Mary G. Korsnick
Acting Chief Executive Officer
Chief Nuclear Officer

Office 410-470-5133
Fax 443-213-6739
E-mail: Maria.Korsnick@cengllc.com

CENG
a joint venture of Constellation Energy EDF

September 23, 2013

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

ATTENTION: Document Control Desk

SUBJECT: R.E. Ginna Nuclear Power Plant
Renewed Facility Operating License No. DPR-18
Docket No. 50-244

Response to Request for Additional Information Re: Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051) (TAC No. MF1174)

REFERENCE:

(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, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012 (ML12054A679)

(c) Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Supplement to Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation, dated March 8, 2013 (ML13073A155)

(d) Letter from M. C. Thadani (NRC) to M. G. Korsnick (CENG), R.E. Ginna Nuclear Power Plant – Request for Additional Information Re: Overall Integrated Plan for Reliable Spent Fuel Pool Instrumentation (Order EA-12-051) (TAC NO. MF1174), dated August 29, 2013 (ML13226A382)

By letter dated February 28, 2013 (Reference a), Constellation Energy Nuclear Group, LLC (CENG) submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012 (Reference b), NRC Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) for the R.E. Ginna Nuclear Power Plant, LLC (Ginna). Reference (c) provided a supplement to the Ginna OIP and superseded Reference (a). By letter dated August 29, 2013 (Reference d), the NRC requested that CENG respond to a request for additional information by September 23, 2013.

Attachment (1) provides the requested response.

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

A001
NRR

If there are any questions concerning this letter, please contact Everett (Chip) Perkins at 410-470-3928.

I declare under penalty of perjury that the foregoing is true and correct. Executed on September 23, 2013.

Sincerely,

Mary G. Korsnick

Mary G. Korsnick

MGK/STD

Attachments: (1) Ginna Response to Request for Additional Information
(2) Regulatory Commitments Contained in this Correspondence

cc: NRC Project Manager, CCNPP
NRC Project Manager, Ginna
NRC Project Manager, NMPNS
Region I, NRC
Resident Inspector, Ginna
S. Gray, DNR

ATTACHMENT (1)

GINNA RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NRC RAI-1

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.*

c) *Detailed information regarding the analysis used to determine Level 2 including assumptions for amount and location of source material, assumptions regarding future changes to amount of source material and locations that are valid for the stated 100 mrem/hr dose rate appropriately marked on the floor plan. Include a discussion regarding dose rates for stored spent fuel versus that of other material that may be stored in the pool.*

Ginna Response

a) The Level 1 value is established at Ginna based on the low water level trip of Spent Fuel Pool (SFP) Pump B at 275'-11.5", which is approximately 2' below the Top of the SFP and approximately 2' above the pump upper suction line, and is based on preventing air entrapment that may occur due to vortexing. Refer to Figure 1 which shows the relative orientation of the SFP Pump B trip setpoint with the other elevations. The Level 1 elevation at the SFP Pump B trip setpoint represents the higher of the two points described in the NEI guidance for this level in that this elevation represents the level at which the water height, assuming saturated conditions, above the centerline of the cooling pump suction provides the required net positive suction head specified by the pump manufacturer or engineering analysis. Engineering analysis shows that for SFP Pump B, with the SFP high and low suction valves open and SFP temperature at 212°F, the required NPSH for the minimum flow rate is approximately 275'-11". The level at which reliable suction loss occurs due to uncovering of the coolant inlet pipe (274'-0") is lower than the elevation at which SFP Pump B loses the required net positive suction head (275'-11.5") making the SFP Pump B trip setpoint the higher of the two points selected for the Level 1 value.

b) The instrument chosen for both primary and backup channels is the AREVA VEGAPULS 62ER Through-Air Radar manufactured by VEGA Americas, Inc. Each channel will be mounted at the SFP edge and comprised of a horn antenna, waveguide assembly and mounting bracket, electronic sensor, and a display panel. The radar horn antenna is positioned above the SFP water surface and is capable of measuring from the mounting location on the SFP curb to the top of the fuel racks. Figure 1 shows an elevation view sketch of the instrumentation arrangement for Ginna. The sketch shows the datum values of Levels 1, 2, and 3, and the top of the fuel as previously described in the submitted Overall Integrated Plan (OIP). The Through-Air Radar sensor measurement range, labeled "Minimum Sensor Range / Sensitive Range" in Figure 1, encompasses the Level 1, Level 2, and Level 3 datum points.

