) 3.1.5.3, Control Element Assembly (CEA) freedom of movement surveillance, such that Unit 2, CEA 88 may be excluded from the last remaining quarterly performance of the SR in Unit 2, Cycle 19.

This amendment is necessary due to a degraded Control Element Drive Mechanism (CEDM) upper gripper coil (UGC) that normally holds CEA 88 in place. The UGC is also used to demonstrate compliance with SR 3.1.5.3, which verifies CEA freedom of movement. On August 27, 2015, during the performance of a monitoring program for all CEAs, the UGC current noise for CEA 88 was found to have exceeded the monitoring threshold value and the CEA holding function was transferred to the lower gripper coil. Upon transfer to the lower gripper coil, the UGC de-energized and remains de-energized which prevents further UGC degradation. If APS were to perform the SR 3.1.5.3, freedom of movement surveillance on CEA 88, the UGC would re-energize to move the CEA. Should the UGC further degrade during CEA movement, the CEA may drop into the core, resulting in a reactivity transient and subsequent power reduction, and would result in a plant shutdown if the CEA were deemed unrecoverable. Therefore, APS requests that CEA 88 not be exercised during the last remaining quarterly performance of SR 3.1.5.3 in Unit 2, Cycle 19. Repairs to CEA 88 will be completed during the 2R19 outage currently scheduled to commence on October 10, 2015.

The Enclosure to this letter provides a detailed description of, and basis for, the proposed TS amendment, as well as technical and regulatory evaluations of the amendment. The Enclosure includes the basis for a determination that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and describes the exigent circumstances. A proposed TS marked-up page and a retyped TS page are included as Attachments 1 and 2, respectively, to the Enclosure to this letter.

Approval of this exigent amendment is requested by September 25, 2015. Once approved, the amendment will be implemented prior to the SR 3.1.5.3 performance due date for CEA 88 in Unit 2, Cycle 19, which is September 28, 2015.

In accordance with the PVNGS Quality Assurance Program, the Plant Review Board and the Offsite Safety Review Committee have reviewed and concurred with this proposed amendment. By copy of this letter, this submittal is being forwarded to the Arizona Radiation Regulatory Agency (ARRA) pursuant to 10 CFR 50.91(b)(1).

No commitments are being made by this letter. Should you need further information regarding this amendment request, please contact Michael D. Dilorenzo, Licensing Section Leader, at (623) 393-3495.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 4, 2015 .
(Date)

Sincerely,

Lacal, Maria L(Z06149)

Digitally signed by Lacal, Maria L(Z06149)
DN: cn=Lacal, Maria L(Z06149)
Reason: I am approving this document
Date: 2015.09.04 11:53:15 -07'00'

MLL/JR

Enclosure: Evaluation of the Proposed Change, Amendment to Technical Specification Surveillance Requirement 3.1.5.3

cc:	M. L. Dapas	NRC Region IV Regional Administrator
	M. M. Watford	NRC NRR Project Manager for PVNGS
	L. J. Klos	NRC NRR Project Manager
	C. A. Peabody	NRC Senior Resident Inspector for PVNGS
	A. V. Godwin	Arizona Radiation Regulatory Agency
	T. Morales	Arizona Radiation Regulatory Agency

ENCLOSURE

Evaluation of the Proposed Change, Amendment to Technical Specification Surveillance Requirement 3.1.5.3

ENCLOSURE

Evaluation of the Proposed Change

Subject: **Request to Amend Technical Specification Surveillance Requirement 3.1.5.3 for Control Element Assembly 88 for the Remainder of Unit 2, Cycle 19**

1. SUMMARY DESCRIPTION

This evaluation supports an Arizona Public Service Company (APS) request to amend Operating License No. NPF-51 for Palo Verde Nuclear Generating Station (PVNGS) Unit 2. The license amendment request (LAR) specifically amends the Technical Specifications (TS) that are incorporated as Appendix A to the Renewed Operating License for PVNGS Unit 2. The LAR adds a note to Surveillance Requirement (SR) 3.1.5.3 such that Unit 2, Control Element Assembly (CEA) 88 may be excluded from the last remaining quarterly performance of the SR in Unit 2, Cycle 19.

