10 CFR 50.90

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102-06655-DCM/RKR/CJS
January 31, 2013

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

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528, 50-529, and 50-530
Response to Request for Additional Information Regarding License Amendment Request to Eliminate the Use of the Term CORE ALTERATION in the Technical Specifications**

By letter no. 102-06486, dated March 8, 2012 (Agencywide Documents Access and Management System [ADAMS] Accession no. ML12076A045), and supplemented by letter no. 102-06604, dated October 11, 2012 (ADAMS Accession no. ML12286A330) Arizona Public Service Company (APS) submitted a license amendment request (LAR) for PVNGS, Units 1, 2, and 3. The proposed amendments would eliminate the use of the term CORE ALTERATION from the Technical Specifications.

By NRC letters dated December 19, 2012 (ADAMS Accession no. ML12347A040) and January 3, 2013 (ADAMS Accession no. ML12362A292), the NRC staff provided requests for additional information (RAI) to complete its review. The APS response was requested by January 31, 2013.

The enclosure to this letter contains the APS response to the RAIs. The response to the December 19, 2012 RAIs are provided first, followed by the January 3, 2013 RAI response.

No commitments are being made to the NRC by this letter.

Should you need further information regarding this response, please contact Robert K. Roehler, Licensing Section Leader, at (623) 393-5241.

A001
NRR

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

Executed on JANUARY 31, 2013
(date)

Sincerely,

FOR D. C. MIMS

DCM/RKR/CJS/hsc

Enclosure: Response to Request for Additional Information Regarding License Amendment Request to Eliminate the Use of the Term CORE ALTERATION in the Technical Specifications

cc:	E. E. Collins Jr.	NRC Region IV Regional Administrator
	L. K. Gibson	NRC NRR Project Manager
	M. A. Brown	NRC Senior Resident Inspector for PVNGS
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Enclosure

Response to Request for Additional Information Regarding License Amendment Request to Eliminate the Use of the Term CORE ALTERATION in the Technical Specifications

Introduction

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NRC Request 1 (December 19, 2012 NRC RAI)

For PVNGS, current TS 3.9.2 (for Mode 6), "Nuclear Instrumentation", requires that (1) Core Alterations be suspended and (2) positive reactivity activities be terminated if the required source range nuclear instrumentation is determined to be inoperable. The licensee proposed to remove the required action of suspending Core Alterations from the TS 3.9.2 while maintaining the required action of suspending positive reactivity activities.

At PVNGS, the source range monitors (SRMs) are used during refueling operations to monitor the core reactivity conditions. The SRMs provide a signal to operator of unexpected changes in core reactivity such as a boron dilution event and a misloaded fuel assembly event. These detectors are located external to the reactor vessel and detect neutron leaking from the core. The licensee stated in its submittal that for the conditions that one SRM is inoperable, the required action of suspending positive reactivity additions is sufficient to preclude an accident criticality.

Based on the current definitions in TS 1.1, "CORE ALTERATION shall be the movement or manipulation of any fuel, sources, or reactivity control components [excluding control assemblies (CEAs) withdrawal into the upper guide structure], within the reactor vessel with vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position."

With the removal of the TS required action of suspending CORE ALTERATION, the only TS 3.9.2 restriction is the required action to suspend positive reactivity operations.

Since the withdrawal of fuel assemblies from the core may not contribute to the addition of positive reactivity to the core, it is not prohibited by the proposed TS 3.9.2.

The NRC staff is concerned that the SRM could be decoupled from the nuclear response when the fuel assemblies are withdrawn out of the core. For example, the withdrawal of fuel assemblies could result in a condition where fuel assemblies reside in a half of the core opposite the operable SRM. Another example is removal of a source assembly from a decayed core. Under these conditions, the remaining operable SRM may not be able to effectively detect the neutron reactivity. Thus, there may not be an SRM to adequately detect the occurrence of the boron dilution or misloaded fuel assembly event, resulting in an unanalyzed condition.

a. Please address whether the operable SRM could be decoupled from the neutron fluxes during a fuel assembly withdrawal in Mode 6.

b. If the SRM-neutron decouple is determined to be a non-credible phenomenon, please provide the rationale in support of the determination.

c. If the SRM-neutron decouple is determined to be a credible phenomenon, please justify the proposed change to remove CORE ALTERATION from the TSs. The justification should include information addressing the compliance with:

   i. Acceptance criterion in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," (SRP) Section 15.6.4, "Radiological Consequences of Main Steam Line Failure Outside Containment (BWR)," that requires that at least 30 minutes is available from the time the operator is made aware of the unplanned boron dilution event to the time a total loss of shutdown margin (criticality) occurs during refueling (Mode 6), and

   ii. Guidance of Item 4 on page 15.4.6-8 of SRP Section 15.6.4, Revision 2, March 2007, that specifies that redundant alarms should be available for the operator to identify and terminate the unplanned boron dilution within the required time.

