Entergy

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 479-858-3110

Jeremy G. Browning
Site Vice President
Arkansas Nuclear One

2CAN011601

January 12, 2016

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

SUBJECT: Completion of Required Action by NRC Order EA-12-051
Reliable Spent Fuel Pool Level (SFP) Instrumentation
Arkansas Nuclear One – Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCES:

1. NRC Order Number EA-12-051, *Order to Modify Licenses with Regard to Reliable SFP Instrumentation*, dated March 12, 2012 (0CNA031207) (ML12054A679)

2. Completion of Required Action by NRC Order EA-12-051 Reliable Spent Fuel Pool Level (SFP) Instrumentation Arkansas Nuclear One – Unit 1, dated April 14, 2015 (1CAN041501) (ML15105A248)

3. Fifth Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051), Arkansas Nuclear One – Unit 2, dated August 28, 2015 (2CAN081504) (ML15243A417)

Dear Sir or Madam:

On March 12, 2012, the NRC issued Order EA-12-051, *Order Modifying Licenses with Regard to Reliable SFP Instrumentation* (Reference 1), to all power reactor licensees, which is applicable to Entergy Operations, Inc. (Entergy). This Order was effective immediately and directed the installation of reliable SFP instrumentation as outlined in Attachment 2 of the Order, applicable to Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2). Reference 2, along with its enclosures, provided the notification required by Section IV.C.3 of the Order that full compliance with the requirements described in Attachment 2 of the Order had been achieved for ANO-1. This letter, along with its enclosures, provides the notification required by Section IV.C.3 of the Order that full compliance with the requirements described in Attachment 2 of the Order has been achieved for ANO-2 and provides information updates as necessary with respect to References 2 and 3.

This letter contains no new regulatory commitments. Should you have any questions regarding this submittal, please contact Stephenie Pyle at 479.858.4704.

I declare under penalty of perjury that the foregoing is true and correct; executed on January 12, 2016.

Sincerely,

ORIGINAL SIGNED BY JEREMY G. BROWNING

JGB/nbm

Attachments: 1. Compliance with Order EA-12-051
2. NRC Requests for Information

cc: Mr. Marc L. Dapas
Regional Administrator
U. S. Nuclear Regulatory Commission, Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Ms. Andrea E. George
MS O-8B1
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

U. S. Nuclear Regulatory Commission
Attn: Mr. Peter Bamford
MS O13F15M
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Attachment 1 to

2CAN011601

Compliance with Order EA-12-051

Compliance with Order EA-12-051

BACKGROUND

On March 12, 2012, the NRC issued Order EA-12-051, *Order Modifying Licenses with Regard to Reliable Spent Fuel Pool (SFP) Instrumentation* (Reference 1) to all power reactor licensees, which is applicable to Entergy Operations, Inc. (Entergy). This Order was effective immediately and directed the installation of reliable SFP instrumentation as outlined in Attachment 2 of the Order, applicable to Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2). SFP instrumentation supports implementation of NRC Order EA-12-049 (References 15, 16, and separate submittals). Reference 10 documented full compliance for ANO-1 in response to Order EA-12-051. The information provided herein documents full compliance for ANO-2 in response to Order EA-12-051 and provides information updates as necessary with respect to References 10 and 11.

COMPLIANCE

Entergy has installed two independent full scale level monitors on the ANO-2 SFP in response to Reference 1. ANO is a two unit site, and the ANO-2 SFP is independent of the ANO-1 SFP.

Entergy submitted the ANO Overall Integrated Plan (OIP) by Reference 2 and minor updates per Reference 5 and Reference 8. By Reference 3 the NRC provided requests for additional information (RAIs) for the OIP. Entergy provided responses to the RAIs by Reference 4 and updates per Reference 9. By Reference 6, the NRC provided its interim staff evaluation (ISE) and requested additional information necessary for completion of the review. The above cited RAI revisions impact the ISE and said RAI related discussion within the ISE. Entergy provided responses and/or updates to these ISE RAIs by ePortal, References 7, 8, 9, 10, 11, and this submittal.

ACTIONS COMPLETED

Engineering Change EC-48348 (ANO-2 SFP Level Instrumentation (SFPI) for NRC Order EA-12-051) has been implemented providing SFP level monitoring capability in the back of the main control room.

IDENTIFICATION OF LEVELS OF REQUIRED MONITORING – COMPLETE

ANO-2 Level 1: Elev. 401 feet 0 inches (mean sea level)

Level adequate to support normal SFP cooling system operation and pump suction requirements.

ANO-2 Level 2: Elev. 388 feet 3.3125 inches +/- one foot

Ten feet (+/- one foot) above highest point of any fuel rack seated in SFP associated with providing substantial radiation shielding for personnel standing on the SFP operating deck.

ANO-2 Level 3: Elev. 378 feet 3.3125 inches +/- one foot

Highest point of any fuel rack seated in SFP (within +/- one foot) associated with level where fuel remains covered.

INSTRUMENT DESIGNED FEATURES – COMPLETE

ANO-2 SFP level instrument channels incorporate two permanently installed, physically independent, and physically separated channels (with channel separation in accordance with existing plant design basis requirements). Sensors at the SFP are spatially separated near opposite corners of the SFP with cables both being protected with metal raceway and maintaining reasonable spatial separation until promptly exiting the SFP floor (see Reference 8, Attachment, Section 7, for ANO-2 SFP Floor cable routing approximate depiction). Displays are installed in the back of the main control room. Power sources include 1) independent Class 1E plant alternating current (AC) power sources, 2) channel-specific stand-alone battery power with analyzed seven-day capacity, as well as 3) connections and cables for external direct current (DC) alternate power source capability. Equipment and raceway are mounted/installed to ANO-2 Seismic Category I requirements.

