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10 CFR 2.202

February 27, 2013

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

SUBJECT: Docket Nos. 50-361 and 50-362
License Nos. NPF-10 and NPF-15
Southern California Edison'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)
San Onofre Nuclear Generating Station, Units 2 and 3

References:

1. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events dated March 12, 2012.

2. 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," Revision 0, dated August 28, 2012

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

4. Southern California Edison's 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), dated October 29, 2012

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Southern California Edison (SCE). Reference 1 was immediately effective and directs SCE 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. 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 12-06, Revision 0 (Reference 3) with clarifications and

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exceptions identified in Reference 2. Reference 3 provides direction regarding the content of this Overall Integrated Plan.

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

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms SCE has received Reference 2 and has an Overall Integrated Plan developed in accordance with the guidance for defining and deploying strategies that will enhance the ability to cope with conditions resulting from beyond-design-basis external events.

The information in the enclosure provides the SCE Overall Integrated Plan for mitigation strategies 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.

The enclosure does not contain Security Related Information and is available for public disclosure.

A version of this letter with Security Related Information was signed and submitted to the NRC on this date.

This letter contains no new regulatory commitments. If there are any questions regarding this plan, please contact Mr. Steven D. Root at 949-368-6480.

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

Executed on 2/27/13

By:

Peter T. Dietrich
Senior Vice President and Chief Nuclear Officer

Enclosure: San Onofre Nuclear Generating Station FLEX Overall Integrated Plan Response to NRC Order EA-12-049

cc: Director, Office of Nuclear Reactor Regulation
E. E. Collins, Regional Administrator, NRC Region IV
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 and 3
B. Benney, NRC Project Manager, San Onofre Units 2 and 3

Enclosure 1
San Onofre Nuclear Generating Station
FLEX Overall Integrated Plan
Response to NRC Order EA-12-049

San Onofre Nuclear Generating Station
FLEX Overall Integrated Plan
Response to NRC Order EA-12-049

Prepared By:	Steven Root, Technical Lead, Project Manager, Nuclear Regulatory Affairs	2/15/2013 Date
Technical Review By:	Thomas Remick, Supervisor, Transients and Setpoints	2/25/13 Date
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Technical Review By:	Ashley Serbus, Mechanical Design Engineer	2/25/13 Date
Technical Review By:	Dale Helvig, Manager, Operations Support	2-25-2013 Date
Technical Review By:	Larry McCann, Manager, Emergency Preparedness	2/25/13 Date
Approved By:	Gary Johnson, Manager, Nuclear Engineering	2/25/13 Date
Approved By:	Mehrdad Hojati, Manager, Design Engineering	2/25/13 Date
Approved By:	John Davis, Manager, Plant Operations	2/25/13 Date

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General Integrated Plan Elements
San Onofre Nuclear Generating Station

Overall Integrated Plan Introduction:
On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued Order EA-12-049 (the "Order"), *Issuance of Order Modifying License with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events* (Reference 77). The Order requires that licensees develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following a beyond-design-basis event that results in loss of normal access to the ultimate heat sink and an Extended Loss of Alternating current Power (ELAP). The Order also requires that an overall integrated plan be provided that describes how the requirements of Attachment 2 of the Order will be achieved.

The Order requires a three phase approach to mitigating Beyond-Design-Basis External Events (BDBEE):

Phase 1 - Use of installed equipment to maintain or restore core cooling, containment, and Spent Fuel Pool (SFP) cooling capabilities

Phase 2 - Transition to onsite portable *Diverse and Flexible Coping Strategies* (FLEX) equipment

Phase 3 - Indefinite sustainment of these functions using offsite resources

Nuclear Energy Institute (NEI) document NEI 12-06 [Rev. 0], *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, provides an approach for complying with the Order. NRC Interim Staff Guidance (ISG), JLD-ISG-2012-01 [Rev. 0], *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, endorses the guidelines provided in NEI 12-06 [Rev. 0] as an acceptable means of meeting the requirements of the Order subject to clarifications as identified in the ISG.

This FLEX Overall Integrated Plan describes the strategy of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 for complying with the requirements of the Order using methods described in NRC JLD-2012-01 [Rev. 0] in conjunction with Nuclear Energy Institute document NEI 12-06 [Rev. 0].

Determine Applicable Extreme External Hazard **Ref: NEI 12-06 section 4.0 -9.0 JLD-ISG-2012-01 section 1.0**	*Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps.* *Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant* ***screened out*** *for certain hazards.*

SONGS has been evaluated in accordance with Nuclear Energy Institute (NEI) 12-06, Revision 0, "Diverse and Flexible Mitigation Coping Strategies (FLEX) Implementation Guide." The following applicable hazards have been identified:

- Seismic
- External Flooding
- High Temperatures

Southern California Edison (SCE) has determined the functional threats from each of these hazards and identified FLEX equipment that may be affected. The FLEX storage locations will provide the protection from these hazards. SCE is also developing procedures and processes to further address plant strategies for responding to these various hazards.