APS Response

1. a. Response

PVNGS is designed with two source range monitors (SRM), positioned approximately 180 degrees apart; located outside the reactor vessel. The SRMs, in addition to providing the control room core neutron flux indication, also provide the neutron flux indication to the *Boron Dilution Alarm System* (BDAS). At PVNGS during core offload, after sufficient fuel assemblies have been removed from the reactor vessel (and placed in the spent fuel pool) the 'far side' SRM from the remaining fuel assemblies will detect a reduced amount of neutron flux, as compared to the 'near side' SRM. This is because there is an area within the reactor vessel that only contains highly borated water and no fuel assemblies to serve as a neutron 'bridge' to link the detectors' response.

The exact timing of when the 'far side' SRM experiences this reduction in neutron flux is highly dependent on the reactivity of the fuel assemblies in the reactor vessel and the sequence of the fuel assembly removal (i.e., which fuel assemblies are removed and when, during the core offload process).

1. b. Response

Based upon the design of the system at PVNGS, one SRM could experience a reduced amount of neutron flux, as compared to the other, during core offload. Therefore, a response to NRC request 1.c. is provided.

1. c. Response

As the response to NRC request 1.a. indicates, the withdrawal of fuel assemblies during a normal core offload could result in a condition where one SRM experiences a reduced neutron flux as compared to the other SRM. The removal of the term CORE ALTERATION from TS is justified, in part, based on the following information.

Background of the Boron Dilution Alarm System [BDAS] and Source Range Monitors [SRM]

The PVNGS Updated Final Safety Analysis Report (UFSAR), chapter 7, sections 7.1.1.10 and 7.1.1.11, describe the installed instrumentation as follows:

7.7.1.1.10 Excore Neutron Flux Monitoring System (Non-Safety Channels)

Two startup channels provide source level neutron flux information to the reactor operator for use during extended shutdown periods, initial reactor startup, startups after extended shutdown periods, and following reactor refueling operations. Each channel consists of a dual section proportional counter assembly, with each section having multiple BF3 proportional counters, one preamplifier located outside the reactor shield, and a signal processing drawer containing power supplies, a logarithmic amplifier, and test circuitry. High voltage power to the proportional counters is terminated several decades of neutron flux above the source level to extend detector life. These channels provide readout and audio count rate information but have no direct control or protective functions.

<u>7.7.1.1.11 Boron Dilution Alarm System</u>

Reactivity control in the reactor core is affected, in part, by soluble boron in reactor coolant system. The Boron Dilution Alarm System (Figure 7.7-11) utilizes the startup channel nuclear instrumentation signals to detect a possible inadvertent boron dilution event while in Modes 3-6. There are two redundant and independent channels in the Boron Dilution Alarm System (BDAS) to ensure detection and alarming of the event.

The BDAS contains logic which will detect a possible inadvertent boron dilution event by monitoring the startup channel neutron flux indications. When these neutron flux signals increase (during shutdown) to equal or greater than the calculated alarm setpoint, alarm signals are initiated to the Plant Annunciation System. The alarm setpoint is periodically, automatically lowered to be a fixed amount above the current neutron flux signal. The alarm setpoint will only follow decreasing or steady flux levels, not an increasing signal. The current neutron flux indication and alarm setpoint (per channel) are displayed. There is also a reset capability to allow the operator to acknowledge the alarm and initialize the system.

During normal core offload in Mode 6, with both SRMs operable (in compliance with applicable TS), both SRMs will initially have the same reading (within the range allowed by surveillance requirement 3.9.2.1). The BDAS alarm setpoint will also be approximately the same for both detectors. As the fuel assemblies are removed from the reactor vessel, the indication on both SRMs will decrease as the available neutron flux is decreased. As the UFSAR notes, both independent channels of BDAS will reduce their setpoints automatically. Once sufficient fuel assemblies have been removed, such that one SRM (and its associated BDAS channel) has indication of higher neutron flux level than the other SRM; the BDAS channel that is associated with the SRM that has the reduced neutron flux indication will automatically reduce its setpoint to a lower value, commensurate with the lower neutron flux reading on the SRM. Thus, from this point in the core offload process until the core is entirely offloaded to the spent fuel pool, the two independent BDAS channels will have different alarm setpoints but remain capable of indicating a boron dilution event.

