VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

July 2, 2013

10 CFR 2.202
EA-12-051

Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Serial No.: 12-166C
NL&OS/ETS: R2
Docket Nos.: 50-338/339
License Nos.: NPF-4/7

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
MARCH 12, 2012 COMMISSION ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR RELIABLE SPENT FUEL POOL INSTRUMENTATION (ORDER NUMBER EA-12-051)
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)

References:

1. NRC Order Number EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012 (ML12073A202)

2. NRC Interim Staff Guidance JLD-ISG-2012-03, Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation, Revision 0, dated August 29, 2012 (ML12221A339)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-051 (Reference 1) to Virginia Electric and Power Company (Dominion). Dominion responded to the Order by letter dated March 26, 2012 (Serial No. 12-166) and provided an Initial Status Report on October 25, 2012 (Serial No. 12-166A), which was within 60 days of the issuance of Reference 2. Dominion also submitted an Overall Integrated Plan, as required by Section IV, Condition C.1.a of the Order, in a letter dated February 28, 2013 (Serial No. 12-166B).

On May 28, 2013, Dr. V. Sreenivas, the NRC Project Manager for North Anna Power Station, provided an RAI request in an email to Mr. David Heacock, President and Chief Nuclear Officer of Dominion. Dominion's response to the RAI is provided in the attachment to this letter.

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NRR

If you have any questions, please contact Ms. Margaret Earle at (804) 273-2768.

Sincerely,

David A. Heacock
President and Chief Nuclear Officer

Attachment

Response to Request for Additional Information - Reliable Spent Fuel Pool Instrumentation

Commitments made in this letter: None

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me today, in and for the County and Commonwealth aforesaid, by David A. Heacock who is President and Chief Nuclear Officer of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of the Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 2nd day of July, 2013.

My Commission Expires: 5-31-14.

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140542
My Commission Expires May 31, 2014

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ATTACHMENT

Response to Request for Additional Information
Reliable Spent Fuel Pool Instrumentation

Virginia Electric and Power Company
(Dominion)
North Anna Power Station Units 1 & 2

Response to Request for Additional Information
Reliable Spent Fuel Pool Instrumentation

Background

By letter dated February 28, 2013, Virginia Electric and Power Company (Dominion) submitted an Overall Integrated Plan (OIP) (ADAMS Accession No. ML13063A017), in response to the March 12, 2012, U.S. Nuclear Regulatory Commission (NRC) Commission Order that modified licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for North Anna Power Station Units 1 and 2.

The NRC reviewed the Dominion OIP and determined that the following Request for Additional Information is needed to complete its technical review. In an email dated May 28, 2013, the NRC North Anna Project Manager provided a request for additional information (RAI). Dominion's response to the RAI associated with the OIP, as well as the timeframe for providing requested information that is not currently available, is provided below.

NRC RAI No. 1

The OIP states, in part, that

> "Level 1 - This is indicated level on either the primary or back-up instrument channel of greater than approximate elevation 286'-7" plus the accuracy of the spent fuel pool (SFP) level instrument channel, which is to be determined. This level is based on the elevation at which the top of the SFP cooling pump suction lines penetrate the pool walls (Reference 4, Section 9.1.3.3.3).
>
> Level 2 - This is indicated level on either the primary or back-up instrument channel of greater than approximate elevation 274'-2" plus the accuracy of the SFP level instrument channel, which is to be determined. This elevation is approximately 10' above the top of the fuel racks and ensures a minimum level of 10' above the top of the fuel (Reference 4).
>
> This water level ensures there is sufficient depth to provide radiation shielding for personnel to respond to Beyond-Design-Basis (BDB) External Events and to initiate SFP makeup strategies.
>
> Level 3 - This is indicated level on either the primary or back-up instrument channel of greater than approximate elevation 264'-2" plus the accuracy of the SFP level instrument channel, which is to be determined. This monitoring level assures that the fuel remains covered (Reference 4, Section 9.1.3.3.3)."

