Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

February 27, 2014
NOC-AE-14003089
10 CFR 2.202

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

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
STPNOC Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies For Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number 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 (ML12073A195)
2. Letter from D.W. Rencurrel, STPNOC, to NRC Document Control Desk, "Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)", October 24, 2012 (ML12310A389) (NOC-AE-13002909)
3. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," August 29, 2012 (ML12233A042)
4. Letter from D.L. Koehl, STPNOC, to NRC Document Control Desk, "STPNOC Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)", February 28, 2013 (ML13070A011) (NOC-AE-13002963)
5. Letter from G.T. Powell, STPNOC, to NRC Document Control Desk, "STPNOC First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)", August 26, 2013 (ML13249A060) (NOC-AE-13003027)
6. Nuclear Energy Institute (NEI) Guidance 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, August 21, 2012 (ML12242A378)

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On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (Reference 1) to STP Nuclear Operating Company (STPNOC) to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. The purpose of this letter is to provide the second six-month status report pursuant to Section IV, Condition C.2, of EA-12-049 (Reference 1), delineating progress made in implementing the requirements of EA-12-049. The Attachments included with this letter provide updates of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

Per the requirements of Reference 1, STPNOC submitted an initial status report (Reference 2) 60-days following issuance of the final Interim Staff Guidance (Reference 3) and an Overall Integrated Plan pursuant to Section IV, Condition C of the Order (Reference 4). STPNOC submitted the first six-month status report on August 26, 2013 (Reference 5).

Direction regarding the content of the status reports is provided in NEI 12-06 (Reference 7).

This letter contains no new regulatory commitments.

If there are any questions regarding this letter, please contact Wendy Brost at (361) 972-8516 or me at (361) 972-7566.

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

Executed on: February 27, 2014

G. T. Powell
Site Vice President

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Attachments:

1. STP Nuclear Operating Company (STPNOC) Second Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events
2. Conceptual Drawings
3. Updated Phase 3 Equipment Table

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Attachment 1

STP Nuclear Operating Company (STPNOC) Second Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

STP Nuclear Operating Company (STPNOC) Second Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

1. Introduction

STPNOC developed an Overall Integrated Plan (OIP) (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides the second update of milestone accomplishments since submittal of the OIP, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any. Because several changes have occurred to the OIP, the following is a brief overview of STP's current basic strategies to meet the Order. Changes to the OIP specific to this update are emphasized with italics.

NOTE: All flow rates and pressures are approximate

Overview of how the strategies work together:

If the Extended Loss of AC Power (ELAP) occurs while the Steam Generators (SGs) are being used as the heat sink, the Turbine Driven Auxiliary Feedwater (TDAFW) pump will start automatically and feed one SG. Operators will then manually line up feedwater to all SGs. Operators will cooldown and depressurize the plant to a predetermined SG pressure, ensuring a cooldown will not result in a return to criticality event and the cooldown will not allow nitrogen into the Reactor Coolant System (RCS) from the Safety Injection (SI) accumulators.

Once the cooldown begins, site personnel will begin to focus on starting the FLEX diesel generators and mechanically and electrically lining up FLEX equipment to be placed in service. Cooldown and depressurization should start during the first hour following initial event. After approximately ten hours, one of the FLEX DGs will be running and providing power to an RCS makeup pump permitting boric acid to be added to the RCS to maintain shutdown margin. Once the SI accumulators are isolated or vented, then the RCS will be further depressurized and cooled down. This subsequent cooldown and depressurization is to seat the pressure relief valve (PRV) on the Reactor Coolant Pump (RCP) seal return line that should have opened due to the increased RCP seal leakage early in the event. At about 15 hours into the event, the PRV should be re-seated. Pressurizer level will be restored and makeup to the RCS will no longer be necessary at approximately 22 hours following event start.

Most of STP's strategies now involve the use of a primary and alternate means to meet the safety functions for the Order instead of only using an N and +1 pump. Having diverse strategies make the response more robust and the station is more likely to survive any event.

The revised sequence of events timelines are based conservatively on starting the FLEX diesel generator and associated pumps and equipment at hour 10 following event initiation.

- FLEX POWER – Two 480V AC, *1000* kW diesel generators (N and +1) will be staged on the Mechanical Auxiliary Building (MAB) roof of each unit in an enclosure that protects them from external hazards.

- REACTOR COOLANT SYSTEM (RCS) INVENTORY (Modes 1-4) – *The primary strategy for filling the RCS will use a* 35 gpm Chemical and Volume Control System (CVCS) Positive Displacement pump (PDP) at 3100 psig taking suction on either the Boric Acid Tanks (BATs) or the Refueling Water Storage Tank (RWST) and discharging into the CVCS charging line. The *alternate means of filling the RCS is a pre-staged* 40 gpm FLEX RCS Makeup pump at *700* psi installed in one of the SI pump bays located in the Fuel Handling Building (FHB). Suction is from the RWST, discharging into the SI line downstream of High Head SI discharge motor-operated valve (MOV). *The pump size has changed from 1600 psig discharge pressure to 700 psig to reduce the physical size of the pump. STP has the ability to vent the reactor head thus allowing the use of this smaller head pump.*

- CORE COOLING (Modes 1-4) – Initial core cooling is accomplished using the Turbine Driven Auxiliary Feedwater (TDAFW) pump. In the event the TDAFW pump is lost, *the primary strategy for cooling the core is a new 300 gpm at 500 psig pre-staged motor-driven FLEX SG Makeup pump located in the Isolation Valve Cubicle (IVC)* that will take suction from the Auxiliary Feedwater Storage Tank (AFWST) and discharge into the cross-connect header that feeds all four SGs. *The alternate means of feeding the SGs uses a trailer mounted diesel driven high capacity pump that will feed the SGs using the normal Feedwater lines. This alternate strategy provides flexibility and diversity to meet this safety function.*