As part of the corrective action for the Unit 2 CEA 15 drop event on November 6, 2014 (Reference 6.1), APS initiated a monitoring program to trend the Control Element Drive Mechanism (CEDM) upper gripper coil (UGC) voltage, current, current noise, and temperature for all CEAs. During the monitoring program data collection on August 27, 2015, CEA 88 was found to have exceeded the monitoring threshold value for current noise and the CEA holding function was transferred to the lower gripper coil. Upon transfer to the lower gripper coil, the UGC de-energized and remains de-energized which prevents further UGC degradation. If APS were to perform SR 3.1.5.3, freedom of movement surveillance on CEA 88, the UGC would re-energize to move the CEA. Should the UGC further degrade during CEA movement, the CEA may drop into the core, resulting in a reactivity transient and subsequent power reduction, and would result in a plant shutdown if the CEA were deemed unrecoverable. Therefore, APS requests that CEA 88 not be exercised during the last remaining performance of SR 3.1.5.3 before the refueling outage scheduled to begin October 10, 2015. The duration from the SR due date to the Unit 2 outage is 12 days. Administrative controls have been established to energize the CEA 88 UGC only when necessary for the remainder of Unit 2, Cycle 19.

Freedom of movement of each full strength CEA, including CEA 88 in Unit 2, is verified in SR 3.1.5.3 which is required to be performed in Unit 2 prior to September 28, 2015. This LAR is being requested to allow CEA 88 to be excluded from the SR during the last remaining performance during Unit 2, Cycle 19. Since the LAR is needed within the normal 30-day public comment period for the "notice of opportunity for hearing" as described in regulation 10 CFR 50.91, APS requests that the LAR be considered for exigent circumstances. Expedited approval is needed since the degraded condition of the UGC on CEA 88 was not discovered in sufficient time to permit the normal 30-day public comment period. NRC review and approval of the LAR is needed prior to the SR 3.1.5.3 performance due date for CEA 88 in Unit 2, Cycle 19, which is September 28, 2015.

2. DETAILED DESCRIPTION

2.1 <u>Description of Control Element Assembly Groups</u>

PVNGS Unit 2 has 89 CEAs divided into nine control groups: two Shutdown Groups A and B, five Regulating Groups 1 through 5, and two power shaping groups designated as Groups P1 and P2. These nine control groups are separated further into 22 Subgroups. CEA 88 is in Regulating Group 4, Subgroup 22.

Shutdown Groups A and B ensure that sufficient negative reactivity is available to support a reactor trip or normal shutdown. The shutdown CEAs must be within their insertion limits (i.e., fully withdrawn) any time the reactor is critical or approaching criticality. Insertion limits on Regulating Groups 1-5 are also established, and all CEA positions are monitored and controlled during initial criticality and power operation to ensure that the power distribution and reactivity limits are preserved. During reactor startup, regulating CEA groups are withdrawn and operate in a predetermined sequence with a predetermined amount of position overlap. Power shaping control groups P1 and P2 control the axial flux distribution in the core and are operated as a single group.

During power operations, all CEAs are normally fully withdrawn, except to complete performance of SR 3.1.5.3, CEA freedom of movement surveillance.

2.2 Description/Operation of Control Element Drive Mechanism Control System

2.2.1 General System Description

The Control Element Drive Mechanism Control System (CEDMCS) is a reactivity control system that provides "drive signals" to the coils of Control Element Drive Mechanisms (CEDMs), which position and hold the CEAs.

