



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 17, 2014

Mr. George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 -
REQUEST FOR ADDITIONAL INFORMATION REGARDING ATMOSPHERIC
DUMP VALVES LICENSE AMENDMENT REQUEST (TAC NOS. MF3388 AND
MF3389)

Dear Mr. Gellrich:

By letter dated January 13, 2014, Calvert Cliffs Nuclear Power Plant, LLC submitted a license amendment request to add Technical Specifications for atmospheric dump valves for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2.

The Nuclear Regulatory Commission (NRC) staff is reviewing the submission and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The NRC staff is requesting a response to the RAI within 45 days of the date of this letter.

If you have any questions regarding this issue, please contact me at (301) 415-1016.

Sincerely,

A handwritten signature in black ink, appearing to read "Nadiyah S. Morgan".

Nadiyah S. Morgan, Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
RAI

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

REGARDING ATMOSPHERIC DUMP VALVES

LICENSE AMENDMENT REQUEST

CALVERT CLIFFS NUCLEAR POWER PLANT, LLC.

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-317 AND 50-318

By letter dated January 13, 2014 (Agencywide Documents Access and Management System Accession No. ML14015A138), Calvert Cliffs Nuclear Power Plant, LLC, the licensee, submitted a license amendment request (LAR) to add Technical Specifications (TSs) for atmospheric dump valves (ADV) for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (Calvert Cliffs). In order to complete its review, the Nuclear Regulatory Commission (NRC) staff needs the following additional information:

Reactor Systems:

1. The LAR refers to the updated final safety analysis report (UFSAR) Section 14.15, "Steam Generator Tube Rupture Event [SGTR]" as the limiting case for radiological releases due to ADV operation. Revision 46 of the UFSAR has the latest analytical evaluations of the Nuclear Steam Supply System response to a postulated SGTR event. Reference 4 of Section 14.15.5 presents the re-analyzed consequences for this event and has the following citation: "CA06595, Westinghouse Calculation CN-TAS-05-13, Revision 000, Calvert Cliffs Units 1 & 2 [SGTR] Event." This calculation package is not currently available to the NRC staff. Please provide the calculation package CA06595, Westinghouse Calculation CN-TAS-05-13, Revision 000.
2. On page 5 of the LAR, it is stated that for the SGTR event under UFSAR Section 14.15, the ADV on the affected steam generator (SG) is assumed to open upon turbine and reactor trip and a loss of offsite power. However, UFSAR Section 14.15 does not provide "a loss of offsite power" as an assumption for the presented analysis. The UFSAR states that for the SGTR event analysis, "no credit was taken for the operation of the steam bypass valves to the condenser," it is later stated that other means are available for cooldown, if the ADVs are unavailable.
 - a. Because the LAR states, in support of the TS, that the loss of offsite power is an assumption in the UFSAR analysis, provide justification for the loss of offsite power as an assumption in the SGTR event analysis or provide a revised analysis in support of the LAR that includes the loss of offsite power as an initial assumption for the SGTR event.

Enclosure

- b. Provide documentation (analysis and procedures) as to what other means are available for cooldown if the ADVs are unavailable given the event assumptions of a loss of offsite power and no credit being taken for the operation of the steam bypass valves to the condenser.

Balance of Plant:

3. The licensee determined that the ADVs meet Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(2)(ii) Criterion 3 and should be included in the plant TSs. The licensee stated that they modeled the proposed new TS upon provision 3.7.4 in NUREG 1432, Revision 4, "Standard Technical Specifications [STS] - Combustion Engineering Plants," March 2012. In the STS bases document that supports TS 3.7.4, it states that four ADV lines are provided. Two ADV lines per SG are necessary in order to have at least one operable following an event rendering one SG unavailable and a single failure renders one of the ADVs inoperable on the other SG.

Specifically, the STS states:

- LCO [Limiting Conditions for Operation] 3.7.4 Condition A (One required ADV line inoperable) a completion time of 7 days.
- LCO 3.7.4 Condition B (Two or more [required] ADV lines inoperable) a completion time of 24 hours.

The licensee's LAR states:

- LCO 3.7.18 Condition A (One required ADV line inoperable) a completion time of 48 days.
- LCO 3.7.18 Condition B (Two ADV lines inoperable) a completion time of 1 hour.

