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SOUTHERN COMPANY

February 27, 2013

Docket Nos.: 50-348
50-364

NL-13-0171

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

Joseph M. Farley Nuclear Plant – Units 1 and 2
Southern Nuclear Operating Company's Overall Integrated Plan In Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order 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-2012-03, *Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Requirements for 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, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,* dated August 24, 2012

4. Southern Nuclear Operating Company letter NL-12-2150 to the NRC, *Joseph M. Farley Nuclear Plant – Units 1 and 2 Southern Nuclear Operating Company's Initial Status Report 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)*, dated October 23, 2012

Ladies and Gentlemen:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Southern Nuclear Operating Company (SNC). Reference 1 was immediately effective and directs SNC to have

a reliable indication of the water level in associated spent fuel storage pools. Specific requirements are outlined in Attachment 2 of Reference 1.

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 Joseph M. Farley Nuclear Plant's (FNP) initial status report regarding reliable spent fuel pool instrumentation, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plan for FNP pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms SNC has received Reference 2 and has an Overall Integrated Plan for FNP developed in accordance with the guidance for the purpose of ensuring a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of required wide range pool water level conditions by trained personnel.

The information in the Enclosure provides the FNP Units 1 and 2 Overall Integrated Plan for reliable spent fuel pool instrumentation pursuant to Reference 3. The enclosed Integrated Plan is based on conceptual design information. Final design details and associated procedure guidance, as well as any revisions to the information contained in the Enclosure, will be provided in the 6-month Integrated Plan updates required by Reference 1.

SNC intends to fully implement the requirements of the Order by breaker closure of the Unit 1 Spring 2015 refueling outage and the Unit 2 Fall 2014 refueling outage per Section IV, Condition A.2 of Reference 1. In accordance with Section IV, Condition C.3 of Reference 1, SNC intends to submit notification to the NRC that full compliance of the Order has been achieved within 60 days of full implementation for each unit at FNP.

This letter contains no new regulatory commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Respectfully submitted,

B. L. Ivey
Vice President – Regulatory Affairs

BLI/CLN

Mr. B. L. Ivey states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Sworn to and subscribed before me this 27th *day of* February, *2013.*

Nora Louise Henderson
Notary Public

My commission expires: March 23, 2014

Enclosure: Joseph M. Farley Nuclear Plant Units 1 and 2 Integrated Plan with Regard to Reliable Spent Fuel Pool Instrumentation

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
Mr. T. A. Lynch, Vice President – Farley
Mr. B. J. Adams, Vice President – Fleet Operations
Mr. C. R. Pierce, Director – Regulatory Affairs
RTYPE: CFA04.054

U. S. Nuclear Regulatory Commission
Mr. E. Leeds, Director of the Office of Nuclear Reactor Regulation
Mr. V. M. McCree, Regional Administrator
Ms. E. A. Brown, NRR Project Manager – Farley
Mr. P. K. Niebaum, Senior Resident – Farley
Mr. J. R. Sowa, Senior Resident – Farley
Mr. Blake A. Purnell, NRR/JLD/PMB, NRC
Mr. Steven R. Jones, NRR/DSS/SBPB, NRC

Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

Joseph M. Farley Nuclear Plant – Units 1 and 2
Southern Nuclear Operating Company's Overall Integrated Plan In Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation
(Order EA-12-051)

Enclosure

Joseph M. Farley Nuclear Plant Units 1 and 2 Integrated Plan with Regard to Reliable Spent Fuel Pool Instrumentation

Southern Nuclear Operating Company

J. M. Farley Nuclear Plant

Units 1 & 2

Reliable Spent Fuel Pool Instrumentation

Overall Integrated Implementation Plan

Revision 0, February 27, 2013

Table of Contents

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 submittal of an overall integrated plan which will provide a description of how the requirements of the Order will be achieved.

NEI 12-02, *Industry Guidance for Compliance with NRC Order EA-12-051, "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 in conformance with the guidelines provided in NEI 12-02, Revision 1, subject to the clarifications and exceptions specific to NEI 12-02 Section 3.4, Qualification, are an acceptable means of meeting the requirements of Order EA-12-051.

This integrated plan provides the Joseph M. Farley Nuclear Plant (FNP) Units 1 and 2 approach for complying with Order EA-12-051 using the methods described in NEI 12-02 with the exceptions and clarifications as detailed in the following sections. Six month progress reports will be provided consistent with the requirements of Order EA-12-051 and the guidance in NEI 12-02.

