Calvert Cliffs Nuclear Power Plant

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657

CENG
a joint venture of
Constellation Energy
EDF

July 3, 2013

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTENTION: Document Control Desk

SUBJECT: **Calvert Cliffs Nuclear Power Plant, Units 1 and 2**
Renewed Facility Operating License Nos. DPR-53 and DPR-69
Docket Nos. 50-317 and 50-318

Response to Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051) (TAC Nos. MF1140 and MF1141)

REFERENCES:

(a) Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation, dated February 28, 2013 (ML13066A172)

(b) NRC Order Number EA-12-051, Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012 (ML12054A679)

(c) Letter from N. S. Morgan (NRC) to G. H. Gellrich (CCNPP), Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 - Request for Additional Information Regarding Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation, Order EA-12-051 (TAC Nos. MF1140 and MF1141), dated June 19, 2013

By letter dated February 28, 2013 (Reference a), Constellation Energy Nuclear Group, LLC (CENG) submitted to the Nuclear Regulatory Commission (NRC) an Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation in response to the March 12, 2012, NRC Order for Calvert Cliffs Nuclear Power Plant (CCNPP) (Reference b). By letter dated June 19, 2013 (Reference c), the NRC requested that CENG respond to a request for additional information (RAI) by July 5, 2013. Attachment (1) provides the requested response.

Attachment (2) defines the regulatory commitments contained within this correspondence.

If there are any questions regarding this submittal, please contact Everett (Chip) Perkins, Director-Fleet Licensing at 410-470-3928.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 3, 2013.

Sincerely,

Mark D. Flaherty
Plant General Manager

MDF/PSF/bjd

Attachments: (1) Calvert Cliffs Nuclear Power Plant Response to Request for Additional Information
(2) Regulatory Commitments Contained in this Correspondence

cc: N. S. Morgan, NRC
B. K. Vaidya, NRC
M. C. Thadani, NRC
W. M. Dean, NRC
Resident Inspector, Calvert Cliffs
S. Gray, DNR

ATTACHMENT (1)

CALVERT CLIFFS NUCLEAR POWER PLANT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Calvert Cliffs Nuclear Power Plant, LLC
July 3, 2013

NRC RAI 1.a:

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.

CCNPP RESPONSE TO RAI 1.a:

Response to this request for information will be provided on February 28, 2014 with the second 6-month update of the Calvert Cliffs Nuclear Power Plant (CCNPP) Overall Integrated Plan.

NRC RAI 1.b:

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.

CCNPP RESPONSE TO RAI 1.b:

Figure 1 shows an elevation view sketch of the instrumentation arrangement for CCNPP. The sketch shows the datum values of Level 1, 2, and 3, and the top of the spent fuel racks. The instrument chosen for both primary and backup channels is the AREVA VEGAPULS 62ER Through Air Radar components manufactured by VEGA Americas, Inc. Each channel will be mounted at the pool edge, comprised of a horn antenna, waveguide assembly and mounting bracket, electronic sensor, and a display panel. As shown in Figures 4 and 5, the radar horn antenna is positioned above the Spent Fuel Pool (SFP) water surface and is capable of measuring from the mounting location on the SFP curb to the top of the spent fuel racks.