Technical Specification Action Requirements – Current

During core offload, when both SRMs are indicating approximately the same reading, if a SRM experiences a failure such that it is inoperable, TS 3.9.2 and 3.3.12 Conditions would be entered. The current PVNGS TS would require 3 actions to be completed immediately.

The first action is TS 3.9.2, Condition A.1, Suspend CORE ALTERATIONS. This is defined as stopping the movement or manipulation of any fuel, sources, or reactivity control components [excluding control element assemblies (CEAs) withdrawn into the upper guide structure], within the reactor vessel with the vessel head removed and fuel in the vessel (i.e., fuel assemblies cannot be either removed from or added/inserted into the reactor vessel).

The second action is TS 3.9.2, Condition A.2, Suspend positive reactivity additions. While this term is not specifically defined, it means that both boron dilutions and changes in reactor coolant system (RCS) temperature that add positive reactivity to the core (hence reduce shutdown margin / decrease core sub-criticality) are to be secured, as clarified by APS RAI response dated October 11, 2012 (APS letter no. 102-06604).

The third action is TS 3.3.12, Condition A.1, Determine the RCS boron concentration. This requirement is based on the boron concentration measurement and the operable BDAS channel providing alternate methods of detection of boron dilution with sufficient time for termination of the event before the reactor achieves criticality (as documented in TS Bases 3.3.12, description of Action A.1).

If during core offload, the SRM with the higher neutron flux level experiences a failure, such that it is inoperable and TS 3.9.2 and TS 3.3.12 Conditions are entered (when there are significantly reduced numbers of fuel assemblies in the core), the current TS would require the same 3 actions described above to be completed immediately.

Standard Review Plan Discussion

The Standard Review Plan (SRP) criteria of Section 15.4.6 - *Inadvertent Decrease in Boron Concentration in the Reactor Coolant System (PWR)*, requires at least 30 minutes, from the time the operator is made aware of the unplanned boron dilution event, to the time a total loss of shutdown margin (criticality) occurs during refueling (Mode 6). This is accomplished at PVNGS by having both operable BDAS channels and monitoring of the RCS concentration through boron concentration measurement, in the event a channel is inoperable.

In the case of an inoperable BDAS channel, the BDAS setpoint on the operable channel is adequate to detect a boron dilution event. Boron concentration monitoring is the redundant process that provides defense-in-depth to detect a boron dilution event. The PVNGS UFSAR chapter 15.4.6 provides a discussion of how the required acceptance criteria of SRP Section 15.4.6 are satisfied.

SRP Section 15.6.4, *Radiological Consequences of Main Steam Line Failure Outside Containment (BWR),* is not specifically addressed in this response to the NRC request, as this SRP section is not relevant to PWRs, like PVNGS.

Technical Specification Action Requirements – Proposed

APS is requesting to remove the definition of CORE ALTERATION from TS consistent with TSTF-471. The LAR would change the required actions to be only the second and third items described in the aforementioned scenarios. The effect of the removal of the term CORE ALTERATION on TS 3.9.2 is that the change would allow the reactor vessel to be offloaded (fuel assemblies removed) with an inoperable SRM and BDAS channel, which would facilitate SRM corrective maintenance.

Protection of public health and safety during Mode 6 (refueling) is tied to the criticality state of the core. If the core remains sub-critical, then safety is ensured. PVNGS maintains administrative controls, consistent with the TS, to maintain a K_{eff} less than 0.95 during fuel handling evolutions. This procedural requirement is in addition to the Core Operating Limits Report (COLR) requirement that the refueling boron concentration be maintained at a uniform concentration greater than or equal to 3000 ppm, which supports TS 3.9.1.

Core sub-critically in Mode 6 can be changed by (1) changing the amount of soluble poison (boron) in the RCS coolant and core or by (2) changing the RCS temperature, thus changing the amount of moderator reactivity feedback or by (3) changing the number of fuel assemblies in the reactor vessel. The requested change to TS 3.9.2, Condition A, restricts each of these ways of changing core sub-critically.

