NEXTera ENERGY SEABROOK

February 26, 2013

SBK-L-13039
Docket No. 50-443

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

Seabrook Station

Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation
(Order Number EA-12-051)

References:

1. NRC Order Number EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012 (ML12056A044).
2. NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012 (ML12221A339).
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 24, 2012, (ML122400399).
4. NextEra Energy Seabrook Letter, SBK-L-12211, Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated October 26, 2012 (ML12311A012).

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 implement and maintain reliable spent fuel pool water level instrumentation. Specific requirements are outlined in Attachment 2 of Reference 1.

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Reference 1 requires submission of an Overall Integrated Plan by February 28, 2013. The NRC Interim Staff Guidance (ISG) (Reference 2) was issued August 29, 2012 which endorses industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 3 provides direction regarding the content of this Overall Integrated Plan.

Reference 4 provided the NextEra Energy Seabrook initial status report regarding mitigation strategies, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms NextEra Energy Seabrook has received Reference 2 and has an Overall Integrated Plan developed in accordance with the guidance for installing and maintaining reliable spent fuel pool water level indication that satisfies the requirements of Reference 1.

The information in the enclosure provides the NextEra Energy Seabrook Overall Integrated Plan for reliable spent fuel pool instrumentation pursuant to Reference 3. The enclosed Integrated Plan is based on conceptual design information that is current as of this letter. As design details and associated procedural guidance are finalized, additional information, as well as revisions to the information contained in the enclosure to this letter, will be communicated to the NRC in the 6-month Integrated Plan updates as required by Reference 1.

This letter contains no new regulatory commitments.

Should you have any questions regarding this letter, please contact Mr. Michael O'Keefe, Licensing Manager, at (603) 773-7745.

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

Executed on February 26, 2013.

Sincerely,

Kevin T. Walsh
Site Vice President
NextEra Energy Seabrook, LLC

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

Enclosure

Reliable Spent Fuel Pool Instrumentation
Overall Integrated Implementation Plan - Seabrook Station

NextEra Energy Seabrook, LLC

Reliable Spent Fuel Pool Instrumentation
Overall Integrated Implementation Plan

Revision 0, February 20, 2013

Table of Contents

Section

I. Introduction

The Nuclear Regulatory Commission (NRC) issued Order EA-12-051, *Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation*, (Reference 1) on March 12, 2012. The Order requires licensees to have reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. The Order also requires an overall integrated plan that provides a description of how the requirements of the Order will be achieved.

NEI 12-02, *Industry Guidance for Compliance with NRC Order EA-12-05, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,"* (Reference 4) provides an approach for complying with Order EA-12-051. NRC Interim Staff Guidance JLD-ISG-2012-03, *Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation*, (Reference 3) considers that the methodologies and guidance provided in NEI 12-02, Revision 1, subject to the clarifications and exceptions specific to Section 3.4, Qualification, are an acceptable means of meeting the requirements of Order EA-12-051.

This integrated plan provides the approach that NextEra Energy Seabrook, LLC (NextEra Energy Seabrook) will implement to comply with Order EA-12-051 using the methods described in NRC JLD-ISG-2012-03 (Reference 3) and NEI 12-02 with the exceptions and clarifications as detailed within the following sections. The current revision of the integrated plan is based on conceptual design information and will be revised as the detailed design engineering for the installation is developed. Consistent with the requirements of Order EA-12-051 and the guidance in NEI 12-02, the NextEra Energy Seabrook six-month update reports will delineate progress made, any proposed changes to the methods use for compliance, updates to the schedule, and if needed, requests for relief and their bases.

II. Schedule

NextEra Energy is implementing standard Spent Fuel Pool (SFP) level instrumentation across the fleet. The installation time table noted below will ensure that implementation for Seabrook Station will be completed in accordance with the requirements of the Order. The installation of reliable SFP level instrumentation for Seabrook Station is scheduled to be completed prior to the end of refuel outage OR17 (second refueling outage), which is currently scheduled for the third quarter of 2015.