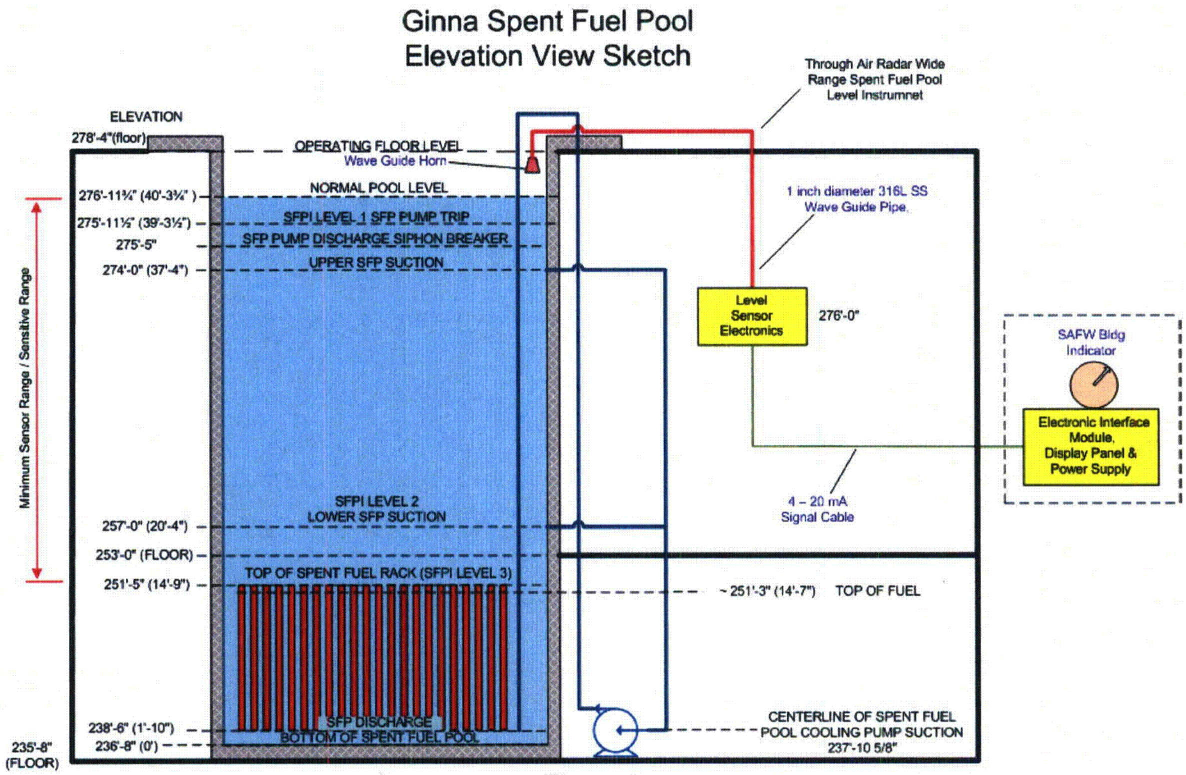

Figure 1

c) Calculations for determination of the dose projected at the top edge of the SFP in the event of lowering SFP water level were performed using ORIGEN-ARP source term calculations and the MCNP5 code was used to calculate gamma dose rates at the perimeter of the SFP. Key assumptions for amount and location of source material and assumptions regarding future changes to amount of source material are provided below.

The SFP was assumed to contain all of the fuel discharged up to the capacity of the SFP. The Region 1, Type 3 racks are assumed to contain the most recent discharged fuel (starting at 100 hours per current plant limitations). Region 2, Type 2 is assumed to contain the discharges after Region 1, Type 3 is fully loaded. The remaining discharges are assumed to be loaded in Region 2, Type 1. Westinghouse Vantage 422V+ fuel is assumed for the entire pool. This fuel type has more uranium, has a higher top of active fuel and has a smaller top nozzle than other Ginna fuel types. These assumptions are conservative as they will result in peaking of the dose rates in the pool and at the deck.

Two discharge streams are assumed for the entire pool: (1) 4.6 weight percent (wt. %) U-235, 50,000 Megawatt-days/Metric Ton of Uranium (MWd/MTU) ("e46b50" run identification) and (2) 5.0 wt. % U-235, 55,000 MWd/MTU ("e50b55" run identification). This is expected to bound post-Extended Power Uprate (EPU) discharges and will dominate the dose rates in the period of extended operation. These assumptions should conservatively represent older fuel as well. The e46b50 depletion models assume a two cycle burnup history at 50 MW/MTU. The e50b55 depletion models assume a three cycle burnup history at 50, 50 and 13.2 MW/MTU. Based on actual powers, these are conservative.

Cycle operation is assumed to consist of 532.86 Effective Full Power Days (EFPD) and 15 days coast down. This is a reasonable assumption for 18 month cycles and will have minimal impact on the source terms provided the desired burnup is achieved. It is assumed that 1/3 of the 45 discharges are e46b50 and 2/3 are e50b55. This is a reasonable representation of post-EPU operation and is expected to be conservative for future operation.

Top of the racks is assumed to be at plant elevation 251'-5". SFP rack drawings reveal that there are two tops of racks. Region 1 is at plant elevation 251' 5", while Region 2 is approximately between 251'-1.25" and 251'-1.5". These configurations result in the fuel assemblies sitting below the top of the racks in Region 1 and slightly above in Region 2, which complicates the MCNP modeling. To standardize the model, the top of the Region 1 racks was used uniformly as this is the one that the water level will reach first during a drain down. The top of the fuel assembly is modeled in MCNP as 1.775" below the top of the racks. The active fuel is modeled in MCNP as 14.3" below the top of the racks at plant elevation ~250'-2.75". The air above the water in the SFP is assumed to be void in MCNP and the density of the water is assumed to be 1.0 grams per cubic centimeter (g/cc). The SFP is assumed to be surrounded by 3' of concrete to account for scatter.

The axial burnup distribution is assumed to be the profile that corresponds to 40 to 50 Gigawatt-days (GWD)/MTU fuel without axial blankets. Using fuel without low enriched or natural uranium blankets is conservative as it maximizes the gamma source at the ends of the fuel assembly, which is conservative for dose rates above the racks.

The calculation indicates that water coverage of 5'-6" above the racks is sufficient to ensure dose rates around the SFP deck area meet the acceptance criterion of ≤ 100 milli-rem per hour (mrem/hr). The Level 2 value has been established at ~ 5'-7" above the racks to provide additional margin.

Dose rates in the SFP area are determined using tally volumes and meshes. Dose rates at the SFP edge utilize the maximum dose rate from each of the four edges of the SFP. These dose rates were calculated using tally meshes running the entire length of the SFP edge. Dose rates at the water surface are taken from a circular surface tally with a radius of 240 centimeters (cm) centered over the middle of the racks at 1-foot intervals in the water for the 5-foot case.

Based on the calculation performed, with 5'-6" of water above the top of the SFP racks, Figure 2 depicts the projected dose rate locations on a plan view sketch, from the edge of the SFP up to 1' back from the SFP edge, and from 3' to 6' above the deck elevation. All areas surrounding the SFP under this condition are calculated to be less than 100 mrem/hr as indicated by Figure 2.

The dose calculation assumes that there is no material stored above the SFP racks that contributes to the dose rate. If materials that can contribute to the dose rate are planned to be stored in the SFP in the future, additional analysis will be performed to determine the projected dose rate impact and the appropriate Level 2 value. The addition of irradiated materials to the SFP and any additional analysis will be controlled by a station procedure. Specific requirements of the procedure, including details of the analysis to be performed, will be developed and provided in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #1).