The CEDMCS performs the following functions:

- Drops CEAs into the reactor core to add a large amount of negative reactivity when the power is removed from the CEDMCS power bus
- Provides for rapid insertion of select CEAs when a secondary plant load rejection or loss of a Main Feedwater pump occurs
- Provides CEA position signals which are used as an indication to assure the reactivity control system has maintained the plant within safety limits
- Develops the control voltage to withdraw, hold, or insert CEAs to achieve power control and power distribution control
- Allows CEA groups to be used to compensate for reactivity changes
- Provides a reactor trip signal to secondary plant control systems such as Main Turbine, Feedwater, and Steam Bypass Control Systems

The CEDMCS controls the direction and rate of motion of the CEAs either manually or automatically. The CEAs can be moved individually or as part of pre-assigned control groups. The CEDMCS directs the motion of the nine control groups.

The functions performed by CEAs as described in UFSAR Sections 7.7.1.1.1 and 7.7.1.1.6 for reactor power control and reactor power cutback are not credited in the UFSAR Chapter 15 accident analysis, but are instead referred to as *Control Systems not Required for Safety*. For the UFSAR Chapter 15 events, the control rods are implicitly assumed to be in compliance with the TS and the Power Dependent Insertion Limit (PDIL) as an initial condition. The control rods are credited to drop into the core when the reactor trip signal is generated by the Reactor Protective System (RPS). In certain UFSAR Chapter 15.4 events, the control rods are explicitly modeled to be initially at the PDIL transient insertion limit and then, either due to CEDMCS malfunction or operator error, are assumed to start withdrawing toward the All Rods Out (ARO) position until a condition requiring a RPS trip is reached. For economic reasons, the reactor power cutback system is designed to reduce reactor power and steam demand for two specific secondary plant transients, loss of a main feedwater pump or loss of load event. Both of these events generate reactor power cutbacks. If the system were to be in manual or disabled and either of the transients were to occur, the plant would initiate an RPS trip. The consequences of a reactor trip are bounded by the UFSAR Chapter 15 events.

The CEDMCS receives motion demands from a control room operator's module via five different modes:

- Automatic Sequential
- Manual Sequential
- Manual Group
- Manual Individual
- Standby

The active interface between the RPS and the CEDMCS is at the trip circuit breakers located at the Reactor Trip Switchgear (RTSG). A reactor trip initiated by the RPS causes the power to be removed from the CEDMCS by opening the RTSG breakers, which removes coil voltage and releases the spring-loaded magnetic jacks, allowing all CEAs to insert into the core by gravity.

2.2.2 Control Element Drive Mechanisms

The CEDM is an electromechanical device that converts electrical energy into mechanical motion. The CEA coils provide the magnetic flux that operates the mechanical parts of the drive within the pressure housing. Motion of these parts engage, lift, and release the latching devices, which translate the motion of the gripper assembly to the CEDM drive shaft. There is one CEDM per CEA.

Each CEDM has an upper lift coil, upper gripper coil, lower lift coil, and lower gripper coil, which comprise the coil stack assembly. These coil stack assemblies produce magnetic fields which control the magnetic jack assemblies causing the jacks to engage, hold, move, or release the CEAs. Each CEDM is capable of withdrawing, inserting, holding or tripping (releasing) its CEA from any point within its 153-inch stroke. Under normal operating conditions, while a CEA is not in motion, the CEA is held by the upper gripper coil which is continuously energized.

The CEDM coil stack assembly slides over the CEDM pressure housing and rests upon a locating shoulder. The coil stack is surrounded by a sheet metal cooling shroud producing an annulus through which air flows. Air flowing from bottom to top of the coil stack will remove operating coil heat and some internal CEDM heat. CEDM gripper coils are subject to thermal degradation of the coil insulation and potential internal shorting of the coil if operated at an abnormally elevated temperature.

2.3 Description of the Proposed Change

The proposed amendment would add the following note to SR 3.1.5.3 such that Unit 2, CEA 88 may be excluded from the last remaining performance of the SR in Unit 2, Cycle 19:

> Not required to be performed for Unit 2 CEA 88 for the remainder of Cycle 19.

The specific change to the Unit 2 PVNGS TS is indicated in the proposed TS page markup and retyped TS page that are included as Attachments 1 and 2, respectively, to this enclosure.