The licensee only has two ADV lines per unit and one per SG. The licensee proposes TS 3.7.18 with a limiting condition for operation requiring two ADVs lines be operable. The licensee acknowledged that their plant design deviates from the STS design. In accordance with 10 CFR 50.36(b), TSs will be derived from the analyses and evaluation including the safety analysis report.

- a. Please provide a discussion of how the ADVs lines are used in accident mitigation in to order to determine the appropriate TS conditions, actions, and surveillance requirements (SRs).

The discussion should include the following:

- The requirements of ADV remote operations
- The requirements of credited ADV local operation within a certain time restraint.
- The requirements of the ADVs being able to close remotely and manually.

- The requirements of the ADV lines meeting single failure assumption, following an event rendering one SG unavailable (i.e., what is licensing basis under single failure considerations).
- The requirements of the ADV block valves being credited in the analysis in the event the ADV fails to close once open.
- The technical basis, including a discussion of defense in depth and safety margins for the proposed LCO's 3.7.8, Condition A and B Completion Times of 48 hours and 1 hour, respectively.

b. In addition, describe the failure and effects analysis for the ADV line.

4. In the bases section of STS B3.7.4 – Combustion Engineering Plant, the ADV, also called atmospheric vent valves block valves, are described as part of the ADV line. The STS for the two other types of pressurized water reactors (Westinghouse [B3.7.4] and Babcock and Wilcox [B3.7.4]) recommends a TS SR for the ADV block valve. In the description of the bases for the proposed TS B3.7.18, the licensee does include the statement, "Each ADV line consists of one ADV and an associated isolation valve. The ADVs are provided with upstream isolation valves to permit their being tested at power, if desired." However, the licensee did not propose a TS SR for these isolation valves.

If the ADVs cannot be closed due to the failure that causes the ADVs to spontaneously open and remain open, then the licensee can isolate the potential radiological steam release by closing the associated ADV isolation (block) valve.

a. Justify why there is not a TS surveillance for the ADV block valves.

b. Verify that the ADVs can be reliably closed in the event the ADV spontaneously opens.

5. In UFSAR Section 14.15.1, the licensee stated, "The use of the affected ADV in this analysis is for the purpose of maximizing the radiological releases during the event since the ADVs are not required for cooldown. The ADVs do not perform a safety function; other means are available for cooldown, turbine bypass valves, MSSVs [main steam safety valves], and once-through core cooling, if ADVs are unavailable. If neither ADV were used, releases to the atmosphere would decrease."

Additionally, the licensee states in UFSAR Section 14.15.2, "No credit was taken in the analysis for operation of the steam bypass valves to the condenser. All of the steam releases are assumed to be directed to the atmosphere via the MSSVs or the ADVs."

In the LAR, the licensee stated, in part, "The ADVs are part of the primary success path for cooldown of the Unit following a SGTR. In a SGTR, the fission product barrier [the reactor coolant system (RCS)] is assumed to be failed. Therefore, the ADVs meet 10 CFR 50.36(c)(2)(ii) Criterion 3 and should be included in the TSs. The proposed TS is based on NUREG-1432 and is modified based on plant specific design features."

The licensee's position is unclear in its UFSAR for how a SGTR is to be mitigated. In UFSAR Section 14.15.1, the licensee stated that there are other means available to cooldown the RCS during a SGTR. In the LAR, the licensee explains that the ADVs are

part of the primary success path for cooldown of the Unit following a SGTR. Also, the ADVs are assumed to be used by the operator to cool down the unit to shutdown cooling system entry conditions because the accident is accompanied by a loss of offsite power.

Provide a description (update to UFSAR) of a SGTR event specifically showing which equipment that is now credited for accident mitigation, how that equipment is used, operator actions due to the loss of offsite power, and how a single failure would affect the ability of this equipment to perform its function.

6. In the LAR, the licensee provides a discussion of the different types of expected accidents and transients in Table 1, Summary of UFSAR Chapter 14 Event Dispositions.

For the Excess Load Event, UFSAR Section 14.4.3.3 states that the radiological consequence of stuck open atmospheric dump and turbine bypass valves during an Excess Load Event is less adverse than the Loss of Non-Emergency Alternating Current (AC) Power event. Since non-emergency AC power is still available in the Excess Load Event, steam may be directed to the condenser after 10 minutes for controlled plant cooldown. When this happens, the steam (and any activity in it) is no longer being released directly to the atmosphere through the ADVs and MSSVs.