The proposed change would only allow the addition of soluble poison to the RCS coolant (per TS 3.9.1 and COLR item 3.9.1) that increases the uniform RCS boron concentration. Such a change would not result in a positive change in core reactivity or a reduction in core sub-criticality. The proposed change would also allow a change in RCS temperature that results in a change in moderator feedback such that only negative reactivity was added to the core, as clarified in APS letter no. 102-06604, dated October 11, 2012.

The proposed TS 3.9.2, Condition A, would allow Palo Verde to either continue removing assemblies from the core or start removing fuel assemblies, after both TS 3.9.2, Condition A, and TS 3.3.12, Condition A, where met. The removal of fuel assemblies (and storing them in the spent fuel pool) increases the sub-critically of the core, by removing the source of neutrons from the core; thus increasing the core sub-criticality, and ensuring safety.

Should the remaining operable SRM (when there is reduced numbers of fuel assemblies in the core) experience a failure, such that it is inoperable, then TS Bases 3.3.12, Action B.1, describes the redundant methods that are to be implemented when both independent channels of BDAS are inoperable. The use of redundant methods to monitor the RCS boron concentration provides alternate indications of inadvertent boron dilution. This will allow detection with sufficient time for termination of a boron dilution event before the reactor achieves criticality, consistent with the objectives of the SRP.

The case of SRMs being inoperable is a condition of the TS Actions, and not the normal plant design configuration described in the SRP. As such, the requirements of the TS Actions govern, which allow for circumstances that deviate from the design configuration for limited periods, until compliance with the TS LCO and the SRP design configuration (including the single failure criterion) can be restored.

Misloaded Fuel Assembly Event Discussion

The NRC request also mentions the misloaded fuel assembly event, as it relates to a condition where one SRM is experiencing a reduced neutron flux as compared to the other SRM. The Inadvertent Loading of a Fuel Assembly into the Improper Position (NUREG-0800, SRP, Section 15.4.7) is discussed in PVNGS UFSAR Chapter 15.4.7. As noted in the SRP Acceptance Criteria Section (page 15.4.7-2):

> The primary safeguards against fuel-loading errors are procedures and design features to minimize the likelihood of the event. Additional safeguards include incore instrumentation systems which would detect errors. However, should an error be made and go undetected, it is possible in some reactor designs for fuel rod failure limits to be exceeded. Therefore, the following acceptance criteria cover the event of operation with misloaded fuel caused by loading errors:
>
> 1. To meet the requirements of GDC 13, plant operating procedures should include a provision requiring that reactor instrumentation be used to search for potential fuel-loading errors after fueling operations.

As noted in the acceptance criteria, the principle concern with this event is not during the refueling of the core with new assemblies, as any assembly misloadings during this time period are to be identified by the use of administrative controls, including station procedures. Rather, the issue is the ability to detect a mis-loading with in-core instrumentation after the core has been fully reloaded / refueled and returned to operation. As noted in the PVNGS UFSAR Section 15.4.7, there are various processes and tests used (independent of the SRMs) to verify the fuel loading, during initial criticality of the refueled core and during operation of the core, to ensure a misloaded fuel assembly is identified prior to fuel rod failure limits being exceeded.

The requested change to the TS to eliminate the term CORE ALTERATION does not change the methods presented in UFSAR Section 15.4.7 or the processes APS uses to refuel / reload the core. The proposed change does not, therefore, affect the likelihood or consequences of a misloaded fuel assembly.

<u>NRC Request 2</u> (December 19, 2012 NRC RAI)

The NRC staff is concerned that, without a prior criticality analysis, it could be difficult to determine whether shuffling an assembly (change the core geometry) causes a positive or negative reactivity change. By restricting core alteration, rather than just positive reactivity addition, current TS 3.9.2 explicitly delineates components that cannot be moved, and this TS restriction of core alteration could prevent the operator from misjudging the reactivity of the fuel assembly movement.

Please describe how the licensee determines whether shuffling an assembly would cause a positive or negative reactivity change.

<u>APS Response</u>

If TS LCO 3.9.2, Condition A, is entered due to an SRM being inoperable, current Required Action A.2 (proposed Action A.1), requires operations to suspend positive reactivity additions. This would be accomplished by (1) suspending the insertion of new fuel assemblies into the core, and by (2) suspending any in-core shuffle, until the LCO requirement of two SRMs being operable has been restored. Suspension of positive reactivity additions would not preclude allowing core off-load to proceed, if needed for example to perform SRM maintenance.