II. Schedule

Installation of reliable spent fuel pool (SFP) level instrumentation will be completed prior to startup from the second refueling outage per unit after submittal of this plan (the Second Refueling outage commencing at FNP following February 28, 2013 is Spring 2015 for Unit 1 and Fall 2014 for Unit 2), but no later than December 31, 2016, (Reference 6).

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 subsequent six (6) month status reports.

The current milestones are:

Original Target Date	Activity	Status *{Include date changes in this column}*
Oct. 2012	Submit 60 Day Status Report	Complete
Feb. 2013	Submit Overall Integrated Implementation Plan	Complete
May 2013	Unit 2 1st RFO	
Aug 2013	Submit 6 Month Status Report	
Nov 2013	Unit 1 1st RFO	
Dec 2013	Develop Modifications Unit 2	
Feb. 2014	Submit 6 Month Status Report	
Apr 2014	Receipt of Unit 2 SFP Instrument Channel	
Apr 2014	Develop Modifications Unit 1	
June 2014	Receipt of Unit 1 SFP Instrument Channel	
3Q2014	Complete Functional Test of Unit 2 SFP Instruments	
Aug. 2014	Submit 6 Month Status Report	
4Q2014	Complete Functional Test of Unit 1 SFP Instruments	
Nov 2014	Unit 2 Implementation Complete (2nd RFO)*	
Feb. 2015	Submit 6 Month Status Report	
Apr 2015	Unit 1 Implementation Complete (2nd RFO)*	
June 2015	Submit Completion Report	

*Full compliance after second listed refueling outage

III. Identification of Spent Fuel Pool Water Levels

Each unit at Joseph M. Farley Nuclear Plant has its own spent fuel pool. The wet spent-fuel storage facility is located in the Auxiliary Building at El. 155'-00" in separate rooms. The Unit 1 and Unit 2 wet spent fuel pool storage facilities are made of reinforced concrete and each is lined on the inside with ¼" thick stainless steel plate . The SFPs are designed to provide underwater storage space for spent fuel assemblies and control rods after their removal from containment. The SFPs shall maintain enough heat removal capacity to accommodate the assemblies from a full core emergency off-load as well as the spent fuel assemblies previously discharged to the pool (See Attachment 1).

Key spent fuel pool water levels:

1. **Level adequate to support operation of the normal fuel pool cooling system** – Fuel pool level to support spent fuel pump Net Positive Suction Head (NPSH) requirements is 153'-4". (References 15, 16, and 18)
2. **Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck** - Elevation 139'-3/8" is approximately 10'-0" above the highest point of the fuel racks (plus or minus 1 foot). (Reference 10 – Figure 9.1-2 (sheet 1 of 2) and References 15 & 16)
3. **Level where fuel remains covered** - Elevation 129'-3/8" is the nominal level of the highest fuel rack. (Reference 10 – Figure 9.1-2 (sheet 1 of 2) and References 15 & 16)

IV. Instruments

Design of the instruments will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02 with the exceptions and clarifications as detailed below.

- Primary and backup instrument channels will consist of fixed components.
- The plan is for both channels to utilize Guided Wave Radar, 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 inferred.
- The measured range will be continuous from the high pool level elevation 153'-10" to the top of the spent fuel racks at elevation 129'-3/8" (Reference 10 – Figure 9.1-2 (sheet 1 of 2) and References 15, 16, 17, & 18).
- Instrument channel level sensing components (probe) will be located in the SFP directly adjacent to the spent fuel. The electronics processing module will be capable of being located in a non-harsh environment area outside the SFP area.
- The display shall provide a continuous indication of spent fuel pool water level at the Display location. In the event the link to the Display is lost, a field accessible signal/Indication (remote to the Display location) will be available for determination of pool level.

- The electronic processing module and the Display will be installed in a location that will meet the criteria established in NEI 12-02 and endorsed by NRC JLD-ISG-2012-03. The specific location of the electronic processing module and the Display has not been determined yet.

V. Reliability

Reliability of the primary and backup instrument channels will be assured by conformance with the guidelines of NRC JLD-ISG-2012-03 or NEI 12-02, as discussed in Section 3.4, Qualification and 3.8 Testing. Reliable level indication will be functional during all times when used fuel is in the SFP consistent with NEI 12-02 Section 4.3, Testing and Calibration.