Please provide the following:

a) *For Level 1, specify how the identified location represents the HIGHER of the two points described in the NEI 12-02 guidance for this level.*

b) *A clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangement for the portions of instrument channel consisting of permanent measurement channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets). Indicate on this sketch the datum values representing Level 1, Level 2, and Level 3 as well as the top of the fuel. Indicate on this sketch the portion of the level sensor measurement range that is sensitive to measurement of the fuel pool level, with respect to the Level 1, Level 2, and Level 3 datum points.*

Dominion Response

a) Level 1, as specified in the North Anna OIP, does not represent the HIGHER of the two points identified in NEI 12-02. The HIGHER point is the level based on adequate net positive suction head (NPSH) under saturated pool conditions, as discussed below, and has been determined to be above the top of the SFP walls. Therefore, for the North Anna SFP Level Instrumentation, Level 1 is established as the water level required to support operation of the normal fuel pool cooling system. As stated in the OIP, this level is the indicated level on either the primary or back-up instrument channel of greater than elevation 286.6 feet plus the accuracy of the SFP level instrument channel, which is to be determined. This level is based on the elevation at which the SFP cooling pump suction lines penetrate the pool walls.

   The level at which the required NPSH is lost, assuming a saturated condition in the pool, is approximately 292 feet. This level is slightly above the top of the pool walls. The distance from the normal pool water level to the pump suction centerline is approximately 39 feet. (Refer to the SFP elevation diagram in the response to item b below.) The head loss from the SFP coolant intake to the pump suction is approximately 19 feet at a flow rate of 2700 gpm. Therefore, for a saturated pool with normal water level, the available net positive suction head is approximately 20 feet. The manufacturer's required NPSH is 22 feet. Consequently, the level required to provide adequate NPSH with a saturated pool and normal flow is approximately 2 feet above the nominal water level, which is slightly above the top of the SFP walls.

   As a result of the manufacturer's NPSH requirements, startup of the SFP cooling pumps after an extended loss of cooling will need to include precautions to avoid pump cavitation after initial startup, such as throttling the initial cooling flow or continuing to add cooler water from the FLEX makeup source.

b) The diagram below provides an elevation view of the North Anna SFP showing the proposed Level 1, 2, and 3 values and elevations of the fuel racks and cooling system. It is anticipated that the final mounting arrangement (e.g., fixed level sensors and mounting brackets) will be available upon completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

SFP Elevations

Location	**Absolute Elevation above MSL (ft.)**		
Top of SFP Wall	291.8		
Top of Instrument Span	290.3		
Nominal Level	289.8		Instrument Span =26.1 feet.
Low Level Annunciator	289.3		
LEVEL 1 - Top of Cooling Suction Inlet Pipe	286.6		
LEVEL 2	274.2		
Top of Fuel Racks + 10 feet	274.1		
LEVEL 3 - Bottom of Instrument Span	264.2	10 ft.	
Top of Fuel Racks	264.1		
Centerline of Cooling Pumps	251.2	14 ft.	
Bottom of Pool	249.3		

NRC RAI No. 2

The OIP states, in part, that

> "The primary and back-up channel level sensor probes will be installed on opposite sides of the SFP to maintain adequate channel separation. In the conceptual design, the SFP probes bolt to a triangular mounting plate for installation at the corner of the SFP or a rectangular plate for mounting at the side of the SFP. The mounting options will allow the probe to be installed within a few inches of the SFP liner, minimizing the chances of interference with other structures, and occupying limited space on the SFP deck. Existing barriers and physical separation will be used to provide a level of protection for the sensor and interconnecting cable.... Specific details will be developed during the detailed design phase....
>
> Vendor electronics will be located in a mild environment of the Auxiliary Building providing adequate protection from temperature, humidity, and radiation. Level indicators will be located in the Cable Spreading Room. This display location meets the guidance of NEI 12-02 since the Cable Spreading Room is promptly accessible from the Main Control Room, is within the Service Building which is designed to withstand tornado effects, and is not within a very high radiation or locked high radiation area. Specific details will be developed during the detailed design phase.
>
> Cables associated with a channel's sensor, power supply and indicator will be independently routed in separate raceways from cables associated with the other channel."

Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/ placement of the primary and back-up SFP level sensor, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.

Dominion Response

The final locations for the level sensor, electronics and display units have not been determined. The final system component locations will be available upon completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

NRC RAI No. 3

The OIP states, in part, that:

> "Both the primary and backup systems will be installed as Seismic Category I to meet the NRC ISG JLD-ISG-2012-03 and NEI 12-02 guidance requirements."

Please provide the following:

a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

b) A description of the manner in which the level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connections.

c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly.