- CORE COOLING/RCS INVENTORY (Modes 5 and 6 without SGs when natural circulation is not available) – *The primary strategy uses a 170* gpm *at 100* psi FLEX pump that will be located in the FHB SI pump bays. It will use the identical suction and discharge path as the Modes 1-4 RCS Inventory (Makeup) FLEX pump. The *alternate means of filling the RCS* will be a Boric Acid (BA) Transfer pump *and CVCS piping.* The BA Transfer pump can deliver 140 gpm at 180 psi.

- SPENT FUEL POOL (SFP) MAKEUP AND SPRAY – There are 3 different makeup means required in the guidance:
  - The normal makeup mode will be using a Reactor Makeup Water (RMW) pump and opening FC-0048, which is the valve used to fill the SFP.
  - The hose to the pool method will be a 250 gpm at 150 psi pre-staged FLEX SFP Makeup pump *in the FHB.* Hose fittings will be installed on the end of the pipe and temporary hoses will be staged in the area. Hoses will be routed from this location to the SFP. This FLEX pump suction is from the RWST.
  - The spray method uses this same above mentioned pump but hoses are routed to the monitors on the south end of the SFP deck.

- WATER SUPPLIES
  - RCS Inventory – RWST and BA Storage tanks will be the primary tanks used to makeup to the RCS. *The tanks will not deplete because of the new strategy of depressurizing the RCS to the point that the loss of coolant via the RCP seal return pressurized safety valve (PSV) will stop. Thus, not more than 70,000 gallons should be needed to refill the RCS following seating the PSV.*
  - Core Cooling (Modes 1-4) – For external events other than the Design Basis (DB) flood from a Reservoir embankment breach, the AFWST will be re-filled

using a diesel driven pump from the Regional Response Center (RRC) or using one of STP's trailer mounted diesel driven pumps. The suction source can be any one of a number of tanks, basins or the Ultimate Heat Sink, whichever is available. For the DB flood from a Reservoir embankment breach, water level around the AFWST at about 30 hours (fill start time) into the event will still be approximately five feet deep. A modification to the Feedwater Dearator will allow its water to be moved *via hose and gravity to the AFWST via drain lines in the AFW system. This will provide enough water for continued AFW system running until the flood waters subside.*

- Core Cooling (shutdown) - RWST will be the primary tank used to makeup to the RCS. Following depletion of this tank STP can fill the RWST from other on site tanks, basins or main reservoirs using the trailer mounted diesel driven pump and entering the south side of the MAB near the Waste Monitor tanks and going into the RMW tank room.
- SFP makeup and spray –
  - For normal makeup, the source is the RMW Storage Tank (RMWST).
  - For makeup with hoses, the source is the RWST.
  - For makeup with spray, the source is the RWST with outside basins and tanks as backup.
  - STP can fill the RWST with non-borated water as discussed above.

The following chart has been developed to aid in understanding the pumps and protection for the strategies:

	SAFETY FUNCTION			
	RCS Inventory (Modes 1-4)	**RCS Inventory/ Core Cooling (shutdown modes)**	**Core Cooling (SG Makeup)**	**SFP Makeup**
Primary strategy	Installed CVCS PDP at 35 gpm	Pre-staged FLEX RCS Makeup at 170 gpm	Installed TDAFW pump (Phase 1) and pre-staged FLEX SG Makeup motor driven pump at 300 gpm (Phase 2)	Installed Reactor Makeup Water pump at 300 gpm
Alternate strategy	Pre-staged FLEX RCS Makeup at 40 gpm	Installed BA Transfer pump at 140 gpm	Trailer mounted diesel driven pump See Note below	Pre-staged FLEX SFP makeup pump at 250 gpm
Protection in accordance with NEI 12-06?	Yes, both inside Class 1E buildings.	Yes, both inside Class 1E buildings.	Yes, primary strategy is inside Class 1E building, fully protected. Alternate strategy will meet 12-06, separated sufficiently that a tornado missile should only affect one.	Yes, both inside class 1E buildings.

Note: The two trailer mounted pumps will be stored in structures that meet NEI 12-06 protection guidelines with the exception of a tornado missile. The buildings will be separated sufficiently to provide reasonable assurance that a tornado missile should not destroy both pumps. Deployment following an incredible design basis flood from the MCR embankment breach cannot take place until about 72 hours following event. This is an Interim Staff Evaluation open item.

2. Milestone Accomplishments

STP has no milestone accomplishments to discuss at this time.

3. Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the Order implementation date.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	Oct 2012	Complete	None
Submit Overall Integrated Plan	Feb 2013	Complete	None
Submit 6 Month Updates:			
Update 1	Aug 2013	Complete	None
Update 2	Feb 2014	*Complete*	*None*
Update 3	Aug 2014	Not Started	-
Update 4	Feb 2015	Not Started	-
Update 5	Aug 2015	Not Started	-
Update 6	Feb 2016	Not Started	-
Update 7	Aug 2016	Not Started	-
FLEX Strategy Evaluation	Sept 2013	Started	*Nov 2014*
Walk-throughs or Demonstrations	Dec 2014	Not started	*April 2015*
Perform Staffing Analysis	Dec 2013	Not started	*Dec 2014*
Modifications:			
Modifications Evaluation	Sept 2013	Started	June 2014
Unit 1 Design Engineering	Jan 2014	*Started*	*Aug* 2014
Unit 1 Implementation Outage	Oct 2015	Not started	-
Unit 2 Design Engineering	Jan 2014	Started	*June* 2014
Unit 2 Implementation Outage	Apr 2015	Not started	-

Storage:			
Storage Design Engineering	Sept 2013	*Started*	July 2014
Storage Implementation	Apr 2015	*Started*	-
FLEX Equipment:			
Procure On-Site Equipment	Jan 2014	*Started*	*Nov* 2014
Develop Strategies with RRC	Oct 2013	Started	Oct 2014
Procedures:			
PWROG[1] issues NSSS[2]-specific guidelines	Apr 2015	Started	-
Create Site-Specific FSGs[3]	Apr 2015	Started	-
Create Maintenance Procedures	May 2014	Not started	-
Training:			
Develop Training Plan	May 2014	*Started*	Jan 2015
Training Complete	Sept 2014	Not started	April 2015
Unit 1 FLEX Implementation	Oct 2015	Started	-
Unit 2 FLEX Implementation	Apr 2015	Started	-
Submit Completion Report	-	Not started	Oct 2015

[1] PWROG – Pressurized Water Reactor Owner's Group

[2] NSSS – Nuclear Steam Supply System

[3] FSG – Functional Safety Guidelines

4. Changes to Compliance Method

SPECIFIC CHANGES TO THE OIP AND THE FIRST 6 MONTH UPDATE:

A. STP originally planned to recirculate the water from the containment floor back into the RCS; however, the elevated temperature of the water inside containment prevents this due to inadequate net positive suction head. RMWST and RWST water sources provide well beyond 72 hours of inventory for both the RCS and SFP.

B. The capacity of the diesel generators has been increased to 1000 kW at 480V to accommodate running more equipment.

C. For Modes 1-4 Core Cooling, STP's strategy has been updated to:
   a. Use the Turbine Driven Auxiliary Feedwater (TDAFW) pump in Phase 1.
   b. Use the new 300 gpm at 500 psig FLEX SG fill pump as the primary strategy to back up the TDAFW pump during Phase 2.
   c. Use the trailer mounted portable diesel driven pump feeding the Main Feedwater lines as the alternate strategy. This strategy cannot be used for about 72 hours following a Main Reservoir embankment breach flood but can be used immediately for all other external events.

D. The FLEX RCS Makeup pump was originally rated at 1500 psi but has been updated to a rating of 700 psi. STP can open the Reactor Head Vents as necessary during this event.

E. The trailer mounted diesel driven pumps will be used as a backup for SFP spray. Both will be stored separately and protected from design basis hurricane winds.

F. The FLEX power diesel generator enclosures on top of the MAB will be made of steel vice concrete.

G. For Modes 5 and 6 Core Cooling, a new FLEX pump rated at 170 gpm at 100 psig will be used as the primary strategy and a Boric Acid Transfer pump will be used as the alternate strategy.

H. The new FLEX SFP makeup pump has been updated to a rating of 250 gpm at 150 psig. This pump will be used both for makeup using hoses and for spray.

I. The strategy for draining the FW Deaerator (DA) into the AFWST has changed. STP plans to modify a drain from the DA and install a valve and blind flange on the deck of the Turbine Generator Building (TGB) to support this effort.

J. Most drawings have changed during the design process. Final drawings will be provided in the basis document.

K. Phase 3 Strategies – When the OIP was written, the Phase 3 strategies had not been thoroughly addressed. The Phase 2 strategies will enable STP to cope indefinitely; however Phase 3 equipment will arrive from the RRC and will be used on an "as needed" basis. For example, a medium voltage generator (4160 VAC) will be supplied to each unit from the RRC – Although this generator is not required for indefinite coping, it will provide for the restoration of a Class 1E switchgear thereby restoring additional plant

support equipment. This generator also permits the plant to start 4160 VAC pumps that can be used as a method for meeting the required safety functions.

See Attachment 2 for conceptual drawings and drawing changes planned for FLEX power distribution, SFP Makeup, RCS Makeup, and SG Makeup.

5. Need for Relief/Relaxation and Basis for the Relief/Relaxation

The NRC identified two open items (3.1.2.2.A and 3.2.4.8.B) in the Interim Staff Evaluation that require justification for their approach to meeting the Order.

See Section 6 for further information and justifications.

6. Open Items from Overall Integrated Plan and Draft Safety Evaluation

Below are the open items from the Technical Evaluation Report issued Jan. 29, 2014 (Reference 3):

OI # 3.1.2.2.A – The licensee does not provide for transportation/deployment of the diesel driven trailer mounted pump relied upon as a spare SG makeup pump in the event of a design basis flood.

No update

OI # 3.2.1.1.A – Demonstrate the applicability of the RETRAN-3D code for analysis of the ELAP transient.

No update

OI # 3.2.1.1.B – Provide analysis of the ELAP transient that is applicable to STP and which demonstrates the adequacy of the mitigating strategy proposed for STP. This includes specification of an acceptable definition for the transition to reflux condensation cooling to ensure that the analysis is not credited beyond this juncture. A sufficient number of cases should be included in the analysis to demonstrate the acceptability of different strategies that may be necessary to mitigate an ELAP (e.g., as discussed in Section 3.2.1.6, in some cases "N" and "N+1" pumps have different capabilities, which may substantially affect the sequence of events in the integrated plan).