PROGRAM FEATURES – COMPLETE

Training has been conducted as needed. Technical Requirements Manual (TRM) entry has been implemented to control functionality and actions for non-functionality along with implementation of a channel functional test procedure and a preventive maintenance (PM) task to control scheduling within TRM requirements. Routine monitoring is provided per Operations log entry implementation.

MILESTONE SCHEDULE – ITEMS COMPLETE [*]

ANO-2 Milestones	Completion Date
ANO-2 Reliable SFPI Design Modification Package Developed/Issued (EC-48348)	October 9, 2014
ANO-2 Reliable SFPI Installed	November 13, 2015 (startup from outage 2R24)
#1 NRC RAIs (Received June 26, 2013)	July 25, 2013 (Ref. 4) (Updated per Ref 9)
#2 NRC ISE RAIs (Received October 29, 2013)	References 7, 8, 9, 10, 11 and this submittal

[*] For ANO-1 SFPI compliance completion in response to NRC Order EA-12-051, see Reference 10.

Based on the above, the requirements of Order EA-12-051 have been achieved for ANO-2. A summary of ANO-2 compliance with Reference 1 is provided as follows:

COMPLIANCE ELEMENTS SUMMARY

In accordance with NRC Order EA-12-051, Entergy shall have a 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 SFP operating deck, and

(3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

Per References 2, 4, 9, and 14, key SFP water levels, including the three critical levels defined in Nuclear Energy Institute (NEI) 12-02, Revision 1, were identified. Both the primary and backup instrument level channels are permanent, mounted directly within the SFP, and measure level over a single continuous span from *above* Level 1 down to *below* the upper limit of Level 3. Access to the SFP area is not required to operate the instrument channels or obtain level data. Displays and signal processors are located in the main control room. The three critical levels for ANO-2 are as follows:

LEVEL 1: Level 1 is the level above which is adequate to support operation of the normal SFP cooling system and is also associated with the level at which reliable pump suction loss can occur due to uncovering the coolant inlet pipe or any weirs or vacuum breakers since it is more limiting than level associated with pump net positive suction head requirements. This level is established for ANO-2 based on nominal elevation of the vacuum (or siphon breaker) in the coolant inlet pipe. The elevation associated with this level is 401 feet 0 inches for ANO-2.

LEVEL 2: Level 2 is the level adequate to provide substantial radiation shielding for a person standing on the SFP operating deck. Entergy has selected the ten-foot option which has been determined by the NRC to meet the requirements of the order with no further evaluation or review required. Permanently stored irradiated material in the SFP is not hung from the SFP walls; therefore, there are no specific requirements in the procedures controlling irradiated equipment or materials stored in the SFP. Because Level 2 has been chosen as ten feet (+/- one foot) above the highest point of any fuel rack seated in the SFP, no additional analysis is required. Additionally, the ANO FLEX strategy ensures that activities in the proximity of the SFP are completed prior to the calculated time to boil and thus prior to reduction of SFP level. This strategy ensures that necessary operations in the vicinity of the SFP can be completed without significant dose consequences. The elevation associated with this level is 388 feet 3.3125 inches +/- one foot for ANO-2.

LEVEL 3: Level 3 is the level where fuel remains covered. It is defined as the highest point of any fuel rack seated in the SFP (within +/- one foot). The highest point (nominal) of any fuel rack seated in the SFP is 378 feet 3.3125 inches for ANO-2. Therefore, Level 3 is elevation 378 feet 3.3125 inches +/- one foot for ANO-2.

1. **In accordance with NRC Order EA-12-051, the SFP level instrumentation shall include the following design features:**

   a. **Instruments: The instrumentation shall consist of a permanent, fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable.**

      Per References 2 and 14, both ANO-2 primary and backup SFP level instrument channels are fixed or permanently installed. Both instrument probes are permanently installed near (within approximately one foot) opposite (southwest and southeast) corners of the SFP. Both instrument displays/processors are permanently installed in the back of the main control room.

   b. **Arrangement: The SFP level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP. This protection may be provided by locating the primary instrument channel and fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the SFP area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the SFP structure.**

      Per References 2, 4, 5, 8, and 14, and in accordance with the guidance of Section 3.2 of NEI 12-02, Revision 1, ANO-2 primary and backup SFP level instrument probes are spatially separated and installed near (within approximately one foot) opposite SFP corners. Corner locations provide inherent protection of the probes. Channel separation for cable routing away from the probes maintains reasonable spatial separation distance (see Reference 8, Attachment, Section 7, for ANO-2 SFP Floor cable routing approximate depiction). Channel routing on the SFP floor is limited with prompt exit/penetration below the SFP floor. Probe top section and channel cabling are protected by metallic raceway and the probe mounting bracket structure itself, all of which incorporate a low profile design. Concrete curbs and refueling bridge tracks in the vicinity that rise a few inches above floor elevation provide additional inherent protection. As described, reasonable protection of the SFP level function is provided from potential SFP area overhead structure missiles.

   c. **Mounting: Installed instrument channel equipment within the SFP shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the SFP structure.**

      Per References 2, 4, and 14, as well as Reference 10 per its supporting Attachment 2 “Bridging Document”, the entire ANO-2 SFP instrument channel (equipment from the SFP to the main control room) is mounted and designed to requirements equal to or greater than ANO-2 seismic design bases, Seismic Category I requirements. As such, the SFP instrument channels are designed and installed to retain the design configuration during and following maximum requirements of the ANO-2 seismic design bases.

d. Qualification: The primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the SFP water at saturation conditions for an extended period. This reliability shall be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program).