2.4 Nuclear Safety Risk Insights

The nuclear safety risk associated with potentially inducing a reactor trip upon exercising CEA 88, although small, is significantly greater than the nuclear safety risk associated with not exercising the CEA. The surveillance test verifies that CEAs are not mechanically bound. Probabilistic Risk Analysis baseline modeling of Internal Events, Internal Fire, Internal Flooding, External Events, and Seismic Events includes the likelihood of four or more CEAs failing to insert into the core upon a reactor trip signal. Industry modeling conservatively presumes that the probability of four stuck CEAs upon reactor trip represents a reasonable likelihood for a mechanical CEA binding common cause failure probability resulting in significant reactivity worth to impact the shutdown capability.

The nuclear safety risk importance of the CEA common cause failure event indicates a negligible increase in Core Damage Frequency and Large Early Release Frequency over the exposure period given the increase in failure likelihood due to conservatively assuming one un-exercised CEA would be mechanically bound. Performance of the scheduled CEA exercise surveillance test on the remaining CEAs prior to the exposure period (time between SR performance and 2R19 refueling outage) significantly reduces the likelihood that a common cause condition exists, or would occur prior to the refueling outage.

2.5 Basis for Requesting the Proposed Exigent Change

This amendment is necessary due to a degraded UGC located atop the reactor vessel head that normally holds Unit 2 CEA 88 in place. On August 27, 2015, during the performance of a monitoring program for all CEAs, CEA 88 was found to have exceeded the monitoring threshold value for current noise and the holding function was transferred to the lower gripper coil. Upon transfer to the lower gripper coil, the UGC de-energized and remains de-energized. The prior three sets of monitoring results reflected stable UGC current noise levels, which did not indicate a degraded condition. If APS were to perform the SR 3.1.5.3 freedom of movement surveillance on CEA 88, the UGC would re-energize to move the CEA. Should the UGC further degrade during CEA movement, the CEA may drop into the core, resulting in a reactivity transient and subsequent power reduction, and would result in a plant shutdown if the CEA were deemed unrecoverable. Therefore, APS requests that CEA 88 not be exercised during the last remaining performance of SR 3.1.5.3 in Unit 2, Cycle 19.

Since the LAR is needed within the normal 30-day public comment period for the "notice of opportunity for hearing" as described in regulation 10 CFR 50.91, APS requests that the LAR be considered for exigent circumstances. Expedited approval is needed since the degraded condition of the UGC on CEA 88 was not discovered in sufficient time to permit the normal 30-day public comment period. NRC review and approval of the LAR is needed prior to the SR 3.1.5.3 performance due date for CEA 88 in Unit 2, Cycle 19, which is September 28, 2015.

3. TECHNICAL EVALUATION

3.1 <u>Description/Justification</u>

As part of the corrective action for the Unit 2 CEA 15 drop event on November 6, 2014 (Reference 6.1), APS initiated a monitoring program to trend the UGC voltage, current, current noise and temperature for all CEAs. The trending data is used to reduce the potential for a CEA drop event due to coil degradation, which was the cause of the Unit 2 CEA 15 drop event, until final corrective actions are implemented.

On August 27, 2015, during the monitoring program data collection, the UGC for CEA 88 was found to have exceeded the monitoring threshold value for current noise and the holding function was transferred to the lower gripper coil, de-energizing the UGC. The monitoring activity trends the UGC current noise, which is the range of oscillation above and below the set UGC current value.

The monitoring results prior to August 27, 2015, reflect a consistent peak-to-peak gripper coil current noise level of 1.4 amps. On August 27, the peak-to-peak current noise level increased to 4.83 amps. This exceeded the monitoring threshold value of 2.5 amps for transferring the holding function of the CEA to the lower gripper coil.