Dominion Response

a) The design criteria to be used to estimate the total loading on the mounting devices is an item to be supplied by the vendor per the Dominion procurement specification. The vendor has provided the following:

> The flexible probe will have excursions that will result in some impacts to the liner. However, the mass of the entire probe (less than 15 pounds) and the self-relaxing response to static and hydrodynamic loading will dramatically limit the inertia and energy that the probe can impart to the liner.

Further details of the hydrodynamic/seismic evaluation will be provided by the vendor in accordance with the final procurement specification. It is anticipated that the full qualification will be available upon completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

b) Because of the lightweight and flexible design of the Guided Wave Radar (GWR) probe, a stilling well is not required. The lack of probe mass and the probe's reaction to seismic loading permit the pool mount to be very simple, lightweight, and require a very small footprint. It can be mounted on the curb's horizontal surface or curb face in most pool situations. Mounting on the curb face results in the cable conduit from the mount to the transmitter enclosure being the only protrusion above the curb. The transmitter enclosures will be located in either the Fuel Building or the Auxiliary Building depending on the final locations of the GWR probes.

The footprint on the SFP deck and over the pool is minimal. Weight is minimal, and recognizing the self-damping characteristics of the flexible probe, seismic issues are manageable conditions. The probe is comprised of a three-eighths inch braided stainless cable secured at the top by a connector and flange. The bottom of the probe has a uniquely designed approximate two pound weight surrounded by a radiation and chemical resistant shock absorbent material. The probe is designed to hang in close proximity to the liner without touching it. During an event, analysis shows that the probe will contact the liner, but the weight of the probe, the bumper material, the self-relaxing characteristics of the cable, and the dampening effects of the pool inventory result in minimal energy being imparted on the pool liner. Therefore, there are no points of attachment on the SFP liner.

The final mounting details will be available upon completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

c) As discussed above, the flexible GWR probe will be mounted either on the SFP curb horizontal surface or the curb face. Because of the design, no attachment to the pool liner is required.

NRC RAI No. 4

The OIP states, in part, that

"Components of the instrument channels will be qualified for shock and vibration using one or more of the following methods:

- Components are supplied by manufacturers using commercial quality programs (such as 1SO9001, Quality management systems - Requirements (Reference 6)) with shock and vibration requirements included in the purchase specification at levels commensurate with portable hand-held device or transportation applications;
- Components have a substantial history of operational reliability in environments with significant shock and vibration loading, such as portable hand-held device or transportation applications; or
- Components are inherently resistant to shock and vibration loadings, such as cables.

For seismic effects on the installed instrument channel components, the following measures will be used to verify that the design and installation are adequate. Applicable components of the instrument channels are rated by the manufacturer (or otherwise tested) for seismic effects at levels commensurate with those of postulated design basis event conditions at the location of the instrument channel component using one or more of the following methods:

- Substantial history of operational reliability in environments with significant vibration, such as for portable hand-held devices or transportation applications. Such a vibration design envelope will be inclusive of the effects of seismic motion imparted to the components proposed at the location of the proposed installation;
- Adequacy of seismic design and installation is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations, (Reference 7) or a substantially similar industrial standard; or
- Demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges).

These requirements will be used as design input for the detailed design, vendor selection, and final implementation."

Please provide the following:

a) A description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under BDB ambient temperature, humidity, shock, vibration, and radiation conditions.

b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.

c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment during and following seismic conditions to maintain its required accuracy.

Dominion Response

a) Reliability of the permanently installed equipment under BDB ambient temperature, humidity, shock, vibration, and radiation conditions will be demonstrated through the equipment design, testing, or analysis.

The installed equipment will be tested and analyzed to meet the Seismic Qualification Reporting & Testing Standardization (SQURTS) seismic envelope for plants in the United States. The equipment mounts will be seismically configured for the specific conditions and locations determined by the final design. Site specific analysis will be performed to certify the mount's performance at the selected location.