Per References 2, 4, and 14, as well as Reference 10 per its supporting Attachment 2 "Bridging Document", the entire ANO-2 SFP instrument channel (equipment from the SFP to the main control room) is designed and qualified to ANO-2 environmental extremes applicable for the area of interest (e.g., SFP, main control room). The SFP area environmental extremes are in accordance with NEI 12-02, Revision 1, SFP example conditions (as summarized below). The SFP instrumentation channels have been designated as Augmented Quality per Entergy processes covering procurement, design, and installation. As such, the SFP instrument channels have demonstrated reliability through establishment of Augmented Quality processes at applicable environmental extremes.

SFP Area Parameter	SFP Area NEI 12-02 Rev 1 Example Condition	SFP Area EC Qualification
Radiation	SFP @ Water Level 3 (low) for 7-day min. event/post-event (or until FLEX strategy mitigation)	SFP @ Water Level 3 (low) for 7-day event/post-event (no credit for earlier FLEX mitigation)
	Fuel freshly discharged (100 Hours)	Full core off-load @ 100 hours Remaining fuel @ 18 mo. (consv.)
	+ normal dose	SFP @ normal water level for 40 yr
Temperature	212 °F	212 °F
Humidity	100% (boiling borated water &/or steam)	100% (boiling borated water &/or steam)

e. Independence: The primary instrument channel shall be independent of the backup instrument channel.

Per References 2, 4, and 14, as well as ISE RAI #11 update per this submittal, ANO-2 SFP instrument channels have highly reliable independent power sources (as detailed in the next section) and channel independence achieved by incorporation of two permanently installed, physically independent, and physically separated channels (with channel separation in accordance with existing plant design basis requirements) that are designed and installed to Seismic Category I requirements (as described in Section "c" above). As such, the SFP instrument channels are independent.

f. Power supplies: Permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant ac and dc power distribution systems, such as portable generators or replaceable batteries. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

Per References 2, 4, and 14, as well as ISE RAI #11 update per this submittal, the two ANO-2 SFP instrument channels are "channelized" and powered from opposing power divisions (e.g., red train and green train) safety-related vital 120-volt AC (VAC) power sources. Power is supplied for one channel from 120 VAC Panel 2RS1, which is a Class 1E inverter-backed (or emergency diesel generator (EDG) and battery-backed) panel supplied from 125-volt DC (VDC) Bus 2D01. Power is supplied for the other channel from 120 VAC Panel 2RS2, which is a Class 1E inverter-backed (or EDG and battery-backed) panel supplied from 125 VDC Bus 2D02.

The two ANO-2 SFP instrument channels incorporate independent plant power sources [not only originating from different buses (NEI 12-02 required) but also from different power divisions (NEI 12-02 preferred) as well as incorporating channel-specific stand-alone backup battery power of sufficient capacity (NEI 12-02 acceptable in and of itself coupled with power restoration strategy)]. The permanently installed replaceable and rechargeable backup batteries are configured for an analyzed seven-day capacity. A third power alternative is available per external connections and cables included for each battery panel supplying each SFP processor/display panel to permit powering the system from an external DC source independent of plant sources.

[*It is noted that the following paragraph is generically applicable to both ANO-1 and ANO-2 and supersedes the related ANO-1 paragraph of Reference 10.*]
The primary independent AC power source design provides expected timely restoration per FLEX strategies during a beyond-design-bases external event (BDBEE) from sources independent of plant sources (e.g. FLEX portable diesel generators). BDBEE FLEX strategy normal power path restoration for one SFPI channel (e.g., one vital DC power bus/train) is expected to be rapid (e.g., within hours via on-site 480 VAC portable diesel generators) with normal power path restoration for the other SFPI channel (e.g., both vital DC power buses/trains) still expected to be timely per Phase 3 FLEX strategies (e.g., within days via off-site National Strategic Alliance for FLEX Emergency Response Center 4160 VAC portable diesel generators). SFPI permanently installed battery capacity is analyzed to cover reasonably long duration (e.g., seven days). Installed rechargeable battery capacity for a full seven days coupled with FLEX power restoration strategies precludes the need for crediting rapid restoration, battery replacements, stocking of battery spare stock, and the alternate external DC power source capability. As stated above, restoration of normal power path to one SFPI channel is expected to be rapid and it is also noted that alternate external DC power source capability is provided for both SFPI channels via a battery cable that allows for connection of an external DC source or battery. As such, the SFP instrument channels have highly reliable power sources, originating from separate power sources, with power capability independent from plant sources, and with on-board battery capacity analyzed for reasonably long duration

(e.g., seven days) or reasonable offsite resource availability time frames. An installed alternate power source is provided for instrument channel power with sufficient capacity to maintain the level indication function for reasonably long duration including until offsite resource availability is reasonably assured.

g. Accuracy: The instrument channels shall maintain their designed accuracy following a power interruption or change in power source without recalibration.

Per References 2, 4, and 14, as well as Reference 10 per its supporting Attachment 2, *Bridging Document,* and ISE RAI #14-17 combined response update per this submittal, the ANO-2 SFP instrument channels have a reasonably high certified design accuracy of equal to or better than +/- three inches (excluding boric acid deposition effects that cause a conservative decrease in indicated level) which is not affected by power interruption as supported by vendor test documentation. As such, the SFP instrument channels have been documented to maintain their designed accuracy following power interruption or change in power source without recalibration being required.

h. Testing: The instrument channel design shall provide for routine testing and calibration.

