NEXTera ENERGY SEABROOK

August 28, 2013

SBK-L-13158
Docket No. 50-443

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

Seabrook Station

NextEra Energy Seabrook, LLC's First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)

References:

1. NRC Order Number EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012
2. NRC Interim Staff Guidance JLD-ISG-2012-01, Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, Revision 0, dated August 29, 2012
3. NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, dated August 2012
4. NextEra Energy Seabrook, LLC Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, (Order Number EA-12-051), dated October 26, 2012
5. NextEra Energy Seabrook, LLC Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, (Order Number EA-12-051), dated February 26, 2013
6. NRC E-mail, John Lamb to NextEra Energy Seabrook, Mike Ossing, Draft RAI Regarding the Seabrook Overall Integrated Plan for Reliable SFP Instrumentation, dated July 18, 2013 (ML13217A166)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to NextEra Energy Seabrook, LLC (NextEra Energy Seabrook). Reference 1 was immediately effective and directs NextEra Energy Seabrook to install reliable spent fuel pool level instrumentation. Specific requirements are outlined in Attachment 2 of Reference 1.

A001
NRR

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the NextEra Energy Seabrook initial status report regarding mitigation strategies. Reference 5 provided the NextEra Energy Seabrook overall integrated plan. In Reference 6, the NRC requested additional information to enable the continued technical review of the NextEra Energy Seabrook, LLC (NextEra) Overall Integrated Plan (OIP).

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. The purpose of this letter is to provide the first six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any. It also provides responses to the Reference 6 request for additional information.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact Mr. Michael Ossing, Licensing Manager, at (603) 773-7512.

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

Executed on 8/28, 2013.

Sincerely,

Thomas Vehec
Plant General Manager
NextEra Energy Seabrook, LLC

cc: NRC Region I Administrator
J.G. Lamb, NRC Project Manager, Project Directorate 1-2
NRC Senior Resident Inspector
Director, Office of Nuclear Reactor Regulation
Ms. Jessica A. Kratchmann, NRR/JLD/PMB, NRC
Mr. Eric E. Bowman, NRR/DPR/PGCB

Director Homeland Security and Emergency Management
New Hampshire Department of Safety
Division of Homeland Security and Emergency Management
Bureau of Emergency Management
33 Hazen Drive
Concord, NH 03305

Mr. John Giarrusso, Jr., Nuclear Preparedness Manager
The Commonwealth of Massachusetts
Emergency Management Agency
400 Worcester Road
Framingham, MA 01702-5399

ATTACHMENT

Enclosure 1

NEXTERA ENERGY SEABROOK, LLC
SEABROOK NUCLEAR PLANT

FIRST SIX MONTH STATUS REPORT FOR THE IMPLEMENTATION OF ORDER EA-12-051, ORDER MODIFYING LICENSES WITH REGARD TO RELIABLE SPENT FUEL POOL INSTRUMENTATION

1.0 INTRODUCTION

By letter dated February 26, 2013 (Agency wide Documents Access and Management System (ADAMS) Accession No. ML13063A439), NextEra Energy Seabrook, LLC (NextEra, the licensee) submitted an Overall Integrated Plan (OIP) for the Seabrook Nuclear Plant in response to the March 12, 2012, U.S. Nuclear Regulatory Commission (NRC) Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12056A044). This attachment provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule or need for relief/relaxation and the basis.

2.0 MILESTONE ACCOMPLISHMENTS

- Commence Engineering and Design – This milestone is in progress. Seabrook has selected SFP level instrumentation that will be used to meet the criteria delineated in the Overall Integrated Plan.
- Submit First 6 month update - Complete

3.0 MILESTONE SCHEDULE STATUS

There currently are no changes to the Milestone Schedule provided in the Overall Integrated Plan (Reference 2). Any changes to the following target dates will be reflected in the six month updates:

The current milestones are:

• Submit Second 6 Month Update	1Q 2014 (February)
• Submit Third 6 Month Update	3Q 2014 (August)
• Complete Engineering and Design	4Q 2014 (December)
• Submit Fourth 6 Month Update	1Q 2015 (February)
• Complete Procurement of SFP Instruments	1Q 2015 (March)
• Complete Installation/ Instruments Operational	3Q 2015 (August)
• Submit Fifth 6 Month Update	3Q 2015 (August)
• Second Refueling Outage	3Q 2015 (October)
• Training Complete	3Q 2015 (October)

Required implementation date: 3Q 2015 (Refueling Outage 17)

4.0 CHANGES TO COMPLIANCE METHOD

There currently are no changes to the compliance method documented in the Overall Integrated Plan (Reference 2). Consistent with the requirements of Order EA-12-051 and the Order guidance documents, the six month reports will delineate any proposed changes to compliance methods.

5.0 NEED FOR RELIEF/ RELAXATION AND BASIS

Seabrook is not requesting relief from the requirements of Order EA-12-051 or guidance document JLD-ISG-2012-03 (Reference 4) at this time.

6.0 *REQUESTS FOR ADDITIONAL INFORMATION*

The NRC staff determined that additional information was required to enable the continued technical review of the NextEra Energy Seabrook, LLC (NextEra) Overall Integrated Plan (OIP).

Table 1 provides a summary of the status of responses to the Request for Additional Information (RAIs) that was received from the NRC staff on July 18, 2013 (Reference 1). The response to the open RAIs in the table requires design information that is not available at this time. As details are developed responses to these RAIs will be provided to the NRC as part of future six month updates.

Table 1

Open RAIs	Status
RAI-3 a, b, c – Mounting	In progress
RAI-4 a, b, c – Qualification	In progress
RAI-7 a, b – Accuracy	In progress
RAI-8 a, b, c, d – Testing	In progress
RAI-10 a, b – Program Features	In progress
RAI-11 a, b, c – Testing and Calibration	In progress

RAI-1: Levels of Required Monitoring

The OIP states, in part, that;

Level 1 is the level adequate to support operation of the normal fuel pool cooling system - Based on preliminary calculation, the low level limit for reliable SFP cooling system operation corresponds to an elevation of approximately 22 ft., 6 in. This level is based on a preliminary calculation that assumes mitigating effects by the installed suction strainer on vortexing. The actual effect of the strainer on this level will be determined during the engineering and design phase of the project.

For the purposes of this submittal the minimum level that will be adequate to support normal fuel pool cooling system operation, as indicated on either the primary or backup instrument channel, is assumed to correspond to a plant elevation of 22 ft., 6 in.

Level 2 is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck - Indicated level on either the primary or backup instrument channel of greater than an elevation of 10 ft., 9.5 in will provide substantial radiation shielding for a person standing on the SFP operating deck. This elevation is approximately 13 feet above the top of the spent fuel positioned in the pool (Nominal Elev. (-) 1 ft., 5-3/4 in.). With 13 feet of water above the highest fuel element position, the calculated dose rate at the surface of the SFP is less than 2.5 mrem/hr (Reference 10, Section 12.3.2.1.c). This monitoring level ensures there is adequate water level to provide substantial radiation shielding for personnel to respond to Beyond-Design-Basis External Events including the initiation of SFP makeup strategies that would require access to the Fuel Storage Building (FSB).