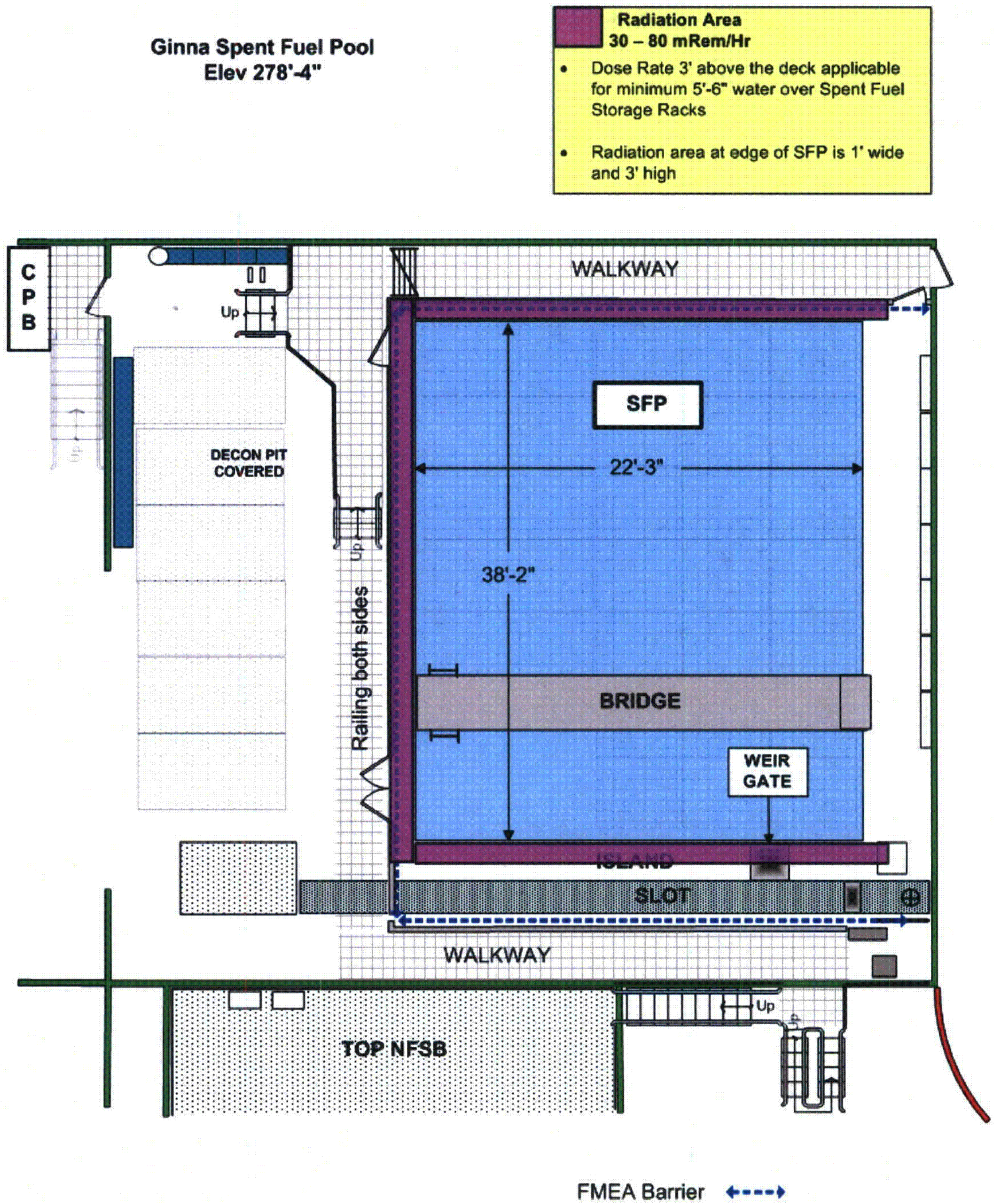
Ginna Spent Fuel Pool
Elev 278'-4"
Radiation Area
30 – 80 mRem/Hr
• Dose Rate 3' above the deck applicable for minimum 5'-6" water over Spent Fuel Storage Racks
• Radiation area at edge of SFP is 1' wide and 3' high
C P B
WALKWAY
Up
SFP
22'-3"
38'-2"
DECON PIT COVERED
Up
Railing both sides
BRIDGE
WEIR GATE
ISLAND
SLOT
WALKWAY
TOP NFSB
Up
FMEA Barrier

Figure 2

NRC RAI-2

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

Ginna Response

The SFP interior distance from the south to north wall is 22'-3". The SFP east to west wall interior distance is 38'-2". The SFP inside dimensions are shown on Figure 2.

SFP water level sensors will be installed in the northeast and southeast corners of the SFP. The waveguide will route from the southeast horn antenna to its level transmitter seismically mounted on the exterior east wall of the decontamination pit at the 276' elevation level, between the south block wall of the auxiliary building and the new fuel storage building's south wall. The waveguide from the northeast horn antenna will route to its level transmitter seismically mounted at the 276' elevation level, at the exterior SFP east wall directly under the stairwell leading from the spent fuel pool decking to the auxiliary building operating level. The locations of the horn antennas and level transmitters are depicted on Figure 3: Plan View of SFP Showing New SFP Water Level Instrumentation.

The northeast channel's level transmitter cabling will route into the adjacent cable tray 68 which penetrates down into the middle level. The cable will route in tray 68 for approximately 18 feet and then head south in conduit to the Chemical & Volume Control System (CVCS) Hold-Up Tank (HUT) room wall. The cable and conduit will then route into the CVCS HUT room opening between tanks 1 and 2 and run along the north interior wall into the waste gas compressor room. Inside the waste gas compressor room the cable and conduit will run along the north, then east, and then south walls to the new building penetrations made for the new Diesel Driven Auxiliary Feedwater (DDAFW) building. New buried conduit has been installed from these new penetrations through to the east wall of DDAFW building. This wall is also the west wall (shared wall) of the existing Standby Auxiliary Feedwater (SAFW). The cable and conduit will penetrate into the SAFW building (core bore) just south of the walkway between the buildings, and then run north on the west wall to the northwest corner of the building where the control panel will be mounted to the north wall approximately 10 feet east from the west wall. (See Figures 4a and 4b: Plan View Showing New SFP Water Level Instrumentation.)