The two following figures show the step change in coil current noise:

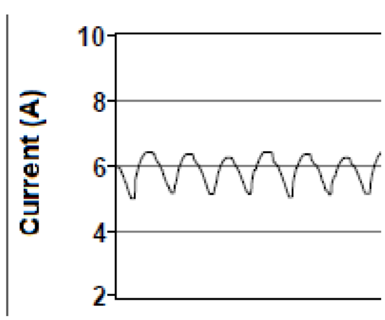

Figure 1 –Before August 27, 2015

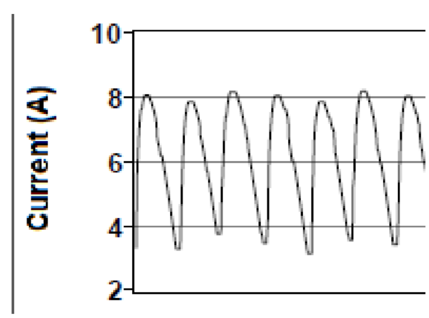

Figure 2 – On August 27, 2015

Administrative controls have been established to only energize the UGC for CEA 88 when necessary for the remainder of Unit 2, Cycle 19. Should an automatic CEA motion demand occur, the UGC for CEA 88 would re-energize and the CEA should move with its group. After movement, the holding function for CEA 88 would be transferred to the lower gripper coil. The UGC for CEA 88 will be replaced in the 2R19 outage, currently scheduled to commence on October 10, 2015.

The primary failure modes of a CEDM coil are:

- One or more winding shorts
- An open coil

Overheating is the primary driver of both failure modes. Heating is primarily internal and largely a result of the coil being energized.

The majority of failures are related to the coil insulation breakdown. The shorted-winding condition is the most common cause of coil failure. It occurs when the insulation resistance degrades within a winding, allowing a secondary, or parasitic, current path. Although a single shorted turn in a winding may not have an immediate effect on a coil's performance, the point of insulation degradation becomes a source of additional heat. This localized heat buildup causes further insulation breakdown. Furthermore, the shorted turns reduce the overall circuit resistance resulting in additional current draw and heat generation, and reduced coil magnetic holding power.

Monitoring of the UGC for CEA 88 has indicated an increase in peak-to-peak current noise which is believed to be caused by shorted turns in the coil winding. An open coil condition has not been observed for CEA 88. The possible causes of the shorted turns in the coil winding are:

- Short-term high current causing overheating and winding insulation break down
- Thermal-related and age-related degradation of the coil insulation
- Excessive voltage resulting in insulation breakdown
- Manufacturing weakness which results in localized heating

The increase in UGC current noise between the monitoring periods most likely indicates an initial turn-to-turn short. The turn-to-turn short indicates degraded insulation which is resulting in localized heating. The coil will further degrade with continued use or if energized. The degradation is not linear or predictable. This localized heating can result in further turn-to-turn shorts which will increase current draw until the associated breaker opens, or the coil magnetic holding power is reduced resulting in the CEA dropping into the core.

Further exercising of CEA 88 increases the potential for a CEA drop, which would result in a reactivity transient and subsequent power reduction, and would lead to a reactor shutdown if the CEA were deemed unrecoverable. Therefore, APS requests NRC approval to not perform the last remaining SR 3.1.5.3 freedom of movement surveillance for Unit 2 CEA 88 before repairs can be completed in the upcoming fall 2015 refueling outage 2R19. Coil replacement requires access atop the reactor vessel which cannot be performed while the unit is online.

The purpose of SR 3.1.5.3 is to verify that the CEAs are free to move (i.e., trippable). This is accomplished by moving each CEA in the Manual Individual Mode (i.e., only one CEA is moved at a time by the Control Room Operator). Successful movement of the CEA confirms no mechanical binding exists.

In addition, the design of the CEAs provides for freedom of movement. Because of the design of the CEDMCS, electrical problems will not prevent insertion of a CEA into the core when the reactor trip breakers are opened. The Unit 2 CEA 15 drop event demonstrated that freedom of movement was not affected by coil failure. Unit 2 has not experienced mechanical binding of any CEA. The results of the last performance of SR 3.1.5.3 showed freedom of movement. Additionally, three-eighths of an inch of free movement was verified for CEA 88 when the holding function was transferred to the lower gripper coil from the UGC. During that transfer, the Upper Electric Limit (UEL) light went out, indicating that the CEA had moved down out of the range of the UEL. This movement provides additional assurance that CEA 88 is not mechanically bound.