Level 3 is where fuel remains covered - Indicated level on either the primary or backup instrument channel of greater than Elevation (-)1 foot. This is the nominal water level

approximately 6 in. above the top of the fuel racks. This monitoring level will assure the maximum range of level information is available to the plant Operators and emergency response personnel. This level is also assumed to be the minimum level that assures that adequate water level remains above the top of the stored fuel seated in the SFP (nominal elevation of (-)2 ft., 2.5 in.).

Please provide the following:

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

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

NextEra Response RAI-1.a

For Level 1, the two points described in the NEI 12-02 guidance are; the level at which reliable suction loss occurs due to uncovering of the coolant inlet pipe, weir or vacuum breaker (depending on the design), or 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.

To determine the higher of the two levels the following was taken into consideration:

(1) The level at which reliable suction loss occurs due to uncovering the coolant inlet pipe or any weirs or vacuum breakers associated with suction loss. This level was established based on nominal suction strainer inlet elevation and conservative estimate for the onset of vortexing. The actual effect of the strainer on this level has been formally determined by calculation C-S-1-24606, "Spent Fuel Pool Level for Reliable Pump Suction," (Reference 7). The elevation for reliable pump suction is plant elevation 23 ft., 4 inches.

(2) The level at which the normal spent fuel pool cooling pumps lose required NPSH assuming saturated conditions in the pool. Reference 7 demonstrates that the point of zero NPSH margin is 22 ft., 4 inches of plant elevation. With the spent fuel pool at 212 degrees F, saturated conditions, the NPSHA is approximately 11.2 ft. The NPSHR for the pump is 10 ft. at 212 degrees F. This results in a ratio of NPSHA/NPSHR value of approximately 1.12. Therefore, the NPSHA is greater than the NPSHR at saturated conditions.

The higher of the above points is the level where the inlet strainer will lose suction (Item (1) above). Therefore, Level 1 has been revised to elevation 23 ft., 4 inches for both the primary and backup instrumentation.

The SFP level instrument upper range will be at least 12 inches above Level 1 to account for upper instrument sensitivity band and instrument loop uncertainty. From a practical perspective, the upper range capability will extend even higher (e.g. above normal operating level).

Level 3 has also been revised to provide margin for instrument sensitivity band and uncertainty. For the purposes of this submittal an indicated level on either the primary or backup instrument channel of greater than plant elevation (-) 0 ft., 6 in will be assumed to assure that the fuel remains covered. The actual effect of the instrument sensitivity band and accuracy on this level will be determined during the engineering and design phase of the project.

NextEra Response RAI-1.b

Enclosure 2 contains an elevation view of the proposed arrangement for the portions of the instrument channel consisting of permanent measurement channel equipment. In addition, the datum values for the Levels 1, 2 and 3 are depicted as well as the assumed sensitivity and accuracy of the equipment.

RAI-2: INSTRUMENTATION DESIGN FEATURES

Arrangement

The OIP states, in part, that;

The Spent Fuel Pool Level (SFP) Instrumentation for each channel will consist of a level sensing probe suspended in the SFP, a signal conditioning processor module, level indicator and a backup battery system. Redundant Train A and Train B cables will be routed from the Fuel Storage Building (FSB) through the Containment Enclosure Ventilation Area (CEVA) and into the Primary Auxiliary Building (PAB) to connect each probe to a signal conditioning processor module. The signal processor module is a panel-mounted instrument that has a display screen showing a numerical read out of SFP level as a continuous indication (i.e., remote Indication). The signal conditioning processor module for each channel will be mounted in a separate stainless steel enclosure located in the PAB so that the instruments will not be subject to the radiation, high temperature and high humidity conditions that could result from postulated loss of water inventory in the SFP. The primary operator indication and backup battery systems will be provided in the Train A and Train B Essential Switchgear Rooms (Elev. 21 ft., 6 in.) located in the Control Building.

Please modify the sketch in Figure 1 or provide a marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/placement of the primary and back-up SFP level sensors, and the proposed routing of the cables that will extend from the sensors toward the location of the local electronics cabinets and read-out/display devices in the main control room or alternate accessible location.

NextEra Response RAI-2

Enclosure 3 contains a plan view of the proposed arrangement for the portions of the instrument channel consisting of permanent measurement channel equipment. As requested the enclosure depicts the inside dimensions of the SFP, planned placement of the primary and backup level sensors in the SFP and the proposed routing of cables that will connect the sensors to the level transmitters. The location of the signal conditioning processor module (level Transmitter) for each channel has been revised from the Primary Auxiliary Building to the Containment Enclosure Building. The planned location of the UPS/ remote display in the Train A and Train B Essential switchgear Rooms is also provided.

RAI-3: Mounting

The OIP states, in part, that;

Equipment mounting will be Seismic Category I in accordance with guidelines of Regulatory Guide 1.29. Installed equipment will be seismically qualified to withstand the maximum seismic ground motion considered in the design of the plant area in which it will be installed.

Where the collapse of components would adversely affect the performance of the SFP level instrumentation, the components will be supported to withstand seismic loading or isolated from the systems or components by Seismic Category I boundary restraints.

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.

NextEra Response RAI-3.a, b, c

The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

RAI-4: Qualification

The OIP states, in part, that;

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

The effects of postulated seismic events on installed instrument channel components (with the exception of battery chargers and replaceable batteries) will be verified to ensure that the equipment design and installation is robust.

Applicable components of the instrument channels will be qualified by the manufacturer (or otherwise tested) for seismic effects at response levels commensurate with the equipment mounting

location. Instrument channel qualification will be based on the guidance provided in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations, or a substantially similar industrial standard.

In addition, any of the below may also be used to provide additional assurance that the equipment will perform as designed during and following a seismic event:

- *Review of operating history for component used in environments with significant vibration, such as for portable hand-held devices or devices used in transportation applications. The effects of low frequency, high acceleration will be included in the qualification as discussed above. Vibration qualification will be inclusive of methods that demonstrate the effects of seismic motion imparted to the components at the location of installation;*
- *Demonstration that devices are substantially similar in design to equipment that has been previously tested for seismic effects in accordance with the plant design basis at the location where the instrument is to be installed (g- levels and frequency ranges).*

In addition, pool mounted equipment will be qualified for submergence, providing protection from wave and seismic related disturbances during and after a seismic event.

Please provide the following:

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

b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and 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 such that following a seismic event the instrument will maintain its required accuracy.