The southeast channel's level transmitter cabling will route in conduit northward along the exterior of the decontamination pit wall and into the new fuel storage building. The cabling and conduit will run 11.5 feet along the east concrete wall of the new fuel storage building and then into the middle level CVCS HUT 1 room through a new hole that will be bored into the operating floor. The cable and conduit will then run north along the west wall to the north wall where it will then run eastward and meet up with the other channel's conduit between the HUT room 1 and room 2 areas. The cable and conduit will run the rest of the way to its respective control panel in the same general area as the northeast channel's route. The southeast channel's control panel will be mounted just above the control panel for the northeast channel on the SAFW building's north wall. (See Figures 4a and 4b: Plan View Showing New SFP Water Level Instrumentation.)

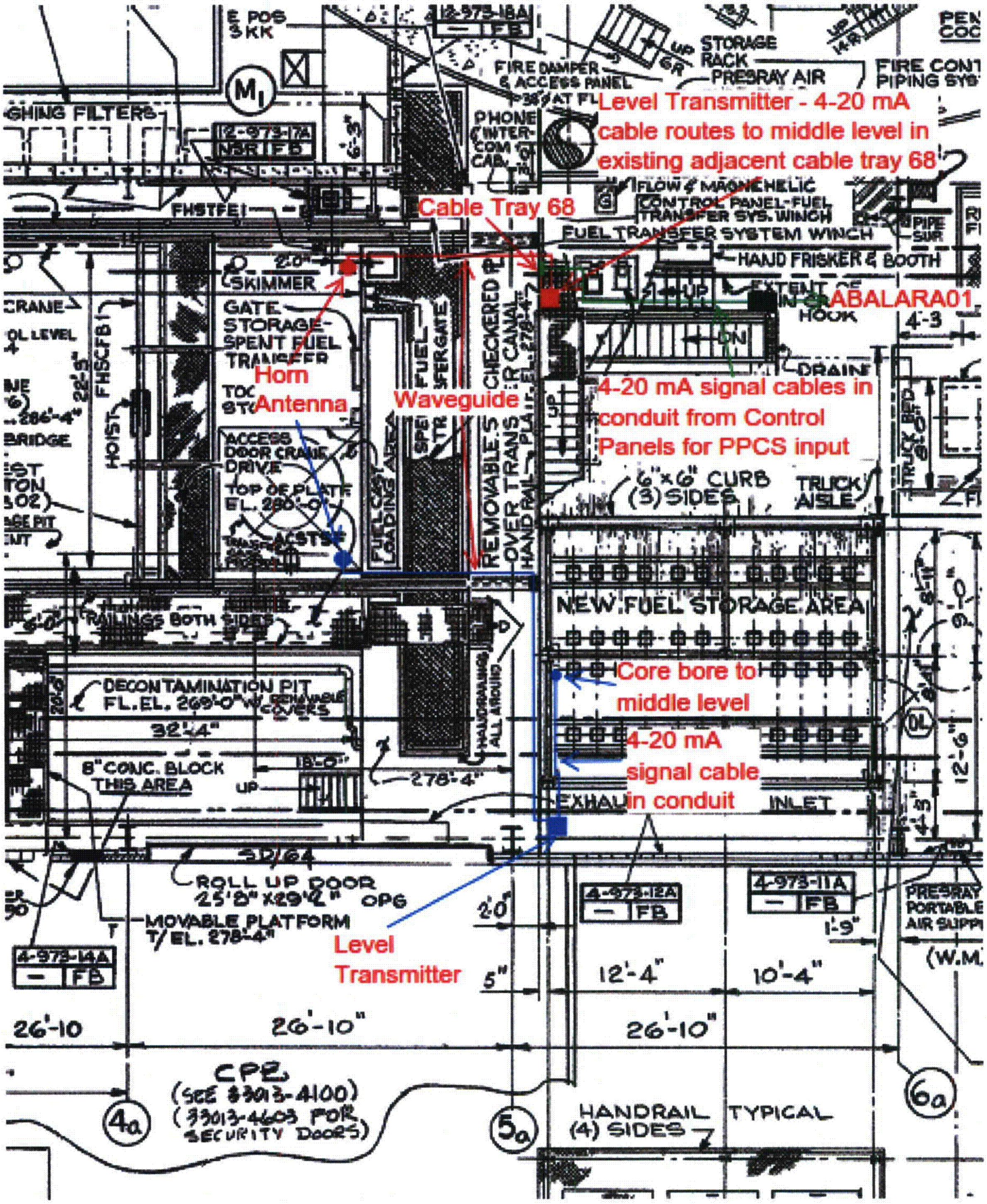

Figure 3: Plan View of SFP Showing New SFP Water Level Instrumentation

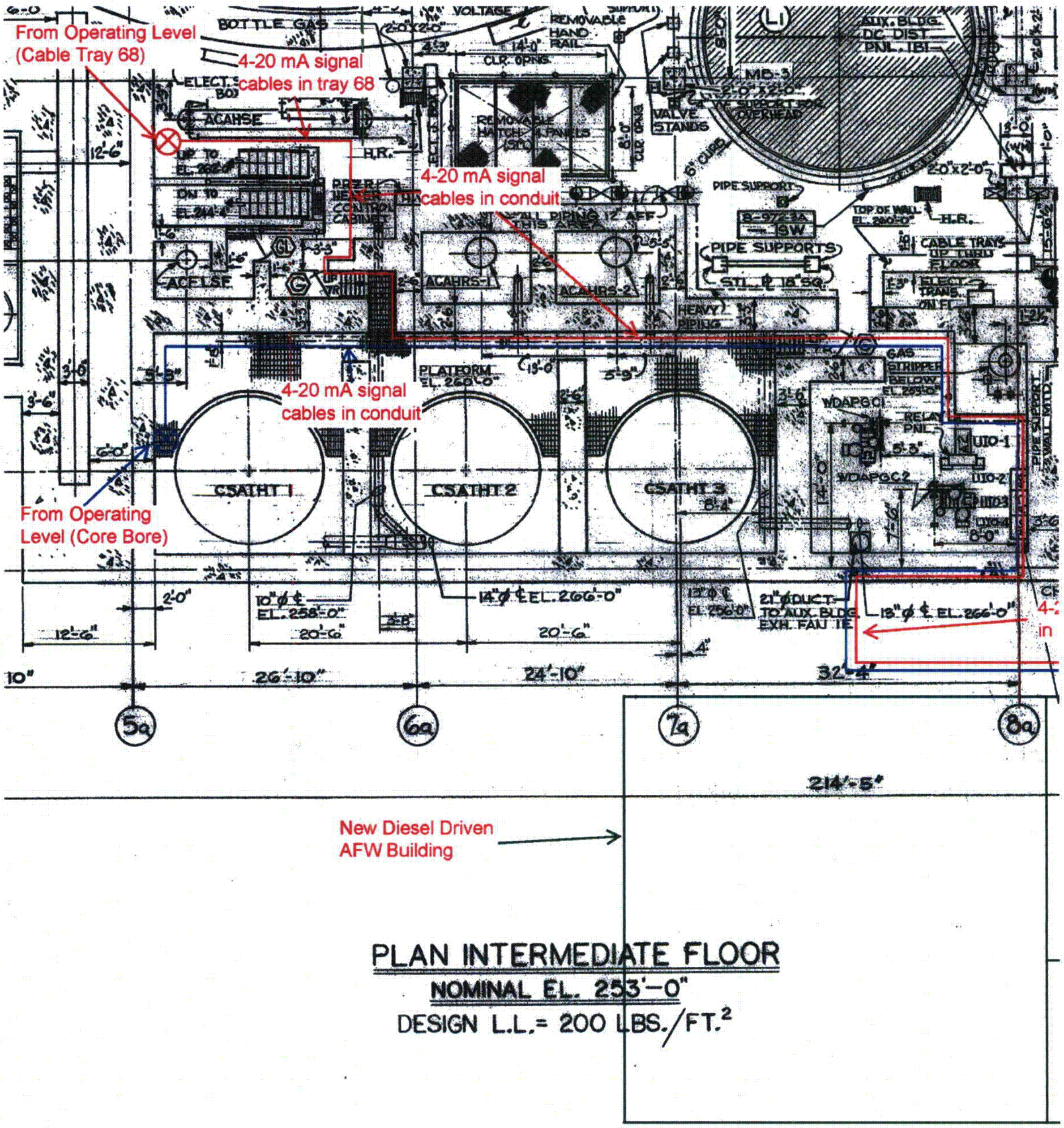

Figure 4a: Plan View Showing New SFP Water Level Indication
Note: Figure 4b is a continuation of Figure 4a

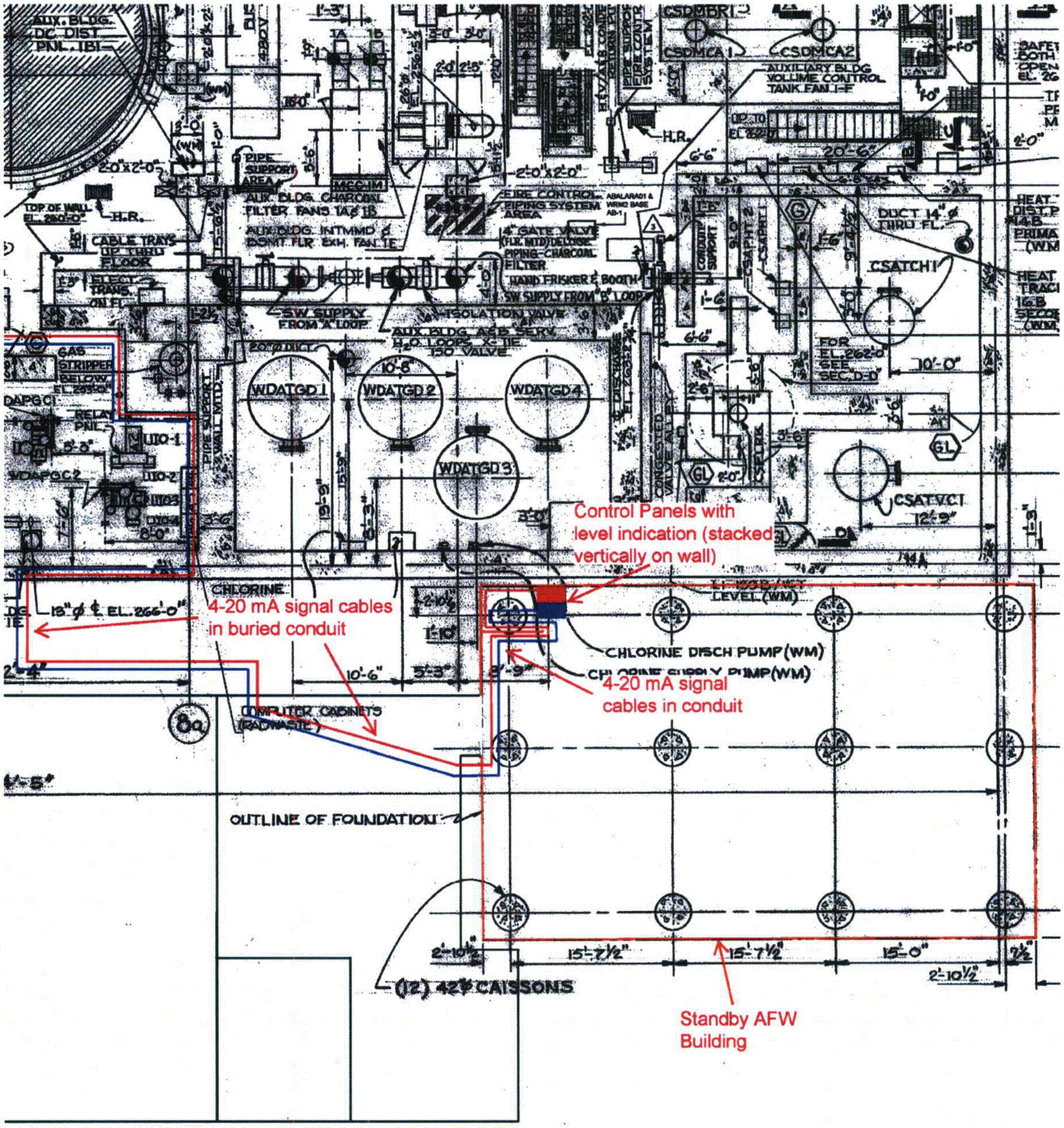

Figure 4b: Plan View Showing New SFP Water Level Indication
Note: Figure 4a is a continuation of Figure 4b