No update

OI # 3.2.1.6.A – Develop the final timeline(s) and sequence(s) of events for STP.

No update

OI # 3.2.4.8.B – Electric Power Sources - On page 20 of the Integrated Plan, the licensee stated the strategy for mitigating an ELAP is to use a 480 VAC air cooled diesel generator on top of roof of the MAB to provide power to an electric driven SG FLEX pump, a RCS FLEX pump and a spent fuel pool FLEX pump. The use of pre-staged generators appears to be an alternative to NEI 12-06. The licensee

has not provided sufficient information to demonstrate that the approach meets the NEI 12-06 provisions for pre-staged portable equipment. Additional information is needed from the licensee to determine whether the proposed approach provides an equivalent level of flexibility for responding to an undefined event as would be provided through conformance with NEI 12-06.

Update: Pre-staging the two FLEX DGs is necessary because of the postulated flood caused by a breach of the reservoir embankment (Reference UFSAR 3.4.1.1). Although this event is not considered credible, another flooding scenario due to upstream dam failure has the potential of inundating the site with several feet of water. Staging and storing the FLEX diesels on the MAB roof would provide reasonable protection from either flooding event. NEI 12-06 Section 11.3.2 states that the mitigation strategy and support equipment will be reasonably protected from applicable external events such that the equipment could be operated in place.

Use of the existing electrical distribution system also conforms to the requirements of NEI 12-06. Section 3.2.1.3, Item (8) states that installed electrical distribution systems, including inverters and battery chargers, remain available provided they are protected consistent with current station design. The electrical paths for energizing the FLEX equipment will be diverse in that the currently installed equipment will be repowered via Class 1E motor control centers (MCCs) and the new FLEX pumps will be powered via new cabling to the new pumps. Item (9) of Section 3.2.1.3 states that no additional events or failures are assumed to occur immediately prior to or during the event. As stated in Section 8.1.4.2 of the STP UFSAR, the Class 1E Electrical System is designed to withstand the effects of design basis natural phenomena, assuming single active failure, without loss of onsite power to those safety-related electrical components required to shut down the plant and maintain it in a safe condition or to mitigate the consequences of postulated accidents.

The two pre-staged 480VAC 1000kW DGs are capable of providing the protection called for in the Order. New cables will be run from a new FLEX distribution panel located near the new FLEX DGs either through existing electrical system pathways (cable trays) or through conduits that meet the requirements associated with initial plant construction standards.

The FLEX equipment being powered from the FLEX diesel that will be used in Phase 2 of the FLEX strategy is contained in Category I structures and protected from external events. Cabling provides power to Class 1E MCCs so that other components can be powered to provide a variety of functions including battery charging, pumping, ventilation, lighting and communications. The new and previously installed cables that will be used for the FLEX strategies will be protected from all external events as described in NEI 12-06 as will the MCCs and the pre-staged pumps.

Diversity for this strategy exists:

- **Each FLEX DG is redundant and sized for 100% capacity – only one is required.**
- **The FLEX distribution panel feeds three completely separate & independent "trains" of ESF electrical equipment. These are separated on three different elevations in the Electrical Auxiliary Building (EAB) and power like components on different trains.**
- **Specific FLEX cables go directly to the new FLEX pumps without utilizing the "trains" of ESF electrical equipment.**
- **Each safety function strategy has both a permanent plant pump and a new FLEX pump with diverse power distribution.**

Flexibility for this strategy exists:

The FLEX cabling being run from the FLEX DGs to power ESF motor control centers for powering battery chargers, pumps, lighting, valves and other equipment can be modified to run to multiple motor control centers (MCC) to power redundant equipment in the event of a fire or disturbance to one particular "train" of ESF electrical power. An example would be the Boric Acid Transfer pump B is powered from the train 'A' MCC and the Boric Acid Transfer pump A is powered from train 'C' MCC. The Reactor Makeup Water pumps are powered similarly. Thus if something disturbed the 10' elevation of the EAB electrical switchgear room where the 'A' train electrical equipment is located, the 'C' train electrical equipment should not be affected because it is on the 60' elevation of the EAB. For this reason, there is capability to adapt to different scenarios.

Section 3.2.1.3(6) of NEI 12-06 states that permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, high winds and associated missiles are available. Section 3.2.1.7 states that the priority for the plant response is to utilize systems or equipment that provides the highest probability for success. The STP strategies that include pre-staged FLEX diesel generators and use permanent plant equipment provide the highest probability of success.

7. Potential Draft Safety Evaluation Impacts

There are no potential impacts to the Draft Safety Evaluation identified at this time.

