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UniStar
NUCLEAR ENERGY

10 CFR 50.4
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March 07, 2013

UN#13-017

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

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Response to Request for Additional Information for the
Calvert Cliffs Nuclear Power Plant, Unit 3,
RAI 382 Switchgear Building Ventilation System, Turbine Island

References:
1) Surinder Arora (NRC) to Paul Infanger (UniStar Nuclear Energy), "CCNPP3 - FINAL RAI 382 SCVB 6909," email dated January 10, 2013

2) UniStar Nuclear Energy Letter UN#13-005, from Mark T. Finley to Document Control Desk, U.S. NRC, Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3, RAI 382 Switchgear Building Ventilation System, Turbine Island, dated February 8, 2013

The purpose of this letter is to respond to the request for additional information (RAI) identified in the NRC e-mail correspondence to UniStar Nuclear Energy, dated January 10, 2013 (Reference 1). This RAI addresses Switchgear Building Ventilation System, Turbine Island, as discussed in Section 9.4.4 of the Final Safety Analysis Report (FSAR), as submitted in Part 2 of the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 Combined License Application (COLA), Revision 8.

Reference 2 indicated that a response to RAI 382, Question 09.04.04-4 would be provided to the NRC by March 8, 2013. Enclosure 1 provides our response to RAI No. 382, Question 09.04.04-4, and includes revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes into a future revision of the COLA.

Enclosure 2 provides a Table of Changes to the COLA associated with this RAI 382 response.

Our response does not include any new regulatory commitments. This letter does not contain any sensitive or proprietary information.

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NRO

If there are any questions regarding this transmittal, please contact me at (410) 369-1907 or Mr. Wayne A. Massie at (410) 369-1910.

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

Executed on March 7, 2013

Mark T. Finley

Enclosures:
1) Response to NRC Request for Additional Information RAI No. 382, Question 09.04.04-4, Switchgear Building Ventilation System, Turbine Island, Calvert Cliffs Nuclear Power Plant, Unit 3
2) Table of Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 382

cc: Surinder Arora, NRC Project Manager, U.S. EPR Projects Branch
Laura Quinn-Willingham, NRC Environmental Project Manager, U.S. EPR COL Application
Amy Snyder, NRC Project Manager, U.S. EPR DC Application, (w/o enclosures)
Patricia Holahan, Acting Deputy Regional Administrator, NRC Region II, (w/o enclosures)
Silas Kennedy, U.S. NRC Resident Inspector, CCNPP, Units 1 and 2,
David Lew, Deputy Regional Administrator, NRC Region I (w/o enclosures)

Enclosure 1

Response to NRC Request for Additional Information
RAI No. 382, Question 09.04.04-4,
Switchgear Building Ventilation System, Turbine Island,
Calvert Cliffs Nuclear Power Plant, Unit 3

RAI No. 382

Question 09.04.04-4

The applicant stated that the site-specific design information to address the COL item 9.4-2 for the switchgear building ventilation system (SWBVS) will be included when the detailed design is sufficiently complete. The information and conclusions are expected to be similar to that provided for the turbine building ventilation system (TBVS) in Sections 9.4.4.1 through 9.4.4.6. The COL item for SWBVS cannot be evaluated until detailed design information is provided. Staff request the FSAR be amended to provide the design information as committed to in the application to enable the staff to reach a safety determination. Also provide the site-specific design information for the switchgear building ventilation system.

Response

FSAR Sections 9.4.4, 9.4.4.1, 9.4.4.2, 9.4.4.3, 9.4.4.4, and 9.4.4.5 have been revised to include both turbine building ventilation system (TBVS) and switchgear building ventilation system, turbine island (SWBVS) design information.

COLA Impact

CCNPP Unit 3 FSAR Chapter 9 has been updated as follows:

9.4.4 Turbine Island Ventilation System

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Items in Section 9.4.4:

> A COL applicant that references the U.S. EPR design certification will provide site-specific design information for the turbine building design information for the turbine building ventilation system (TBVS).
>
> A COL applicant that references the U.S. EPR design certification will provide site-specific design information for the switchgear building ventilation system, turbine island (~~SGBVS~~SWBVS).