In accordance with TS / COLR limit 3.9.1, the boron concentration of all filled portions of the RCS and the refueling canal shall be maintained at a uniform concentration of greater than or equal to 3000 ppm. Additionally, surveillance requirement (SR) 3.5.5.3 requires the Refueling Water Tank (RWT) boron concentration to be greater than or equal to 4000 ppm and less than or equal to 4400 ppm. The RWT is the source of borated water for the RCS (and refueling pool) during refueling operations and, in practice, the refueling boron concentration is greater than or equal to 4000 ppm, rather than the less restrictive COLR limit of greater than or equal to 3000 ppm.

The all rods out (ARO) reactivity for any given end-of-cycle N-1 configuration at the COLR refueling boron concentration limit of 3000 ppm and refueling conditions is such a large negative value that any used fuel assembly may be moved to any desired location in-core. This complete freedom of used fuel assembly movement exists up until the time a new fuel assembly is placed in the core.

On a cycle-specific basis, the boron concentration required to maintain a core K_{eff} equal to 0.95 with minus 1 percent delta rho added for uncertainty is determined. This cycle-specific refueling boron concentration confirms the conservativeness of the COLR TS LCO 3.9.1 refueling boron concentration limit with respect to the upcoming cycle. This boron concentration is calculated at ARO, beginning-of-cycle N, with all new assemblies in their final core locations, and initial conditions such as RCS temperature applicable to refueling conditions. This core configuration represents the most reactive analyzed configuration for the cycle-specific refueling condition. Since the PVNGS CEAs are withdrawn into the Upper Guide Structure (UGS) and, therefore removed from the core during the normal refueling process, no credit for CEAs is taken when calculating and/or confirming the refueling boron concentration. No inserted control rod worth is, therefore, needed to meet the desired 0.95 K_{eff} during refueling.

If an in-core shuffle were to be conducted (APS does not currently plan to perform in-core shuffles, but rather performs full-core offloads), an additional rule would be imposed to control the movement and placement of fuel assemblies. This rule would be enforced by procedure and by the special nuclear materials control and accountability process. In order to preclude the existence of unanalyzed core configurations having reactivity more positive (less negative) than the final beginning-of-cycle N configuration, it would be necessary to observe the following rule.

> Immediately before, and at all times after, the introduction of the first new fuel assembly into the core, the placement of fuel assemblies must be restricted as follows. Every assembly in the core must be either in its final beginning-of-cycle N location or in a core location which will ultimately contain (in the final beginning-of-cycle N core configuration) an assembly of equal or greater k-infinity. Cycle-specific k-infinity data will be used for this determination.

In summary, if TS LCO 3.9.2, Condition A, is entered, due to an SRM being inoperable, TS require operations to suspend positive reactivity additions. This would be accomplished by (1) suspending the insertion of new fuel assemblies into the core, and by (2) suspending in-core shuffle until the LCO requirement of two SRMs being operable has been restored. This would not preclude partially or fully offloading the core in order to facilitate restoration of the SRMs, if warranted. While APS has no current plans to perform core shuffles, in lieu of full-core offloads, positive administrative controls would be implemented to ensure ample margins to criticality during core shuffles.

<u>**NRC Request 3**</u> (January 3, 2013 NRC RAI)

The LAR states:

> In summary, with the exception of suspending movement of irradiated fuel assemblies, there are no design basis accidents or transients that are initiated by, or mitigation affected by, suspension of CORE ALTERATIONS. Therefore, removing CORE ALTERATIONS from applicability of TS 3.3.8, *Containment Purge Isolation Actuation Signal* (CPIAS) and TS 3.9.3, *Containment Penetrations*, is justified. In addition, with the exception of two TSs discussed below, the TS Required Actions that currently require suspension of CORE ALTERATIONS also require suspension of movement of irradiated fuel. For these TSs, suspension of CORE ALTERATIONS provides <u>no safety benefit</u> [emphasis added] and the removal of the suspension of CORE ALTERATIONS is justified.

NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," (SRP) Section 15.7.4, "Radiological Consequences of Fuel Handling Accidents," states:

> The purpose of the review is to evaluate the adequacy of system design features and plant procedures provided for the mitigation of the radiological consequences of accidents that involve damage to spent fuel. Such accidents include the dropping of a single fuel assembly and handling tool <u>or of a heavy object onto other spent fuel assemblies</u> [emphasis added].