In addition, Limiting Condition for Operation (LCO) 3.1.5, *Control Element Assembly (CEA) Alignment*, requires alignment of CEAs within their respective group. With the UGC de-energized, CEA 88 will remain aligned and withdrawn with its group as required by the LCO.

3.2 Reactivity Impact

CEA 88 is trippable and is expected to remain so for the remainder of Unit 2, Cycle 19. The following reactivity information is provided to further demonstrate the acceptability of eliminating SR 3.1.5.3 for CEA 88 for the remainder of Unit 2, Cycle 19. The TS definition of Shutdown Margin (SDM) is:

> Shutdown Margin shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming all control element assemblies are fully inserted except for the single assembly of highest reactivity worth which is assumed to be fully withdrawn.

TS 3.1.2 specifies that the SDM shall be greater than or equal to that specified in the Core Operating Limits Report (COLR). The Unit 2, Cycle 19, COLR SDM operating limit is 6.5% $\Delta K/K$ in Modes 3 through 5 with trip breakers closed; this value being the maximum SDM requirement over the temperature range. A parametric study was conducted from 450 effective full power days (EFPD) to the end of Cycle 19 to determine the minimum SDM that would exist following a reactor trip assuming that both CEA 88 and the CEA of the highest reactivity worth fail to insert. The calculated minimum SDM for this scenario is 7.27% $\Delta K/K$, which is above the 6.5% $\Delta K/K$ SDM requirement in the COLR. The calculated SDM value bounds operation for the remainder of Unit 2, Cycle 19.

Based on the above results, it can be shown analytically that SDM in excess of the COLR limit of 6.5% $\Delta K/K$ is present at all times for the remainder of Unit 2, Cycle 19, even if CEA 88 fails to insert into the core during a reactor trip. The calculations were based on the same models and methods as those used to perform the TS surveillances.

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50.46, *Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plant*, requires, in part, safety system designs with adequate

margin to ensure specified acceptable fuel design limits are not exceeded. The applicable General Design Criteria (GDC) for CEA design requirements include the following:

> GDC-4, *Environmental and dynamic effects design bases*. Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping;
>
> GDC-10, *Reactor design*. The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences;
>
> GDC-23, *Protection system failure modes*. The protection system shall be designed to fail into a safe state or into a state demonstrated to be acceptable on some other defined basis if conditions such as disconnection of the system, loss of energy (e.g., electric power, instrument air), or postulated adverse environments (e.g., extreme heat or cold, fire, pressure, steam, water, and radiation) are experienced;
>
> GDC-25, *Protection system requirements for reactivity control malfunctions*. The protection system shall be designed to assure that specified acceptable fuel design limits are not exceeded for any single malfunction of the reactivity control systems, such as accidental withdrawal (not ejection or dropout) of control rods;
>
> GDC-26, *Reactivity control system redundancy and capability*. Two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods, preferably including a positive means for inserting the rods, and shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including anticipated operational occurrences, and with appropriate margin for malfunctions such as stuck rods, specified acceptable fuel design limits are not exceeded. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes (including xenon burnout) to assure acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core subcritical under cold conditions;
>
> GDC-27, *Combined reactivity control systems capability*. The reactivity control systems shall be designed to have a combined capability, in conjunction with

> poison addition by the emergency core cooling system, of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods the capability to cool the core is maintained;
>
> GDC-28, *Reactivity limits*. The reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. These postulated reactivity accidents shall include consideration of rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold water addition.; and
>
> GDC-29, *Protection against anticipated operational occurrences*. The protection and reactivity control systems shall be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences.

The technical evaluation has concluded that CEA 88 is not mechanically bound, and has no history of mechanical binding. Failure of CEA 88 to insert would not result in inadequate SDM should both CEA 88 and the CEA having the highest reactivity worth fail to insert following a reactor trip. Delaying SR performance until the UGC can be replaced during the upcoming refueling outage has no impact on the CEA's ability to move. Nevertheless, because required SDM will continue to be met given the aforementioned scenario (two CEAs remain fully withdrawn post-trip), no fuel design limits will be challenged as a result of this amendment request should it be approved.