NRC RAI-3

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.*

d) *A description of how other material stored in the SFP will not create adverse interaction with the fixed instrument location(s).*

Ginna Response

a) The Ginna SFP level instrumentation components that are mounted at the SFP edge include 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 SFP 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 safe shutdown earthquake (SSE) at 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 Ginna OIP status update (Regulatory Commitment #2).

b) The Through-Air Radar waveguide horn and waveguide piping assembly is attached to a waveguide assembly mounting bracket. Figure 5 provides a visual representation of the SFP edge mounting configuration. There is no portion of the Through-Air Radar level equipment that contacts the SFP water, nor is there any connection to the SFP liner. The horn antenna is cantilevered over the edge of the SFP and firmly fixed in a direction perpendicular to the SFP water surface. The bracket provides the attachment point for the horn and waveguide assembly to the SFP operating floor. Four bolts at the base of the bracket fasten the bracket to the SFP operating 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 SFP 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 SFP liner without impacting the functionality of the level measurement.

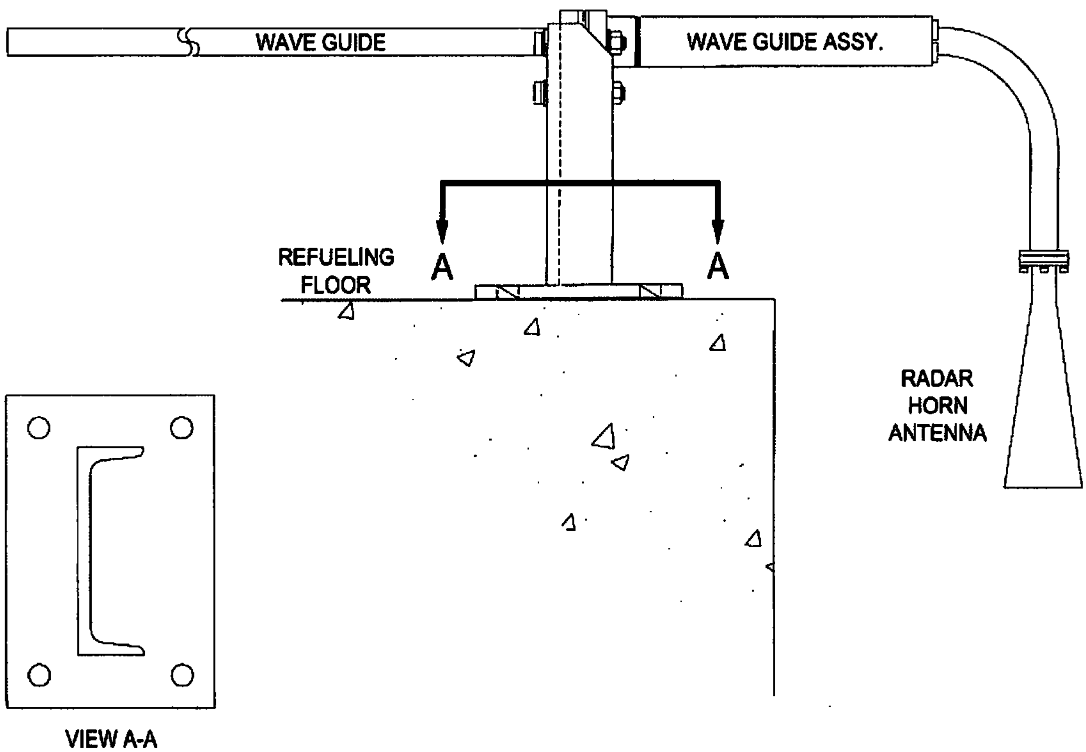

Figure 5: Waveguide Assemble Mounting Bracket Details

The final mounting details for the horn antenna and waveguide assembly will be available upon completion of the final design and will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update (Regulatory Commitment #3).

c) Figure 6 provides a *standard* conceptual arrangement of the elements of the Through-Air Radar system. The waveguide piping that is connected between the waveguide assembly at the SFP edge and the remotely located sensor will be attached to building structures using the applicable site design standards for seismic small bore pipe and supports 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 SFP 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" 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 and will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update (Regulatory Commitment #3).