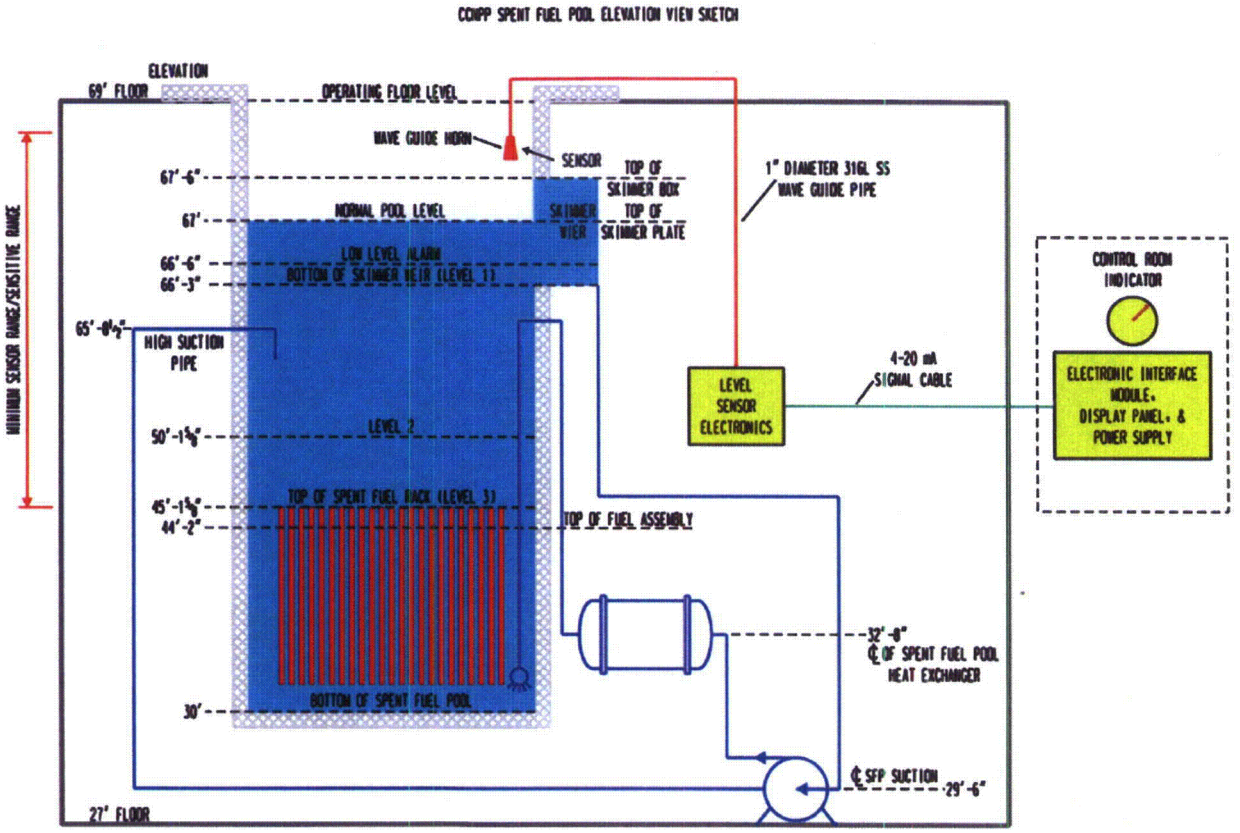
CCNPP SPENT FUEL POOL ELEVATION VIEW SKETCH
ELEVATION
69' FLOOR
OPERATING FLOOR LEVEL
WAVE GUIDE HORN
SENSOR
67'-6"
TOP OF SKIMMER BOX
1" DIAMETER 316L SS WAVE GUIDE PIPE
67'
NORMAL POOL LEVEL
SKIMMER WIER
TOP OF SKIMMER PLATE
LOW LEVEL ALARM
66'-6"
BOTTOM OF SKIMMER WEIR (LEVEL 1)
66'-3"
MINIMUM SENSOR RANGE/SENSITIVE RANGE
65'-0½"
HIGH SUCTION PIPE
CONTROL ROOM INDICATOR
4-20 mA SIGNAL CABLE
LEVEL SENSOR ELECTRONICS
ELECTRONIC INTERFACE MODULE, DISPLAY PANEL, & POWER SUPPLY
50'-1⅝"
LEVEL 2
45'-1⅝"
TOP OF SPENT FUEL RACK (LEVEL 3)
44'-2"
TOP OF FUEL ASSEMBLY
32'-0"
℄ OF SPENT FUEL POOL HEAT EXCHANGER
30'
BOTTOM OF SPENT FUEL POOL
℄ SFP SUCTION
29'-6"
27' FLOOR

Figure 1

NRC RAI 2:

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 mounting brackets, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.

CCNPP RESPONSE TO RAI 2:

Figure 2 is a plan view of the SFP area, depicting the SFP inside dimensions using the pool liner as a reference. The shown location/placement of the new wide range level instrument is preliminary. The proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device has not been determined. The final system component locations and cable routing will be available upon completion of the final design. This information will be forwarded to the Nuclear Regulatory Commission (NRC) on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