Per References 2, 4, and 14, as well as Reference 10 per its supporting Attachment 2, *Bridging Document,* and ISE RAI #14-17 combined response update per this submittal, the ANO-2 SFP instrument channels automatically monitor the integrity of the measurement system using in-situ capability or on board diagnostics. Deviation of measured test parameters from manufactured or as-installed configuration beyond a configurable threshold prompts Operator intervention. The probe itself is a perforated tubular coaxial waveguide with defined geometry and is not calibrated. Channel design provides capability for calibration or validation against known/actual SFP level. As such, the SFP instrument channel's design provides for routine testing and calibration.

i. Display: Trained personnel shall be able to monitor the SFP water level from the control room, alternate shutdown panel, or other appropriate and accessible location. The display shall provide on-demand or continuous indication of SFP water level.

Per References 2, 4, and 14, the ANO-2 SFP instrument channel displays are located in the ANO-2 main control room. Level is displayed continuously when on primary AC power and on-demand when on backup DC power. As such, the SFP water level indication can be monitored by trained personnel from the main control room either continuously or on-demand.

2. In accordance with NRC Order EA-12-051, the SFP instrumentation shall be maintained available and reliable through appropriate development and implementation of the following programs:

a. Training: Personnel shall be trained in the use and the provision of alternate power to the primary and backup instrument channels.

Two ANO instrument and control maintenance technicians received training on the MOHR EFP-IL SFP Level Monitoring System at the vendor (MOHR) facilities.

Training (e.g., reference training presentations *ASLP-ERTD-FLEXEC (FLEX ECs)* and *FLEXGAP* as well as Section 2.6.14 of System Training Manual 1-73, *SFP Instrumentation*) has been provided to appropriate personnel (e.g., Operations, the Emergency Response Organization, Chemistry, Radiation Protection personnel). Training on alternate power sources (on board seven-day battery capacity, external DC power source capability, primary AC safety-related EDG and battery-backed power source restoration per FLEX strategies) has been addressed initially by the above. It is noted that FLEX strategies are being established as required by implementation of Order EA-12-049 (References 15 and 16).

On-site training is governed by Entergy Training processes including Systematic Approach to Training for both initial and continuing elements and target audience.

b. Procedures: Procedures shall be established and maintained for the testing, calibration, and use of the primary and backup SFP instrument channels.

ISE RAI #14-17 combined response update per this submittal provides a description of required and implemented procedures. A new procedure, OP-2304.271, *Unit 2 Spent Fuel Pool Level Instrumentation Channel Functional Test,* has been implemented. The ANO-2 TRM has been revised to include actions to be taken for the primary and back-up SFP level instruments with respect to functionality (new TRM 3.10.1). In addition, procedure OP-1015.003B, *Unit 2 Operations Logs*, has been revised to add SFP level instruments 2LIT-2020-1 and 2LIT-2020-2. An Operations procedure was not required based on the simple indication function and use.

c. Testing and Calibration: Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup SFP level instrument channels to maintain the instrument channels at the design accuracy.

A PM Task has been established for scheduling and implementing necessary functional testing in accordance with TRM requirements. The testing per OP-2304.271, *Unit 2 Spent Fuel Pool Level Instrumentation Channel Functional Test,* provides for calibration or validation of the primary and backup SFP level instrument channels against known/actual SFP level to maintain the design accuracy within limits established. The testing also provides for SFP level instrument cross channel comparison. This is augmented by routine monitoring per procedure OP-1015.003B, *Unit 2 Operations Logs*.

REFERENCES

1. NRC Order Number EA-12-051, *Order Modifying Licenses with Regard to Reliable SFP Instrumentation*, dated March 12, 2012 (0CNA031207) (ML12054A679)

2. *OIP in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable SFP Instrumentation (Order Number EA-12-051)*, dated February 28, 2013 (0CAN021303) (ML13063A015)

3. *RAI for the OIP in Response to the Commission Order Modifying Licenses with Regard to Requirements for Reliable SFP Instrumentation (Order Number EA-12-051)*, dated June 26, 2013, (0CNA061308) (ML13156A313)

4. *Response to RAI* dated July 25, 2013 (0CAN071301) (ML13207A269)

5. *First Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable SFP Instrumentation (Order Number EA-12-051)*, dated August 28, 2013 (0CAN081303) (ML13241A415)

6. *Arkansas Nuclear One, Units 1 and 2 – ISE and RAI Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable SFP Instrumentation (TAC NOs. MF0944 and MF0945)*, dated October 29, 2013 (0CNA101307) (ML13281A502)

7. *Second Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable SFP Instrumentation (Order Number EA-12-051)*, dated February 27, 2014 (0CAN021406) (ML14059A230)

8. *Third Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable SFP Instrumentation (Order Number EA-12-051)*, dated August 28, 2014 (0CAN081403) (ML14246A209)

9. *Fourth Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable SFP Instrumentation (Order Number EA-12-051)*, dated February 24, 2015 (0CAN021503) (ML15056A153)

10. *Completion of Required Action by NRC Order EA-12-051 Reliable SFP Instrumentation Arkansas Nuclear One – Unit 1,* dated April 14, 2015 (1CAN041501) (ML15105A248)

11. *Fifth Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable SFP Instrumentation (Order Number EA-12-051)*, dated August 28, 2015 (2CAN081504) (ML15243A417)

12. *ANO-1 & ANO-2 Report for Audit Regarding Implementation of Mitigating Strategies and Reliable SFP Instrumentation (Related to Orders EA-12-049 and EA-12-051)*, dated September 1, 2015 (0CNA091502) (ML15236A340)