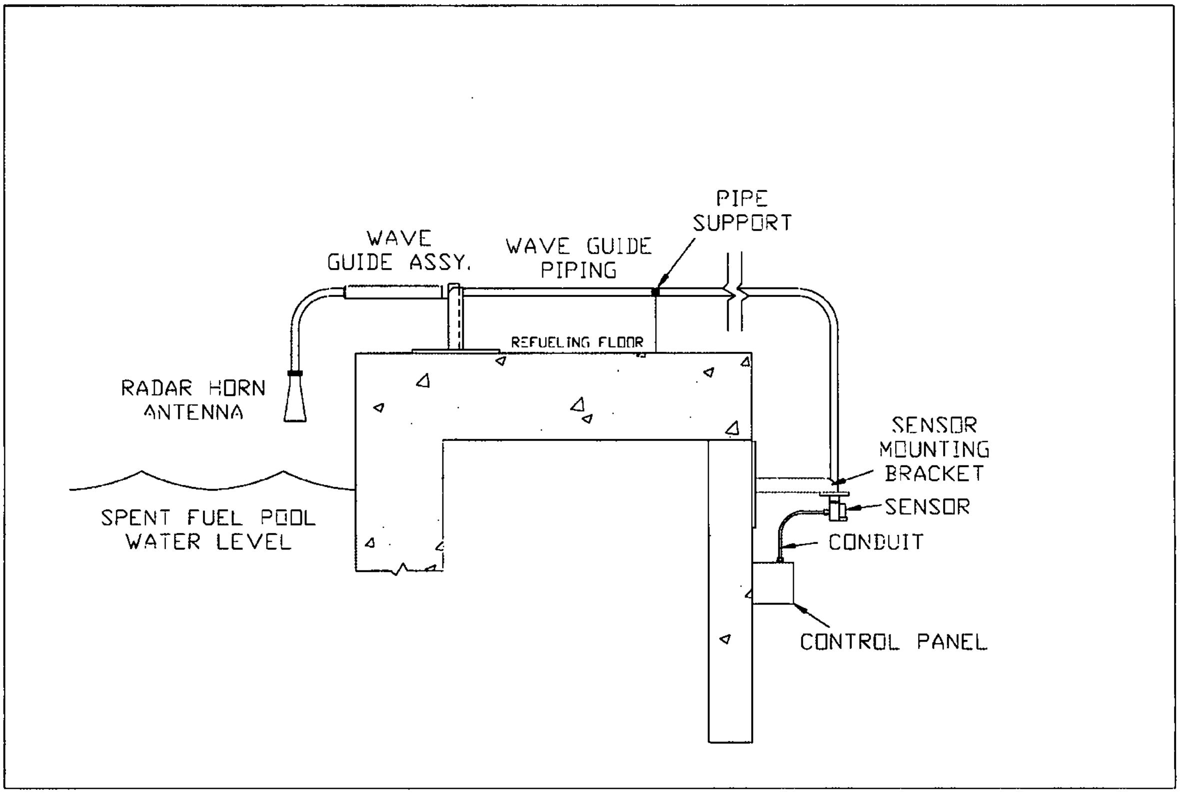

Figure 6: Standard Conceptual Arrangement of the Elements of the Through-Air Radar System

d) Other material stored in the SFP (fuel handling equipment) will not adversely impact the level instrumentation as the horn antenna is cantilevered over the edge of the SFP and there is no portion that contacts the SFP water. Therefore, interaction with material stored in the SFP is not possible.

NRC RAI-4
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 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 spent fuel pool 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.*

Ginna Response

a) Reliability of the permanently installed equipment under beyond-design-basis (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 ambient temperature in the SFP area that results from a boiling SFP 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 not greater than 130°C (266°F). The level sensor electronics will be located outside of the SFP area at a lower elevation. The temperature will be shown not to exceed the rated temperature.

Humidity

The maximum humidity postulated for the SFP floor elevation is 100% Relative Humidity (RH), saturated steam. The VEGA electronics will be located outside of the SFP floor area 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. Therefore, operating experience has shown that the Through-Air Radar functions at high levels of steam saturation.

Shock and Vibration

The 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 control 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 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 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 SFP will be subject to large amounts of radiation in the event that the pool level is severely lowered. The only parts of the measurement channel in the SFP radiation environment are the metallic waveguide and horn, which are not susceptible to the expected levels of radiation. The electronics will be located on the elevation below the SFP operating floor in an area that does not exceed their $1x10^3$ rad integrated dose 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 and will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update (Regulatory Commitment #4).

b) A seismic shake test will be performed to the requirements of IEEE 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," for elements of the VEGAPULS 62ER Through-Air Radar to levels anticipated to envelop most if not all plants in the US. The equipment to be tested includes the sensor, readout and control panel, horn end of the waveguide, pool end and sensor end mounting brackets, and waveguide piping. The items will be tested to the Required Response Spectra (RRS) contained in EPRI TR-107330, "Generic Requirements Specification for Qualifying a Commercially Available PLC for Safety-Related Applications in Nuclear Power Plants," to account for the potentially high seismic motion that could occur to cabinet-mounted readout and control panel. This RRS will also envelop the calculated seismic motion for items mounted to the building structure, SFP edge, etc.

c) The seismic testing described in Response to RAI-4.b above includes testing the VEGAPULS 62ER for functionality prior to and post seismic testing, which includes verification of the instrument's 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 and will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update (Regulatory Commitment #4).

NRC RAI-5

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.*

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.*

Ginna Response

a) The two channels of the AREVA Through-Air Radar SFP 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 the southeast and northeast corners of the SFP. This separation will be maintained for the routing of the stainless steel waveguide piping and each channel's sensor electronics. Wiring from the sensors and wiring to the control panels and displays for each channel will be routed in separate conduits to the SAFW Building.

b) The instrumentation power sources are provided with independent and battery backed-up supplies. See the power source discussion in the response to RAI-6.a. Independence will be maintained throughout the entire channel. Therefore, failure of one power source will not result in a loss of both instrument channels.

   Further details on independence and channel separation of the permanently installed equipment will be provided in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #5).

NRC RAI-6

Please provide the following:

a) *A description of the normal and alternate 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)), 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).*

Ginna Response

a) Each control panel will receive an independent non-safety related 120VAC power feed. Power for the northeast channel's control panel will be from ACPDPAF02 (located in the southeast corner of the SAFW building), circuit 8. This panel is fed from MCC E, which is powered from Bus 15. Power for the southeast channel's control panel will be from the planned ACPDPAF05 panel located in the new DDAFW building. This panel will be fed from the RG&E 12kV Sodus Line. Alternate power to the instruments is from self-contained batteries, which are independent from the normal plant AC and DC power systems. Battery capacity is sufficient to support reliable instrument channel operation until offsite resources can be deployed by mitigating strategies resulting from Order EA-12-049. See additional details on battery backup power in the response to RAI-6.b.

b) As required in NEI 12-02, in the event of loss of primary power the instruments can be manually switched to backup power. The VEGAPULS has a self-contained battery (four (4) standard C lithium cells) backup source which will support approximately 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 < 0.5 Watts. The sizing of the battery back-up for each channel of the VEGAPULS 62ER is based on the ability to supply the sensor at full load (20 milli-amps (mA)), and the level monitoring display, ensuring that the channel will be available to run reliably and continuously following onset of the BDB/Extended Loss of AC Power (ELAP) event for at least seven days, with built-in margin. The sizing of the battery will be verified by calculation and/or test prior to installation. The self-contained battery system will be 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 Ginna OIP status update (Regulatory Commitment #6).