VI. Instrument Channel Design Criteria

Instrument channel design will meet the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02 and applicable sections of the plant FSAR with the exceptions and clarifications as detailed below.

A. Arrangement

SFP level probes will be installed separate from each other in the SFP. Primary and backup level indication will be installed in the Main Control Room, at the alternate shutdown panel, or another appropriate and accessible location (reference NEI 12-06) that complies with the NEI 12-02 following characteristics. SNC has not determined the exact location at this time and has several options that provide various benefits. For example, the Main Control Room is the NRC preferred location while an appropriate accessible location in the plant would provide information to personnel in the plant at a location closer to the pool and mitigation equipment. Both existing and new barriers will be used to provide a level of protection for the cable located on the refueling floor from falling debris missiles generated by the event.

Probes will consist of a small diameter stainless steel cable mounted within a protective sleeve (stilling well). The cable will end just above the fuel racks. Based on the light weight of the probe, it is assumed that the probe will survive the event with little or no damage. Likewise, the pool wall or spent fuel will not be damaged by any interaction with the protective sleeve during the event.

Specific channel level sensing components physical properties and installation details will be provided later after the engineering and design phase is completed.

The probe support (including stilling well) will be designed to shield the probe from event generated missiles (falling debris). The design of the probe and probe support will allow the fuel handling machine to pass over it without interference.

Cabling for power supplies and indications for each channel will be separated for missile protection (falling debris) and routed in separate conduits from cabling for the other channel.

B. Mounting

Per NEI 12-02 Section 3.3, Mounting, the new equipment will be mounted to maintain the current Seismic Class of the Spent Fuel Pool which is Seismic Class I (Reference 10 – Section 3.8.4). Thus, the new equipment will be seismically qualified to Class I. In addition, the mounting of the primary and backup channel components throughout the plant will meet the criteria of the structure it will be routed through or attached to. (refer to Qualification details below relating to cable and raceway installation criteria)

C. Qualification

The components/cables/connections for both primary and backup channels will be reliable at the temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for seven (7) days. Saturation temperature at the bottom of the SFP assuming normal water level will be approximately 250°F. Post event temperature at sensors located above the SFP is assumed to be 212°F. Post event humidity in the SFP room is assumed to be 100% with condensing steam. The components/cables/connections will be qualified for expected conditions at the installed location assuming the SFP has been at saturation for an extended period. The components/cables/connections located in the vicinity of the SFP will be qualified to withstand peak and total integrated dose radiation levels for their installed location assuming that post event SFP water level is equal to the top of irradiated fuel for a time no greater than six (6) hours. It is anticipated that the station personnel can align one of the three (3) SFP Cooling Strategies as detailed in NEI 12-06 if conditions are degrading as indicted by decreasing SFP level.

Conduit design in the SFP area will be installed to Seismic Category 1 criteria. Both existing and new barriers will be used to provide a level of protection for the cable located on the refueling floor from missiles. The existing and new raceway used to route the cable to the Display will be installed to Seismic Class 1 criteria. Augmented quality requirements, similar to those applied to fire protection, will be applied to the components installed in response to this Order.

The specific values to use for the shock and vibration qualification will be determined in the design phase of the implementation using FSAR and Design Basis information. Components of the instrument channels installed in the SFP area will be qualified for shock and vibration using one or more of the following methods (note different methods may be used for the various sub components of the primary and back-up instrument channels):

- Instrument channel components use known operating principles, are supplied by manufacturers with commercial quality programs (such as ISO9001, *Quality management systems – Requirements* (Reference 8)) with shock and vibration requirements included in the purchase specification and/or instrument design, and commercial design and testing for operation in environments where significant shock and vibration loadings are common, such as for portable hand-held devices or transportation applications;

- Substantial history of operational reliability in environments with significant shock and vibration loading, such as transportation applications; or
- Use of components inherently resistant to shock and vibration loadings or are seismically reliable such as cables.