13. EC-44046, ANO-1 Engineering Change implementing NRC Order EA-12-051 SFP Instrumentation

14. EC-48348, ANO-2 Engineering Change implementing NRC Order EA-12-051 SFP Instrumentation

15. NRC Order Number EA-12-049, *Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for BDBEEs*, dated March 12, 2012 (0CNA031206) (ML12056A045)

16. *Arkansas Nuclear One, Unit 1 - Relaxation Of The Schedule Requirements For Order EA-12-049 "Issuance Of Order To Modify Licenses With Regard To Requirements For Mitigation Strategies For BDBEEs",* dated May 20, 2014 (1CNA051402) (ML14114A697)

Attachment 2 to

2CAN011601

NRC Requests for Information

NRC Requests for Information

As stated in Attachment 1, Entergy submitted ANO's Overall Integrated Plan (OIP) by Reference 2 and minor updates per Reference 5 and Reference 8 of Attachment 1.

By Reference 3 of Attachment 1 the NRC provided requests for additional information (RAIs) for the OIP. Entergy provided responses to the RAIs by Reference 4 of Attachment 1 and revisions (to RAI #5.b and RAI #9.b) per Reference 9 of Attachment 1.

By Reference 6 of Attachment 1, the NRC provided its interim staff evaluation (ISE) and requested additional information necessary for completion of the review. The above cited RAI revisions impact the ISE and their related discussion in the ISE. Entergy provided responses and/or updates to these ISE RAIs by References 7, 8, 9, 10, and 11 of Attachment 1 as well as with this submittal as presented below. Reference 8 of Attachment 1 refers to a preliminary bridging document on the ePortal and Reference 9 of Attachment 1 refers to a final bridging document uploaded to the ePortal September 30, 2014. This final bridging document was also provided per Reference 10, Attachment 2. The ANO ISE RAI response status is presented in a table immediately below. Bridging document Item #22 has a minor update as indicated below at the bottom of the table. Updated are [1] the ANO ISE RAI #11 response and [2] the ANO ISE RAI combined #14-17 response. However, <u>all</u> ANO ISE RAI responses are repeated or included/presented below for convenience.

Entergy has received an ISE that includes 17 RAIs. The following table provides ISE RAI status.

RAI	ANO Response Status [*2 updates (11 & 14-17), but all responses presented for convenience*]
1	Latest response per Reference 9 (4th 6 mo. status)
2	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
3	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
4	Latest response per Reference 8 (3rd 6 mo. status)
5	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
6	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload incl. bridging document [*] also attached to Ref. 10
7	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
8	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
9	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
10	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
11	Reference 11 response **updated**, see below
12	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
13	See Reference 8 (3rd 6 mo. status) and e-portal September 30, 2014 upload; incl. bridging document [*] also attached to Ref. 10
14	Reference 11 combined (14-17) response **updated**, see below
15	Reference 11 combined (14-17) response **updated**, see below
16	Reference 11 combined (14-17) response **updated**, see below
17	Reference 11 combined (14-17) response **updated**, see below

[*] Bridging document item #22 (Topic: Emissions Testing) is hereby updated. The response included a statement of expectation as follows: *FLEX Strategy Guidelines (FSG) governing the use of the SFPI are expected to include a cautionary statement to preclude radio usage within close proximity to the displays*. The update is striking of the subject statement of expectation since it is not necessary. The displays are located in the Main Control Room (MCR) with general low levels of noise sources expected but with general prohibition of radio use already existing [*reference OP-1903.062 Rev 27 "Communications System Operating Procedure" Section 6.1.1 which documents ANO-1 and ANO-2 MCRs being posted areas prohibiting use of portable two-way radios and also reference Operations Directive COPD-010, Rev 15, "Unit 1 / Unit 2 Trip Sensitive Area Designation," Section 1.0, which documents that specific equipment in the MCRs is exempt from the directive (e.g., exempt from individual radio sensitive area marking/designation on prior basis of the entire control room being posted as a radio prohibited area)*].

RAI #1: Please provide information regarding the projected dose rate impact of any irradiated hardware stored in the SFP on the Level 2 value. Please provide any changes in the elevation identified as Level 2, if applicable.

Latest response per Reference 9. Repeated here for convenience.

Interim Staff Guidance (ISG) JLD-ISG-2012-03, *Compliance with Order EA-12-051, Reliable SFP Instrumentation*, states "The NRC staff considers that the methodologies and guidance in conformance with the guidelines provided in Nuclear Energy Institute (NEI) 12-02, Revision 1, subject to the clarifications and exceptions in Attachment 1 to this ISG, are an acceptable means of meeting the requirements of Order EA-12-051."

NEI 12-02, Revision 1, Section 2.3.2, defines Level 2 as a "level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck." Level 2 represents the range of water level where any necessary operations in the vicinity of the SFP can be completed without significant dose consequences from direct gamma radiation from the stored spent fuel. Level 2 is based on either of the following:

- Ten feet (+/- one foot) above the highest point of any fuel rack seated in the SFPs, or
- a designated level that provides adequate radiation shielding to maintain personnel radiological dose levels within acceptable limits while performing local operations in the vicinity of the pool. This level shall be based on either plant-specific or appropriate generic shielding calculations, considering the emergency conditions that may apply at the time and the scope of necessary local operations, including installation of portable SFP instrument channel components. Additional guidance can be found in EPA-400, USNRC Regulatory Guide 1.13, and ANSI/ANS-57.2-1983.

Entergy has selected the ten-foot option which has been determined by the NRC to meet the requirements of the order with no further evaluation or review required.