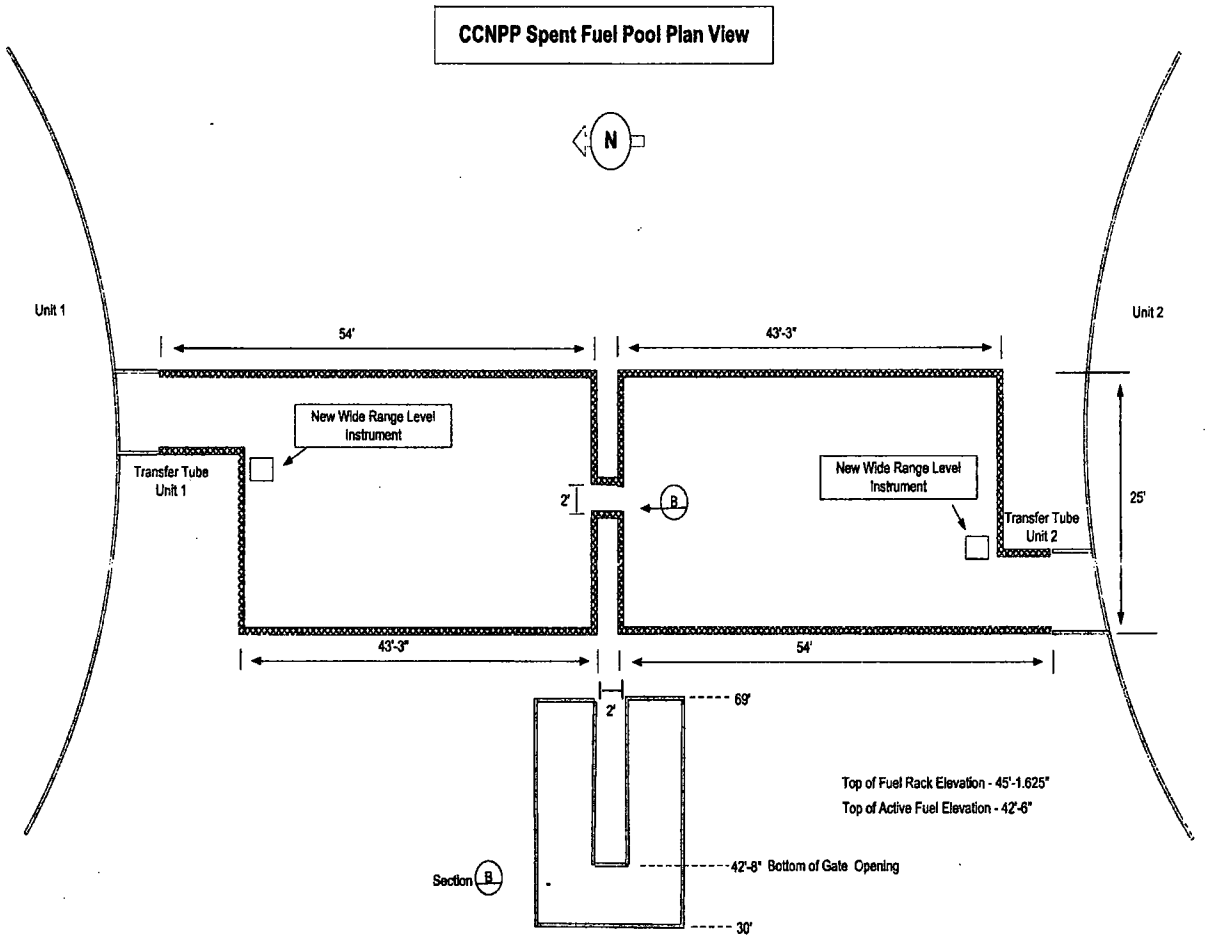

Figure 2

NRC RAI 3:

Please provide a description of the conditions under which the two SFPs connected by a channel would be isolated by a gate or other means such that the separated pools would not have independent measurements of wide range SFP level for the respective pools. Provide the justification for not installing independent level indications in each SFP for conditions in which the SFPs are two isolated pools.

CCNPP RESPONSE TO RAI 3:

Should a breach occur under severe accident conditions, the bulkhead gate would be installed to isolate the unaffected side of the SFP in order to maintain the water inventory on that side. Initiation of this action is governed by a severe accident management guideline at CCNPP.

Under normal operating conditions and during refueling outages, the SFP is configured as one pool. As such, CCNPP has one SFP that can be separated by the bulkhead gate only under severe accident conditions that would involve a breach on one side of the pool with an attendant loss of water inventory. Consequently, two sets of independent (two primary and two backup) level indications are not required.

Please refer to Figure 2 for a plan drawing of the SFP and Figure 3 for a drawing of the bulkhead gate.