For seismic impact on instrument channel components required after a potential seismic event for installed components, the following measures will be used to verify that the design and installation is adequate. Applicable components of the instrument channels are rated by the manufacturer (or otherwise tested) for seismic impact at levels commensurate with those of postulated design basis event conditions in the area of instrument channel component use using one or more of the following methods (note different methods may be used for the various sub components of the primary and back-up instrument channels):

- Adequacy of seismic design and installation is demonstrated based on the guidance 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
- Instrument channel components use known operating principles are supplied by manufacturers with commercial quality programs (such as ISO9001) with seismic requirements included in the purchase specification and/or instrument design, and commercial design and testing for operation in environments where significant seismic effects are common
- Substantial history of operational reliability in environments with significant vibration, such as for portable hand-held devices or transportation applications
- Demonstration of seismic reliability using methods that predict the equipment's performance by:
    - Analysis
    - Testing of the equipment under simulated seismic conditions
    - Using a combination of test and analysis
    - The use of experience data.
- Demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges)
- Seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

D. Independence

The primary and backup instrument channels are of the same technology, are permanently installed, separated by distance or barriers, and utilize independent power supplies from different buses/switchgear.

E. Power Supplies

Each channel will normally be powered from independent (different buses/switchgear) 120V AC power sources and will have a dedicated battery backup. The battery backup will be dedicated to each channel, should have the capability of automatically switching and operating on backup batteries and will have manual switching as a minimum. A minimum battery life of 24 hours will be provided to allow for power restoration from portable equipment (refer to attachment 2 for a typical sketch). Refer to Safety Function Support section of the SNC Integrated Plan February 28, 2013, submittal for NRC Order EA-12-049 for details on the power strategy from portable FLEX Diesel Generators (DGs).

F. Accuracy

Instrument channels will be designed such that they will maintain their design accuracy without recalibration following a power interruption or change in power source.
SNC plans for the instrument design accuracy to be within ± 1 inch, or as close as reasonably achievable, over the entire range for the expected environmental and process conditions. Accuracy will consider SFP post event conditions, e.g., saturated water, steam environment, or concentrated borated water. Additionally, the instrument accuracy of the GWR technology will be sufficient to allow trained personnel to determine when the actual level exceeds the specified level of each indicating range (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.

G. Testing

Instrument channel design will provide for routine testing and calibration consistent with Order EA-12-051 and the guidance in NEI 12-02.

- SNC plans for the design to facilitate in-situ testing and /or calibration of the Static or non-active installed (fixed) sensors
- SNC plans for the design to facilitate the microprocessor based channel features to be capable of testing while mounted in the pool.
- Existing work control processes will be used to control maintenance and testing. (*e.g.*, Preventive Maintenance Program, Surveillance Program, Vendor Contracts, or work orders)
- Other testing and calibration requirements are located in Program Controls testing sub section below.

H. Display

Primary and backup indication will be provided in the Main Control Room, at the alternate shutdown panel, or another appropriate and accessible location (reference NEI 12-06) that complies with the NEI 12-02 characteristics. If multiple display locations are powered from the instrument loop, then the guidance in NEI 12-02 regarding multiple displays will be followed (refer to attachment 2 for a typical sketch).

VII. Instrument Channel Program Criteria

Instrument channel program criteria will be consistent with the guidelines of NRC JLD-ISG-2012-03 and NEI 12-02.

A. Training

A systematic approach will be used to identify the population to be trained and to determine both the initial and continuing elements of the required training. Personnel will complete training prior to being assigned responsibilities associated with this instrument.

B. 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 consistent with NEI 12-02.

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 (References 5 and 7).

C. 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 instrument and the monitor. Out of service time as identified in NEI 12-02 will be incorporated consistent with the programmatic process used for compliance with NRC Order EA-12-049 (Order to Modify Licenses With Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events).