Permanently stored irradiated material in the SFP is not hung from the SFP walls; therefore, there are no specific requirements in the procedures controlling irradiated equipment or materials stored in the SFP. Because Entergy has chosen Level 2 as ten feet (+/- one foot) above the highest point of any fuel rack seated in the SFPs, no additional analysis is required. Additionally, the ANO FLEX strategy ensures that activities in the proximity of the SFP are completed prior to the calculated time to boil and thus prior to reduction of SFP level; therefore, this strategy ensures that necessary operations in the vicinity of the SFP can be completed without significant dose consequences.

RAI #2: Please provide the analyses verifying that the SFP instrument design configuration will be maintained during and following the maximum seismic ground motion considered in the design of the SFP structure.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 8, 9 & 12.

RAI #3: For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 8, 9, 12 & 13.

RAI #4: Please provide the results of the evaluation performed to ensure that other hardware stored in the SFP cannot adversely interact with the SFP level instrumentation.

Latest response per Reference 8. Repeated here for convenience.

An exclusion zone of two square feet around the probe is the minimum clearance required to prevent any tools or devices from disturbing the function of the probe. Additionally, a Civil walkdown follow-up is planned to ensure other hardware does not adversely interact with the SFPI.

Note for ANO-2, an existing level switch (2LS-5414) was identified within the two square feet exclusion zone of the Channel 2 or B SFPI probe mounting location. This level switch hangs approximately three feet down into the SFP. The item is not designed per seismic category 1; however, the mounting details show it threaded into a ¼" stainless steel angle iron mount that is welded to the liner plate such that it does not adversely interact with the SFPI probe.

RAI #5: Please provide information indicating what will be the maximum expected ambient temperature in the room in which the signal processor (electronics) will be located under Beyond Design Basis External Event (BDBEE) conditions in which there is no ac power available to run heating, ventilation, and air conditioning (HVAC) systems.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 3.

RAI #6: Please provide information indicating the maximum expected relative humidity in the room in which the signal processor (electronics) will be located under BDBEE conditions, in which there is no ac power available to run HVAC systems, and whether the sensor electronics is capable of continuously performing its required functions under this expected humidity condition.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 3.

RAI #7: Please provide information describing the evaluation of the comparative sensor design, the shock test method, test results, and forces applied to the sensor applicable to its successful tests demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of severe shock.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 14.

RAI #8: Please provide information describing the evaluation of the comparative sensor design, the vibration test method, test results, and the forces and their frequency ranges and directions applied to the sensor applicable to its successful tests, demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of high vibration.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 14.

RAI #9: Please provide the results of the seismic testing performed per IEEE 344-2004 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 located.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 8.

RAI #10: Please provide analysis of the seismic testing results and show that the instrument performance reliability, following exposure to simulated seismic conditions representative of the environment anticipated for the SFP structures at ANO, has been adequately demonstrated.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 8.

RAI #11: Please provide the NRC staff with the final configuration of the power supply source for each channel so that the staff may conclude that the two channels are independent from a power supply assignment perspective.

Note: The following ISE RAI response update applies to both ANO-1 and ANO-2.

Note: The ISE RAI #11 response immediately below supersedes
[A] in entirety the previous ISE RAI #11 response per Reference 11 and
[B] in part Reference 10, Attachment 1, Pages 5 and 6 item 1.f (Power Supplies) response with its paragraph #3 superseded by below response paragraph #5.

UPDATE to previous Reference 11 response is made below. Updated areas are highlighted with italicized text. This update is necessary as a result of FSG / FLEX power restoration finalized (versus draft) strategy incorporating early stage rapid restoration expectation of only a single DC power bus/train in order to optimize load control on the on-site 480 VAC portable diesel generators with power restoration of both DC buses/trains not expected until later stage Phase 3 deployment of off-site 4160 VAC diesel generators.

For ANO-1, the primary channel (Instrument Channel 3) 120 volt alternating current (VAC) power is supplied from Panel RS3, which is a Class 1E inverter-backed panel supplied from 125 volt direct current (VDC) Bus D01. The backup channel (Instrument Channel 4) 120 VAC power is supplied from Panel RS4, which is a Class 1E inverter-backed panel supplied from 125 VDC Bus D02.

For ANO-2, the primary channel (Instrument Channel 1) 120 VAC power is being supplied from Panel 2RS1, which is a Class 1E inverter-backed panel supplied from 125V VDC Bus 2D01. The backup channel (Instrument Channel 2) 120 VAC power is being supplied from Panel 2RS2, which is a Class 1E inverter-backed panel supplied from 125 VDC Bus 2D02.

For ANO-1, the two SFPI instruments are “channelized” and are powered from opposing power division (e.g., red train and green train) safety-related vital 120 VAC power sources. For ANO-2, the two SFPI instruments are “channelized” and are being powered from opposing power division safety-related vital 120 VAC power sources.

Installation of permanently installed, physically independent, and physically separated channels (with channel separation in accordance with existing plant design basis requirements) that are supplied from opposing power division safety-related vital power sources (e.g., separate independent power sources with each inverter-backed, or emergency diesel

generator and battery-backed) that are designed and installed to Seismic Category I requirements assures that channels are independent from a power supply assignment perspective.