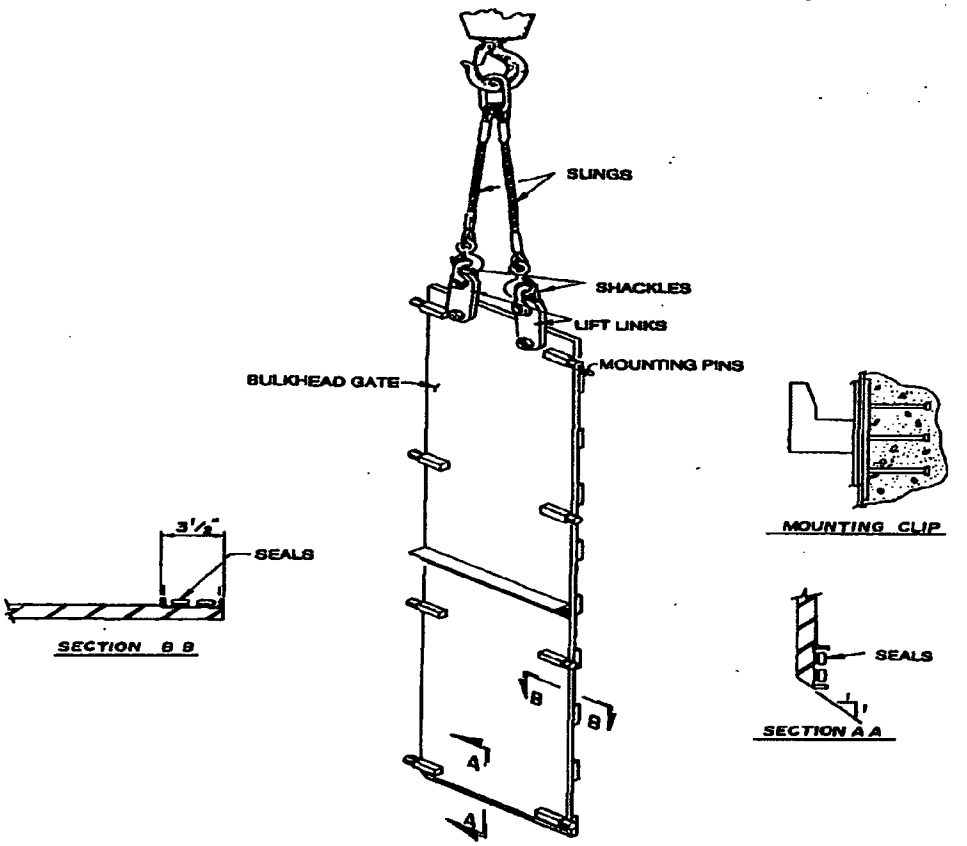

Figure 3

NRC RAI 4.a:

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.

CCNPP RESPONSE TO RAI 4.a:

The AREVA VEGAPULS 62ER Through Air Radar components manufactured by VEGA Americas, Inc. that are mounted at the pool edge comprise a horn antenna, waveguide assembly and mounting bracket. The radar horn antenna is positioned above the SFP water surface. The loading on the mounting bracket includes the static weight loads and dynamic loads of the horn antenna, waveguide assembly and attached waveguide pipe up to the nearest pipe support. The dynamic loads on the mounting bracket consist of design basis maximum seismic loads of the bracket and the mounted components, along with hydrodynamic loads produced by impinging surface waves caused by seismically-induced pool sloshing. The design criteria to be used to estimate the total loading on the mounting devices will be based on the plant seismic design bases.

The methodology for ensuring that the mounting bracket and attached equipment can withstand the seismic dynamic forces will be by analysis and/or test of the combined maximum seismic and hydrodynamic forces on the cantilevered portion of the waveguide assembly and horn antenna exposed to potential seismically induced wave action. In addition to the analysis described above, seismic qualification testing will be performed to seismic response spectra that envelope the maximum seismic ground motion for the installed location.

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 and will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 4.b:

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.

CCNPP RESPONSE TO RAI 4.b:

The AREVA VEGAPULS 62ER Through Air Radar horn antenna and waveguide assembly is attached to a waveguide assembly mounting bracket. The schematic in Figure 4 provides a visual representation of the pool edge mounting configuration. There is no portion of the AREVA VEGAPULS 62ER Through Air Radar level sensor that contacts the SFP water, nor is there any connection to the pool liner. The horn antenna is cantilevered over the edge of the pool and firmly fixed in a direction perpendicular to the pool water surface, although the horn assembly mounting bolts can be loosened and the horn rotated away from the pool surface for instrument calibration (see Response 9.a). The bracket provides the attachment point for the horn and waveguide assembly to the refueling floor. Four bolts at the base of the bracket fasten the bracket to the refueling floor. For mounting to a concrete floor, the bolts may be anchor bolts in a range of sizes from 3/8 inch to 3/4 inch. The distance of the two nearest bolts to the pool edge will be

determined by the specific requirements of the anchor bolt size used. For mounting to metal floor, the bracket base may be fastened to the floor by welding. The horn can be away from or next to the pool liner without impacting the functionality of the level measurement.

