VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

10 CFR 2.202
EA-12-051

August 8, 2013

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

Serial No.: 13-416
NL&OS/MAE: R2
Docket Nos.: 50-280/281
License Nos.: DPR-32/37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY 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)
REQUEST FOR ADDITIONAL INFORMATION (RAI) RESPONSE

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. 12-167) and provided an Initial Status Report on October 25, 2012 (Serial No. 12-167A), consistent with Reference 2. Dominion also submitted an Overall Integrated Plan, as required by Section IV, Condition C.1.a of the Order, by letter dated February 28, 2013 (Serial No. 12-167B).

The NRC issued an RAI to Dominion on July 11, 2013 in an email from Ms. Karen Cotton Gross of the NRC to Mr. David Heacock of Dominion. In a July 15, 2013 email from Ms. Gross to Mr. Gary D. Miller of Dominion, it was agreed that the RAI response would be provided to the NRC by August 15, 2013. Dominion's response to the RAI is provided in the attachment to this letter.

A001
NRR

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

Sincerely,

Eugene S. Grecheck
Vice President – Nuclear Engineering and Development

Attachment:

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

Commitments made in this letter: None

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

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me today, in and for the County and Commonwealth aforesaid, by Eugene S. Grecheck who is Vice President – Nuclear Engineering and Development for 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 8TH day of August, 2013.

My Commission Expires: 5-31-14.

Vicki L. Hull
Notary Public

(SEAL)

cc: Director of Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 13H16M
11555 Rockville Pike
Rockville, MD 20852-2738

U. S. Nuclear Regulatory Commission, Region II
Regional Administrator
Marquis One Tower
245 Peachtree Center Ave., NE
Suite 1200
Atlanta, Georgia 30303-1257

Mr. Jonathan E. Evans
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 10 C 15
11555 Rockville Pike
Rockville, MD 20852-2738

Dr. V. Sreenivas
NRC Project Manager-North Anna
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O8 G-9A
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. Karen R. Cotton Gross
NRC Project Manager-Surry
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O8 G-9A
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Surry Power Station

ATTACHMENT

Response to Request for Additional Information
Reliable Spent Fuel Pool Instrumentation

Surry Power Station Units 1 & 2
Virginia Electric and Power Company

Response to Request for Additional Information
Reliable Spent Fuel Pool Instrumentation

Background

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13063A013), Virginia Electric and Power Company submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, Commission Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051) for Surry Power Station Units 1 and 2. The U.S. Nuclear Regulatory Commission (NRC) staff endorsed Nuclear Energy Institute (NEI) 12-02 "Industry Guidance for Compliance with NRC Order EA-12-051, to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, dated August 2012 (ADAMS Accession No, ML12240A307), with exceptions, as documented in Interim Staff Guidance (ISG) 2012-03 "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

The NRC staff has reviewed the February 28, 2013, response by the licensee and determined that the following Request for Additional Information (RAI) is needed to complete its Technical Review. If any part of this information is not available by the July 26, 2013 response date for this RAI, please provide the date this information will be submitted.

NRC RAI No.1

The OIP states, in part, that

"1) Level 1 -This is indicated level on either the primary or back-up instrument channel of greater than approximate elevation 42'-2" plus the accuracy of the 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.

2) Level 2 - This is indicated level on either the primary or back-up instrument channel of greater than approximate elevation 31'-3" 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 External Events and to initiate SFP makeup strategies.

3) Level 3 - Indicated level on either the primary or back-up instrument channel of greater than approximate elevation 21'·3" plus the accuracy of the SFP

level instrument channel, which is to be determined. This monitoring level assures that the fuel remains covered."

Please provide the following:

a) For level 1, specify how the identified elevation 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 racks, 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) In the Surry OIP, the Level 1 elevation represents the HIGHER of the two points identified in NEI 12-02. The Surry SFP Level Instrumentation at Level 1 measures 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 42'-2" (42.2 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 top of the SFP cooling pump suction lines penetrate the pool walls.

   For the LOWER point, a calculation is being performed to verify that adequate water level is available to support net positive suction head (NPSH) of the SFP cooling pumps. Results of the calculation, including justification for the Level 1 value specified in the OIP, will be provided in the February 2014 six month status update.

b) The table below provides an elevation view of the Surry SFP showing the proposed Level 1, 2, and 3 values and elevations of the fuel racks and cooling system. The final determination of Level 3 will take into account the weight located on the bottom end of the probe (Refer to RAI Response 3b). 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.