NextEra Response RAI-4.a, b, c

The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

RAI-5: Independence

The OIP states, in part, that;

The backup instrument channel will be redundant to, and independent of, the primary instrument channel. Independence will be obtained through separation of the sensors, indication, backup

battery power supplies, associated cabling and channel power feeds. Power sources to each channel will be from a different Class 1E plant bus (Train A and Train B).

Please provide the following:

a) A description of how the two channels of the proposed level measurement system in each pool meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.

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

NextEra Response RAI-5.a

The permanently installed primary and backup instrument channels are redundant and will be installed independent of each other with respect to physical separation and electrical power sources. The physical and electrical separation will minimize the potential for a common cause event to adversely affect both channels. Each channel will consist of a level sensor, Level Transmitter and Uninterruptible Power Supply (UPS) with remote level display.

The level sensors will be located on the North and South sides of the SFP physically separated to the extent practical by a distance greater than the shortest length of a pool side. The length of the shortest side of the SFP is approximately 27 Ft feet. The horizontal separation will minimize the potential for a common cause event in the area of the SFP to adversely affect both channels.

The level transmitters, one per channel, will also be mounted in separate locations within the Containment Enclosure Ventilation Area (CEVA) using independent seismically qualified supports (see Enclosure 3). A vendor supplied cable will be independently run from each SFP sensor to the appropriate level transmitter. The vendor cables will be routed in dedicated rigid steel conduits that will be installed from each SFP sensor locations to the west wall of the SFP building, head south to the existing cable tray block outs, exit through the block outs to the transmitters located in CEVA. Each conduit will be installed on its own separate independent series of seismically qualified supports (i.e. "A" train and "B" train supports) maintaining physical separation between the primary and backup channel routings. The spatial separation of the transmitters and associated conduits will minimize the potential for a common cause event in the SFP area to adversely affect both channels.

The primary and backup channel UPS/ Remote Indication Enclosures, which include the remote displays, will be located in the "A" and "B" train Essential Switchgear Rooms, one channel in each room. The Essential Switchgear Rooms are separated by physical barriers that assure train separation that preserves the independence of redundant Class 1E plant electrical systems to prevent the occurrence of a common failure mode. From the transmitter locations in CEVA, new plant cables will be installed in the existing seismically qualified "A" and "B" train tray systems to the remote indication enclosures (UPS/ Remote Indicator) located in the "A" and "B" train Essential Switchgear Rooms. Rigid steel conduit will also be installed in each switchgear room from the enclosure to the tray system. All conduit and trays for the routing of the cabling will be seismically qualified and capable of carrying safety related Class 1E circuits.

The primary level channel will be powered from the 120VAC distribution panel for MCC 615 (Train "B"). MCC 615 is located in the train "B" Essential Switchgear Room. The backup level channel will be powered from the 120VAC distribution panel for MCC 515 (Train "A"). MCC 515 is located in the train "A" Essential Switchgear Room. These panels are physically separated from each other and will be normally powered from independent emergency diesel backed power supplies which serve to minimize the potential for a common cause event to affect both channels. In the event that the primary or backup power source from these panels is unavailable the channel UPS will automatically swap from 120VAC power to the battery backup power supply.

NextEra Response RAI-5.b

Two completely redundant, independent and permanently installed SFP level measurement channels, both from the same supplier are being provided. Each channel utilizes guided wave radar (GWR) technology which uses the principle of time domain reflectometry to detect SFP water level.

Each level measurement channel will consist of a stainless steel sensor cable probe suspended in the SFP from a bracket attached to the operating deck at the side of the pool, a level transmitter located in an adjacent area (CEVA) and an Uninterruptible Power Supply (UPS) with remote level display. Physical and spatial separation will be included in the design as described in the NextEra response to RAI-5.a above.

Each level measurement channel will be powered by an independent Emergency Diesel backed power source. The primary level channel will be powered from the120VAC distribution panel for MCC 615 (Train "B"). The backup level channel will be powered from 120VAC distribution panel for MCC 515 (Train "A").

The primary level channel signals between the level probe, transmitter and level processor cabinet are entirely independent and separated from the backup level channel as described in the NextEra response to RAI-5.a above.

RAI-6: Power Supplies

The OIP states, in part, that

> *The primary and backup instrument channels will be powered from redundant dedicated batteries and local battery chargers. The battery chargers will normally be supplied 120 V AC power from redundant Class 1E distribution panels (Train A and Train B) that are sequenced and powered by the Emergency Diesel Generators or the Supplemental Emergency Power System (SEPS) on loss of off-site power (LOOP) events. If the normal Class 1E power supply to a channel is not available, the dedicated battery supply will automatically power the instrument channel. A minimum battery life of 72 hours will be provided for each channel.*
>
> *The design will include the capability to isolate the normal Class 1E power supply to each channel by opening the feeder breaker within the Class 1E distribution panel. The Class 1E distribution panels that will be used for this application are located in the Essential Train A and Train B Switchgear Rooms.*

The minimum battery life of 72 hours will be sufficient to assure that the SFP level instrumentation will provide reliable level indication until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049. As part of the mitigating strategies for Order EA-12-049 (Reference 2), it is assumed that one channel of the SFP level instrumentation will be repowered by the SEPS approximately 10 minutes into the event if the emergency diesel generators are not available. Off-site resources (personnel, equipment, etc.) will begin to arriving at the station approximately hour 6 into the event and full staffing is expected within 24 hours. Requested portable equipment that will be connected to repower the redundant vital plant bus, including the power feed to the redundant SFP level monitoring instrument channel, is assumed to arrive at the site from the Regional Response Center (RRC) approximately 24 hours into the event.

Long term coping strategies will include repowering of the redundant SFP level monitoring instrument channel and SFP cooling equipment approximately 36 hours into the event.

Please provide the following:

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

b) If the level measurement channels are to be powered through a battery system (either directly or through an Uninterruptible Power Supply (UPS)), please provide the design criteria that will be applied to size the battery in a manner that ensures, with margin, that the channel will be available to run reliably and continuously following the onset of the BDB event for the minimum duration needed, consistent with the plant mitigation strategies for BDB external events (Order EA-12-049).

NextEra Response RAI-6.a

As previously described, the primary level channel will be powered from the120VAC distribution panel for MCC 615 (Train "B"). MCC 615 is located in the Train "B" Essential Switchgear Room and is normally powered from Unit Substation 61. The backup level channel will be powered from 120VAC distribution panel for MCC 515 (Train "A"). MCC 515 is located in the Train "A" Essential Switchgear Room and is normally powered from Unit Substation 51. The "A" and "B" Train Essential Switchgear Rooms are physically separated from each other by seismically qualified fire rated wall(s).

On a loss of offsite power MCC 615 and MCC 515 are powered from separate independent Emergency Diesel Generators. In the event that the primary or backup power source from these panels is unavailable the respective channel UPS will automatically swap from 120VAC to the battery backup power supply.