The final mounting details for the horn antenna and waveguide assembly will be available upon completion of the final design. They will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

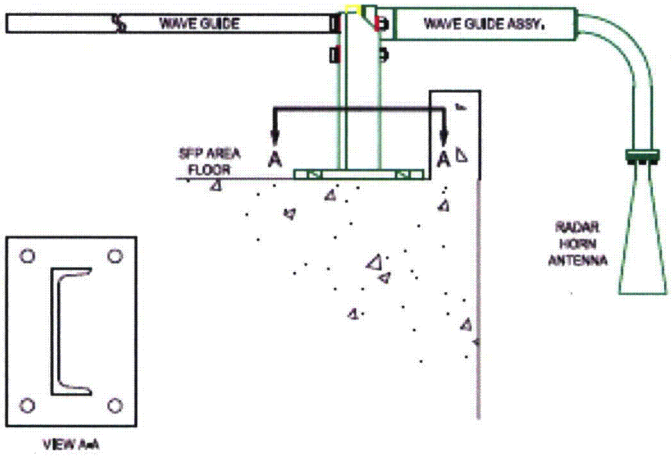

Figure 4

NRC RAI 4.c:

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.

CCNPP RESPONSE TO RAI 4.c:

Figure 5 provides a standard conceptual arrangement of the elements of the AREVA VEGAPULS 62ER Through Air Radar system. The waveguide piping that is connected between the waveguide assembly at the pool edge and the remotely located sensor will be attached to building structures using the applicable site design standards for small bore pipe supports and small bore pipe in accordance with the design change process.

The radar sensor is mounted on a mounting bracket that is fastened to seismically-qualified mounting points, either building structural steel or a concrete wall. Four bolts at the base of the bracket fasten the bracket to the building structure. The fastening method described for the pool edge mounting bracket applies also to the sensor mounting bracket. Electrical connections to the sensor are made using flexible conduit into one of two available ½ inch NPT threaded openings in the sensor housing.

The final mounting details for the waveguide piping and radar sensor will be available upon completion of the final design. They will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

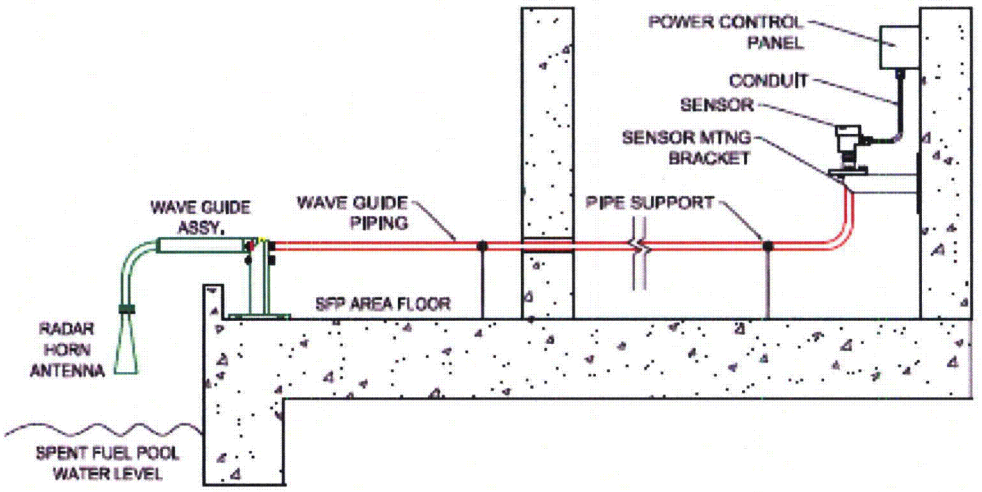

Figure 5

NRC RAI 5.a:

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.

CCNPP RESPONSE TO RAI 5.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 performed by the vendor. The following qualification elements will be evaluated.

Temperature

The postulated temperature in the SFP area that results from a boiling pool is 100°C (212°F). The electronics in the sensor are rated for a maximum ambient temperature of 80°C (176°F) on the condition that the process temperature (that which the flange connection is in contact with) is no greater than 130°C (266°F). The level sensor electronics will be located outside of the SFP area in an area where the temperature will not exceed the rated temperature.

Humidity

The maximum humidity postulated for the SFP room is 100% RH, saturated steam. The VEGA electronics will be located outside of the SFP room in an area away from the steam atmosphere. The waveguide pipe can withstand condensation formed on the inside walls provided there is no pooling of the condensate in the waveguide pipe. This is ensured by installing a weep hole(s) at the low spots in the wave guide pipe.