Seismic

Seismic hazards ***screen in*** for all sites per Section 5.2 of Reference 4. Per Reference 1, the seismic criteria for San Onofre Nuclear Generating Station (SONGS) include two design earthquake spectra: Operating Basis Earthquake (OBE) and Design Basis Earthquake (DBE). The OBE and DBE peak ground accelerations are 0.33 g and 0.67 g, respectively.

External Flooding

External flooding hazards ***screen in*** for SONGS per Section 6.2 of Reference 4. The design basis external flooding events that apply to SONGS are local intense precipitation, tropical storm, and tsunami.

From Reference 2, the tropical storm and tsunami flood elevation is +27 ft. mean lower low water (mllw), including 11.4 ft. from wind driven waves. This flood elevation is below plant grade in the Units 2 and 3 Protected Area (PA) (elevation +30 ft. mllw) and above plant grade in the North Industrial Area (elevation +20 ft. mllw). Consequently, the North Industrial Area, formally Unit 1, cannot be used for storage and deployment of FLEX equipment.

Local intense precipitation results in flooding above plant grade, and therefore will need to be considered in storage and deployment of FLEX equipment. The design basis maximum flood levels in the Units 2 and 3 PA are less than +31 ft. mllw (1 ft. above plant grade) (Reference 2).

Severe Storms with High Winds and Tornados

Severe storms with high winds and tornado hazards ***screen out*** for SONGS based on Figure 7-2 of Reference 4.

Snow, Ice and Extreme Cold

Snow, ice, and extreme cold hazards ***screen out*** for SONGS based on Figures 8-1 and 8-2 of Reference 4. The design basis low ambient temperature of 36 °F, as defined in Reference 5, applies.

High Temperatures

High temperature hazards ***screen in*** for all sites per Section 9.2 of Reference 4. The design basis maximum temperature of 85 °F, as defined in Reference 5, applies.

Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:*

Assumptions are consistent with those detailed in Section 3.2.1 of Reference 4 and the Executive Summary of the Pressurized Water Reactor Owners Group (PWROG) Core Cooling Position Paper (Reference 116). Key industry guidance and site-specific assumptions are presented here:

NEI 12-06 Key Assumptions:

Initial Plant Conditions:

The initial plant conditions are assumed to be the following:

(1) Prior to the event, the reactor has been operating at 100 percent rated thermal power for at least 100 days or has just been shut down from such a power history as required by plant procedures in advance of the impending event.

(2) At the time of the postulated event, the reactor and supporting systems are within normal operating ranges for pressure, temperature, and water level for the appropriate plant condition. All plant equipment is either normally operating or available from the standby state as described in the plant design and licensing basis.

Initial Conditions:

The following initial conditions are to be applied:

(1) No specific initiating event is used. The initial condition is assumed to be a loss of offsite power (LOOP) at a plant site resulting from an external event that affects the offsite power system either throughout the grid or at the plant with no prospect for recovery of offsite power for an extended period. The LOOP is assumed to affect all units at a plant site.

(2) All installed sources of emergency onsite alternating current (AC) power and station blackout (SBO) alternate ac power sources are assumed to be not available and not imminently recoverable.

(3) Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles are available.

(4) Normal access to the ultimate heat sink (UHS) is lost, but the water inventory in the UHS remains available and robust piping connecting the UHS to plant systems remains intact. The motive force for UHS flow, i.e., pumps, is assumed to be lost with no prospect for recovery.

(5) Fuel for FLEX equipment stored in structures with designs that are robust with respect to seismic events, floods and high winds and associated missiles, remains available.

(6) Permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles, are available. *[See site-specific assumptions below.]*

(7) Other equipment, such as portable AC power sources, portable back up direct current (DC) power supplies, spare batteries, and equipment for 10 CFR 50.54(hh)(2), may be used provided it is reasonably protected from the applicable external hazards per NEI 12-06, Sections 5 through 9 and Section 11.3 and has predetermined hookup strategies with appropriate procedures/guidance and the equipment is stored in a relative close vicinity of the site.

(8) Installed electrical distribution system, including inverters and battery chargers, remain available provided they are protected consistent with current station design.

(9) No additional events or failures are assumed to occur immediately prior to or during the event, including security events.

(10) Reliance on the fire protection system ring header as a water source is acceptable only if the header meets the criteria to be considered robust with respect to seismic events, floods, and high winds, and associated missiles.

Reactor Transient:

The following additional boundary conditions are applied for the reactor transient:

(1) Following the loss of all AC power, the reactor automatically trips and all rods are inserted.

(2) The main steam system valves (such as main steam isolation valves, turbine stops, atmospheric dumps, etc.), necessary to maintain decay heat removal functions operate as designed.

(3) Safety/relief valves or pressure-operated relief valves initially operate in a normal manner if conditions in the reactor coolant system (RCS) so require. Normal valve reseating is also assumed.