The COL Items are addressed as follows:

The Turbine Island Ventilation System is comprised of the TBVS and the SWBVS. The site-specific design information for the TBVS and SWBVS are ~~turbine building ventilation system is~~ provided in Ssections 9.4.4.1 through 9.4.4.6. The information provided applies to both the TBVS and SWBVS, unless otherwise stated.

~~{The SGBVS information will be included when the detailed design is sufficiently complete. The information and conclusions are expected to be similar to that provided for the TBVS in Sections 9.4.4.1 through 9.4.4.6.}~~

9.4.4.1 Design Basis

The Turbine Building (TB) and Switchgear Building (SWGB) do ~~turbine building does~~ not contain safety-related equipment. Therefore, the ~~Turbine Building Ventilation System~~ TBVS and SWBVS do~~es~~ not serve any safety-related functions, ~~has~~ have no safety design basis, and ~~is~~ are not required to operate during or following a design basis accident. As such, single failure, environmental qualification and redundancy are not applicable to the ~~Turbine Building Ventilation System~~TBVS and SWBVS.

Turbine Building Ventilation System

The ~~Turbine Building Ventilation System~~TBVS operates during startup, shutdown, and normal plant operations to maintain acceptable air temperatures in the Turbine Building for equipment operation and for personnel working in the building. The system is not relied upon during Station Blackout and Abnormal (e.g. Loss of Off-Site Power) operation.

The ~~Turbine Building Ventilation system~~TBVS is sized to provide the heating, ventilation, and cooling requirements during startup, shutdown, and normal plant operations. The system is designed to maintain a positive pressure to mitigate intrusion of dust and dirt into the Turbine Building.

The ambient outside design conditions for the ~~Turbine Building Ventilation System~~TBVS are established as -10°F for the minimum temperature and 100°F for maximum temperature. The ~~Turbine Building Ventilation System~~TBVS maintains the bulk average temperature within the Turbine Building during normal plant operation at or above 50°F during winter design conditions and at or below 115°F during summer design conditions.

The rate of ventilation is based on maintaining permissible temperatures in areas with appreciable heat gains. For areas with no appreciable heat gains, the rate of ventilation is based on the number of air changes per hour, depending on the specific area being ventilated.

Switchgear Building Ventilation System, Turbine Island

The SWBVS operates during startup, shutdown, and normal plant operations to maintain acceptable air temperatures in the SWGB for equipment operation and for personnel working in the building. The station blackout (SBO) diesel generators divisions 1 & 2 and associated electrical equipment are located inside the Switchgear Building. Ventilation is provided to the SBO rooms by an independent ventilation system, not by the SWBVS described in this section.

The independent station blackout room ventilation system is described in U.S. EPR FSAR Section 9.4.10.

The SWBVS is sized to provide heating, ventilation, and cooling requirements during startup, shutdown, and normal plant operations in the SWGB electrical rooms (battery rooms, Motor Control Center (MCC) rooms, DCS rooms and equipment rooms), and auxiliary boiler rooms.

The ambient outside design conditions for the SWBVS HVAC systems are established as -10°F for the minimum temperature and 100°F for the maximum temperature. The ambient outside design temperature for the once-through ventilation systems of the SWBVS is established as -5°F for the minimum temperature and 95°F for the maximum temperature.

The ~~Turbine Building Ventilation System provides~~TBVS and SWBVS provide the following functions:

- ♦ Maintain personnel comfort in normally occupied areas of the building
- ♦ Maintain closed space ambient conditions for proper equipment operation within the Turbine Building and Switchgear Building
- ♦ Remove heat generated by equipment
- ♦ Provide fire dampers to separate the different fire zones
- ♦ Smoke venting of the turbine hall and Switchgear Building, after a fire in the area
- ♦ Availability of system operation with manual or automatic actuation for essential system functions
- ♦ Provide ventilation for the battery rooms, within the Switchgear Building

9.4.4.2 System Description

Turbine Building Ventilation System

The Turbine Building Ventilation System is shown in Figure 9.4-1.

Outside air is supplied to the Turbine Building by fans via intake louvers and exhausted to the atmosphere by roof exhaust ventilators. During normal operation outside air is mixed with recirculated air to maintain a positive pressure in the Turbine Building.