The primary independent AC power source design provides *expected timely* restoration *p*er FLEX strategies during a beyond-design-bases external event *(BDBEE)* from sources independent of plant sources (e.g.*,* FLEX portable diesel generators). *BDBEE FLEX strategy normal power path restoration for one SFPI channel (e.g., one vital DC power bus/train) is expected to be rapid (e.g., within hours via on-site 480 VAC portable diesel generators) with normal power path restoration for the other SFPI channel (e.g., both vital DC power buses/trains) still expected timely per Phase 3 FLEX strategies (e.g., within days via off-site National Strategic Alliance for FLEX Emergency Response Center 4160 VAC portable diesel generators). SFPI* permanently installed battery capacity *i*s analyzed to cover *reasonably long* duration (e.g., seven days). Installed rechargeable battery capacity for a full seven days coupled with FLEX power restoration strategie*s p*recludes the need for crediting *rapid restoration,* battery replacements, stocking of battery spare stock, and the alternate external DC power source capability. *As stated above restoration of normal power path to one SFPI channel is expected to be rapid and it is also noted that alternate external DC power source capability is provided for both SFPI channels via a battery cable that allows for connection of an external DC source or battery.* As such, the SFP instrument channels have highly reliable power sources, originating from separate power sources, with power capability independent from plant sources, and with on-board battery capacity analyzed for *reasonably long* duration (e.g., seven days) or *reasonable* offsite resource availability time frame*s.* An installed alternate power source is provided for instrument channel power with sufficient capacity to maintain the level indication function for *a reasonably long* duration including until offsite resource availability is reasonably assured.

The following FLEX Support Guides (FSGs) have been *generated* in association wit*h i*mplementation of NRC Order EA-12-049 FLEX strategies to repower the normal *480 V*AC *(and a single bus/train of normal 125 VDC and its downstream 120 VAC)* power supply to the SFPI with portable equipment following an Extended Loss of AC Power (ELAP) event.

- 1FSG-004 – ANO-1 ELAP DC Load Management
- 2FSG-004 – ANO-2 ELAP DC Load Management

Attachment 2 of the above FSGs ensures that 120 VAC Vital Panel Breakers which feed SFPI are not shed as part of the DC Load Shed strategy to preserve Station Vital Batteries. For ANO-1, the breakers are RS3 Bkr #7 and RS4 Bkr #7. For ANO-2, the breakers are 2RS1 Bkr #1 and 2RS2 Bkr #1.

Attachment 3 of the above FSGs restores power to 480 VAC Vital Load Centers *via on-site 480 VAC portable generators (with 1FSG-004, Attachment 4, providing an alternate connection method for ANO-1)*. For ANO-1, the load centers are B5 and B6. For ANO-2, the load centers are 2B5 and 2B6.

The subsequent attachment (1FSG-004, Attachment 5, 2FSG-004, Attachment 4) restores power to a single 125 VDC Vital Bus (ANO-1: D01 or D02; ANO-2: 2D01 or 2D02). This in turn restores power to one of the SFPI 120 VAC Vital Panel Breakers presented above under the Attachment 2 discussion (ANO-1: RS3 Bkr #7 or RS4 Bkr #7; ANO-2: 2RS1 Bkr #1 or 2RS2 Bkr #1).

Beyond the above FSGs, Phase 3 FLEX strategies provide greater power capacity (e.g., via off-site National Strategic Alliance for FLEX Emergency Response Center or NSRC 4160 VAC generators) and provide the ability and expectation of repowering the other SFPI channel (e.g., both vital DC power buses/trains) in a reasonably timely fashion (e.g., within seven days). Reference EC-48342 Topic Notes, Evaluation/Design Summary, Section 3.1.20, for Phase 3 NSRC DG Connection Evaluation for ANO-1 and ANO-2 including tie-in locations to 4160 VAC Vital Buses.

Power distribution related SAR Figures for ANO-1 (Figure 8-1) and ANO-2 (Figures 8.3-1 and 8.3-6) illustrate the power distribution which feeds SFPI showing connections *from 4160 VAC Vital Buses (ANO-1: A3, A4; ANO-2: 2A3, 2A4) to 480 VAC Vital Load Centers, and* between the 480 VAC Vital Load Centers (ANO-1: B5, B6; ANO-2: 2B5, 2B6) and 120 VAC Vital Panels (ANO-1: RS3, RS4; ANO-2: 2RS1, 2RS2) including those associated with the *125* DC *Vital* Buses *(ANO-1: D01, D02; ANO-2: 2D01, 2D02)* and inverters.

As discussed above, a conservative backup power source option is additionally provided for both SFPI channels via an alternate external DC power source capability (e.g., battery cable that allows for connection of an external DC source or battery) which is addressed within the following FSGs:

- *1FSG-007 – ANO-1 Loss of DC Power (Attachment 12)*
- *2FSG-007 – ANO-2 Loss of DC Power (Attachment 14)*

RAI #12: Please provide the results of the calculation depicting the battery backup duty cycle requirements demonstrating that its capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 18.

RAI #13: Please provide analysis verifying that the proposed instrument performance is consistent with these estimated accuracy normal and BDBEE values. Please demonstrate that the channels will retain these accuracy performance values following a loss of power and subsequent restoration of power.

Latest response per Ref. 8 & ePortal Sept. 30, 2014 upload. Repeated here for convenience.
NOTE: Bridging document available per both ePortal (Sept. 30, 2014 upload) and Ref. 10 Att. 2.

See bridging document Topic # 16, 17 & 18.

RAI #14: Please provide 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.

RAI #15: Please provide a description of the in-situ calibration process at the SFP location that will result in the channel calibration being maintained at its design accuracy.

RAI #16: Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection procedures that will be developed for use of the spent SFP instrumentation. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure.

RAI #17: Please provide 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.

UPDATE to previous Reference 11 response is made below. Updated areas are highlighted with italicized text. This update is twofold in nature. [1] It conservatively adds to the PM and Procedure listing the FSGs newly added to the ISE RAI #11 response. [2] It also updates the ANO-2 presentation from pending/planned to final.