(4) No independent failures, other than those causing the ELAP/loss of UHS event, are assumed to occur in the course of the transient.

Reactor Coolant Inventory Loss:

Sources of expected Pressurized Water Reactor (PWR) coolant inventory loss include:

(1) Normal system leakage

(2) Losses from letdown unless automatically isolated or until isolation is procedurally directed

(3) Losses due to Reactor Coolant Pump (RCP) seal leakage (rate is dependent on the RCP seal design)

SFP Conditions:

The initial SFP conditions are:

(1) All boundaries of the SFP are intact, including the liner, gates, transfer canals, etc.

(2) Although sloshing may occur during a seismic event, the initial loss of SFP inventory does not preclude access to the refueling deck around the SFP.

(3) SFP cooling system is intact, including attached piping.

(4) SFP heat load assumes the maximum design basis heat load for the site.

Containment Isolation Valves:

It is assumed that the containment isolation actions delineated in current SBO coping capabilities are sufficient.

PWROG PSC - ELAP CORE TEAM Core Cooling Management Interim Position Paper Assumptions:

The key assumptions associated with secondary cooling:

(1) The installed (design) AC independent auxiliary feedwater (AFW)/emergency feedwater (EFW) system will function for the mission time required to stage the portable pump following initiation of ELAP event. *[See site-specific assumptions below.]*

(2) The portable steam generator (SG) feed system is capable of maintaining SG level at the RCS pressure required to prevent nitrogen injection from the nuclear steam supply system (NSSS) applicable passive injection system - cold leg accumulators, safety injection tanks, or core flood tanks – generic capability of 300 gpm at 300 psig at SG injection point. *[See site-specific assumptions below.]*

(3) The portable SG feed system is capable of maintaining SG level at the RCS temperature required to maintain the reactor subcritical prior to RCS boration.

(4) The steam relief capability will support the RCS cooldown rate as defined in the NSSS generic ELAP analysis.

(5) The steam relief capability will maintain the final RCS temperature defined in the NSSS generic ELAP analysis.

The following assumptions are specific to the SONGS site:

(1) SONGS will be able to declare an extended loss of AC power event within 2 hours in order to enable actions that place the plant outside of its current design and licensing basis.

(2) The Turbine-Driven AFW (TDAFW) pump is assumed to function until the Reactor Coolant System (RCS) has been cooled sufficiently for steam generator (SG) level to be maintained by the portable SG feed system (approximately 350 °F T-cold).

(3) Permanent plant equipment that is evaluated probabilistically for wind-driven missiles in accordance with the current design and license basis is assumed to remain available. This equipment includes Condensate Storage Tank T120, Refueling Water Storage Tanks T005 and T006, and portions of the connected piping. (Reference 3)

(4) The site-specific capability of the portable SG feed system for SONGS is based on removing decay heat at 1 hour (327 gpm per Reference 37) at the SG pressure corresponding to Shutdown Cooling (SDC) entry conditions of 350 °F T-cold and 376 psia (Reference 12). SONGS cooldown is not limited by reactivity (Reference 9) and the RCS pressure remains above the minimum to prevent accumulator nitrogen injection during the cooldown (Reference 9).

(5) There are two design maximum SFP heat loads considered:

A. The maximum SFP heat load with the core still in the reactor vessel. This heat load is used to determine the timelines for SFP cooling actions that would occur concurrent with the core cooling actions in Attachment 1A, as well as the combined makeup rates and water usage.

B. The maximum SFP heat load including full core offload. This heat load is used to determine timelines for SFP cooling actions and the SFP makeup rates that would occur if there are no concurrent actions for core cooling.

(6) Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, seismic and flooding issues identified that could potentially affect FLEX strategies will be entered into the corrective action program.

(7) Consistent with NEI 12-01, the event impedes site access as follows:

A. Post event time: 6 hours – No site access. This duration reflects the time necessary to clear roadway obstructions, use different travel routes, mobilize alternate transportation capabilities (e.g., private resource providers or public sector support), etc.

B. Post event time: 6 to 24 hours – Limited site access. Individuals may access the site by walking, personal vehicle or via alternate transportation capabilities (e.g., private resource providers or public sector support).

C. Post event time: 24+ hours – Improved site access. Site access is restored to a near-normal status and/or augmented transportation resources are available to deliver equipment, supplies and large numbers of personnel.

(8) This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink resulting from a beyond-design-basis event by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications and/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). (Reference 100)

Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01 NEI 12-06 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.*

SCE plans to fully comply with JLD-ISG-2012-01 and NEI 12-06 in implementing FLEX strategies for the SONGS site.

Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7 JLD-ISG-2012-01 section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walkthrough of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A* See attached sequence of events timeline (Attachment 1A). Technical Basis Support information, see attached Nuclear Steam Supply System (NSSS) Significant Reference Analysis Deviation Table (Attachment 1B)

General:

1. A site specific NSSS evaluation was not performed for the ELAP event. Timelines are based on: WCAP-17601-P; existing Updated Final Safety Analysis Report (UFSAR) analyses for Station Blackout, post-Earthquake safe shutdown; and supporting electrical and hydraulic calculations.
2. Containment integrity was evaluated by use of computer code COPATTA (Bechtel software).
3. A best estimate decay heat curve was developed from UFSAR Figures 6.2-33 and 6.2-33A, which are based on NRC Branch Technical Position ASB 9-2.
4. Environmental conditions within station compartments were evaluated using methods and tools in NUMARC 87-00, and PCFLUD (Bechtel software).
5. 10 CFR 50.63 and Regulatory Guide 1.55: San Onofre is a 4 hour coping plant (Reference 10).
6. Timelines for existing actions are based on existing plant procedures and calculations as noted.
7. Timelines for new actions will be validated as part of the Phase 2 staffing assessment to be performed per Reference 121. [OPEN ITEM OI-1]

Discussion of Time Constraints identified in Attachment 1A:

Table item 13 – Entry into ELAP: Time period is consistent with WCAP-17601-P evaluation for Combustion Engineering NSSS plants (Reference 105) which assumes plant cooldown is initiated at 2 hours.

Table item 14 – Start cooldown: Time period and cooldown rate are consistent with WCAP-17601-P (Reference 105).

Table item 16 – Complete additional Class 1E battery load reduction: Time period is based on existing battery calculations (Reference 110) and consistent with existing Emergency Operating Instructions (EOIs) (Reference 103). The alternative action will be added to the SONGS FLEX Guidelines or the EOIs to re-energize one train of the Class 1E 480 VAC distribution system from a FLEX Diesel Generator (DG) to repower swing battery chargers.

Table item 18 – Re-establish Class 1E switchgear and distribution room cooling: Time period is based on a new electrical area heat up calculation (Reference 114).

Table item 25 – Establish Spent Fuel Pool vent path: Time period is based on new Spent Fuel Pool (SFP) heat up and boiloff calculations for the maximum SFP heat load with the core still in the reactor (References 75 and 78).

Table item 26 – Initiate SFP makeup: Time period is based on new SFP heat up and boiloff calculations for the maximum SFP heat load with the core still in the reactor (References 75 and 78).

Table item 27 – Initiate makeup to Condensate Storage Tanks from Primary Plant Makeup Tanks (PPMUT): Time period is based on new calculations for Steam Generator (SG) makeup and SFP boiloff. Procedure actions will be taken in response to tank level indication rather than time (Reference 43).

Table item 29 – Refuel onboard tanks of FLEX pumps and DGs: Time period is based on fuel capacity requirement SCE expects to include in the procurement specifications for the FLEX diesel driven pumps and DGs. Procedure actions will be taken in response to tank level indication rather than time.

Table item 30 – Clear pathway or landing zone for Regional Response Center (RRC) equipment: Availability of debris removal equipment is based on contract with Strategic Alliance for FLEX Emergency Response (SAFER) for delivery of RRC equipment starting at request plus 24 hours, and Memorandum of Understanding with Marine Corps Base Camp Pendleton for mutual aid equipment.

Table item 31– Initiate makeup to Condensate Storage Tanks from seawater pumps and purification units: Time period is based on new calculations for Steam Generator (SG) makeup and SFP boiloff. Procedure actions will be taken in response to tank level indication rather than time (Reference 43).

Table item 34 – Makeup to Diesel Fuel Storage Tanks from fuel bladders: Time period is based on new calculations for fuel consumption of FLEX diesel driven pumps and DGs. Fuel consumption of additional equipment delivered from the RRC (such as water purification systems) is not included.

Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes.*

Hazards Constraints on Storage and Deployment

As discussed under extreme hazards above, the external hazards applicable to FLEX at SONGS are seismic, external flooding (due to tsunami, tropical storm, and local intense precipitation), and high temperature. The moderate high temperature applicable to the site

(85 °F) will be addressed by venting the equipment storage locations, and has no impact on deployment. The impacts of the seismic and flooding events are summarized in Attachments 3-2 and 3-3 and described below.

The bluffs and non-seismic Category I site structures, located north and south of the plant protected area (PA) and switchyard, are assumed to fail (worst case) in a design basis seismic event, and the North Industrial Area (formerly Unit 1) is expected to flood from the tsunami and tropical storm (Reference 2). Consequently, the FLEX equipment will be stored within the Units 2 and 3 PA.

Within the Units 2 and 3 PA, the buildings and water tanks that are not Seismic Category I, located on the north, south, and west sides of the plant, are also assumed to fail in a design basis seismic event. Because these buildings are normally occupied, the building debris cannot be removed for FLEX deployment until survivors are located and rescued. Consequently, the FLEX equipment and connections, other than equipment and connections for pumping seawater, will be located on the east side of the plant. Flooding from rupture of the tanks that are not Seismic Category I, on the north, south and west sides will not affect the FLEX equipment storage and deployment locations on the east side of the plant due to the distance from the tanks and slope of plant grade to the west.