VIII. Need for Relief and Basis

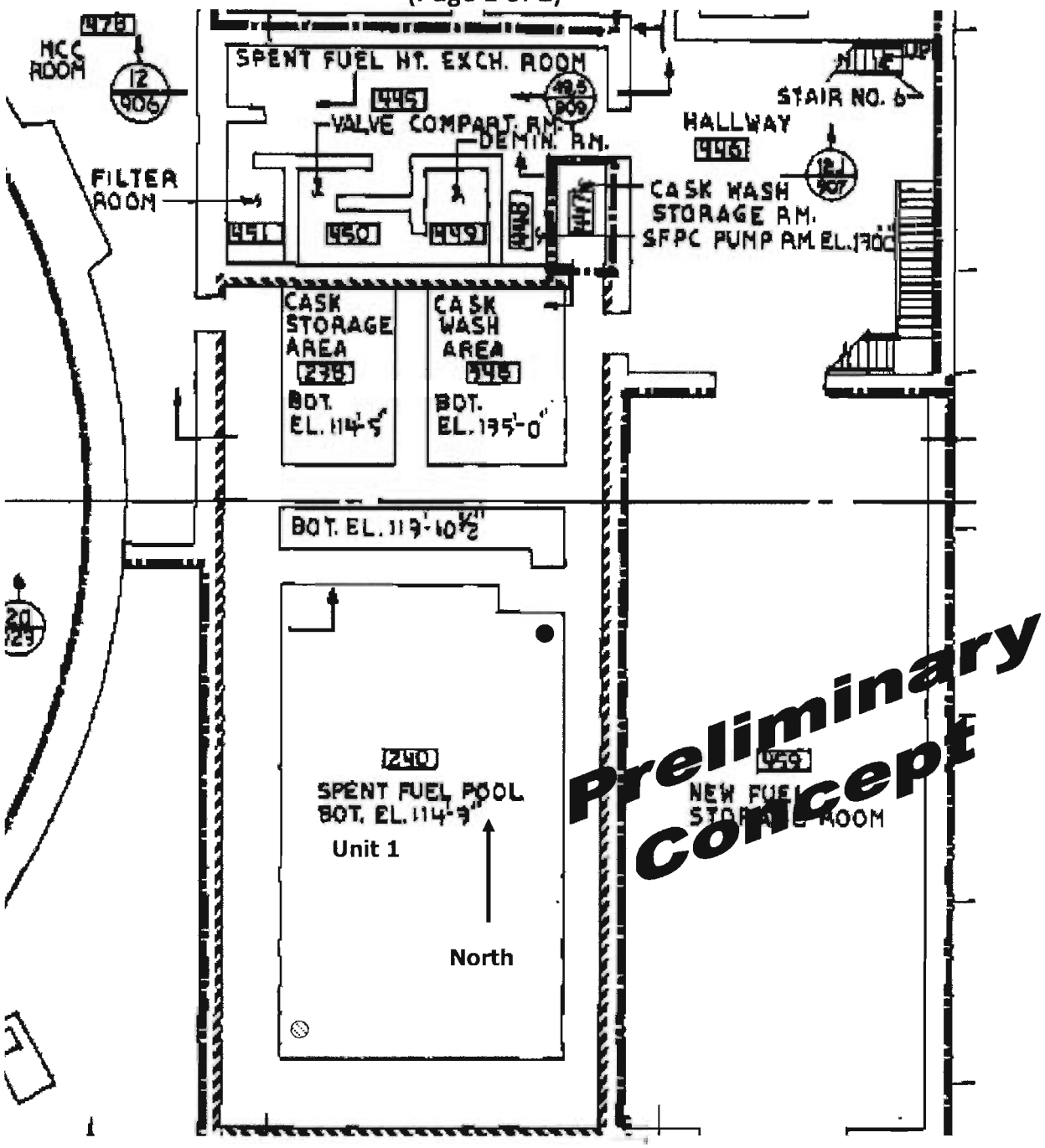
Southern Nuclear is not requesting relief from the requirements of Order EA-12-051 or the guidance in NEI 12-02 at this time, except as discussed herein.

Consistent with the requirements of Order EA-12-051 and the guidance in NEI 12-02 as endorsed by NRC JLD-ISG-2012-03, the six-month reports will delineate progress made, any proposed changes in our compliance methods, updates to the schedule, and, if needed, requests for relief and their bases.

IX. 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) Letter, NL-12-2150, Initial Status Report in Response to Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated October 23, 2013
7) Letter NL-12-2145, Initial Status Report in Response to Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) , dated October 23, 2013
8) ISO9001, Quality management systems – Requirements
9) IEEE Standard 344-2004, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
10) Joseph M. Farley Nuclear Plant Unit 1 and 2 Final Safety Analysis Reports, Revision 25, Nov. 2012
11) D-175043, "P&ID – Spent Fuel Pool Cooling System" – Unit 1
12) D-205043, "P&ID – Spent Fuel Pool Cooling System" – Unit 2
13) D-350804, Ver. 17.0, "Aux. Bldg Conc. Penetration Seals @ El 155'-0" (PS-155-00)"
14) D-356039, Ver. 11.0, "Aux. Bldg Concrete Penetration Seals Key Plan @ El 155'-0" (2PS-155-00)"
15) D-176542, Ver. 15.0, "Section 20 Concrete Auxiliary Building"
16) D-206542, Ver. 6.0, "Sect 20 Conc A/B"
17) U-266647, Ver. 14.0, "Precautions, Limitations and Setpoints for Nuclear Steam Supply Systems"
18) A-181014, Ver. 14.0, "Functional System Description Spent Fuel Pool System"