8. References

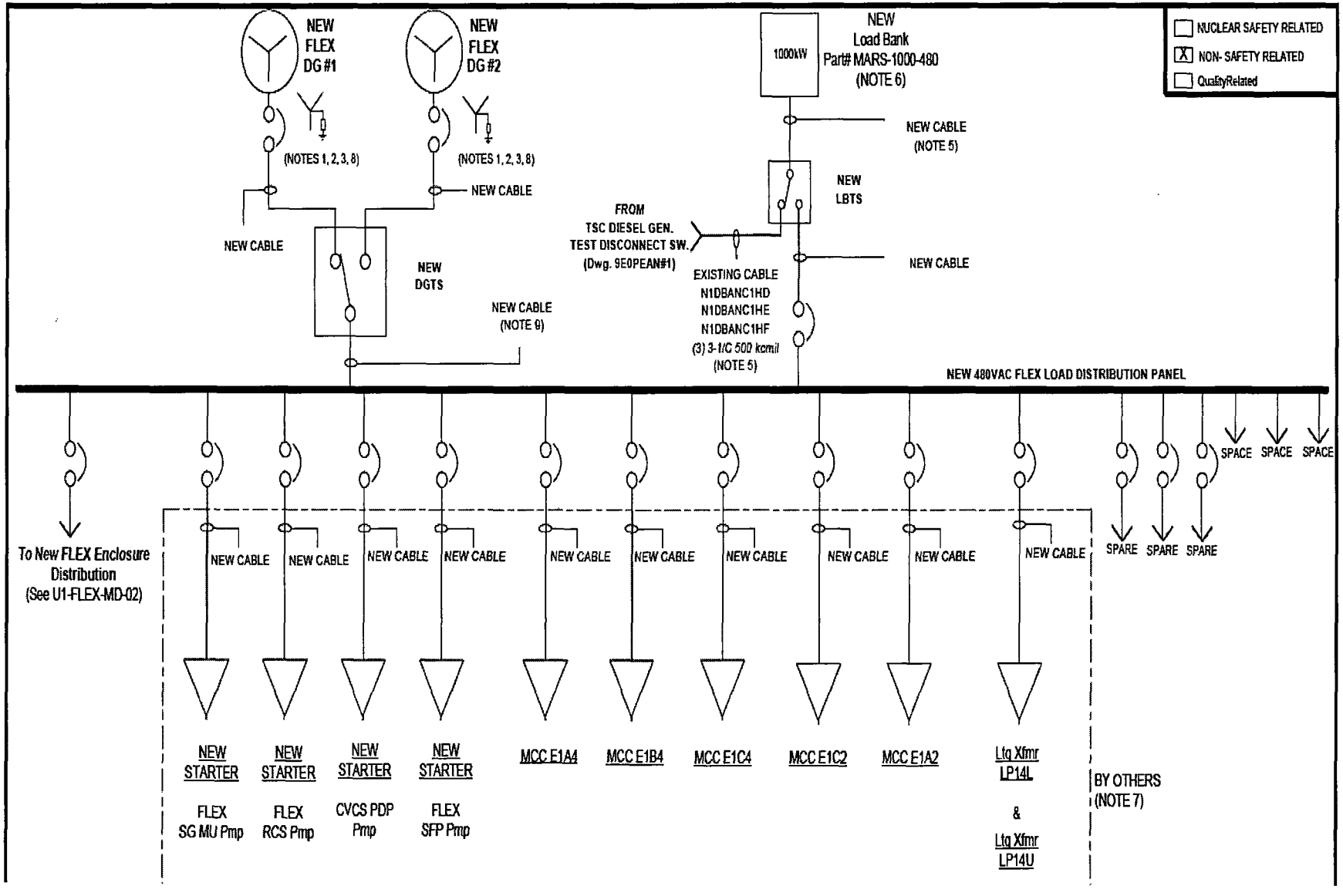
The following references support the updates to the Overall Integrated Plan described in this attachment.

1. STPNOC's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," February 28, 2013 (ML13070A011)
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," March 12, 2012 (ML12073A195)
3. Technical Evaluation Report Related to Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, EA-12-049 for STPNOC, December 19, 2013 (ML13339A736)