<u>NRC RAI-7</u>

Please provide the following:

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

<u>Ginna Response</u>

a) The reference accuracy for the instrument defined by the manufacturer is ± 2 millimeters (mm) 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 represents an accuracy of approximately 0.327% of the 25'-6" measurement range from normal SFP level to SFP Level 3. 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). The stainless steel horn antenna and waveguide pipe that would be 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 SFP operating floor in mild environment conditions so that the effect of elevated SFP operating 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 due at BDB conditions described above is conservatively estimated to not exceed ± 3 inches or 0.980% of the 25'-6" measurement range, which is within the required ± 1 foot described in NEI 12-02.

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 of 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 inch, based on a still water level in the SFP. A change to design accuracy discussed in the Response to RAI-7.a above 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 will be 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 forwarded to the NRC on August 28, 2014 with the third Ginna OIP status update (Regulatory Commitment #7).

NRC RAI-8

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.*

Ginna Response

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.

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. Since the two level channels are independent, a channel check tolerance based on the final design accuracy of each channel will be applied for cross comparison between the two channels. The final accuracy of the instrumentation will be determined following installation testing to develop acceptance criteria for whether recalibration or troubleshooting is needed.

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 18 months. The multi-point test method is described in the Response to RAI-8.a. Calibration tests and functional checks will be incorporated into procedures as part of the plant surveillance program. See the Response to RAI-10.

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 Through-Air Radar instrument requires no regular preventative maintenance, except for routine replacement of the backup lithium battery cells in the control panel. This will be performed 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 August 28, 2014 with the third Ginna OIP status update (Regulatory Commitment #8).

NRC RAI-9

Please provide the following:

a) *For display locations that are not within the main control room, provide a description of the display location that addresses primary and alternate access route evaluation, continuous habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for verbal communications with decision makers for the various SFP drain down scenarios and external events.*

b) *The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" from a response time perspective. Discuss various drain-down scenarios.*

Ginna Response

a) Primary and Backup channel remote indication will be provided in the SAFW Building (Figure 4b). The primary and alternate access route evaluation, continuous habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for verbal communications with decision makers for the various SFP drain down scenarios and external events will be evaluated as part of the response to Order EA-12-049. This information will be provided in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #9).

b) The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" from a response time perspective, including a discussion of various drain-down scenarios, will be provided in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #10).

NRC RAI-10

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 spent fuel pool 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.*

Ginna Response

a) A list of procedures for use of SFP instrumentation has not been developed. Procedures for operating (both normal and abnormal response), calibration/test, maintenance and inspection will be developed for use of the spent fuel pool instrumentation in a manner that addresses the order requirements.

b) Procedures 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, and terminology and human performance considerations.

   The Ginna OIP does not incorporate the use of portable SFP level monitoring components. Consequently, a description of the objectives to be achieved with regard to the storage location and provisions for installation of the portable components is not provided.

   The list of procedures for operating (both normal and abnormal response), calibration/test, maintenance and inspection, along with the technical objectives to be achieved within each procedure will be provided in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #11).

NRC RAI-11

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.*

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.*

Ginna Response

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 summarized in the August 28, 2014 Ginna OIP status update (Regulatory Commitment #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 SPF level instrumentation is out of service for any reason, the out-of-service time 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 and the information summarized in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #13).

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 Ginna's Corrective Action Program. If both channels are determined to be non-functional, Ginna 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 and the information summarized in the August 28, 2015 Ginna OIP status update (Regulatory Commitment #14).

ATTACHMENT (2)

REGULATORY COMMITMENTS

CONTAINED IN THIS CORRESPONDENCE

ATTACHMENT (2)
REGULATORY COMMITMENTS CONTAINED IN THIS CORRESPONDENCE

The following table defines the R.E. Ginna Nuclear Power Plant, LLC (Ginna) regulatory commitments contained in this correspondence.

#	DESCRIPTION	DUE DATE
1	Provide specific requirements of the procedure controlling irradiated equipment or materials stored in the Spent Fuel Pool (SFP), including details of the analysis to be performed, to the NRC in the August 28, 2015 Ginna Overall Integrated Plan (OIP) status update.	August 28, 2015
2	The full hydrodynamic/seismic qualification details will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update.	February 28, 2014
3	The final mounting details for the horn antenna, waveguide assembly, waveguide piping, and radar sensor will be available upon completion of the final design and will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update.	February 28, 2014
4	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, including seismic conditions, will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update.	February 28, 2014
5	Further details on independence and channel separation of the permanently installed equipment will be provided in the August 28, 2015 Ginna OIP status update.	August 28, 2015
6	Further details on the AC and DC power supplies of the permanently installed equipment will be forwarded to the NRC on February 28, 2014 with the second Ginna OIP status update.	February 28, 2014
7	The final calibration methodology will be forwarded to the NRC on August 28, 2014 with the third Ginna OIP status update.	August 28, 2014
8	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 August 28, 2014 with the third Ginna OIP status update.	August 28, 2014
9	The primary and alternate access route evaluation, continuous habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for verbal communications with decision makers for the various SFP drain down scenarios and external events will be evaluated as part of the response to Order EA-12-049. This information will be provided in the August 28, 2015 Ginna OIP status update.	August 28, 2015
10	The reasons justifying why the display locations selected enable the information from these instruments to be considered "promptly accessible" from a response time perspective, including a discussion of various drain-down scenarios, will be provided in the August 28, 2015 Ginna OIP status update.	August 28, 2015
11	The list of procedures for operating (both normal and abnormal response), calibration/test, maintenance and inspection, along with the technical objectives to be achieved within each procedure will be provided in the August 28, 2015 Ginna OIP status update.	August 28, 2015

#	DESCRIPTION	DUE DATE
12	The preventive maintenance, test and calibration program will be available following completion of the final design and will be summarized in the August 28, 2014 Ginna OIP status update.	August 28, 2014
13	The compensatory actions to take when both channels are out of service, and the applicable administrative requirements and implementation procedures will be available and the information summarized in the August 28, 2015 Ginna OIP status update.	August 28, 2015
14	The compensatory actions to take when a channel is not restored within 90 days, and the applicable administrative requirements and implementation procedures will be available and the information summarized in the August 28, 2015 Ginna OIP status update.	August 28, 2015