On the west side of the plant, there are no Seismic Category II and III structures in the circulating water intake structure area that could result in debris between the circulating water intake gate area and fish return area. The flood level due to local intense precipitation or rupture of nearby tanks is less than elevation +31 ft. mllw (Reference 13). Consequently, the submersible seawater pumps and mobile crane for their deployment will be stored above grade in the circulating water gate area and deployed on the bridge over the circulating water intake screen well and fish return area.

The Seismic Category II fire main routed around the perimeter of the Units 2 and 3 and/or its various branch lines are also assumed to rupture in a DBE, creating sink holes (Reference 14). Consequently, the FLEX equipment will be stored and deployed on the west side of the east road in the PA, away from the fire main and its major branch lines, such that the equipment will not have to be moved across potential sink holes to be deployed (Reference 14). This will require storing the FLEX pumps and DGs at or near their respective initial deployment locations. Because the FLEX pumps and DGs will be stored in a fully fueled condition to support timely deployment with minimal onsite staff, they cannot be located within existing safety related structures (e.g., Fuel Handling Building (FHB) truck bays).

To minimize plant operational impacts in the above areas, the N+1 requirement for FLEX equipment will be met by two equipment sets, each capable of supplying Units 2 and 3 concurrently (i.e., 2*N), except for the submersible seawater pumps. Due to electrical loading limitations, the N+1 requirement for the submersible seawater pumps and strainers will be met by three equipment sets, each set capable of supplying one unit. For the mobile cranes used to deploy the submersible seawater pumps in Phase 3, the N requirement for FLEX support equipment will be met by a mobile crane that is seismically stored or in normal use in the circulating water intake and gate area, and a second mobile crane from elsewhere on site or offsite after debris removal equipment from Marine Corps Base Camp Pendleton (via mutual aid agreement, Reference 68) or the RRC arrives to clear a pathway to the intake area.

Selected Storage, Deployment and Connection Locations

The resulting FLEX storage locations are shown on Attachment 3-3. The FLEX diesel driven pumps, FLEX diesel generators and FLEX submersible pumps will be seismically secured on grade level storage pads and provided with weather covers. Other FLEX equipment will be stored in vented cargo containers.

The FLEX piping and electrical connection locations for Steam Generator (SG) makeup, RCS makeup, Spent Fuel Pool (SFP) makeup, and containment spray will also be located on the east side of the plant with the piping connections in the seismic structures roughly flanking the containment equipment hatch (Tank Building and FHB) and the electrical connections located inside the grade level roll-up door in the truck bay area of the seismic Auxiliary Building Radwaste area as shown on Attachment 3-9. Forced entry tools will be included in each FLEX equipment set to permit opening the roll-up door in the event it is damaged by the earthquake.

To ensure that the strategies can be deployed in all modes, areas adjacent to the equipment storage and deployment locations (including areas previously used for outage laydown) on both units will be marked and maintained as exclusion areas, and sufficient margins will be included in the final hydraulic calculations to allow for hose routing, around equipment and cargo containers staged in the PA during maintenance activities, to both the primary and alternate connection points for each strategy.

A simplified depiction of the FLEX Phase 2 and 3 Strategy for SONGS is shown on Attachment 3-1.

Provide a milestone schedule. This schedule should include:
• **Modifications timeline**
  o **Phase 1 Modifications**
  o **Phase 2 Modifications**
  o **Phase 3 Modifications**
• **Procedure guidance development complete**
  o **Strategies**
  o **Maintenance**
• **Storage plan (reasonable protection)**
• **Staffing analysis completion**
• **FLEX equipment acquisition timeline**
• **Training completion for the strategies**
	The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.
	
	See attached milestone schedule Attachment 2.

• **Regional Response Centers operational** **Ref: NEI 12-06 section 13.1**	
Identify how the programmatic controls will be met. **Ref: NEI 12-06 section 11** **JLD-ISG-2012-01 section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section.* *See section 6.0 of JLD-ISG-2012-01.*

Southern California Edison (SCE) will implement an administrative program. A program owner will be assigned with responsibility to ensure configuration control, equipment quality (suitability for the intended service) and availability, maintenance and testing. It is anticipated that some equipment will be controlled under the existing Fire Protection program. The equipment for ELAP will have unique identification numbers and will be dedicated except as follows:

- Some equipment credited for ELAP will also be credited for 10 CFR 50.54(hh)(2).
- The mobile cranes used for submersible seawater pump deployment in the circulating water intake area in Phase 3 will be the crane in use for normal operational activities in this area and any additional mobile crane from on site or offsite (via mutual aid agreement or Regional Response Center) available to meet the N requirement for support equipment for this strategy.