The ability of the radar to "see through" the steam has been demonstrated by testing performed by AREVA. In addition to the AREVA test, VEGA Through Air Radar has been used in numerous applications that involve measuring the level of boiling liquids. The VEGA Operating Instructions Manual contains a table that provides accuracy correction factors for superimposed gas or vapor including saturated steam at various pressures. Therefore, operating experience has shown that the Through Air Radar functions at high levels of steam saturation.

Shock and Vibration

The AREVA VEGAPULS 62ER Through Air Radar sensor is similar in form, fit, and function to the VEGAPULS 66 that was shock and vibration tested in accordance with MIL-S-901D and MIL-STD-167-1. This shock and vibration testing only applies to the sensor. The waveguide piping is not shock or vibration sensitive.

The power supply panel contains components that are part of the standard VEGA Mobile Remote Display. In addition, the readout portion of the display panel, the PLICSCOM, was installed in the sensor during the shock and vibration testing. The Mobile Remote Display is designed for truck-mounted mobile applications subject to shock and vibration from normal handling, transportation and setup on the job. Per Nuclear Energy Institute (NEI) 12-02, designing instruments for operation in environments where significant shock and vibration loadings are common, such as for portable hand-held devices or transportation applications, is an acceptable measure for verifying that the design is adequate to withstand shock and vibration. This panel is therefore considered to have an acceptable resistance to shock and vibration. There are three components in the AREVA power control panel that are not included with the VEGA Mobile Remote Display but are similar in construction and are tested for shock and vibration and/or mounted on vibration dampeners. This panel also will be subjected to seismic tests.

Radiation

The area above and around the pool will be subject to elevated levels of radiation in the event that the fuel becomes uncovered. The only parts of the measurement channel in the pool radiation environment are the metallic waveguide and horn, which are not susceptible to the expected levels of radiation. The electronics will be located in an area that does not exceed their $1x10^3$ rad analyzed limit.

Further details of the qualification and test program used to confirm the reliability of the permanently installed equipment during and following BDB events will be available upon completion of the final design. They will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 5.b:

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.

CCNPP RESPONSE TO RAI 5.b:

A seismic shake test will be performed to the requirements of Institute of Electrical and Electronics Engineers 344-2004 for elements of the AREVA VEGAPULS 62ER Through Air Radar to levels

anticipated to envelop most, if not all plants in the United States. The equipment to be tested includes the readout and power control panel, and the level sensor electronics. The items will be tested to the Required Response Spectra (RRS) contained in Electric Power Research Institute TR-107330 to account for the potentially high seismic motion that could occur to the cabinet-mounted readout and power control panel. This RRS will also envelop the seismic ground motion for items mounted to the building structure, pool edge, etc.

NRC RAI 5.c:

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.*

CCNPP RESPONSE TO RAI 5.c:

The seismic testing described in Part b) includes testing the AREVA VEGAPULS 62ER Through Air Radar for functionality prior to and post-seismic testing, which includes verification of the instrument accuracy.

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. They will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 6.a:

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 minimized to the extent practicable.*

CCNPP RESPONSE TO RAI 6.a:

The instrumentation power sources are provided with independent and battery backed-up supplies. The 120 VAC power sources will be determined in the final design process. Independence will be maintained throughout the entire train for each channel. Therefore, failure of one power source will not result in a loss of both instrument channels.

NRC RAI 6.b:

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.*

CCNPP RESPONSE TO RAI 6.b:

The two channels of the AREVA VEGAPULS 62ER Through Air Radar Spent Fuel Pool Level Measurement system meet the requirement for independence in accordance with the guidance in NRC JLD-ISG-2012-03 and NEI 12-02 through separation by distance and electrical independence of one another. The horn antenna for each level instrument will be installed on opposite corners of the SFP.

This separation will be maintained for the routing of the stainless steel waveguide piping and each channel sensor electronics. Wiring from the sensors and wiring to the power control panels and displays located in the Main Control Room for each channel will be routed in separate conduits and cable raceways to maintain separation.

Further details on independence and channel separation of the permanently installed equipment will be available upon completion of the final design. They will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 7.a:

Please provide the following:

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

CCNPP RESPONSE TO RAI 7.a:

Response to this request for information will be provided on February 28, 2014 with the second 6-month update of the CCNPP Overall Integrated Plan.

NRC RAI 7.b:

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 Beyond-Design-Basis (BDB) event for the minimum duration needed, consistent with the plant mitigation strategies for BDB external events (Order EA-12-049).