Surry SFP Elevations

Location	Absolute Elevation above MSL (ft.)		
Top of SFP Wall	47.3		
Top of Instrument Span	45.8		
Nominal Level	45.3		Instrument Span 24.5 feet.
LEVEL 1* - Top of Cooling Suction Inlet Pipe	42.2		
LEVEL 2	31.3		
Top of Fuel Racks + 10 feet	30.7		
LEVEL 3 - Bottom of Instrument Span in Feb 2013 Submittal	21.3	10 feet	
Top of Fuel Racks	20.7	13.9 ft.	
Centerline of cooling pumps	8.6		
Bottom of Pool	6.8		

* Required level to provide adequate NPSH at saturated conditions will be verified by formal calculation and results provided in the February 2014 six month status update.

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 and 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."

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 sensors, and the proposed routing of the cables that will extend from the sensors toward the location of the local electronics cabinets and read-out/display devices in the main control room or alternate accessible location,

Dominion Response:

The final locations for the level sensors, electronics and display units have not yet been determined. As discussed in the response to RAI No. 5, the conceptual design places the sensor probes in the Fuel Building and the signal conditioning electronics in the Auxiliary Building. Per the response to RAI No. 9, the conceptual design places the read-out/display units in the Cable Spreading Room within the Service Building.

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 JLO-ISG-2012-03 and NEI12-02 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 hydro-dynamic 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 flexible nature of the probe results in a 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 little space for attachment. It can be attached on the curb's horizontal surface or curb face in most pool situations. The signal conditioning electronics will be in enclosures located in the Auxiliary Building.

The space used 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 easily manageable. The probe is comprised of a flexible stainless steel cable secured at the probe housing in the mount. The bottom of the probe has a uniquely designed weight. The probe is designed to hang in close proximity to the liner without touching it. During a seismic

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 very little energy being imparted to 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

"Instrument channel reliability will be demonstrated via a combination of design, analyses, operating experience, and/or testing of channel components for the following sets of parameters:

- Conditions in the area of instrument channel components,
- Effects of shock and vibration on the instrument channel components, and
- Seismic effects on instrument channel components used during and following a potential seismic event."

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 Beyond-Design-Basis (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 retransmitting 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 such that following a seismic event the instrument will 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.

The probe that will be located in the spent fuel pool and the probe housing that will be located above the spent fuel pool will be certified for use in post-event conditions including temperatures in excess of 100° Centigrade, 100 percent condensing atmosphere, and exposure to postulated radiation levels with the fuel storage rack uncovered for an extended period of time. The remaining equipment will be installed in the mild environment of the Auxiliary Building or Service Building and 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 equipment will result in negligible doses to the equipment, even in the event that fuel is uncovered.

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 enclosures for the signal conditioning electronics are currently planned to be located in the Auxiliary Building, which is a Seismic Class I Structure and the displays are currently planned to be located in the Cable Spreading Room which is within a Seismic Class I portion of the Service Building.

c) The new SFP level instrumentation system will be tested and analyzed to meet the SQURTS seismic envelope for plants in the United States. This testing will verify 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

> "The primary instrument channel will be redundant to and independent of the back-up instrument channel. Both the primary and back-up instrument channels will be of the same technology, manufacturer, and model. 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 in each pool meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.

b) Further information describing the design and installation of each level measurement system, consisting of level sensor electronics, cabling, and readout devices. Please address how independence of these components of the primary and back-up channels is achieved through the application of independent power sources, physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.

Dominion Response:

Based on the following information that address both parts of the requested information, a common cause event is not anticipated to adversely affect both channels of the proposed level measurement system.

The Surry 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. The system provides two completely independent channels of level instrumentation. Each channel is comprised of the GWR flexible probe and housing, the probe mount, a signal conditioning enclosure, the electronics enclosure containing the DC power source, charger, and local read-out/displays. The electronics enclosure is equipped with appropriate connections to remote displays and alternate power sources.

The Surry probes will be located on opposite ends of the longest side of the spent fuel pool. The signal conditioning enclosures will be located in the Auxiliary Building, and the read-out/display units (electronics enclosures) will be located in the Cable Spreading Room which is within the Seismic Class I portion of the Service Building. Dominion's standard separation criteria for safety related instrument cable will be applied.

Each level channel is powered from its own dedicated 24-volt DC sealed batteries with 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 available 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 a 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."

Please provide the following:

a) A description of the electrical AC power sources and capacities for the primary and backup channels.

b) 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 mitigation strategies for BDB external events (Order EA-12-049).