- a. Provide sufficient details on the valve and its failure modes that would cause the valve to spuriously open or fail open.
 - b. Identify the method to close the valve or isolate the flow path within 10 minutes, given the valve design and the failure modes.
 - c. Identify if this action is time critical and identify if this is a time critical operator action.
7. In the LAR, the licensee provides a discussion of the different types of expected accidents and transients in Table 1, Summary of UFSAR Chapter 14 Event Dispositions.

For the Loss of Non-Emergency AC Power Event, UFSAR Section 14.10.2 states that with the atmospheric steam dump and turbine bypass systems inoperable, the SG pressure will rapidly approach the MSSVs' opening pressures. The MSSVs will open as this is the only path for removal of decay heat (i.e., steam). With reactor power decreasing to decay heat levels, the RCS will continue to transfer heat to the SGs, thereby keeping the main steam safeties open.

Also, UFSAR 14.10.2 states that the subcooled auxiliary feedwater decreases the SG temperature and starts to cool down the RCS. At 900 seconds (15 minutes), the analysis assumes the operator, by remote-manual operation of the ADVs, initiates plant cooldown. Therefore, the ability to remotely operate the ADVs is lost once non-emergency power is lost.

Provide sufficient information on the ADVs to explain how operation is performed within the time constraints identified in the safety analyses.

8. In the LAR, the licensee provides a discussion under "Testing History" and stated that the ADVs are very reliable valves and that ten years of Condition Reports were reviewed for any issues related to ADV operation.

The NRC staff reviewed operating experiences for the ADVs at Calvert Cliffs and noted failures that were not described in the LAR.

Provide sufficient information to support your statement for the Calvert Cliffs ADVs 1/2-CV-3938 and 1/2-CV-3939. The ADVs that fail to open, fail to close, seat leakage, etc. should be described in the LAR.

9. In the LAR, the licensee stated that, "if local manual operation is required, the ADVs can be locally opened or closed using a hand wheel attached to the ADV. The hand wheel is external to the ADV enclosure in the Auxiliary Building. The area is accessible following a turbine and reactor trip or an accident. Intermediate positioning of the ADV can also be performed using the hand wheel. The ADVs controls receive electrical power from emergency diesel generator-backed, engineered safety feature, 125 VDC unit control panels. When electrical power is unavailable, the quick-opening feature is disabled. The ADVs may still be automatically or manually controlled from the Control Room. Loss of control voltage also actuates an alarm in the Control Room. Local manual operation of the ADVs does not require electrical power or air to function as designed."

The ADV automatic controls and manual controls were not described in detail for the NRC staff to understand the valve controls and interactions. Provide the emergency procedures and sufficient information related to manual ADV controls. Specifically, if the operator in the field takes over manual control of the ADV, are control signals from the reactor regulation system disabled? If so, how is the instrument logic locked out from controlling the ADV?

10. In the LAR, the licensee stated that, "the ADVs and turbine bypass valves reduce, but do not eliminate, the probability of the main steam safety valves (MSSVs) opening following turbine and reactor trips from full power. The steam dump system is safety-related. Two normally shut ADVs are connected to the main steam headers between the containment penetrations and the MSSVs. When opened, the ADVs exhaust part of the secondary steam flow to the atmosphere through separate vent enclosures which extend from the 45-foot level up through the roof of the Auxiliary Building."

Details of the ADV exhaust path pipe routing through the Auxiliary Building roof is not specified. Provide sufficient information related to the ADV piping extension up through the roof of the Auxiliary Building. Specifically, are the ADV exhaust path and pipe route designed against damage from hurricane or tornado generated missiles? Clarify the safety classification of the piping extension and whether it has been reviewed against vulnerability of hurricane or tornado generated missiles.

September 17, 2014

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/RA/

Nadiyah S. Morgan, Project Manager
Plant Licensing Branch I-1
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Docket No. 50-317 and 50-318

Enclosure:
RAI

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***See dated memo**

OFFICE	LPLI-1/PM	LPLI-1/LA	DSS/SRXB/BC	DSS/SBPB/BC	LPLI-1/BC
NAME	NMorgan	KGoldstein	CJackson	GCasto	BBeasley
DATE	9/15/2014	08/27/2014	7/8/2014	7/25/2014	9/17/14

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