CCNPP RESPONSE TO RAI 7.b:

The primary power supply will be from station 120 VAC panels and will be connected to the display panel which will be located in the Main Control Room. As required in NEI 12-02, in the event of loss of primary power the instruments can be manually switched to backup power. The AREVA VEGAPULS 62ER Through Air Radar has a self-contained battery (eight standard AA lithium cells) backup source which is included in the display panel. It will support 2.5 years with 30 minutes of operation per day, or > 300 hours of continuous operation. During this time, it supplies the power to the whole system, i.e., sensor electronics and the display with a power consumption of < 0.5Watts.

The sizing of the battery back-up for the AREVA VEGAPULS 62ER Through Air Radar is based on the ability of the sensor to supply full load (20mA) for the duration specified in the FLEX program of at least seven days after station blackout, with built-in safety margin. The sizing of the battery will be verified by calculation and/or test prior to installation. The self-contained battery system is independent from existing station batteries.

Further details on the AC and DC power supplies of the permanently installed equipment will be available upon completion of the final design and will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 8.a:

Please provide the following:

a) *An estimate of the expected instrument channel accuracy performance (e.g., in % 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.*

CCNPP RESPONSE TO RAI 8.a:

The reference accuracy for the instrument defined by the manufacturer is ±2mm based on sensor horn without a waveguide using a metal target. However, with a waveguide and water as a target, accuracy under normal SFP level conditions has been demonstrated to be ±1 inch based on tests performed by AREVA. This is the design accuracy value that will be used for the SFP level instrument channels. This accuracy value is subject to change dependent on the actual performance with the installed waveguide constructed to support the desired installation location for each channel. The final instrument accuracy will be determined following installation testing implemented as part of the design change acceptance process.

The accuracy of the instrument channel is little affected under BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions). It will maintain its design accuracy following a power interruption without the need for recalibration. The stainless steel horn antenna and waveguide pipe that is exposed to BDB conditions is largely unaffected by radiation, temperature and humidity other than a minor effect of condensation forming on the waveguide inner walls which will have a slight slowing effect on the radar pulse velocity. Condensation is prevented from pooling in the waveguide and thus blocking the radar signal by placement of weep holes at low points in the waveguide pipe. A minor effect on the accuracy based on the length of the overall measurement path can occur due to temperature related expansion of the waveguide pipe. The waveguide pipe permits the sensor to be located on the elevation below the refuel floor in mild environment conditions so that the effect of elevated refuel floor temperatures on accuracy is also limited. A small correction factor is applied to account for the impact of saturated steam at atmospheric pressure on the radar beam velocity. Testing performed by AREVA using saturated steam and saturated steam combined with smoke indicate that the overall effect on the instrument accuracy is minimal. The overall accuracy during the BDB conditions described above is conservatively estimated to not exceed ±3 inches or 0.926% of the 27 foot instrument span, which is within the required ±1 foot described in NEI 12-02.

NRC RAI 8.b:

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.*

CCNPP RESPONSE TO RAI 8.b:

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 will be based upon the difference between readings from the primary and backup level instruments. The estimated design accuracy for each instrument is ±1 inch. The combined maximum deviation between the two instruments after which calibration is needed is therefore ±2 inches based on a

still water level in the pool. A change to design accuracy will likewise cause a proportionate change to the maximum allowable deviation value. The final instrument accuracy will be determined following installation testing implemented as part of the design change acceptance process.

Calibration of the SFP level system is performed in-situ. Channel check and calibration tolerances will be developed as part of the detailed design and incorporated into station maintenance procedures. The final calibration methodology will be available upon completion of the final design. It will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 9.a:

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.

CCNPP RESPONSE TO RAI 9.a:

Multi-point testing is enabled by means of a radar horn antenna capable of being rotated away from the SFP water surface and aimed at a movable metal target that is positioned at known distances from the horn. This allows checking for correct readings of all indicators along a measurement range and validates the functionality of the installed system.

NRC RAI 9.b:

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.

CCNPP RESPONSE TO RAI 9.b:

The primary and backup instrument channels will have indicators that can be compared against each other and against any other permanently-installed SFP level instrumentation. This comparison can be performed at suitable times and frequencies. The results of the comparison between the SFP level instrument channels can be compared with the criteria described in Response 8.b to determine if recalibration or troubleshooting is needed.

NRC RAI 9.c:

c) A description 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.

CCNPP RESPONSE TO RAI 9.c:

Functional checks will be performed on a regularly scheduled basis. The functional check includes visual inspection, verification of the instrument display reading, verification of proper power supply voltage, and testing of the battery backup on simulated loss of normal power. Multi-point calibration tests will also be made on a regularly scheduled basis. The frequency as prescribed in NEI 12-02 will be adopted to perform functional testing within 60 days of a planned refueling outage considering normal testing schedule allowances (e.g., 25%) and not to exceed more than once every 12 months.