Dominion Response:

a) The power source for each level channel is based on 24-volt DC sealed batteries with 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 available to each channel in the form of a portable back-up battery and connections to alternate power sources which are independent of the normal AC or DC power sources. Identification of the specific AC power sources 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) 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 electronics enclosures 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 AC power 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 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."

Please provide the following:

a) An estimate of the expected instrument channel accuracy performance (e.g., in % of span) 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 Surry SFP level instrumentation systems are expected to have a design accuracy of +/- 2 inches and maintain this accuracy over the full range of operating conditions, including beyond-design-basis conditions. Design accuracy is also expected to be maintained following a power interruption without the need for recalibration. The final design accuracy 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) 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. 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 calibration tests and functional checks will be performed and the frequency at which they will be conducted. Discuss how these surveillances will be incorporated into the plant surveillance program.

d) A description of what preventative maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.

Dominion Response:

a) Calibration of the SFP level system will be 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.

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

   The wide-range instruments may also be cross-checked against the existing ultrasonic narrow-range pool level measurement channels. If deemed necessary, tolerances for this cross-check will be developed as part of the final design.

c) Specific details of the functional and calibration test program, including frequencies, will be developed in accordance with the vendor's recommendations as part of the final instrument design, scheduled for

December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

d) Specific details of the preventive maintenance program, including frequencies, will be developed in accordance with the vendor's recommendations as part of the final instrument design, scheduled for December 2013, and will be forwarded to the NRC during the subsequent scheduled status update.

NRC RAI No. 9

The OIP states, in part, that

> "Trained personnel must be capable of monitoring the SFP water level from a location remote to that of the SFP area (e.g. control room, remote shutdown panel or other appropriate and accessible location). To that end, the selected location for the display(s) will ensure SFP level information is promptly made available to plant staff and key decision makers.
>
> 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. However, it is expected that the display will be located at a distance within 500 feet from the sensing element in an appropriate and accessible area with the following characteristics:
>
> - Occupied or promptly accessible to the appropriate plant staff giving appropriate consideration to various drain down scenarios,
> - Outside the area surrounding the SFP floor, e.g., an appropriate distance from the radiological sources resulting from an event impacting the SFP,
> - Inside a structure providing protection against adverse weather, and
> - Outside any very high radiation area or locked high radiation area during normal operation.

The conceptual design locates the electronic enclosure and primary display in the Cable Spreading Room. 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) Since both the primary and backup display locations are not in the main control room, please provide detailed description of the location for the primary and backup display, addressing 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 will enable the information from these instruments to be considered "promptly accessible". Include consideration of various drain-down scenarios.

Dominion Response:

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

The current design places the instrument channel read-out/display units (electronics enclosure) for both channels in the Cable Spreading Room which is within the Seismic Category 1 portion of the Service Building. This area will be accessible from the Main Control Room from primary and alternate routes. The final design will verify that the habitability of the access routes and locations in the Service Building where the instrument channel read-out/display units are planned will be located outside of any very high radiation areas or locked high radiation area during normal operation or various drain-down conditions. Communications with the Main Control Room and/or Technical Support Centers will be maintained via two-way radio. Staffing and communications capabilities for both units will be verified by the FLEX Strategy validation commitments made in response to Order EA-12-049.

Final design details for the instrument channel read-out/display units are scheduled to be completed by December 2013. Upon completion of the final design, justification for prompt accessibility from the Main Control Room and habitability will be forwarded to the NRC during the subsequent scheduled status update.

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 the following:

a) A list of the operating (both normal and abnormal response) procedures, calibration/test procedures, maintenance procedures, and inspection procedures that will be developed for use of the SFP instrumentation in a manner that addresses the order requirements.

b) A brief description of the specific technical objectives to be achieved within each procedure. If your plan incorporates the use of portable spent fuel level monitoring components, please include a description of the objectives to be achieved with regard to the storage location and provisions for installation of the portable components when needed.

Dominion Response:

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

Procedures for inspection, maintenance, calibration/testing, repair, operation, abnormal response, and administrative controls associated with the SFP level instrumentation will be developed in accordance with vendor recommendations using existing station administrative and technical procedures that govern procedure development. These procedures ensure standardization of format and terminology, ease of use, and a consistent level of quality. A detailed list of procedures to be developed and the technical objectives of the procedures 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.

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 the compensatory actions to be taken 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 systems 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 before a planned refueling outage considering normal testing 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 returned 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 yet been specified. 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 and is scheduled for completion in September 2014. A description of the compensatory actions will be forwarded to the NRC during the subsequent scheduled status update.