NextEra Response RAI-6.b

Battery sizing will be in accordance with IEEE 485-2010. The design criteria for each channel will assume continuous level measurement system operation for at least 72 hours following a loss of the normal AC power source. Calculation of system power consumption will be based on the specified values listed in component manufacturer specifications. Margin will be added to the battery sizing calculations, following the guidelines of IEEE 485-2010, Section 6.2.2. The specified 72 hour battery mission time will provide ample margin to allow the implementation of Phase II FLEX actions as described in section IX of the Overall Integrated Plan. The 72 hour battery life will be tested and

verified during the Factory Acceptance Test or Site Acceptance Test prior to final acceptance of the system.

RAI-7: Accuracy

The OIP states, in part, that

> *The instrument channels will be designed such that they will maintain their design accuracy following a power interruption or change in power source without recalibration. Channel accuracy will consider SFP conditions, e.g., saturated water, steam environment, or concentrated borated water.*
>
> *Additionally, instrument channel accuracy will be sufficient to allow trained personnel to determine when the actual level exceeds the key spent fuel pool water levels (Levels 1, 2 and 3) without conflicting or ambiguous indication. The accuracy will be within the resolution requirements of Figure 1 of NEI 12-02.*

Please provide the following:

> *a) An estimate of the expected instrument channel accuracy performance (e.g., in % of span) under both a) normal SFP level conditions (approximately Level 1 or higher) and b) at the BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post- shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points.*
>
> *b) A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.*

NextEra Response RAI-7.a, b

The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

RAI-8: Testing

The OIP states, in part, that;

> *Instrument channel design will provide for routine testing and calibration consistent with Order EA-12-051 and the guidance in NEI 12-02. Instrument channel testing and calibration will be performed using existing plant work control processes. Details for testing and calibration will be determined during the engineering and design phase of the project.*

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.

NextEra Response RAI 8.a, b, c, d

The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

RAI-9: Display

The OIP states, in part, that

The location for primary and backup SFP level indication will be accessible during and following an event. The Operator indication (Primary and Backup indication) will be provided in the Train A and Train B Essential Switchgear Rooms (Elev. 21 ft., 6 in.) which are located in the Seismic Category I Control Building. The Train A and Train B Essential Switchgear Rooms are in close proximity to the main Control Room and Emergency Planning Technical Support Center located on elevation 75 ft of the Control Building. The location of the primary and backup indication is:

- *Promptly accessible to the appropriate plant staff giving appropriate consideration to various drain down scenarios,*
- *Outside of the FSB, e.g., an appropriate distance from the radiological sources resulting from an event impacting the SFP,*
- *Inside a seismic category I structure providing protection against adverse weather and*
- *outside of any high radiation areas during normal operation.*

Please provide the following:

a) Since the backup display location is not in 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 will enable the information from these instruments to be considered "promptly accessible". Include consideration of various drain-down scenarios.

NextEra Response RAI 9.a

Local and remote Spent Fuel Pool (SFP) wide range level instrument displays will be provided for each level measurement channel (Primary and backup). The displays will be located in areas outside of the area surrounding the SFP floor.

A local display will be located on the front of the primary and backup level transmitters located in the CEVA (Ref. Enclosure 3). The CEVA is adjacent to the Spent Fuel Building (SFP) and has multiple access routes through the Seismic Category I Primary Auxiliary Building (PAB) which is normally accessed through the Radiation Protection Checkpoint. Alternate routes into the PAB and CEVA are provided through doors P418 and EM414 (~ Elev. 25 ft.). These doors provide access from the exterior of the PAB and are normally locked. Door EM 414 provides access into the Main Steam Feedwater Pipe Chase and/ or RCA Tunnel. Door P418 provides access to the 25 ft. elevation of the PAB.

Normal access into the CEVA is provided through door P415 which is located on the southeast corner of the 25 ft elevation of the PAB. An alternate access route into CEVA is provided from the West Main Steam and Feedwater Pipe Chase stairwell through door EM409 (Elev. 21 ft., 6 in.). The level transmitters and associated displays will be physically protected from the environmental and radiological conditions that could result from a beyond design basis (BDB) event by a reinforced concrete wall that separate the CEVA from the SFB.

Remote Spent Fuel Pool (SFP) wide range level instrument displays will also be located in the Train "A" and Train "B" Essential Switchgear Rooms (Elev. 21 ft., 6 in.) contained in the Seismic Category I Control Building (Ref. Enclosure 3, one remote indicator per Train). The Train A and Train B Essential Switchgear Rooms are in close proximity to the main Control Room and Emergency Planning Technical Support Center which are located on Elevation 75 ft of the Control Building. The remote level displays will be physically protected from the environmental and radiological conditions that could result from a beyond design basis (BDB) event by a reinforced concrete wall that separate the Essential Switchgear Rooms from the PAB and SFB. This area will be accessible and continuously habitable following a beyond design basis event.

Multiple routes are available to access the Essential Switchgear Rooms from the Control Building. The normal route from the Main Control Room is provided by door C300. This door provides access into the Turbine Building where stair cases TBST1, TBST2, TBST3 and TBST4 provide alternate routes to the 21 ft., 6 in. elevation and door C102. Door C102 provides access from the Turbine Building into the Train "A" Essential Switchgear Room. From the Train "A" Essential Switchgear Room, doors C106 or C109 provide access into the Train "B" Essential Switchgear Room.

An alternate access path into the Train "B" Essential Switchgear Rooms is provided from the Main Control Room via an enclosed Seismic Category I stairwell (Stairwell CBST2). Door C312 provides access from the Main control room into the 75 ft elevation of the stairwell. Door C118 provides direct access from the 21 ft, 6 in elevation of the stairwell into the Train "B" Essential Switchgear room. From the Train "B" Essential Switchgear room, doors C106 or C109 provide direct access into the

Train "A" Essential Switchgear room. Stairwell CBST2 can also be accessed from outside of the control building via door C119 (Elev. 21 ft., 6 in.).

The minimum shift complement following a beyond design basis event will initially consist of the staffing positions noted below

Shift Manager
Unit Supervisor
Work Control Supervisor
Two Control Room Operators
Five Nuclear Systems Operators
Firefighter
Chemistry Technician
Health Physics Technician

Primary and secondary responders from the Offsite Emergency Response Organization would augment this staff within 60 minutes of a declared Alert level (or higher) emergency condition if it is safe to access the plant. If it is unsafe to access the plant, the primary and secondary responders from the offsite Emergency Response Organization will report to the Alternate Technical Support Center/ Operation Support Center located at the Emergency Operations Facility in Portsmouth, New Hampshire. Staff from the Alternate Technical Support Center/ Operation Support Center will be dispatched to the plant when safe access routes are established.

Hand held radios, satellite phones, person to person contact or the plant PBX phone system are communication systems that will be available for transmitting information to and from the Control Room.