Equipment that will be located in the spent fuel pool will be certified for use in post-event conditions including temperatures in excess of 100° Centigrade, 100 percent condensing atmosphere, submerged operation at elevated chemical concentrations, and exposure to postulated radiation levels with the fuel storage rack uncovered for an extended period of time. The new NEMA 4X transmitter enclosure will be installed in either the Fuel Building and/or the Auxiliary Building depending on the final GWR probe locations. The transmitter will be qualified for use at temperatures up to 60° Centigrade, 100 percent condensing atmosphere, and $1x10^4$ rads integrated dose. The inherent shielding of the structures along the line of sight between the fuel and the transmitter will result in negligible doses to the transmitter, even for uncovered fuel. For the transmitter located in the fuel building, thermal analyses will be performed to demonstrate that, for boiling conditions in the pool, the temperature at the transmitter enclosure does not exceed the 60° Centigrade qualification limit.

b) The new SFP level instrumentation system will be tested and analyzed to meet the SQURTS seismic envelope for plants in the United States. The equipment mounts will be seismically configured for the specific conditions and locations determined by the final design. Site specific analysis will be performed to certify the mount's performance at the selected location. The transmitter and display are currently planned to be located in either the Fuel Building or the Auxiliary Building and the Service Building, respectively, which are Seismic Class I Structures.

c) The new SFP level instrumentation system will be tested and analyzed to meet the SQURTS seismic envelope for plants in the United States. Testing will confirm that the system maintains its design accuracy after a seismic event.

Further details of the qualification and test program used to confirm the reliability of the permanently installed equipment during and following seismic conditions will be available upon completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

NRC RAI No. 5

The OIP states in part, that

"Independence will be achieved through physical separation of the final installed instruments. The two (2) permanently installed instrument sensors will be separated

by a distance comparable to the shortest length of a side of the pool, to the extent practical, based on the existing SFP geometry and construction. The cables associated with each channel will follow separate and independent routes from the instruments to each electronics' enclosure and from the enclosures to the displays. The normal AC or DC power source for each channel will be provided from independent and separate sources."

Please provide the following:

a) *A description of how the two channels of the proposed level measurement system meet this requirement so that the potential for a common cause event to adversely affect both channels is precluded.*

b) *Further information on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.*

Dominion Response

The following response addresses both parts ("a" and "b") of the requested information:

The North Anna SFP level instrumentation system is designed to be a complete integrated solution that meets the requirements set forth in EA-12-051, NEI 12-02 Rev. 1, and JLD-ISG-2012-03. Each system provides two completely independent channels of level instrumentation. Each channel is comprised of the GWR flexible probe, the probe mount, the transmitter enclosure, the instrument enclosure containing the DC power source and charger, sensor conditioning and communication circuitry, and is equipped with appropriate enclosure connections to remote displays and alternate power sources.

The sensors are located at opposite ends of the SFP, the transmitters will be located in either the Fuel Building or the Auxiliary Building, and the instrument enclosures are located in the Service Building. Dominion's standard separation criteria for instrument cable will be applied.

The power source for each level channel is based on 24-volt DC sealed batteries and a charging source connected to AC power from different sources. Therefore, the loss of one power source will not result in the loss of both channels. In addition to the normal DC power supply to each channel, a back-up power source will also be provided to each channel in the form of a portable back-up battery and connections to alternate power sources independent of the normal AC or DC power sources.

NRC RAI No. 6

The OIP states, in part, that

> "The normal power supply for each channel will be provided by different power sources such that loss of one power source will not result in the loss of both channels. In addition to the normal plant AC and/or DC power supply to each channel, a back-up power source will also be provided to each channel in the form of a back-up battery independent of the normal AC or DC power sources. Specific details will be developed during the detailed design phase."

If the level measurement channels are to be powered through a battery system (either directly or through an Uninterruptible Power Supply (UPS), please provide the design criteria that will be applied to size the battery in a manner that ensures, with margin, that the channel will be available to run reliably and continuously following the onset of the BDB event for the minimum duration needed, consistent with the plant FLEX Program plans.

Dominion Response

The power source for each level channel is based on 24-volt DC sealed batteries and a charging source connected to AC power from different sources. The seismically qualified batteries are designed to supply power for the entire level monitoring channel for at least seven days after a station black out (SBO). The enclosure and associated electronics are qualified for continuous operation in an operating environment of 0-50° Centigrade and 95 percent humidity, non-condensing atmosphere without the need for cooling fans.

Since the system is designed to support continuous operation over a seven-day or longer SBO period, there is sufficient time to either restore or provide a back-up source of AC power to recharge the 24-volt batteries. Deployment of an AC power source to recharge the level monitoring channel batteries will be included in the FLEX implementing procedures. As such, each channel will be available to run reliably and continuously following the onset of a BDB event for seven days, which is greater than the minimum duration needed.