The following milestone schedule is provided. The dates are planning dates subject to change as design and implementation details are developed. Any changes to the following target dates will be reflected in the six month update reports:

• Commence Engineering and Design	In progress
• Submit First 6 Month Update	3Q 2013 (August)
• 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 completed	3Q 2015 (OR17)

III. Identification of Spent Fuel Pool Water Levels

Key spent fuel pool water levels:

1. **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.

2. **Level 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).

3. **Level 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.).

IV. Instruments

Design of the instrument channels will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02, Revision 1 with the exceptions and clarifications as described in this submittal. The instrumentation will consist of permanent, fixed primary and backup SFP level monitoring instrument channels. The plan is for both channels to utilize Guided Wave Radar technology, which functions according to the principle of Time Domain Reflectometry (TDR). A generated pulse of electromagnetic energy travels down the probe. Upon reaching the liquid surface the pulse is reflected and based upon reflection times level is determined.

The primary and backup instrument channel sensing components will be located on the north and south sides of the SFP. Redundant sensor signal conditioning electronics (Conditioning Processor Modules) and remote level indication will be located in separate areas of the Primary Auxiliary Building (PAB). Redundant dedicated battery backup power supplies and SFP level indicators will be located in the Train A and Train B Essential Switchgear Rooms (Elev. 21 ft., 6 in.). Wireless technology/ capabilities will not be used.

The minimum measured span of each channel will be continuous from a high pool level elevation of 24 ft to approximately 6 in. above the top of the spent fuel racks (total span 25 ft.). Refer to the plan view attached as Figure 1 for the approximate sensor locations in the SFP.

Reliability:
Reliability of the primary and backup instrument channels will be assured by conformance with the requirements and guidelines of NRC JLD-ISG-2012-03 and NEI 12-02, as discussed in Section VII, Qualification and 3.8 Testing. Reliable level indication will be functional during all modes of operation consistent with Section XV, Testing and Calibration.

Instrument Channel Design Criteria:
Instrument channel design criteria will be consistent with the requirements and guidelines of NRC JLD-ISG-2012-03, NEI 12-02 and applicable sections of the plant UFSAR.

V. Arrangement

The FSB, Containment Enclosure Building (CEB), PAB and Control Building (CB) are classified as Seismic Category I structures. The FSB was designed to the requirements of Regulatory Guide 1.13 (Spent Fuel Storage Facility Design Basis), Regulatory Guide 1.29 (Seismic Design Classification) and Regulatory Guide 1.117 (Tornado Design Classification) to ensure optimum protection for the stored fuel assemblies against the effects of extreme natural phenomena such as safe shutdown earthquakes, tornadoes, hurricanes, missiles and floods. These design considerations extend to the SFP walls, fuel storage racks, and other critical components whose failure could cause criticality, loss of cooling, or physical damage to stored fuel.

The Spent Fuel Pool Level 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 FSB through the CEB and into the PAB to connect each probe to a signal conditioning processor module. The signal processor module is a panel-mount 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.

Channel separation (independence) will be provided as part of the design of the SFP level instrumentation. The Guided Wave Radar Sensors (GWS) will be physically located in different areas of the SFP. The GWS probes will be installed on the north and south sides of the pool. Sensor conditioning electronics, battery backup power supplies and level indicators will also be located in separate areas of the plant. Interconnecting cabling for channel power and indication will be routed in separate conduits and raceways from the cabling for the opposite channel.

The SFP, PAB and Essential Switchgear Rooms are separated by reinforced concrete wall(s). This separation will provide suitable radiation shielding to allow access to the signal conditioning electronics, level indication, and backup battery power supplies during and following an event.

VI. Mounting

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.

VII. Qualification

Both channels will be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. Post event temperature at sensors located above the SFP is assumed to be 212°F. Post event humidity in the FSB near and above the SFP is assumed to be 100% with condensing steam.

Equipment will be qualified for expected conditions at the installed location assuming that normal power is unavailable and that the SFP has been at saturation for an extended period. Equipment located in the vicinity of the SFP will be qualified to withstand peak and total integrated dose radiation levels for its installed location assuming that post event SFP water level is equal to the top of the fuel racks for an extended period of time.