Equipment associated with these strategies will be procured as commercial grade with design, storage, maintenance, and configuration control in accordance with Section 11.0 of Reference 4.

The unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy will be managed using plant equipment control guidelines developed in accordance with Section 11.5 of Reference 4.

Programs and controls will be established to ensure personnel proficiency in the mitigation of beyond design basis (BDB) external events (BDBEE). These will be developed and maintained in accordance with Section 11.6 of Reference 4.

Installed SSCs pursuant to 10CFR50.63(a) will continue to meet the augmented quality guidelines of Regulatory Guide 1.155, "Station Blackout."

Standard industry preventive maintenance (PMs) will be established for all components and testing procedures will be developed and frequencies established based on type of equipment and considerations made within Electric Power Research Institute (EPRI) guidelines.

Seismic exclusion zones will be established around the FLEX equipment storage and deployment locations consistent with the existing seismic control program (Reference 8).

The FLEX strategies' bases will be documented and maintained in controlled plant documents. Existing plant configuration control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with Section 11.8 of Reference 4.

Describe training plan	*List training plans for affected organizations or describe the plan for training development.*

Training of Operations, Maintenance, Emergency personnel and general staff will be developed and implemented prior to final turnover of the first unit design implementation. These programs and controls will be implemented in accordance with the Systematic Approach to Training.

Describe Regional Response Center plan	

The industry will establish two (2) Regional Response Centers (RRCs) to support utilities during beyond-design-basis external events. The Strategic Alliance for FLEX Emergency Response (SAFER) has been selected by the industry to provide the RRCs, and SCE has contracted with SAFER for this service (Reference 120).

Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local Assembly Area, established by the SAFER team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.

Notes:
OPEN ITEM OI-1: Validate timelines for new actions in Attachment 1A as part of Phase 2 staffing assessment to be performed per Reference 121.

Maintain Core Cooling & Heat Removal

Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

- **AFW/EFW**
- **Depressurize SG for Makeup with Portable Injection Source**
- **Sustained Source of Water**

Ref: JLD-ISG-2012-01 Section 2 and 3

PWR Installed Equipment Phase 1

Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain core cooling. Identify methods (AFW/EFW) and strategy(ies) utilized to achieve this coping time.

At the initiation of the beyond-design-basis external event, operators will enter the Emergency Operating Instruction (EOI) for Standard Post Trip Actions (Reference 101), which include verification of reactor shutdown and AFW flow to the steam generators (SGs), and the EOI for Station Blackout (SBO) (Reference 18). The operators will manually initiate an Emergency Feedwater Actuation Signal (EFAS) to actuate the TDAFW pump train if it does not start automatically (Reference 122). Abnormal Operating Instructions (AOIs) for Earthquake (Reference 33), Severe Weather (Reference 19), and/or for Loss of Component Cooling Water (CCW) / Loss of Saltwater Cooling (SWC) (Reference 20) will also be entered as applicable. Initial actions performed under the EOIs and the applicable AOIs include letdown and RCS sample line isolation, battery load reduction, opening of cabinet and room doors, and isolation of Seismic Category II branch piping from the Condensate Storage Tanks (CSTs) and Refueling Water Storage Tanks (RWSTs). An ELAP event will be diagnosed when SBO conditions are present on either unit and are expected to last more than 4 hours. Actions for ELAP will be controlled from the EOIs and performed under the Flex Support Guidelines (FSGs). Command and control of the site will be maintained within the EOIs. The actions for ELAP will include initiating RCS cooldown and depressurization at 75 °F/hr to Shutdown Cooling (SDC) entry conditions (350 °F and 376 psia per Reference 12), additional Class 1E battery load reduction (beyond current licensing bases), and deployment of portable FLEX equipment. Steam generator pressure will be 135 psia (Reference 24) following cooldown to SDC entry conditions.

Core cooling will be maintained by natural circulation. RCS heat removal will be provided by the 100 percent TDAFW pump train (Reference 24) from the CSTs, steaming through the Main Steam Safety Valves (MSSVs) and the Atmospheric Dump Valves (ADVs). The AFW system, CSTs, MSSVs, and ADVs are protected against the design basis external hazards applicable to the site (Reference 26). In Phase 1, control of these systems from the Main Control Room (MCR) is maintained by the Class 1E batteries, distribution system, and inverters as described in the Safety Functions Support section below. The backup nitrogen supply for the ADVs has an 8 hour capacity to support valve operation for safe shutdown to SDC entry conditions (Reference 11). This capacity is 2 hours longer than required to complete the RCS cooldown (Reference 12). In

[1] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain Core Cooling & Heat Removal

addition, the AFW, CST and ADV systems can be operated without electrical power, backup nitrogen, or ventilation per existing procedures (Reference 27). Capacities of the CSTs (which may also be used for Phase 2 SFP makeup) are discussed in the Safety Functions Support section below.