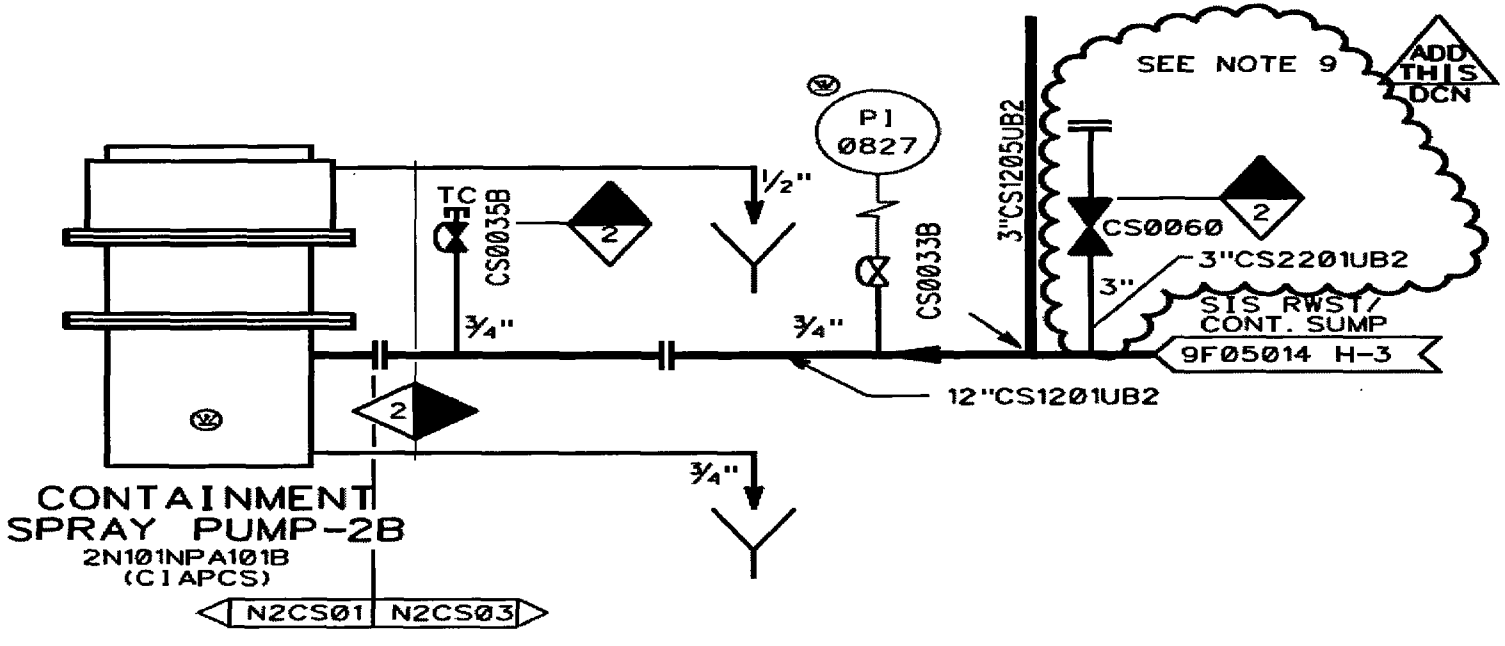
Attachment 2

Conceptual Drawings

Conceptual Drawing - FLEX Electrical Distribution System



Conceptual Drawing – Spent Fuel Pool Makeup



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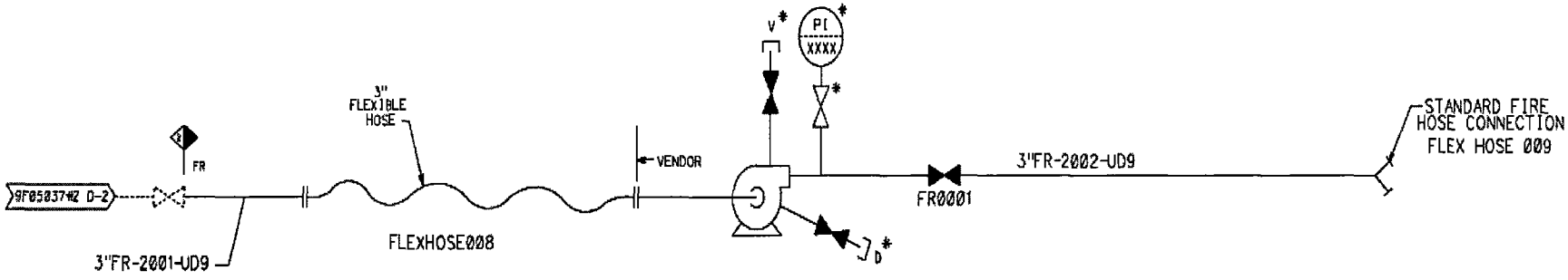
AFTER

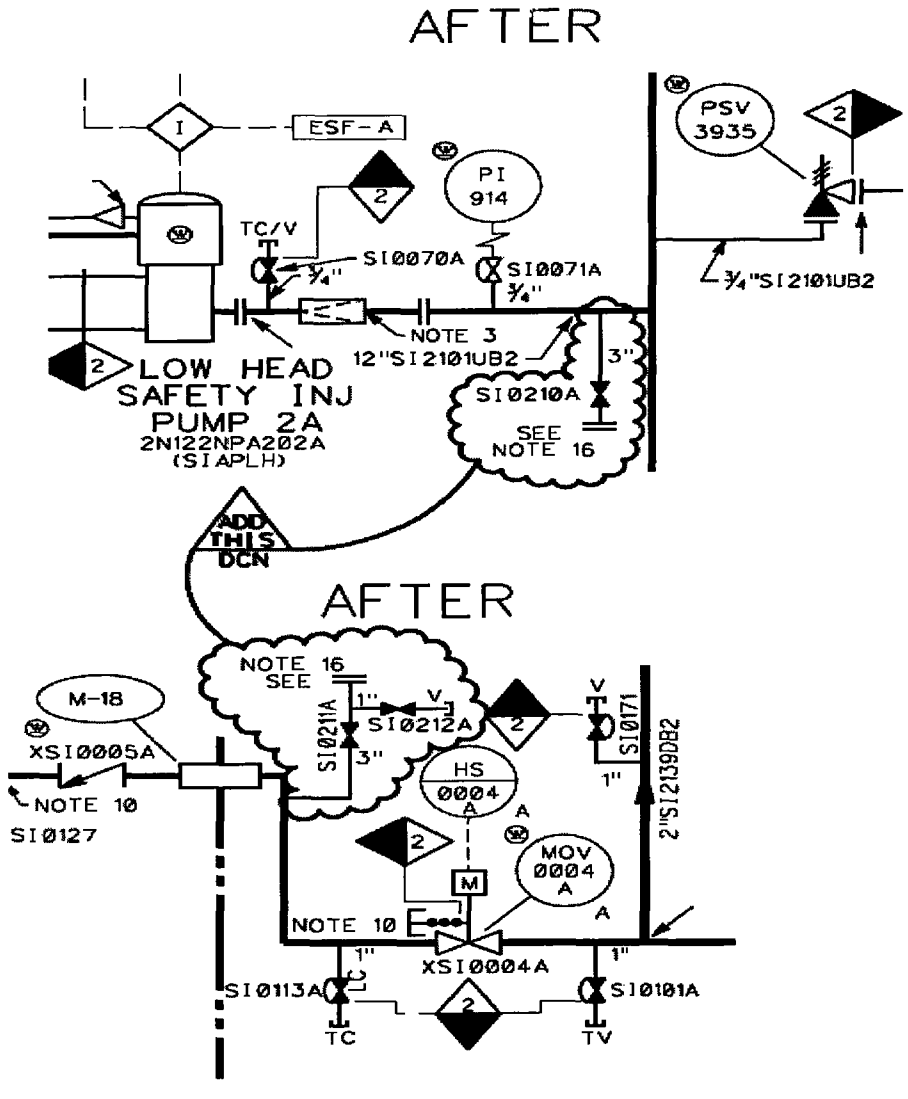
Conceptual Drawing – Spent Fuel Pool Makeup FLEX Pump