4.2 Precedent

The proposed change is similar to the changes previously approved by the Nuclear Regulatory Commission (NRC) for Arkansas Nuclear One, Unit 2 (References 6.2 through 6.5).

4.3 No Significant Hazards Consideration Determination

As detailed above, the proposed amendment would add the following note to Surveillance Requirement (SR) 3.1.5.3 such that Unit 2, Control Element Assembly (CEA) 88 may be excluded from the last remaining performance of the SR in Unit 2, Cycle 19:

> Not required to be performed for Unit 2 CEA 88 for the remainder of Cycle 19.

Arizona Public Service (APS) has determined that the proposed Technical Specifications (TS) amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c). This determination is based on an evaluation with respect to the specific criteria of 10 CFR 50.92(c) as follows:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed amendment would exclude CEA 88 from the last remaining SR 3.1.5.3 performance for Unit 2, Cycle 19, which is currently scheduled to end on October 10, 2015. The function of CEA 88 is to provide negative reactivity addition into the core upon receipt of a signal from the Reactor Protection System (RPS). CEA 88 was demonstrated to be moveable and trippable during the last performance of SR 3.1.5.3 and when it was placed on the lower gripper coil; therefore, the function remains valid for CEA 88.

   The misoperation of a CEA, which includes a CEA drop event, has been evaluated in the Updated Final Safety Analysis and found acceptable. The proposed change would minimize the potential for inadvertent insertion of CEA 88 into the core by maintaining the CEA in its place using the lower gripper. The proposed change will not affect the ability of CEA 88 to insert fully into the core upon receipt of a reactor trip signal.

   No modifications are proposed to the RPS or associated Control Element Drive Mechanism Control System (CEDMCS) logic with regard to the ability of CEA 88 to remain available for immediate insertion into the core. Since CEA 88 remains trippable, no additional reactivity considerations need to be taken into consideration. Nevertheless, APS has evaluated the reactivity consequences associated with failure of CEA 88 to insert upon a reactor trip in accordance with TS and has determined that SDM requirements would be met should such an event occur at any time during the remainder of Unit 2, Cycle 19 operation. The accident mitigation features of the plant are not affected by the proposed amendment.

   Based on the above, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed amendment would exclude CEA 88 from the last remaining SR 3.1.5.3 performance of Unit 2, Cycle 19, which is currently scheduled to end on October 10, 2015. CEA 88 was demonstrated to be moveable and trippable during the last performance of SR 3.1.5.3 and when it was placed on the lower gripper coil; therefore, the function remains valid for CEA 88. The proposed change will not introduce any new design changes or systems that can prevent the CEA from performing its specified safety function. This change does not alter assumptions made in the safety analysis. APS has evaluated the reactivity consequences associated with failure of CEA 88 to insert upon a reactor trip in accordance with TS and has determined that SDM requirements would be met should such an event occur at any time during the remainder of Unit 2, Cycle 19 operation.

Based on the above, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in the margin of safety?

   Response: No.

   The proposed amendment would exclude CEA 88 from the last remaining SR 3.1.5.3 performance of Unit 2, Cycle 19, which is currently scheduled to end on October 10, 2015. SR 3.1.5.3 is intended to verify freedom of movement of CEAs (i.e., trippable). CEA 88 was demonstrated to be moveable and trippable during the last performance of SR 3.1.5.3 and when it was placed on the lower gripper coil. The physical and electrical design of the CEAs, and past operating experience, provides high confidence that CEAs remain trippable whether or not exercised during each SR interval. Eliminating further exercise of CEA 88 for the remainder of Unit 2, Cycle 19 operation does not directly relate to the potential for CEA binding to occur. No mechanical binding has been previously experienced at PVNGS, Unit 2. APS has evaluated the reactivity consequences associated with failure of CEA 88 to insert upon a reactor trip in accordance with TS and has determined that SDM requirements would be met should such an event occur at any time during the remainder of Unit 2, Cycle 19 operation.