NextEra Response RAI-9.b

The information from the SFP level instrument is promptly accessible for various drain-down scenarios and external events based on the reasons specified in RAI 9a above.

RAI-10: PROGRAM FEATURES

Procedures

The OIP states, in part, that

Procedures will be developed using guidelines and vendor instructions to address the maintenance, operation, and abnormal response issues associated with the new SFP instrumentation.

Procedures will address a strategy to ensure SFP water level addition is initiated at an appropriate time consistent with implementation of NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide and EA-12-049, Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events.

Please provide the following:

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

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

NextEra Response RAI-10.a, b

The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

RAI-11: Testing and Calibration

The OIP sates, in part, that

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

Please provide the following:

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

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

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

NextEra Response RAI-11.a,b,c

The answer to this request requires design information that is not available at this time. Information that is available will be provided in future 6-month update reports.

References

1. NRC Electronic Mail to NextEra Energy Seabrook, LLC, "Draft Requests for Additional Information Regarding the Seabrook Overall Integrated Plan for Reliable SFP Instrumentation, dated July 18, 2013 (ADAMS Accession No. ML 13217A166).

2. NextEra Energy Seabrook, LLC's Overall Integrated Plan in Response to March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 26, 2013 (ADAMS Accession No. ML13063A439)

3. NextEra Energy Seabrook, LLC's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 22, 2013 (ADAMS Accession No. ML 13063A438)

4. NRC JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0, August 29, 2012.

5. NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, August 2012.

6. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, August 2012.

7. Seabrook Calculation C-S-1-24606, "Spent Fuel Pool Level for Reliable Pump Suction," Revision 00.

8. NRC Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012 (ADAMS Accession No ML12056A044).

9. Seabrook Drawings:

Drawing No.	Title	Revision
310733	Fuel Storage Building EL. 25'-0"	001
310724	Fuel Storage Building Exposed Conduit Plan Elevation 25'-0"	017
102200	F.S.B. Stainless STL.- Spent Fuel Pool Liner SH.1 Area 040 FB	012
1-NHY-805059	Fuel Storage Building Plan Elevation 21"-6" & 25"-0" General Arrangement	012
1-NHY-310431	Control Building Elev. 21'-6" Electrical General arrangement	030
1-NHY-805062	Primary auxiliary Building Plans At Elev. 25"-0" General Arrangement	020
101619	Containment Enclosure Ventilation Area Concrete Plans At EL. 21'-6" & 53'-0"	011

ENCLOSURE 2

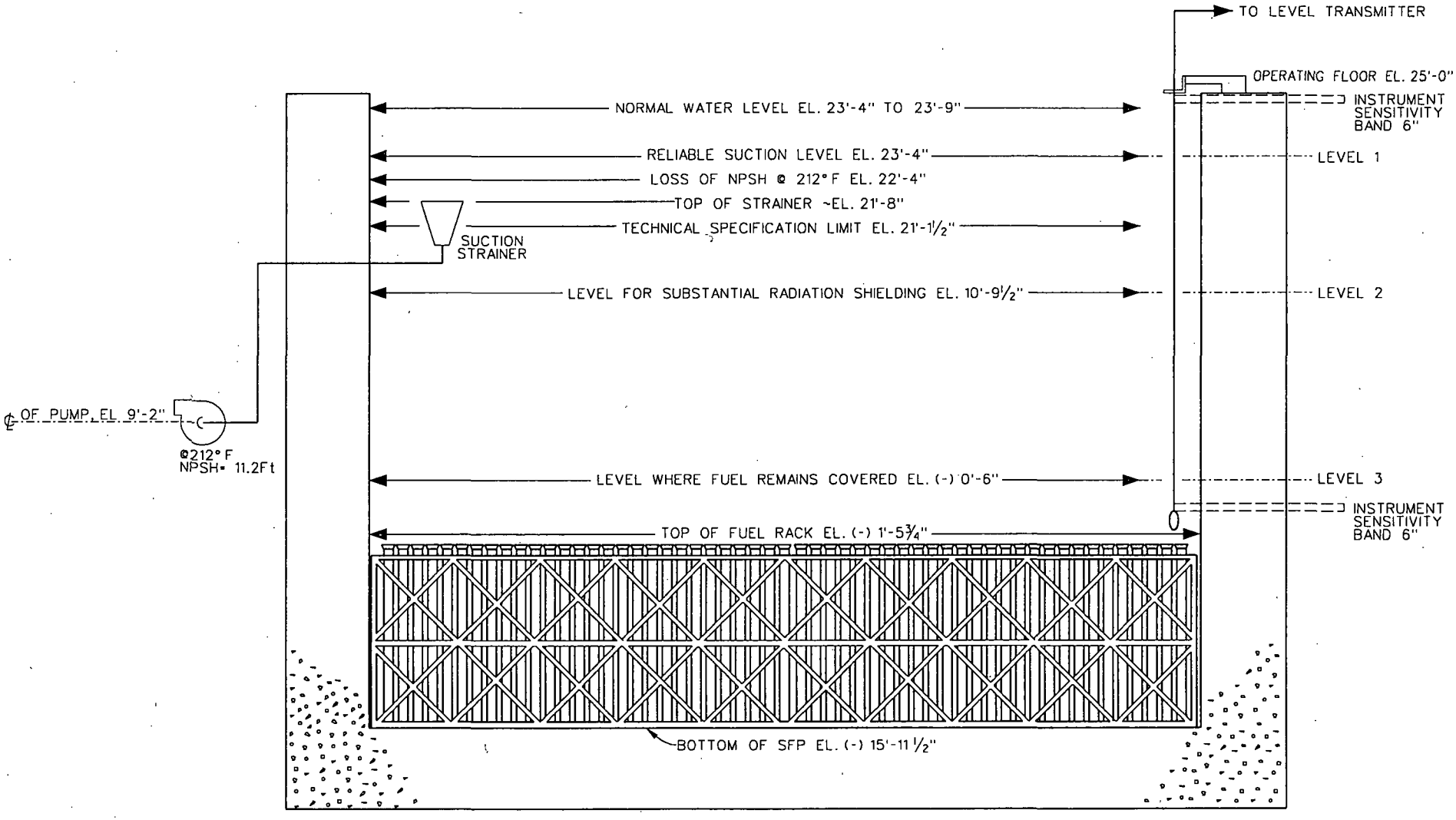
NEXTERA ENERGY SEABROOK, LLC
SEABROOK NUCLEAR PLANT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING OVERALL INTEGRATED PLAN IN RESPONSE TO
ORDER EA-12-051, "RELIABLE SPENT FUEL POOL INSTRUMENTATION"