The ~~Turbine Building Ventilation System~~TBVS removes heat generated by equipment and from the environment to maintain acceptable indoor ambient conditions. Unit heaters are used to maintain the minimum room temperatures within the Turbine Building.

An air conditioning unit in the sampling room located on the basement floor maintains the sample lab equipment at a design minimum temperature of 50°F, and a design maximum temperature of 95°F.

There are no radiation or safety actuation signals associated with the ~~Turbine Building Ventilation System~~TBVS. No ~~Turbine Building Ventilation System~~TBVS realignment or operator action is required in response to plant radiation or safety actuation signals.

The ~~Turbine Building Ventilation System~~TBVS is designed as a ~~non~~ non-seismic system since there are no seismic Category I SSCs inside the Turbine Building.

Switchgear Building Ventilation System, Turbine Island

Each SWGB electrical distribution train will have its own independent and identical heating, ventilation, and air conditioning (HVAC) system. Outside makeup air supplied via intake louvers is mixed with the recirculated air returned from the equipment rooms, before it enters the air conditioning unit to be filtered, heated or cooled, and humidified. A portion of the recirculated air

from the equipment rooms is exhausted back to the atmosphere. The battery rooms have 100% of the air exhausted to the atmosphere. The air conditioning units maintain the electrical and occupied rooms at the associated design temperatures. During cold weather, electric heaters in the supply ducts maintain the required minimum temperature in SWGB battery rooms and workstations.

The SWBVS removes heat generated by equipment and from the environment to maintain acceptable indoor ambient conditions.

The SWBVS also provides independent and identical ventilation of the spreading rooms, cable chases, and HVAC equipment rooms for each distribution train. During cold weather, electric unit heaters recirculate the air in the room to maintain the required minimum temperature.

The SWBVS provides ventilation of the stair towers along with the auxiliary boiler room, equipment rooms and electrical room. During cold weather, electric unit heaters recirculate the air in the rooms to maintain the required minimum temperature.

There are no radiation or safety actuation signals associated with the SWBVS. No SWBVS realignment or operator action is required in response to plant radiation or safety actuation signals.

The SWBVS is designed as a non-seismic system since there are no seismic Category I SSCs inside the SWGB.

9.4.4.2.1 Component Description

The following major components of the TBVS and SWBVS are designed to the codes and standards identified below. Components are non-seismic and non safety-related.

Air Conditioning Units

The TBVS air conditioning unit for the sampling room is located on the basement floor of the Turbine Building. The SWBVS air conditioning units serve the electrical equipment rooms, battery rooms, workstations and access corridors; each unit is sized based on the occupancy and environmental conditions associated with the area under consideration. The cooling and heating coils are designed per ASME AG-1-2003 (ASME, 2003).

Ventilation Fans

Two basic types of ventilation fans are used for air supply, exhaust, and recirculation. These are propeller fans for low pressure, and axial fans for higher pressure (ducted) applications. Fan performance is rated to Air Moving and Conditioning Association ANSI/AMCA 210 (ANSI, 1999), ANSI/AMCA 211 (ANSI, 1987), and ANSI/AMCA 300 (ANSI, 1985).

Roof Exhaust Fans

To maintain acceptable pressures within the TB~~building~~, roof exhaust fans are provided which work in conjunction with the relief vents. Fan performance is rated to Air Moving and Conditioning Association ANSI/AMCA 210 (ANSI, 1999), ANSI/AMCA 211 (ANSI, 1987), and ANSI/AMCA 300 (ANSI, 1985).

Relief Vents

TB Ssupply fans that are associated with relief vents are capable of recirculating the air as well as providing air to a room. The relief vents provide a flow out of the room. The relief vents are designed per ASME AG-1-2003 (ASME, 2003).

Electric Unit Heaters and Hot Water Space Heaters

To maintain the minimum room temperatures within the Turbine Building and Switchgear Building, electric unit heaters or hot water space heaters are provided. Hot water space heaters are supplied from the space heating system with either the secondary steam or auxiliary boiler. Heaters are designed to commercial standards.