Previously, suspension of CORE ALTERATIONS would preclude not only the movement of fuel, but would also preclude the movement of sources and reactivity control components. Dropped fuel sources or reactivity control components could break or they could damage a fuel assembly. Per SRP 15.7.4, these scenarios are to be considered. Although the amount of damage to fuel assemblies due to a dropped radioactive source or components would likely be less than for a dropped assembly, the overall dose to the public and operators might be greater because with the proposed change certain mitigating systems are no longer required to be operable. Please clarify how the suspension of CORE ALTERATIONS would provide "no safety benefit."

Based on the SRP summarized above, please state whether a dropped source or component (or any other item allowed to be moved by CORE ALTERATIONS) can damage a fuel assembly or break and create a radioactive source term. If so, please provide the analysis that shows that the dose consequences of these scenarios are less limiting than the current fuel handling accident. Provide the assumptions, inputs and results of these analyses.

<u>APS Response</u>

In the PVNGS reactor design, control components (CEAs) are removed from the reactor vessel with the upper guide structure, so a drop of these components is not postulated, and excluded in the definition of CORE ALTERATION.

The PVNGS fuel handling accident analysis, as reviewed by the NRC, is discussed in NRC letter dated September 29, 2003, *Palo Verde Nuclear Generating Station, Unit 2 (PVNGS-2) – Issuance of Amendment on Replacement of Steam Generators and Uprated Power Operation* (TAC No. MB3696 - ADAMS Accession Number ML032731029). The PVNGS fuel handling accident analysis has several conservatisms to ensure that it is bounding for all other similar, potential accidents. The analysis documents that the dropped fuel assembly is the only fuel assembly that sustains damage. This was demonstrated by assessing various vertical and horizontal drops, and assumes the dropped assembly reaches terminal velocity (i.e., bounds drop heights) as described in the PVNGS UFSAR, Section 15.7.4, *Radiological Consequences of Fuel Handling Accidents.*

The current analysis assumes that the fuel element damaged is the fuel element with the greatest possible burnup at equilibrium fuel cycle at 102 percent licensed power, and the initiating event occurs 72 hours after reactor shutdown. These assumptions provide the maximum possible radioactive source term.

In addition, it is assumed all of the fuel pins of the dropped fuel assembly sustain damage during the event. These assumptions are bounding relative to criteria from Regulatory Guide 1.25, *Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors (Safety Guide 25)*, Standard Review Plan Section 15.4.7, *Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position,* as well as the PVNGS Technical Requirements Manual (TRM), Section T3.9.100, *Refueling Operations, Decay Time.*

It is also assumed that the fuel has a burnup of 70,000 MWD/MTU and an initial enrichment of 5.0 weight percent U-235. The 70,000 MWD/MTU value is conservative compared to the 60,000 MWD/MTU used in NRC Topical Report CEN-386-P-A, which was used in establishing the PVNGS Safety Limits. The 5.0 weight percent U-235 enrichment value is conservative, when compared to the value of 4.80 weight percent U-235 established in PVNGS TS Section 4.3.1.

It is also conservatively assumed that all activity escaping the water surface is instantaneously mixed homogeneously with the building volume following initiation of the event, with no credit for Containment Purge Isolation. The dose consequences of a fuel handling accident in Containment bound similar events in the Fuel Building.

Based on the conservative assumptions outlined above, the consequences of a dropped source or component (or any other item allowed to be moved by core alterations) are bounded by the current fuel handling accident analysis.

Under routine plant operation, there are no sources present, other than used and new fuel assemblies. In the case of a prolonged shutdown, where a startup neutron source may be needed (e.g., all transuranium has decayed and there is not sufficient neutron flux to start-up using used fuel), the time since shutdown will be sufficiently long that the amount of the critical isotope present (i.e., iodine), is negligible. As a result, a drop of a source is bounded by the current fuel handling accident dose consequence analysis. Therefore, no specific analyses have been performed for other non-bounding drop events.

PVNGS procedures control movement of heavy loads consistent with the current licensing basis with regard to NUREG-0612, *Control of Heavy Loads at Nuclear Power Plants.* Non-bounding load drop events do not meet the criteria of 10 CFR 50.36, *Technical specifications*, subsection (c)(1)(ii) for inclusion in the TS limiting conditions for operation (LCOs). As a result, it is appropriate to remove TS controls for such non-bounding events, as proposed by the LAR elimination of the term CORE ALTERATION.