SPENT FUEL POOL LEVELS
ELEVATION VIEW

ENCLOSURE 2

SEABROOK SPENT FUEL POOL LEVELS
ELEVATION VIEW



NOTES:
1. ALL ELEVATIONS ARE NOMINAL
2. NOT TO SCALE

JIM S SIMPLIFIED SFP.dgn 8/21/2013 4:16:21 PM

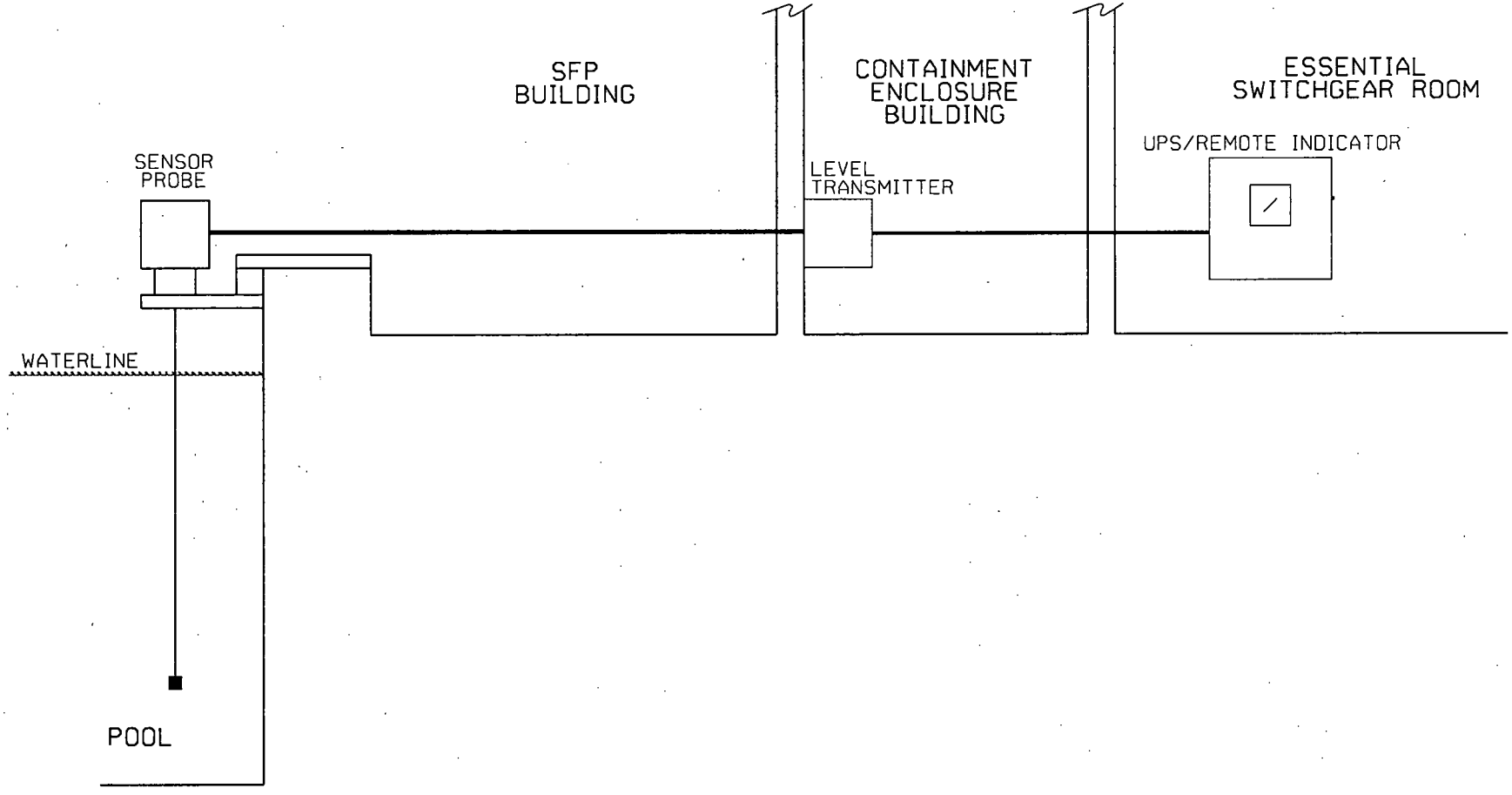
ENCLOSURE 3

NEXTERA ENERGY SEABROOK, LLC
SEABROOK NUCLEAR PLANT

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING OVERALL INTEGRATED PLAN IN RESPONSE TO
ORDER EA-12-051, "RELIABLE SPENT FUEL POOL INSTRUMENTATION"