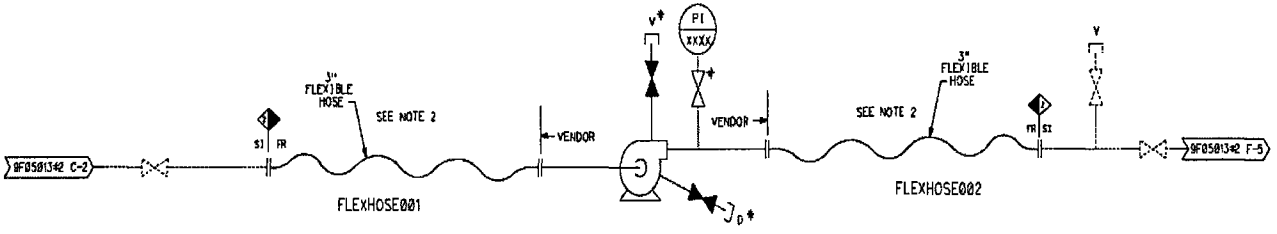
SFP MAKE-UP FLEX PUMP # 25
9Q532NPA0005

Conceptual Drawing – Reactor Coolant System Makeup

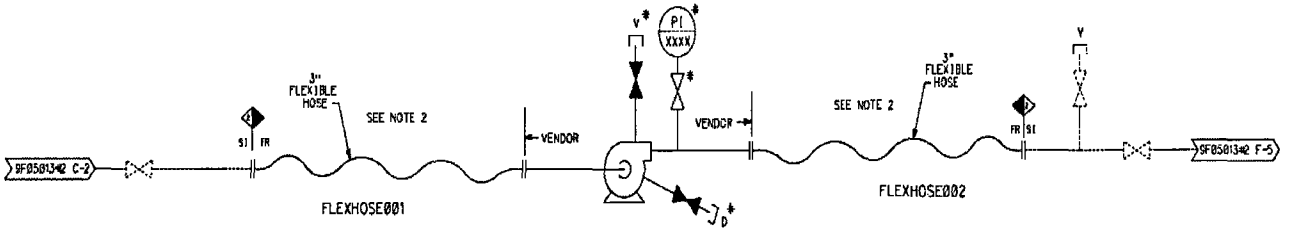
DOC# 5N129F0501 3#2 REV. 33



Conceptual Drawing – Reactor Coolant System Makeup FLEX Pumps



RCS MAKE-UP FLEX PUMP # 24
9Q532NPA0004
MODES 5 & 6

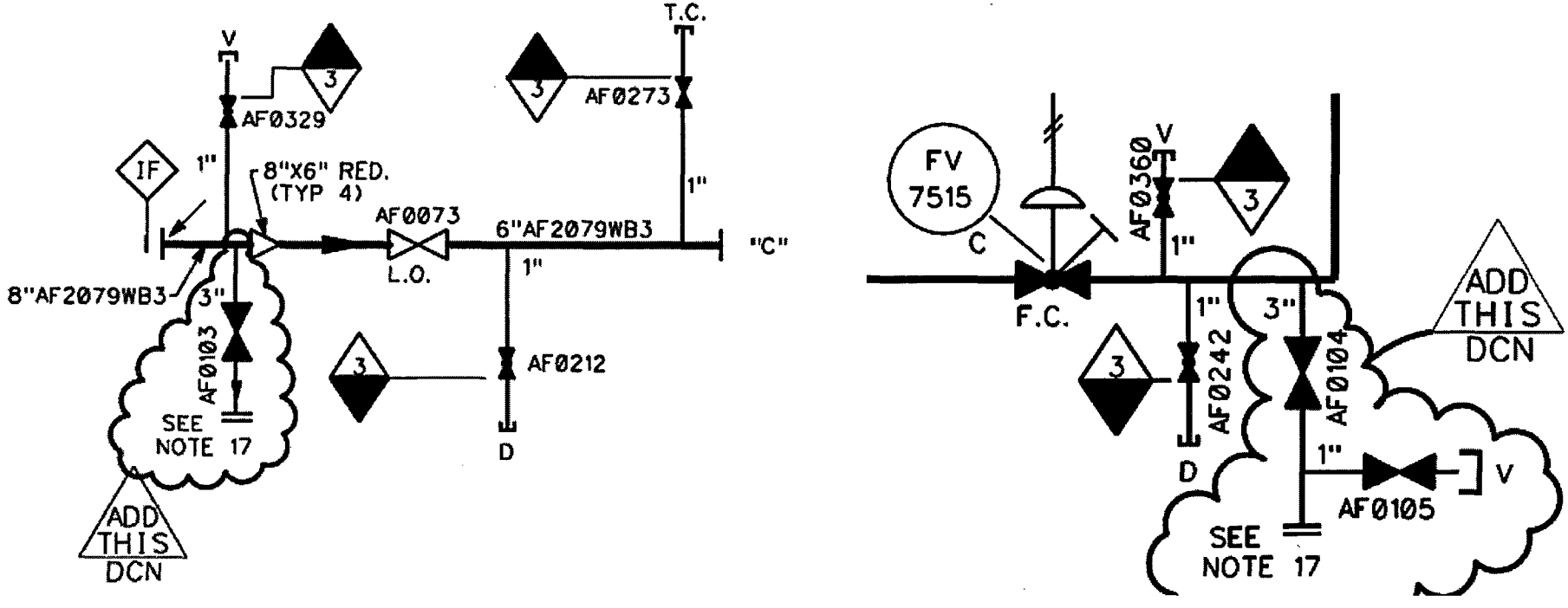


RCS MAKE-UP FLEX PUMP # 23
9Q532NPA0003
MODES 1-4

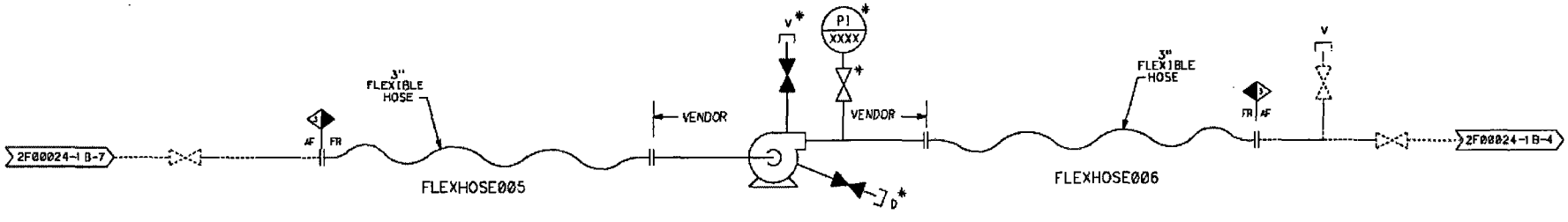
NOTES:

1. THIS PIPING AND INSTRUMENT DIAGRAM DEPICTS THE SYSTEM CONFIGURATION DURING MITIGATION OF A FLEX EVENT.
2. FLEX HOSES ARE SHARED BETWEEN FLEX RCS MAKE-UP PUMPS.

Conceptual Drawing – Steam Generator Makeup (RCS Core Cooling)



Conceptual Drawing – Steam Generator Makeup FLEX Pump (RCS Core Cooling)



RCS CORE COOLING FLEX PUMP # 22
9Q532MPA0002
AFW TRAIN-C

NOTES:

1. THIS PIPING AND INSTRUMENT DIAGRAM DEPICTS THE SYSTEM CONFIGURATION DURING MITIGATION OF A FLEX EVENT.

Attachment 3

Updated Phase 3 Equipment Table

UPDATED PHASE 3 EQUIPMENT TABLE (Per Unit)

Note: Information from previous equipment table is lined-out. Deleted information is no longer part of the Phase 3 strategy.

PWR Portable Equipment Phase 3 – ~~although these are listed as Phase 3 most will need to be pre-deployed in their useful location due to the design basis flood from the main reservoir breach.~~							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrument -ation	Accessibility/ Other		
4160 VAC Generator	**X**	**X**	**X**	**X**	**X**	**2 MW**	**4160 VAC generator could power at least one installed ESF bus from its respective ESF transformer (from RRC).**
~~Hi volume diesel driven pump~~			**~~X~~**			**~~1000 gpm at 175 psig~~**	**~~For SFP spray or fill function if necessary. Also could be used for makeup to AFWST from a variety of sources.~~**