NRC RAI No. 7

The OIP states, in part, that

> "The instrument channels will maintain their design accuracy following a power interruption or change in power source without requiring recalibration. Since the instrumentation is generally commercial off the shelf supplied components, the

vendor published instrument accuracies will be verified as acceptable and will be used as a basis for final configuration and calibration procedures.

Accuracy requirements will consider SFP conditions, e.g., saturated water, steam environment, and concentrated borated water. Additionally, instrument accuracy will be sufficient to allow trained personnel to determine when the actual level exceeds the specified lower level of each indicating range (levels 1, 2 and 3) without conflicting or ambiguous indication. The GWR/TDR equipment selected will have accuracy within the resolution requirements of NEI 12-02, Figure 1.

Specific details regarding accuracy will be obtained from the supplier during the detailed design phase."

Please provide the following:

a) *An estimate of the expected instrument channel accuracy performance under both a) normal SFP level conditions (approximately Level 1 or higher) and b) at the BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points.*

b) *A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.*

Dominion Response:

a) The selected North Anna SFP level instrumentation system has a design accuracy of +/- 2 inches and will maintain this accuracy over the full range of operating conditions, including beyond-design-basis conditions. It will maintain its design accuracy following a power interruption without the need for recalibration.

b) Calibration of the SFP level system is performed in-situ. Channel check and calibration tolerances will be developed as part of the detailed design. The final calibration methodology will be available upon completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

NRC RAI No. 8

The OIP states, in part, that

> "Instrument channel design will provide for routine testing and calibration consistent with Order EA-12-051 and the guidance in NEI 12-02. The installed sensors will be designed to allow testing and/or calibration via in-situ methods while mounted in the pool. Removal of the sensor from the pool will not be required for calibration or testing.
>
> Specific details regarding testing procedures and calibration requirements will be reviewed and determined with the supplier during the detailed design phase."

Please provide the following:

a) A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.

b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation.

c) A description of how functional checks will be performed, and the frequency at which they will be conducted. Describe how calibration tests will be performed, and the frequency at which they will be conducted. Provide a discussion as to how these surveillances will be incorporated into the plant surveillance program.

Dominion Response

a) The SFP level instrumentation system is capable of individual channel in-situ calibration and cross-calibration of the two independent level indication channels. In-situ calibration is performed at the transmitter enclosure using internal displays. The GWR determines pool depth by measuring the time of flight of a pulse from the transmitter to the water interface and back to the transmitter's receiver. A calibration device, provided by the manufacturer, incorporates time of flight delays equal to various pool levels. The device is connected to the transmitter and is exercised for each level. Following calibration certification, the depth indication for both pool level sensors is compared as a final functional check of the level measurement capabilities.

b) The two independent channels of the SFP level instrumentation system will be cross-checked against each other. Since the two wide range level channels are independent, a channel check tolerance based on the design accuracy of each channel will be applied for cross comparison between the two channels. The

tolerance is determined as the square root of the sum of the squares of the design accuracy value, which is +/- 2 inches. (Reference the response to RAI-7.) Therefore, the channel check tolerance is 2.8 inches.

Local level indication is provided by a ruled scale mounted on the east side of the SFP counterfort. Normal SFP level is indicated by the 0 inch mark on the scale and corresponds to the 289.83 foot elevation. Level is normally maintained between the 0 and +3 inch mark. The wide range level instrument may also be cross-checked against this visual indication.

c) The responses to Items "a" and "b" above provide a description of the functional checks to ensure proper operation of the SFP level instrumentation system. Specific details of the functional and calibration test program, including frequencies, will be developed as part of the final instrument design, scheduled for December 2013. The design details will be forwarded to the NRC during the subsequent scheduled status update.

NRC RAI No. 9

The OIP states, in part, that

"Since final indicator location will be based on the detailed design package, the distance between the sensing element and the display is currently not fully defined.... Specific details regarding the display and display location(s) will be finalized during the detailed design phase."