PLAN VIEWS OF INSTRUMENT
CHANNEL ARRANGEMENT

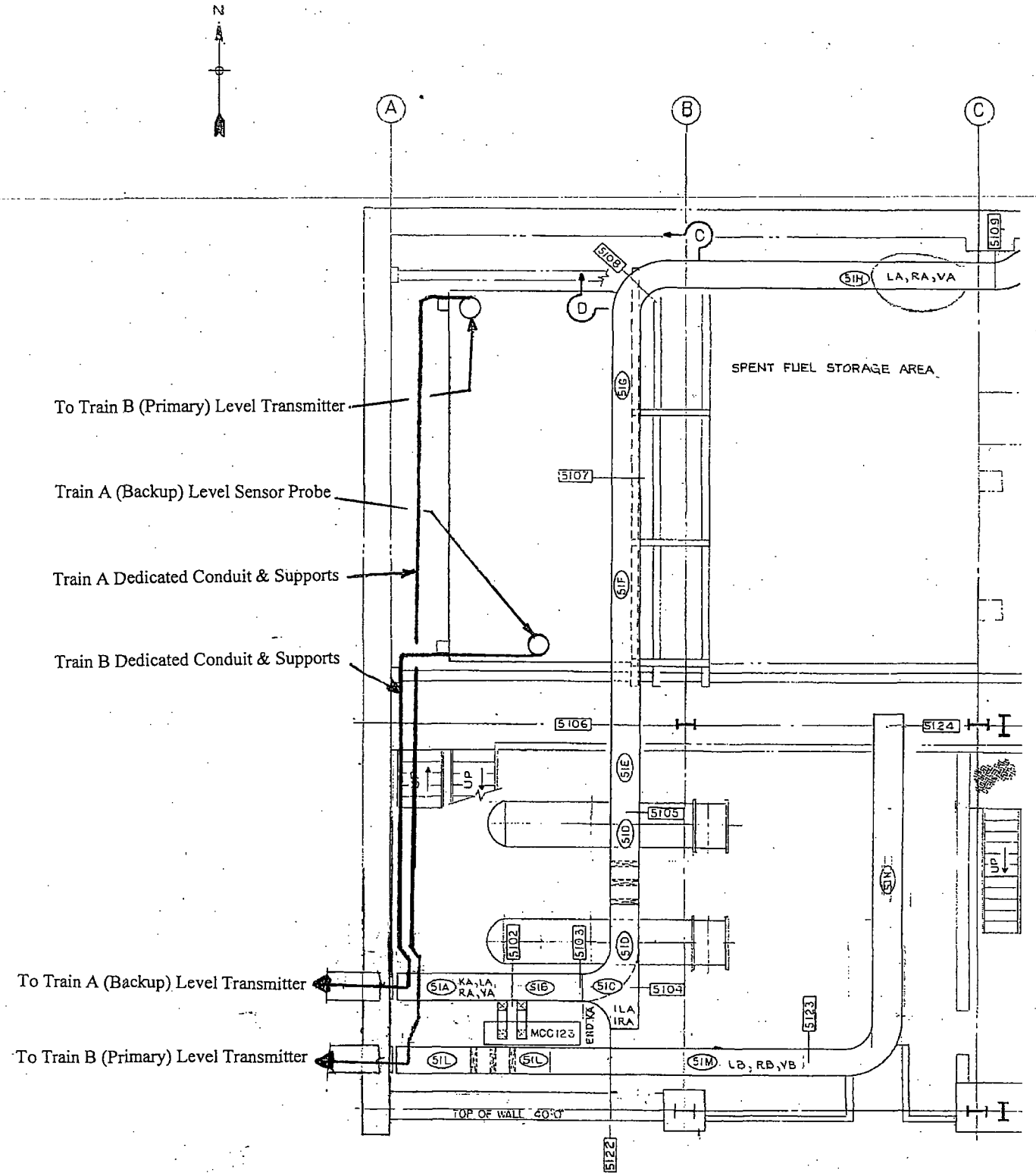
ENCLOSURE 3



SIMPLIFIED SFP LEVEL
MONITORING CHANNEL SKETCH

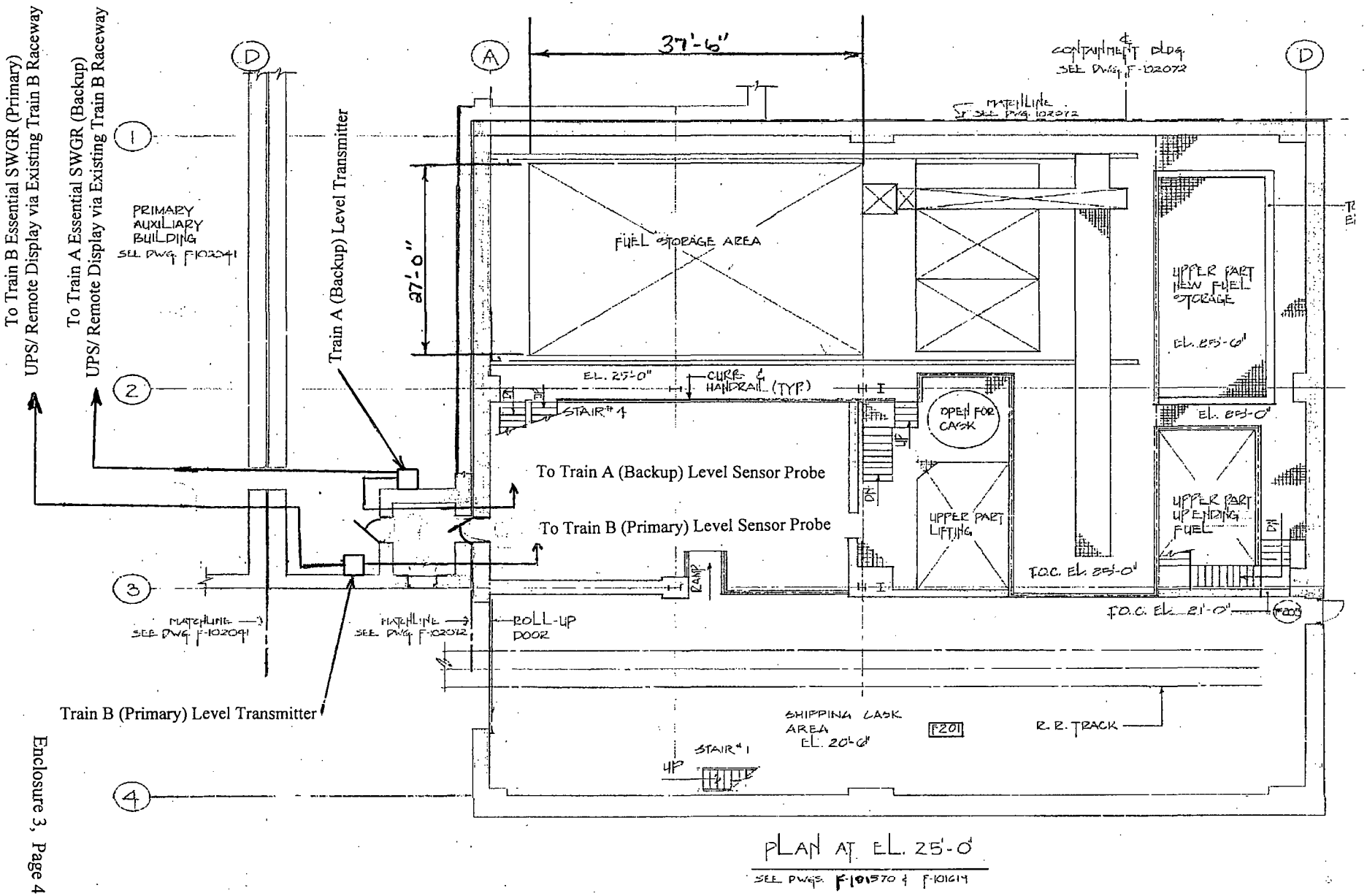
JIM S SIMPLIFIED SFP.dgn 8/12/2013 2:07:10 PM