NRC RAI 9.d:

d) A description 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.

CCNPP RESPONSE TO RAI 9.d:

The maintenance and testing program for the SFP level instruments will meet the requirements in NEI 12-02. Periodic functional tests will be scheduled to occur within 60 days of each planned refueling outage. The functional tests will verify that the readings for the primary and backup channels are consistent with the actual SFP level. The AREVA VEGAPULS 62ER Through Air Radar instrument requires no regular preventative maintenance except for routine replacement of the backup lithium battery cells in the power control panel during regularly scheduled checks and testing.

Specific details of the functional and calibration test program, including frequencies, will be developed as part of the final instrument design and will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 10.a:

Please provide the following:

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

CCNPP RESPONSE TO RAI 10.a:

The primary and backup instrument displays will be in the Control Room.

NRC RAI 10.b:

b) If the location for the backup displays is other than the common Control Room, please 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.

CCNPP RESPONSE TO RAI 10.b:

Please see response to RAI 10.a.

NRC RAI 10.c:

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

CCNPP RESPONSE TO RAI 10.c:

Please see response to RAI 10.a.

NRC RAI 11:

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.

CCNPP RESPONSE TO RAI 11:

Procedures for inspection, maintenance, repair, operation, abnormal response, and administrative controls associated with the SFP level instrumentation will be developed utilizing vendor instructions in accordance with existing controlled station administrative procedures that govern procedure development. These procedures ensure standardization of format, content, terminology and human performance considerations.

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

NRC RAI 12.a:

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.

CCNPP RESPONSE TO RAI 12.a:

The maintenance and testing of the SFP level instrumentation system will be incorporated into the normal station work control processes based on vendor recommendations for maintenance and periodic testing. The calibration and maintenance program will include testing to validate the functionality of each instrument channel within 60 days of 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 and will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 12.b:

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.

CCNPP RESPONSE TO RAI 12.b:

The guidance in NEI 12-02, Revision 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 SFP level instrumentation is out-of-service for any reason, the time out-of-service will be administratively tracked with an action to restore the channel to service within 90 days. Functionality of the other channel will be confirmed via appropriate testing measures within the following 7 days and every 90 days thereafter until the non-functioning channel is restored to service.

The appropriate compensatory actions have not yet been specified for both channels out-of-service. The determination of these actions, administrative requirements, and implementation procedures will be available following completion of the final design and will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

NRC RAI 12.c:

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.*

CCNPP RESPONSE TO RAI 12.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 CCNPP's Corrective Action Program. If both channels are determined to be non-functional, CCNPP will initiate appropriate compensatory actions within 24 hours. The expedited and compensatory actions will be defined in the applicable maintenance procedure.

The appropriate compensatory actions have not yet been specified. The determination of these actions, administrative requirements, and implementation procedures will be available following completion of the final design and will be forwarded to the NRC on February 28, 2014 with the second CCNPP Overall Integrated Plan status update.

ATTACHMENT (2)

REGULATORY COMMITMENTS CONTAINED IN THIS CORRESPONDENCE

ATTACHMENT (2)

REGULATORY COMMITMENTS CONTAINED IN THIS CORRESPONDENCE

The following table identifies actions committed to in this document for Calvert Cliffs Nuclear Power Plant, LLC (CCNPP), Units 1 and 2. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

Regulatory Commitments	Date
Provide for Level 1 how the identified location representing the higher of the two points was specified to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide the final locations/placement of the primary and back-up SFP level sensor, and the proposed routing of the cables locations and cable routing to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide further details of the hydrodynamic/seismic evaluation in accordance with the final procurement specification to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide the final mounting details for the horn antenna and waveguide assembly upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide the final mounting details for the waveguide piping and radar sensor upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide further details of the qualification and test program used to confirm the reliability of the permanently installed equipment during and following Beyond Design Bases Events upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide further details of the qualification and test program used to confirm the reliability of the permanently installed equipment during and following seismic conditions upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide further details on independence and channel separation of the permanently installed equipment upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide a description of the different electrical AC power sources and capacities for the primary and backup channels to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide the final calibration methodology upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide specific details of the functional and calibration test program, including frequencies to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014
Provide a description of the preventive maintenance, test and calibration program to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014

ATTACHMENT (2)

REGULATORY COMMITMENTS CONTAINED IN THIS CORRESPONDENCE

Regulatory Commitments	Date
Provide the description of appropriate compensatory actions for both channels out-of-service, administrative requirements, and implementation procedures upon completion of the final design to the NRC with the second CCNPP Overall Integrated Plan status update.	February 28, 2014