In Modes 5 and 6 with steam generators unavailable, the AOI for Loss of SDC (Reference 28) will also be entered. Operators will establish makeup to the RCS from the RWSTs by manually aligning a gravity flow path through the High Pressure Safety Injection (HPSI) System. The HPSI System and RWSTs are protected against the design basis external hazards applicable to the site (Reference 29). Capacity of the RWSTs (which may also be used for Phase 2 SFP makeup) is discussed in the Safety Functions Support section below.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.*

Existing Emergency Operating Instructions (EOIs) and Abnormal Operating Instructions (AOIs) currently address implementation of this strategy in Modes 1-4 and Modes 5-6 (References 18, 19, and 20). Procedure revisions will be developed to incorporate additional actions for ELAP, including use of FLEX Support Guidelines (FSGs) that will be developed.

Identify modifications	*List modifications and describe how they support coping time.*

No modifications are required for this Phase 1 strategy.

Key Reactor Parameters	*List instrumentation credited for this coping evaluation phase.*

Consistent with the Reference 30 (Pressurized Water Reactor - Owner's Group (PWROG) FLEX Support Guidelines, Supplement 14 ELAP Instrumentation) recommendations:

RCS essential instrumentation:

- Core Exit Thermocouples (via Qualified Safety Parameter Display System)
- Reactor Vessel water level (head and plenum)
- SG levels (wide range)
- SG pressures
- AFW flow rate
- T-hot and T-cold
- Subcooling / Saturation Margin
- RCS pressure (wide range)
- Pressurizer level
- Excore neutron flux
- CST (T121) level
- Safety Injection Tanks (SITs) wide range level (non-1E, read via portable instruments at

Maintain Core Cooling & Heat Removal

instrument rack terminations in MCR; see RCS Inventory Control Phase 2 for discussion of these portable instruments)

- Class 1E Battery voltages
- Class 1E Battery amperes

Containment essential instrumentation:

- Containment pressure

Notes:

Maintain Core Cooling & Heat Removal

PWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain core cooling. Identify methods and strategy(ies) utilized to achieve this coping time.

The transition into Phase 2 core cooling and heat removal will be required once the operating conditions of the TDAFWP cannot be maintained. As the event proceeds, the decay heat and consequently the steam output from the SGs, will decrease. Eventually, the steam output will not be sufficient to run the TDAFWP. Prior to this point, the transition to the Phase 2 strategy will occur.

In Phase 2, core cooling will continue to be maintained by natural circulation. Monitoring of Safety Injection Tank (SIT) levels, and isolation or venting of the SITs to prevent nitrogen injection to the RCS that could interfere with natural circulation, is addressed in Phase 2 of RCS Inventory Control below.

Phase 2 RCS heat removal will be achieved with a portable FLEX diesel-driven pump. A set of two portable 1000 gpm diesel-driven FLEX pumps will be provided for each unit (total of four pumps). Each pump will be capable of supplying condensate from one unit's CSTs simultaneously to both unit's two SGs and to both unit's SFPs, or supplying borated water from one unit's RWSTs simultaneously to both unit's RCS and to both unit's SFPs, or transferring an equivalent flow rate of water between units. Fire hoses will be used to connect the portable pumps to the permanent plant piping. The pumps will be demonstrated to be seismically robust, and will be seismically stored at their respective FLEX deployment location.

Primary and alternate discharge connections will be provided.

<u>SGs available</u>

For heat removal with the SGs available, the *primary* connection will be to the AFW piping (Reference 34), and the *alternate* connection will be to the Main Feedwater (MFW) piping (Reference 35) as shown conceptually in Attachment 3-4.

The use of either the *primary* (AFW) or *alternate* (MFW) injection points will permit flexible feeding capability to each unit's two SGs simultaneously, as required by the PWROG thermal-hydraulic evaluation (Reference 36), and allow control from a single location to facilitate implementation of the strategy. This strategy supports a combined flow rate of at least 327 gpm to each unit (approximately 163 gpm per SG), which is sufficient to remove decay heat at approximately 1 hour post reactor trip (Reference 37).

A suction connection from each of the CSTs will be provided to enable flexible makeup capability from each of these tanks for heat removal with the SGs available using a portable pump (Reference 39). Capacity of the CSTs is discussed in the Safety Functions Support section below. The base of each tank is approximately 1.5 ft. below grade level, which is within the suction lift capabilities of the portable pumps for Phase 2 heat removal (Reference 41).

Maintain Core Cooling & Heat Removal

Additional demineralized water for makeup to the CSTs and use of the RWSTs for continued heat removal is discussed in the Safety Functions Support section below.

Mode 5 and 6 with SGs not available

For heat removal with the SGs unavailable and the RCS open, the *primary* connection will be to HPSI Train B, and the *alternate* connection will be to HPSI Train A as shown conceptually in Attachment 3-5. Use of either the *primary* or *alternate* injection points supports a combined flow rate of at least 150 gpm to the RCS cold legs, which is sufficient to remove decay heat at approximately 48 hours post reactor trip and provide at least 50 gpm boron flushing flow to the reactor core to prevent boron precipitation. (Hot leg injection using unborated water is also possible through the Train A and Train B HPSI Systems; however, this method is not supported by the Loss of Coolant Accident (LOCA) Long Term Cooling Analysis.) (Reference 38).