Please provide the following:

a) The specific location for the primary and backup instrument channel display.

b) If the primary or backup display location is other than the main control room, then provide justification for prompt accessibility to displays including primary and alternate route evaluation, habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for communications with decision makers for the various SFP drain down scenarios and external events.

c) *The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" to various drain-down scenarios and external events.*

Dominion Response

The following response addresses the requested information in RAI No. 9 in total:

The current conceptual design places the display units for both channels in a Seismic Category Class 1 portion of the Service Building, which is accessible from the Main Control Room (MCR) via a stairwell. Alternate access to the current conceptual display location is also available from the MCR via the Turbine Building.

Final design details for the display units, including justification for prompt accessibility from the MCR and habitability, are scheduled to be completed by December 2013 and will be forwarded to the NRC during the subsequent scheduled status update. Resource availability will be determined by staffing assessments. Communication with the MCR and/or Technical Support Center will be maintained via two-way radio. Staffing and communications capabilities will be verified by the FLEX Strategy validation commitments made in response to Order EA-12-049.

NRC RAI No. 10

The OIP states, in part, that

> "Procedures will be developed using guidelines and vendor instructions to address the maintenance, operation, and abnormal response issues associated with the new SFP instrumentation. Procedures will address a strategy to ensure SFP water level addition is initiated at an appropriate time consistent with implementation of NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide (Reference 8)."

Please provide a description of the standards, guidelines and/or criteria that will be utilized to develop procedures for inspection, maintenance, repair, operation, abnormal response, and administrative controls associated with the SFP level instrumentation, as well as storage and installation of portable instruments.

Dominion Response

Procedures for inspection, maintenance, repair, operation, abnormal response, and administrative controls associated with the SFP level instrumentation will be developed in accordance with existing station administrative and technical procedures that govern procedure development. These procedures ensure standardization of format and terminology and ease of use, and assurance of a consistent level of quality in the procedures developed for the SFP level instrumentation.

There are no portable instruments associated with the new SFP level instrumentation system that will be installed. Consequently, procedures for storage and installation of portable equipment are not required.

NRC RAI No. 11

The OIP states, in part, that

> "Processes will be established and maintained for scheduling and implementing necessary testing and calibration of the primary and back-up spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy. Testing and calibration of the instrumentation will be consistent with vendor recommendations and any other documented basis. Calibration will be specific to the mounted instrument and the monitor."

Please provide the following:

a) *Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of your plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.*

b) *A description of how the guidance in NEI 12-02 section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed.*

c) *A description of what compensatory actions are planned in the event that one of the instrument channels cannot be restored to functional status within 90 days.*

Dominion Response

a) The maintenance and testing of the SFP level instrumentation system will be incorporated into the normal station surveillance and work control processes based on vendor recommendations for maintenance and periodic testing. The calibration and maintenance program will include surveillances or testing to validate the functionality of each instrument channel within 60 days of a planned refueling outage considering normal test scheduling allowances (e.g., 25%).

   The preventive maintenance, test and calibration program will be developed consistent with the vendor's recommendations. This information will be available

following completion of the final design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

b) The guidance in NEI 12-02, Rev. 1, states:

> "The primary or back-up instrument channel can be out of service for testing, maintenance and/or calibration for up to 90 days provided the other channel is functional. Additionally, compensatory actions must be taken if the instrumentation channel is not expected to be restored or is not restored within 90 days. If both channels become non-functioning then initiate actions within 24 hours to restore one of the channels of instrumentation and implement compensatory actions (e.g., use of alternate suitable equipment or supplemental personnel) within 72 hours."

In the event a channel of SPF level instrumentation is out of service for any reason, an administrative action statement will be entered to restore the channel to service within 90 days. Functionality of the other channel will be confirmed via appropriate surveillance measures until the non-functioning channel is restored to service. As with Item a) above, the frequency of these actions will be developed consistent with vendor recommendations.

c) In the event that a channel cannot be restored to service within the 90 day period, expedited actions to restore the channel would be initiated and tracked via Dominion's Corrective Action System. If both channels are determined to be non-functional, Dominion will initiate appropriate compensatory actions within 24 hours.

The appropriate compensatory actions have not been specified at this time. The determination of these actions is part of the overall effort to develop the BDB Program administrative and implementation procedures. The BDB Program will incorporate the guidance of NEI 12-02, including the requirements associated with out of service time. The BDB Program is currently scheduled for completion in September 2014. A summary of the compensatory measures will be forwarded to the NRC in a subsequent scheduled status update.