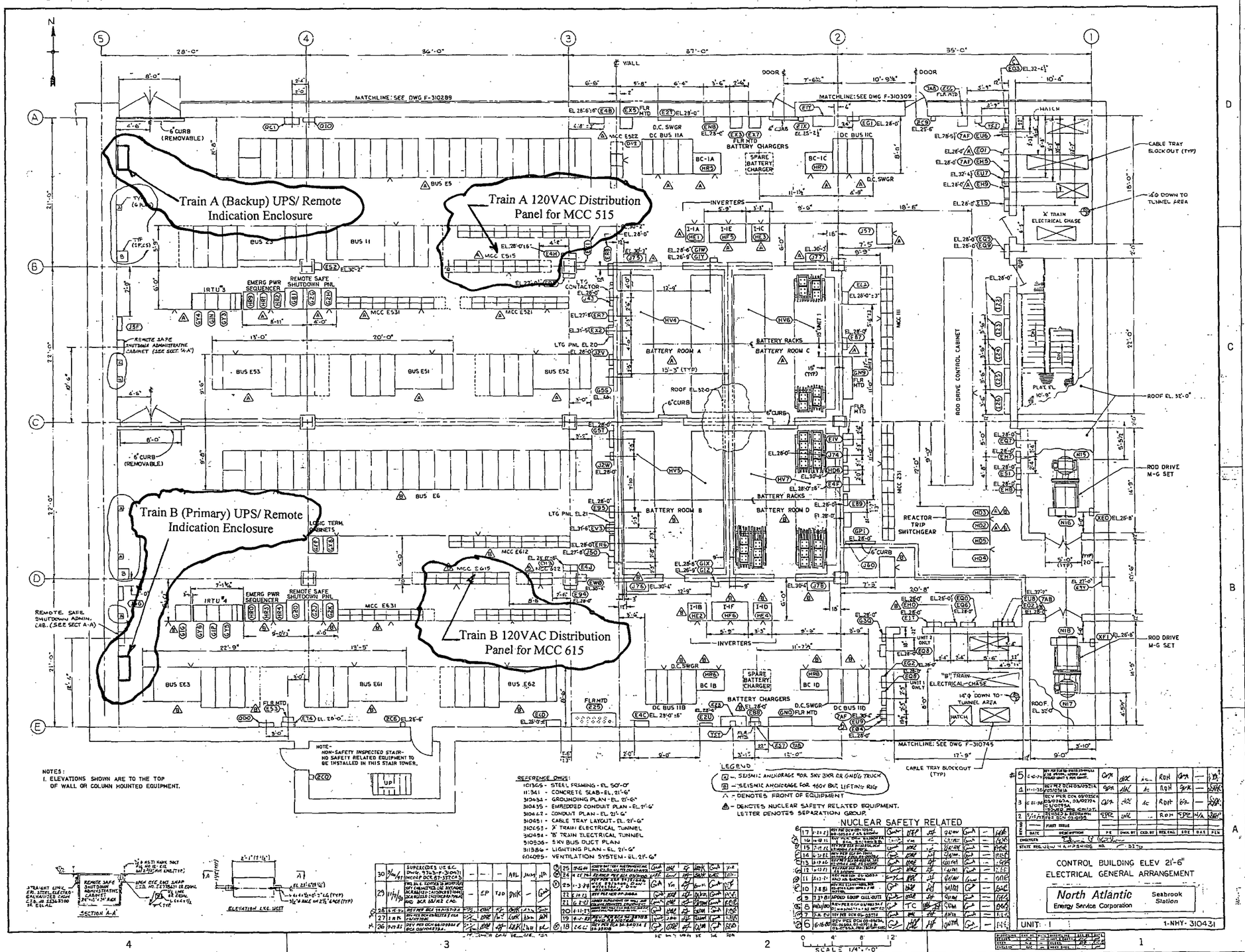
ENCLOSURE 3



Part of Drawing 1-NHY-310733, Rev. 1

ENCLOSURE 3


To Train B Essential SWGR (Primary)
UPS/ Remote Display via Existing Train B Raceway
To Train A Essential SWGR (Backup)
UPS/ Remote Display via Existing Train B Raceway
Train A (Backup) Level Transmitter
PRIMARY AUXILIARY BUILDING
SEE DWG F-102041
37'-6"
27'-0"
FUEL STORAGE AREA
CONTAINMENT BLDG
SEE DWG F-102072
MATCHLINE
SEE DWG 102072
UPPER PART NEW FUEL STORAGE
EL. 25'-0"
CURB & HANDRAIL (TYP.)
STAIR #1
OPEN FOR CASK
To Train A (Backup) Level Sensor Probe
To Train B (Primary) Level Sensor Probe
UPPER PART LIFTING
UPPER PART UPENDING FUEL
T.O.C. EL. 25'-0"
T.O.C. EL. 21'-0"
RAMP
MATCHLINE
SEE DWG F-102041
MATCHLINE
SEE DWG F-102012
ROLL-UP DOOR
Train B (Primary) Level Transmitter
SHIPPING CASK AREA
EL. 20'-0"
F201
R.R. TRACK
STAIR #1
UP
PLAN AT EL. 25'-0"
SEE DWGS F-101570 & F-101619


Train A (Backup) UPS/ Remote Indication Enclosure
Train A 120VAC Distribution Panel for MCC 515
Train B (Primary) UPS/ Remote Indication Enclosure
Train B 120VAC Distribution Panel for MCC 615
MATCHLINE: SEE DWG F-310289
MATCHLINE: SEE DWG F-310309
MATCHLINE: SEE DWG F-310745
BATTERY ROOM A
BATTERY ROOM B
BATTERY ROOM C
BATTERY ROOM D
BATTERY RACKS
BATTERY CHARGERS
INVERTERS
ROD DRIVE CONTROL CABINET
ROD DRIVE M-G SET
REACTOR TRIP SWITCHGEAR
CABLE TRAY BLOCKOUT (TYP)
"A" TRAIN ELECTRICAL CHASE
"B" TRAIN ELECTRICAL CHASE
REMOTE SAFE SHUTDOWN ADMINISTRATIVE CABINET (SEE SECT. 'A-A')
REMOTE SAFE SHUTDOWN ADMIN. CAB. (SEE SECT A-A)
NOTE- NON-SAFETY INSPECTED STAIR- NO SAFETY RELATED EQUIPMENT TO BE INSTALLED IN THIS STAIR TOWER.
NOTES:
1. ELEVATIONS SHOWN ARE TO THE TOP OF WALL OR COLUMN MOUNTED EQUIPMENT.
REFERENCE DWGS:
1C1565 - STEEL FRAMING - EL. 50'-0"
1I1341 - CONCRETE SLAB-EL. 21'-6"
310434 - GROUNDING PLAN - EL. 21'-6"
310435 - EMBEDDED CONDUIT PLAN - EL. 21'-6"
310422 - CONDUIT PLAN - EL. 21'-6"
310451 - CABLE TRAY LAYOUT - EL. 21'-6"
310453 - 'A' TRAIN ELECTRICAL TUNNEL
310454 - 'B' TRAIN ELECTRICAL TUNNEL
310536 - 5KV BUS DUCT PLAN
313186 - LIGHTING PLAN - EL. 21'-6"
606095 - VENTILATION SYSTEM - EL. 21'-6"
LEGEND
(A) - SEISMIC ANCHORAGE FOR SKV 3KR OR GND'G TRUCK
(B) - SEISMIC ANCHORAGE FOR 460V BUS LIFTING RIG
* DENOTES FRONT OF EQUIPMENT
Δ - DENOTES NUCLEAR SAFETY RELATED EQUIPMENT. LETTER DENOTES SEPARATION GROUP.
NUCLEAR SAFETY RELATED
CONTROL BUILDING ELEV 21'-6"
ELECTRICAL GENERAL ARRANGEMENT
North Atlantic Energy Service Corporation
Seabrook Station
UNIT: 1
1-NHY-310431
SCALE 1/4"=1'-0"