RAIs #14, #15, #16, and #17 are combined due to their commonalities.

The ANO SFP instrument channels automatically monitor the integrity of the measurement system using in-situ capability or on-board diagnostics. Deviation of measured test parameters from manufactured or as-installed configuration beyond a configurable threshold prompts operator intervention. The probe itself is a perforated tubular coaxial waveguide with defined geometry and is not calibrated. Channel design provides capability for calibration or validation against known/actual SFP level.

The ANO SFP instrument channels have a reasonably high certified design accuracy of equal to or better than +/- three inches (excluding boric acid deposition effects that cause a conservative decrease in indicated level).

A new ANO-1 procedure, OP-1304.223, *Unit 1 Spent Fuel Pool Level Instrumentation Channel Functional Test,* has been implemented. The ANO-1 Technical Requirements Manual (TRM) has been revised to include actions to be taken for the primary and back-up SFP level instruments with respect to functionality (new TRM 3.10.1). In addition, ANO-1 procedure OP-1015.003A, *Unit 1 Operations Logs*, has been revised to add SFP level instruments LIT-2020-3 and LIT-2020-4. An Operations procedure was not required based on the simple indication function and use.

An ANO-1 Preventative Maintenance task has been established for scheduling and implementing necessary functional testing in accordance with ANO-1 TRM requirements. The testing per ANO-1 OP-1304.223 provides for calibration or validation of the primary and backup ANO-1 SFP level instrument channels against known/actual SFP level to maintain design accuracy within limits established. The testing also provides for ANO-1 SFP level instrument cross channel comparison. This is augmented by routine monitoring per ANO-1 procedure OP-1015.003A, *Unit 1 Operations Logs*.

A new ANO-2 procedure, OP-2304.271, Unit 2 Spent Fuel Pool Level Instrumentation Channel Functional Test, has been implemented. The ANO-2 TRM has been revised to include actions to be taken for the primary and back-up SFP level instruments with respect to functionality (new TRM 3.10.1). In addition, ANO-2 procedure OP-1015.003B, Unit 2 Operations Logs, has been revised to add SFP level instruments 2LIT-2020-1 and 2LIT-2020-2. An Operations procedure was not required based on the simple indication function and use.

An ANO-2 Preventative Maintenance task has been established for scheduling and implementing necessary functional testing in accordance with ANO-2 TRM requirements. The testing per ANO-2 OP-2304.271 provides for calibration or validation of the primary and backup ANO-2 SFP level instrument channels against known/actual SFP level to maintain design accuracy within limits established. The testing also provides for ANO-2 SFP level instrument cross channel comparison. This is augmented by routine monitoring per ANO-2 procedure OP-1015.003B, Unit 2 Operations Logs.

The following table includes all SFPI related preventive maintenance (PM) tasks and Procedures for ANO-1 and ANO-2:

ANO-1 SFPI Related PMs and Procedures	**ANO-2 SFPI Related PMs and Procedures****
MWO-405634 CFT/Calib. Procedure performed IAW ANO-1 TRM 3.10.1	MWO-422989 CFT/Calib. Procedure performed IAW ANO-2 TRM 3.10.1
OP-1304.223 ANO-1 SFPLI Chan-3 &-4 CFT or Calibration Check	OP-2304.271 ANO-2 SFPLI Chan-1 &-2 CFT or Calibration Check
OP-1015.003A ANO-1 Ops Log SFPLI routine rounds/checks	OP-1015.003B ANO-2 Ops Log SFPLI routine rounds/checks
MWO-405171 ANO-1 SFPLI Boric Acid Mitigation Chan-3	MWO-413616 ANO-2 SFPLI Boric Acid Mitigation Chan-1
MWO-405173 ANO-1 SFPLI Boric Acid Mitigation Chan-4	MWO-413619 ANO-2 SFPLI Boric Acid Mitigation Chan-2
MWO-403237 ANO-1 1-Year PM SFPLI Chan-3	MWO-413612 ANO-2 1-Year PM SFPLI Chan-1
MWO-403239 ANO-1 1-Year PM SFPLI Chan-4	MWO-413617 ANO-2 1-Year PM SFPLI Chan-2
MWO-403238 ANO-1 10-Year PM SFPLI Chan-3 for Clock Battery Replacement	MWO-413614 ANO-2 10-Year PM SFPLI Chan-1 for Clock Battery Replacement

ANO-1 SFPI Related PMs and Procedures	**ANO-2 SFPI Related PMs and Procedures****
MWO-403240 ANO-1 10-Year PM SFPLI Chan-4 for Clock Battery Replacement	MWO-413618 ANO-2 10-Year PM SFPLI Chan-2 for Clock Battery Replacement
1FSG-004 – ANO-1 ELAP DC Load Management (*DC load shed to preserve vital batteries & repower vital buses; both 480 VAC, single 125 VDC*)*	2FSG-004 – ANO-2 ELAP DC Load Management (*DC load shed to preserve vital batteries & repower vital buses; both 480 VAC, single 125 VDC*)*
*1FSG-007 – ANO-1 Loss of DC Power (Attachment 12, alternate external DC power source)**	*2FSG-007 – ANO-2 Loss of DC Power (Attachment 14, alternate external DC power source)**

* *Associated with* NRC Order EA-12-049 FLEX strategies implementation. Reference *0CNA031206, ML12056A045 for Order and* 1CNA051402, ML14114A697, relative to ANO-1 schedule relaxation *to match ANO-2*.

** ANO-2 SFPI installation *completed prior to restart from 2R24*.