Air Filters

Air filters are provided for various fans to reduce the amount of dust within the ventilated area and prevent large particles from entering the system. The air conditioning units contains a high efficiency air filter to reduce the amount of dust on the cooling coils. The remaining filtersventilation fans use moderate efficiency filters. The filters are replaceable modular filter elements. The filters are designed per ASME AG-12003 (ASME, 2003) and tested per ANSI/ASHRAE Standard 52.2 (ANSI/ASHRAE 1999).

Louvers

Outside air is supplied by fans via intake louvers. The louvers are designed per ASME AG-1-2003 (ASME, 2003).

Dampers (manual, pneumatic, motor-operated, fire)

Manual dampers are used in the ducted system to balance airflow. Dampers are adjusted during initial plant testing to establish accurate flow balance between the rooms.

Pneumatic dampers are used to control the flow of the air through the various ductwork branches and to maintain a slight positive pressure in the TBbuilding. In cases where the dampers modulate (i.e., variable intake/recirculation supplies), the dampers are of opposed blade design. Dampers used for shut-off are of parallel blade design. Dampers in ductwork that exceed certain higher flow rates use airfoil shaped blades. This minimizes the pressure drop across the damper.

TBVS Mmotor operated dampers fail "as-is" in the case of power loss. SWBVS motor-operated dampers fail to "close" or "open" position in case of power loss, depending on the function of the dampers. Dampers in ductwork that exceed certain higher flow rates use airfoil shaped blades. This minimizes the pressure drop across the damper.

When ductwork passes through a fire barrier wall, fire dampers are installed in the wall with the ductwork mounted on either side. A fire is detected by a fire sensor and reported in the fire alarm system, which automatically closes the corresponding fire damper. Fire dampers are also automatically closed via a fusible link. Duct access is provided for inspecting and replacing fire damper fusible links. The fire dampers have a fire rating consistent with the associated fire

barrier wall rating. The dampers are designed per ASME AG-1-2003 (ASME, 2003) and UL 555-2006 (UL, 2006).

Ductwork and Accessories

The supply and exhaust air ducts are constructed of galvanized sheet steel and are structurally designed for fan shutoff pressure plus margin. The ductwork meets the design, testing, and construction specifications of ASME AG-1-2003 (ASME, 2003).

Humidifiers

Humidifiers are installed to maintain ambient humidity conditions in the electrical rooms. Humidity levels are controlled by the humidity sensors in the room.

9.4.4.2.2 System Operation

Turbine Building Ventilation System

The ~~Turbine Building Ventilation System~~TBVS is manually controlled. Roof exhaust fans and supply fans are manually started and stopped as required to satisfy space temperature conditions and to maintain a positive pressure in the Turbine Building.

Electric unit heaters and hot water space heaters are controlled automatically or manually. In the automatic mode, the electric unit heater fan motors are thermostatically controlled by their respective space thermostats. The space heating system supplies hot water to the hot water space heaters from either the secondary steam or auxiliary boiler.

Switchgear Building Ventilation System, Turbine Island

The SWBVS maintains the required ambient conditions in each electrical division of the SWGB, including the workstations, access corridors and equipment rooms. The main electrical equipment rooms (battery room, UPS equipment rooms and common equipment room) and occupied spaces are provided with outside air mixed with recirculated air that is processed through air conditioning units per train. The battery rooms' air is completely exhausted to the outside via redundant exhaust fans. The temperature and humidity are controlled by local temperature and humidity sensors. The battery rooms and workstation rooms have electric heaters installed in the supply ducts to maintain the minimum temperatures in the rooms.

The SWBVS maintains the required ambient condition in each division of the cable tray chases, spreading rooms, stair towers and HVAC equipment rooms by supplying filtered outside air to each room and exhausting the air to outside to maintain the required ventilation requirements. During winter conditions, electric unit heaters recirculate the air in each room to maintain the minimum required temperature. The unit heaters are thermostatically controlled by their respective area thermostats.

The auxiliary boiler room, along with its associated electrical and equipment rooms, are provided with supply air fans that draw outside air through filters to provide the required air delivery flow rates. Exhaust fans are used to exhaust the air from the room to the outside. During winter conditions, electric unit heaters recirculate the air in each room to maintain the

minimum required temperature. The unit heaters are thermostatically controlled by their respective area thermostats.