~~120VAC pumps~~	**~~X~~**					**~~TBD~~**	**~~These pumps would be used to fill tanks, move water, etc.~~**
Portable light towers					**X**	**~~6~~ 4 that use diesel fuel**	
~~Remote cellular/satellite system~~					**~~X~~**	**~~2~~**	
~~Smaller capacity~~ Diesel driven pump	**~~X~~**		**~~X~~**			**~~4 pumps, 150~~ 5000 gpm at *150 psi***	***This will be additional equipment with no particular function.***
Diesel Driven Pump						***2500 gpm at 300 psi***	***This will be additional equipment with no particular function.***
~~Air compressors~~	**~~X~~**	**~~X~~**	**~~X~~**			**~~3~~**	

PWR Portable Equipment Phase 3 – ~~although these are listed as Phase 3 most will need to be pre-deployed in their useful location due to the design basis flood from the main reservoir breach.~~							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrument -ation	Accessibility/ Other		
480 VAC Generator	~~X~~		~~X~~	~~X~~		**~ 500 kW**	***This is additional equipment that may or may not be used.***
High Pressure Pump for RCS fill	~~X~~					**~~1500 psia~~ 2000 psi ~~gpm~~ and ~~40~~ 60 gpm ~~(site specific analysis may be required)~~**	***This is additional equipment that may or may not be used.***
~~SG Feed~~ Medium capacity diesel driven pump	~~X~~					**~~400~~ 500 psig and ~~300~~ 500 gpm ~~(site specific analysis required – OI#7)~~**	***This is additional equipment that may or may not be used.***
~~SFP Fill Pump~~			~~X~~			**~~75 psig and 200 gpm~~**	
~~tractor~~	~~X~~						
Fuel oil *transfer tank* ~~tanker truck for 4160V~~	~~X~~				X	***264 gal***	***Support filling various diesel driven equipment***
~~(3) Light strings~~					~~X~~	**~~100' each~~**	
~~(12)Ventilation fans and trunks~~				~~X~~	~~X~~		