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

- conditions in the area of instrument channel component use for all instrument components,
- effects of shock and vibration on all instrument channel components, and
- seismic effects on instrument channel components used during and following a potential seismic event for all installed components.

Augmented quality assurance requirements, similar to those applied to Appendix R fire protection equipment in the NextEra Energy Seabrook Quality Assurance Topical Report (Reference 16), will be applied to this project.

Temperature, humidity and radiation levels consistent with the conditions in the vicinity of the SFP and the area of use considering normal operational, event and post-event conditions for no fewer than seven days post-event or until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049 (Reference 2) will be addressed in the engineering and design phase.

Examples of post-event (beyond-design-basis) conditions that will be considered are:

- Radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water at level 3 as described in this order,

- Temperatures of 212 degrees F and 100% relative humidity environment,
- Boiling water and/or steam environment,
- A concentrated borated water environment, and
- The impact of FLEX mitigating strategies.

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

- Components are supplied by manufacturers using commercial quality programs (such as ISO9001, *Quality management systems – Requirements* (Reference 8)) with shock and vibration requirements included in the purchase specification at levels commensurate with a portable hand-held device or transportation applications;
- Components have a substantial history of operational reliability in environments with significant shock and vibration loading, such as a portable hand-held device or transportation applications; or
- Components are inherently resistant to shock and vibration loadings, such as cables.

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*, (Reference 9) 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 seiche related disturbances during and after a seismic event.

VIII. Independence

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).

IX. Power Supplies

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.

X. Accuracy

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.

XI. Testing

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.

XII. Display

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.

XIII. Training

The Systematic Approach to Training (SAT) will be used to evaluate what training is required for station personnel based upon changes to plant equipment, implementation of FLEX portable equipment, and new or revised procedures that result from implementation of the strategies described in this report.

Required Operator and Maintenance Department training will be completed prior to placing the SFP level instrumentation into service to meet final Order compliance in the third quarter of 2015.

XIV. Procedures

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* (References 5 and 7).

Procedures will also be developed/ revised to address the following situations:

- If, during or following an event an instrument channel ceases to function, its function will be recovered within a period of time consistent with the emergency conditions.
- If, at the time of an event or thereafter until the unit is returned to normal service, an instrument channel component must be replaced, commercially available components that may or may not meet all of the channel qualification requirements may be used.

XV. Testing and Calibration

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.

XVI. Need for Relief and Basis

NextEra Energy Seabrook is not requesting relief from the requirements of Order EA-12-051 or the guidance in NRC JLD-ISG-2012-03 at this time.

Consistent with the requirements of Order EA-12-051 and the guidance in NEI 12-02, the six-month update reports will delineate progress made, any proposed changes in compliance methods, updates to the schedule, and if needed, requests for relief and their bases.

XVII. References

1) EA-12-051, Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, March 12, 2012.
2) EA-12-049, Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, March 12, 2012.
3) NRC JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0, August 29, 2012.
4) 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.
5) NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, August 2012.
6) NextEra Energy Seabrook letter SBK-L-12211, "60-Day Post-ISG Report to Order EA-12-051, Spent Fuel Pool Instrumentation," to NRC, dated October 26, 2012.
7) NextEra Energy Seabrook letter SBK-L-12212, "60-Day Post-ISG Report to Order EA-12-049, Beyond Design Basis External Events," to NRC, dated October 26, 2012.
8) ISO9001, Quality Management Standard – Requirements.
9) IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
10) Seabrook Station Updated Final Safety Analysis Report, Revision 14B
11) Calculation C-S-1-84616, "Power Uprate Spent Fuel Pool Cooling System Analysis," Revision 1.
12) Design Basis Document DBD-SF-01, "Spent Fuel Pool Cooling, Purification and Cleanup System," Revision 1.
13) Plant Operating Procedure OS1215.07, "Loss of Spent Fuel Pool Cooling or Level," Revision 13.
14) FP 59752, "RFA Fuel Assembly Outline (5" Blanket)", Issue 01.
15) FP55747, "Poison Rack Assembly (NAH ONLY)", Issue 01.
16) Florida Power and Light Company, NextEra Energy Seabrook, LLC, NextEra Energy Duane Arnold, LLC and NextEra Energy Point Beach, LLC, "Quality Assurance Topical Report" FPL-1, Revision 12.