Components of the Switchgear Building Ventilation System, Turbine Island will be powered from the Normal Power Supply Systems (NPSS). Redundant components will be separated into different trains so that the system can remain operable during maintenance or in the case of a failure of one electrical train.

9.4.4.3 Safety Evaluation

The ~~Turbine Building Ventilation System performs~~TBVS and SWBVS perform no safety-related functions; therefore a systems failure analysis is not required. The ~~Turbine Building Ventilation System is~~TBVS and SWBVS are not required to operate during or following a design basis accident. TBVS and SWBVS components are non safety-related and non-seismic.

There are no safety-related SSCs or important to safety SSCs in the Turbine Building or Switchgear Building; therefore GDC 2 is not applicable to the ~~Turbine Building Ventilation System~~TBVS or SWBVS.

The ~~non-safety~~non safety-related ~~Turbine Building Ventilation System~~TBVS and SWBVS share~~s~~ no SSCs between units~~,~~; therefore this does not adversely impair any safety-related system, as required by GDC 5.

The ~~Turbine Building Ventilation System is~~TBVS and SWBVS are not exposed to any radiological contamination; therefore the requirements of GDC 60 are not applicable.

9.4.4.4 Inspection and Testing Requirements

Shop inspection and testing are performed by the manufacturer for major components, including heating and cooling coils and controls.

The ~~Turbine Building Ventilation System is~~TBVS and SWBVS are designed to permit periodic inspection of system components during normal plant operation. The operating equipment is accessible for visual inspection during all plant operating modes.

Fans are rated and tested in accordance with the standards of Air Moving and Conditioning Association (ANSI/AMCA 210 (ANSI, 1999), ANSI/AMCA 211 (ANSI, 1987), and ANSI/AMCA 300 (ANSI, 1985).

The performance and testing requirements of the isolation dampers are per ASME AG-1-2003 (ASME, 2003).

The filters meet the specifications of ANSI/ASHRAE Standard 52.2 (ANSI/ASHRAE, 1999).

The ductwork meets the design, construction, and testing requirements of ASME AG-1-2003 (ASME, 2003).

9.4.4.5 Instrumentation Requirements

Indication of the operational status of the equipment, position of remotely operated dampers, instrument indications and alarms are provided in the Main Control Room (MCR). TB Fans, motor-operated dampers, and electric unit heaters are manual and auto-operable from the MCR. The SWBVS is controlled by the Process Automation System (PAS). Local instruments are provided to measure differential pressure across filters, flow, temperature, and pressure. The fire detection and sensors information will be delivered to the fire detection systems.

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Enclosure 2

Table of Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 382

Table of Changes to CCNPP Unit 3 COLA Associated with Response to RAI No. 382

Change ID #	Subsection	Type of Change	Description of Change
Part 2 FSAR			
CC3 10-0192	9.4.4	Incorporation of DCD Revision 2 changes.	COL Item 9.4-2 and text regarding how COL Item 9.4-2 would be addressed was added to FSAR Section 9.4.4 as a result of DCD Revision 2 changes.
CC3-12-0201	9.4.4	Incorporate COLA markups associated with Acronym Discrepancies letter UN#12-129[1].	The acronym SWBVS (Switchgear Building Ventilation System, Turbine Island) was corrected in COL Item 9.4-2 and in the text which indicates how COL Item 9.4-2 would be addressed as part of the Acronym Discrepancies letter UN#12-129[1].
GN 13-0032, BB-13-0033, and CC3-13-0034	9.4.4, 9.4.4.1, 9.4.4.2, 9.4.4.3, 9.4.4.4, and 9.4.4.5	Incorporated COLA markups associated with the response to RAI 382 Question 09.04.04-4.	The response to RAI 382 Question 09.04.04-4 involves updating FSAR Section 9.4.4 to provide switchgear building ventilation system (SWBVS) design information.

[1]UniStar Nuclear Energy Letter UN#12-129, from Mark T. Finley to Document Control Desk, Calvert Cliffs Nuclear Power Plant, Unit 3, Acronym Discrepancies, dated November 13, 2012.