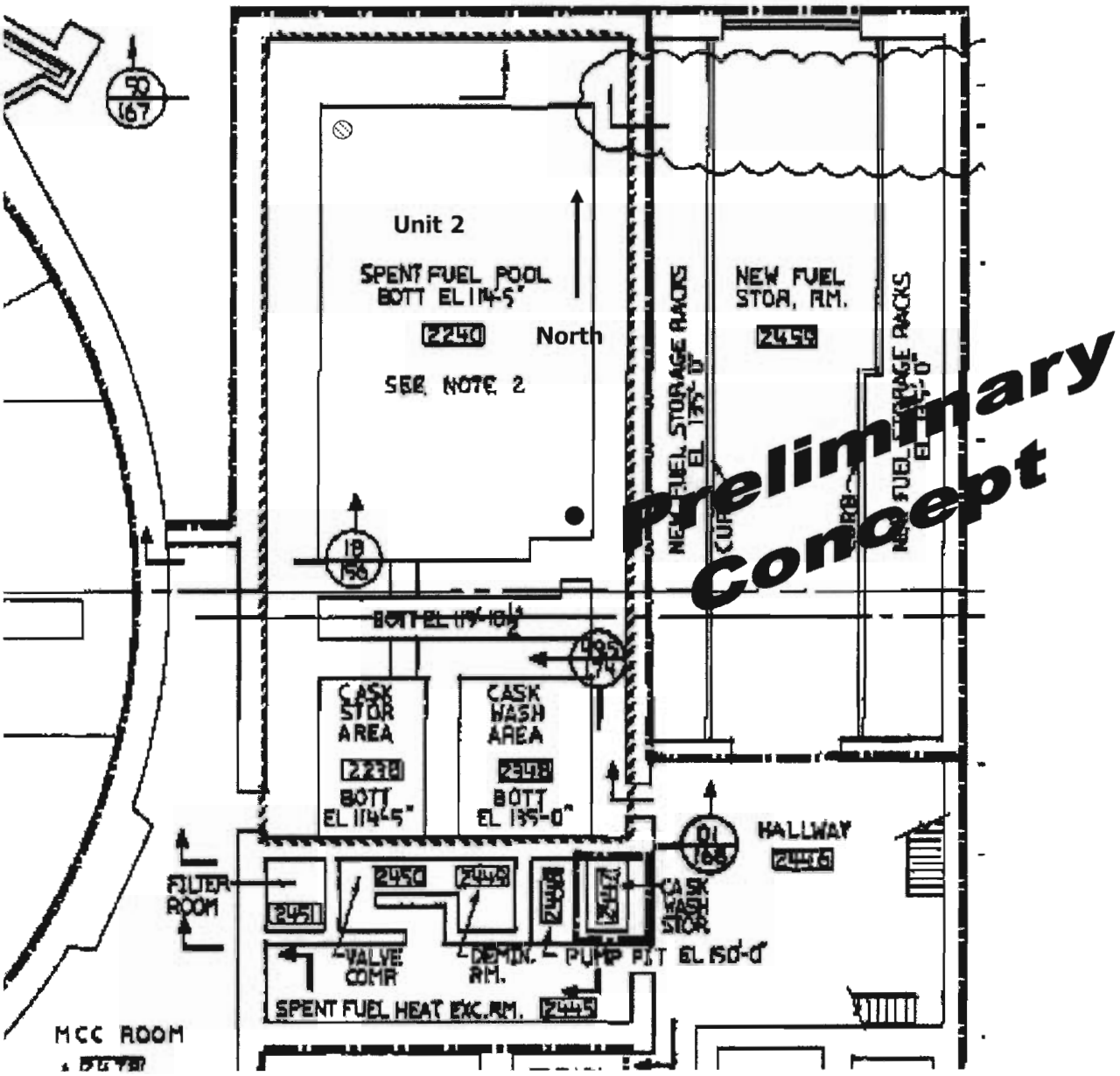
Attachment 1: Probe Location Sketch
(Page 1 of 2)



Note:

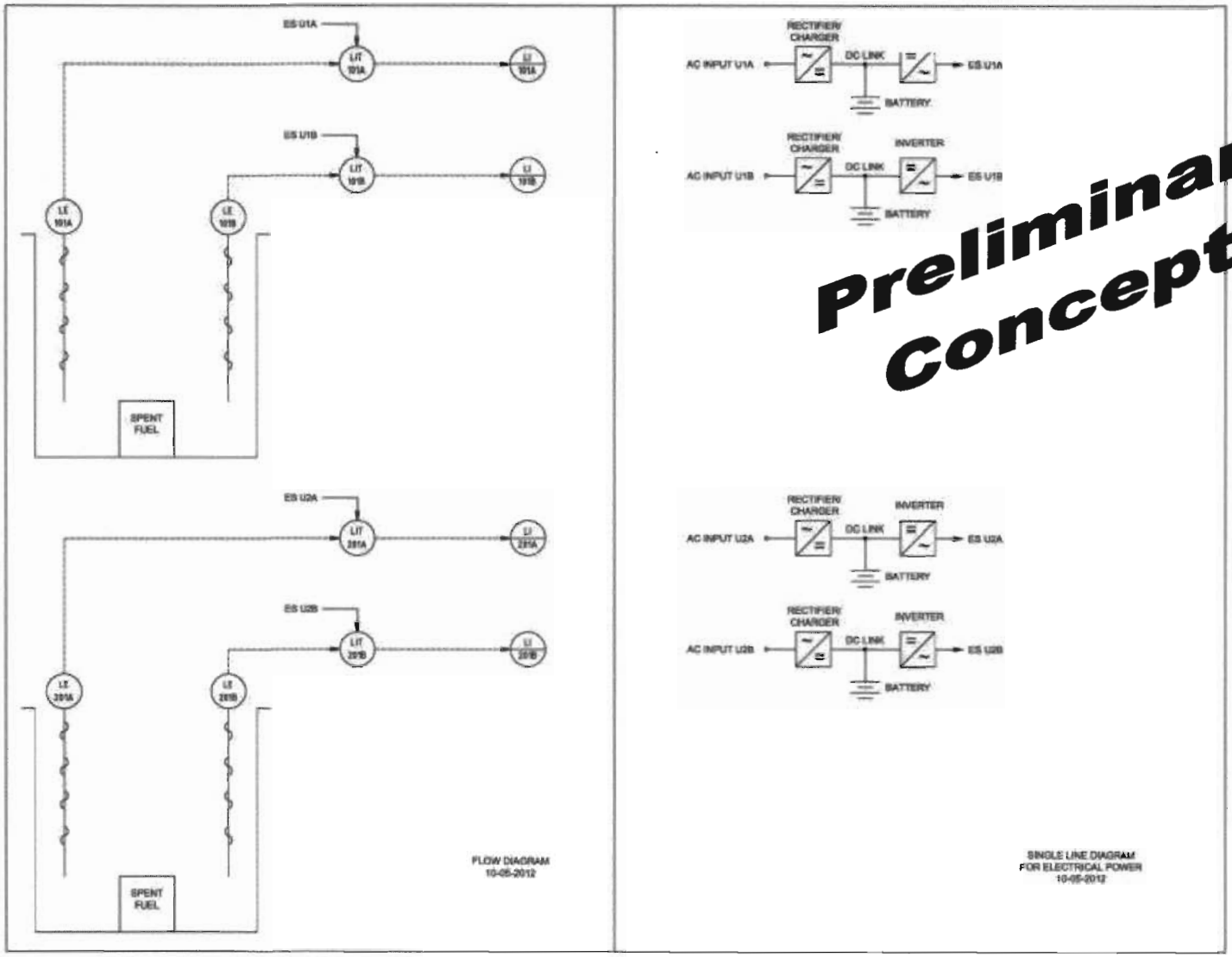
1. Snapshot taken from Reference 13.
2. ● - Potential Probe 1 Location and ⦸ - Potential Probe 2 Location

Attachment 1: Probe Location Sketch (Page 2 of 2)



Note:

1. Snapshot taken from Reference 14.
2. ● - Potential Probe 1 Location and ⦸ - Potential Probe 2 Location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LIT 101B
LI 101B
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LI 201A
ES U2B
LIT 201B
LI 201B
LE 201A
LE 201B
SPENT FUEL
FLOW DIAGRAM
10-05-2012
RECTIFIER CHARGER
AC INPUT U1A
DC LINK
ES U1A
BATTERY
RECTIFIER CHARGER
INVERTER
AC INPUT U1B
DC LINK
ES U1B
BATTERY
Preliminary Concept
RECTIFIER CHARGER
INVERTER
AC INPUT U2A
DC LINK
ES U2A
BATTERY
RECTIFIER CHARGER
INVERTER
AC INPUT U2B
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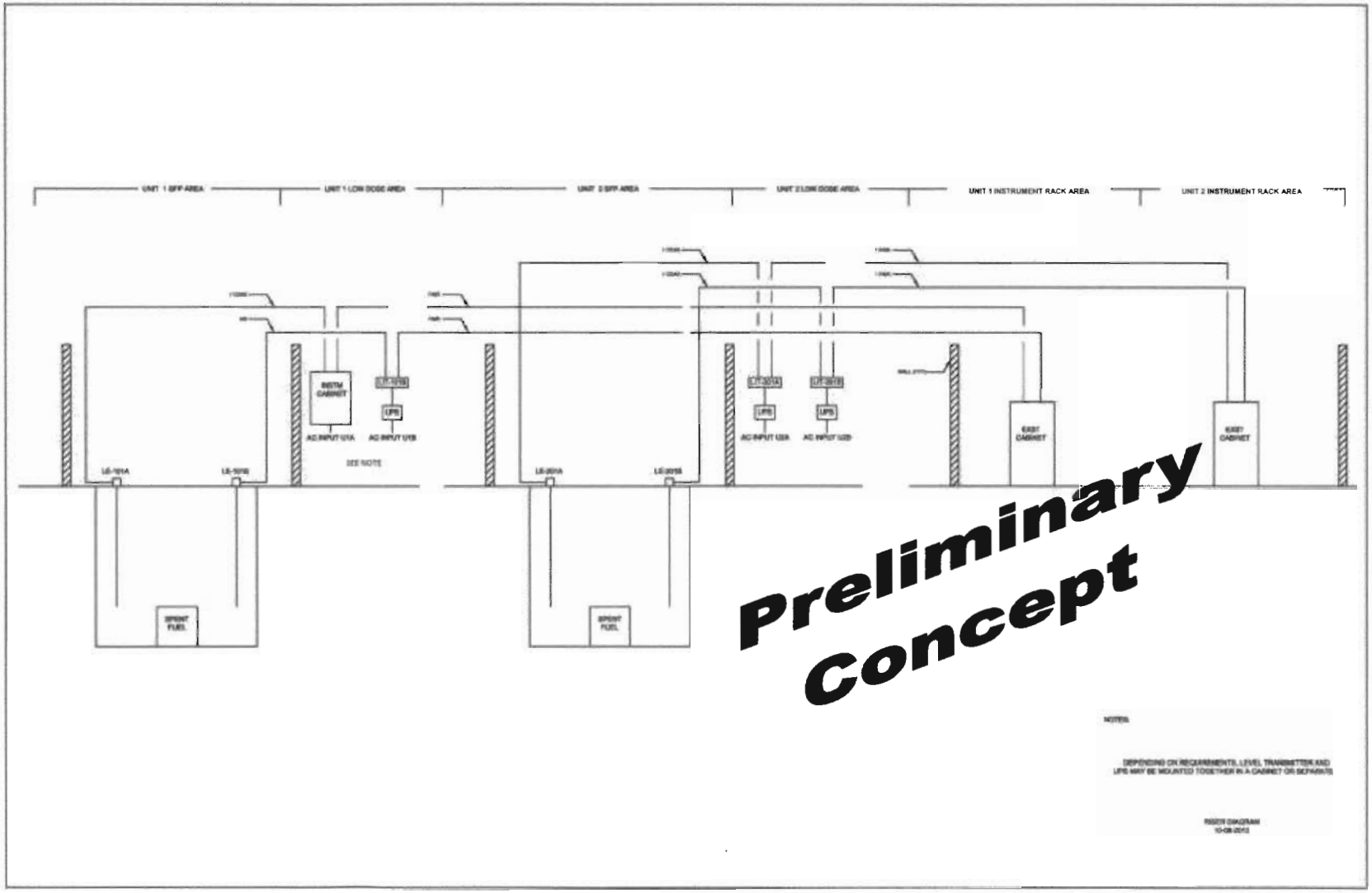
BATTERY
SINGLE LINE DIAGRAM FOR ELECTRICAL POWER
10-05-2012

Attachment 2: Electrical Sketches (Page 2 of 3)



Attachment 2: Electrical Sketches (Page 3 of 3)