XVIII Drawings

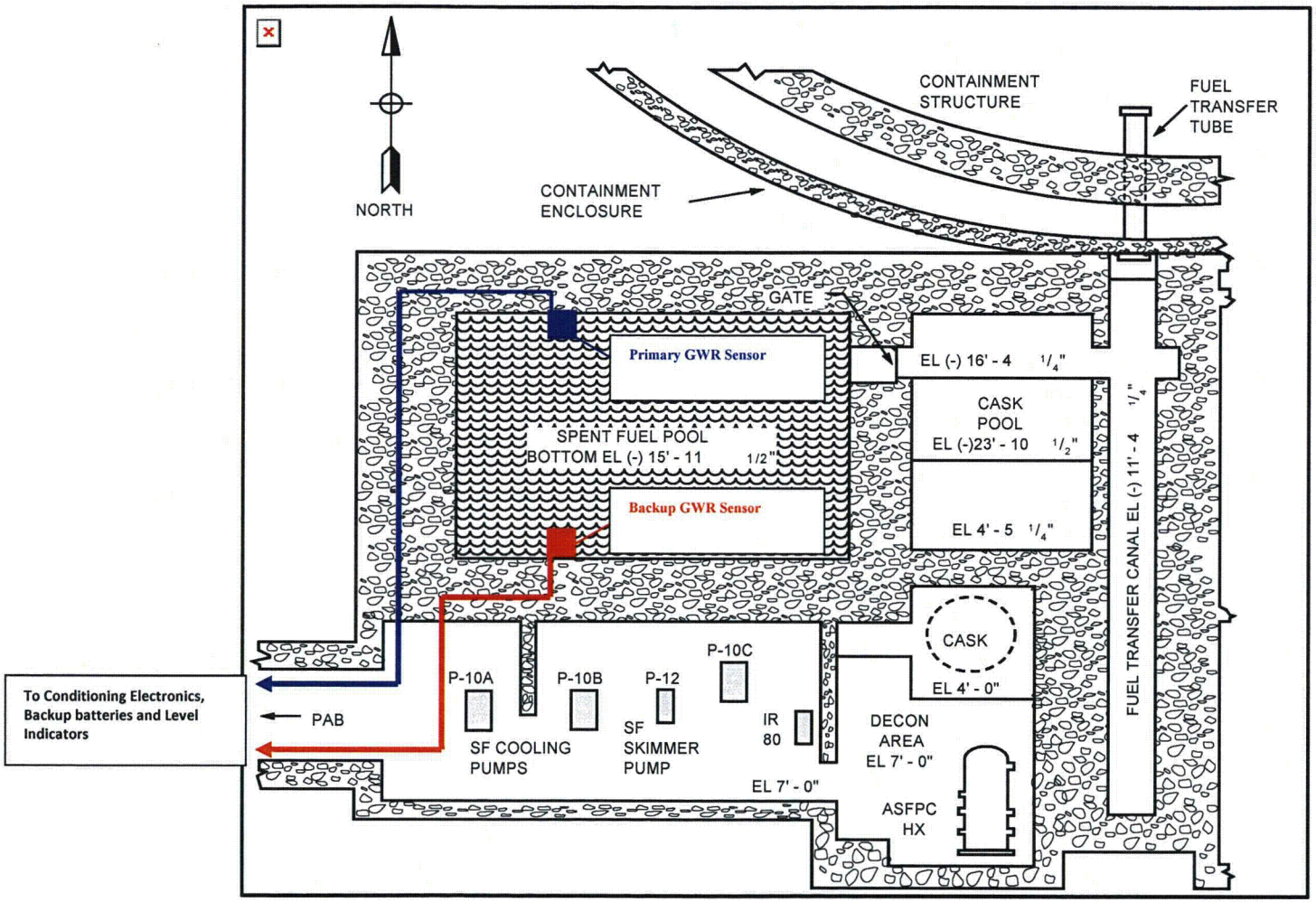

FIGURE 1