   Based on the above, the proposed amendment does not involve a significant reduction in the margin of safety.

Based on the above, APS concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

The proposed amendment does not represent a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, nor does it introduce a significant increase in individual or cumulative occupational radiation exposure.

4.4 Commitments

There are no commitments being made by this license amendment request.
The license amendment statements provide information to support NRC action and are not considered to be regulatory commitments. Once the license amendment is approved, APS plans to implement the amendment immediately.

5. ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change an inspection or surveillance requirement. However, as established above, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion of categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statements or environmental assessment need be prepared in connection with the proposed amendment.

6. REFERENCES

6.1 APS letter number 102-06980 to the NRC [Agency Documents Access and Management System (ADAMS) Accession Number ML15005A045], dated December 30, 2014 - *LER 14-002-00 for Palo Verde Nuclear Generating Station, Unit 2, Regarding Technical Specification (TS) Required Plant Shutdown Due to a Dropped Control Element Assembly*

6.2 Entergy letter to NRC [ADAMS Accession Number ML15041A068] dated February 6, 2015 - *License Amendment Request - Allowance to Eliminate Movement of Control Element Assembly 18 from Surveillance Requirement 4.1.3.1.2 for the Remainder of Cycle 24, Arkansas Nuclear One, Unit 2*

6.3 NRC letter to Entergy [ADAMS Accession Number ML15096A381] dated April 29, 2015 - *Arkansas Nuclear One, Unit 2 – Issuance of Amendment Re: Revise Technical Specifications Surveillance Requirement to Eliminate Movement of Control Element Assembly 18 for the Remainder of Operating Cycle 24*

6.4 Entergy letter to NRC [ADAMS Accession Number ML012420081] dated August 23, 2001 - *Arkansas Nuclear One-Unit 2, License Amendment Request, Allowance to Eliminate Movement of Control Element Assembly 43 from Surveillance Requirement 4.1.3.1.2 for the Remainder of Cycle 15*

6.5 NRC letter to Entergy [ADAMS Accession Number ML012960550] dated October 22, 2001 - *Arkansas Nuclear One, Unit 2 – Issuance of Amendment Re: Allowance to Eliminate Movement of Control element Assembly 43 for the Remainder of Cycle 15*

ENCLOSURE

ATTACHMENT 1

Technical Specification Markup

Page:
3.1.5-3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify the indicated position of each full strength and part strength CEA is within 6.6 inches of all other CEAs in its group.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.2	Verify that, for each CEA, its OPERABLE CEA position indicator channels indicate within 5.2 inches of each other.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.3	Verify full strength CEA freedom of movement (trippability) by moving each individual full strength CEA that is not fully inserted in the core at least 5 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.4	Perform a CHANNEL FUNCTIONAL TEST of each reed switch position transmitter channel.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.5	Verify each full strength CEA drop time $\leq$ 4.0 seconds.	Prior to reactor criticality, after each removal of the reactor head

---------- NOTE ----------
Not required to be performed for Unit 2 CEA 88 for the remainder of Cycle 19.

ENCLOSURE

ATTACHMENT 2

Retyped Technical Specification

Page:
3.1.5-3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify the indicated position of each full strength and part strength CEA is within 6.6 inches of all other CEAs in its group.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.2	Verify that, for each CEA, its OPERABLE CEA position indicator channels indicate within 5.2 inches of each other.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.3	-------------------NOTE------------------- Not required to be performed for Unit 2 CEA 88 for the remainder of Cycle 19. -- Verify full strength CEA freedom of movement (trippability) by moving each individual full strength CEA that is not fully inserted in the core at least 5 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.4	Perform a CHANNEL FUNCTIONAL TEST of each reed switch position transmitter channel.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.5	Verify each full strength CEA drop time $\leq$ 4.0 seconds.	Prior to reactor criticality, after each removal of the reactor head