Safety Functions Support

Other equipment including fuel pumps, carts, and FLEX DGs used in support of reactor core cooling, SFP cooling, and containment functions are described under the Safety Functions Support section below.

Maintain Core Cooling & Heat Removal	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.*

Procedures and guidance to support deployment and implementation, including interfaces to EOIs, AOIs, and system operating procedures, will be developed in accordance with Section 11.4 of Reference 4.

Identify modifications	*List modifications necessary for phase 2*

Implementation of the modifications described below will be per the Milestone Schedule (Attachment 2).

RCS heat removal (SGs available)

The connections for this strategy are shown conceptually in Attachment 3-4.

Injection path:

For the *primary* injection flow path to the steam generators, valved pipe stubs for fire hose connections will be installed in each unit on [...].

This modification will provide the capability to feed both SGs simultaneously without requiring entry into the AFW pump room, thereby addressing both FLEX (using a portable diesel-driven pump per Reference 47) and National Fire Protection Association (NFPA) 805 requirements. The NFPA 805 pump is expected to be a permanent diesel driven high pressure pump; however, any commitments relating to its specifications or its schedule for installation will be addressed separate from FLEX.

The *alternate* injection flow path to the steam generators is via the existing connection, to the [...]. No modifications are required for this flow path [...].

Suction and transfer paths:

A valved pipe stub for a fire hose connection will be installed in [...]. An additional valved pipe stub for a fire hose connection will be installed on [...]. In Unit 3 only, this connection will also serve as an alternate suction source for the Unit 3 portable diesel-driven FLEX pumps. (In Unit 2, the tank connection point is located too far from the pump deployment location.)

These connections will also be used for CST makeup from additional water sources as described under Safety Functions Support below.

Other changes:

Permanent pads will be installed for the equipment, as required, with seismic tie-downs. Barriers

Maintain Core Cooling & Heat Removal
will be added, as needed, to protect the equipment from the adjacent transformers and dead end structures. The Vital Area and security delay fences at the Tank Building of each unit will be modified to provide additional openings for suction and discharge hoses. RCS heat removal (SGs not available) The connections for this strategy are shown conceptually in Attachment 3-5. Injection path: Valved pipe stubs for fire hose connections will be installed in each unit on [...] as the *primary* injection point for borated water for RCS heat removal, and on [...] as the *alternate* injection point [...]. Suction path: No modifications are required. The existing hose connection on [...].

Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same instrumentation as Phase 1, except for additional instrumentation needed to operate portable equipment, including pump flow, discharge pressure, and fuel tank level.	

Maintain Core Cooling & Heat Removal	
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect*
The new permanent plant equipment will be designed to withstand the DBE, as defined in Reference 55. The FLEX pumps will be demonstrated to be seismically robust, and will be seismically secured at their respective FLEX deployment locations east of the plant vital area. FLEX fire hoses and fittings will be stored in a cargo container demonstrated to remain upright and intact in the event of a DBE in an area that is clear of interactions from Seismic Category II and III structures (including potential sink holes from fire water system rupture), and near to their deployment locations (Reference 14). Permanent pads will be installed for the equipment, as required, with seismic tie-downs. Barriers will be added, as needed, to protect the equipment from the adjacent transformers and dead end structures. Seismic exclusion zones will be established around the FLEX equipment storage and deployment locations consistent with the existing seismic control program (Reference 8).	
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect*
The new permanent plant equipment will be protected against the effects of local intense precipitation, tropical storm and tsunami. The portable FLEX equipment will be protected against the effects of local intense precipitation, tropical storm, and tsunami at both the storage and deployment locations. From Reference 2, the tropical storm and tsunami flood elevation is +27 ft. mllw. This flood elevation is below plant grade in the Units 2 and 3 PA (elevation +30 ft. mllw). Local intense precipitation results in flooding above plant grade. Therefore, the portable FLEX equipment will be stored above the current design basis flood elevation of +31 ft. mllw (1 ft. above plant grade) (Reference 2), by mounting on a trailer or skid, or storing in a cargo container with a floor above this elevation. FLEX equipment in the PPMUT vaults will be permanently installed below grade, but protected from external flooding to the design basis flood level by the walls of the Auxiliary Building Radwaste area (Reference 58).	
Severe Storms with High Winds	*List Protection or schedule to protect*
Severe storms with high winds and tornado hazards are ***screened out*** based on Figure 7-2 of Reference 4.	

Maintain Core Cooling & Heat Removal	
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect*
Snow, ice, and extreme cold hazards are ***screened out*** based on Figures 8-1 and 8-2 of Reference 4.	
High Temperatures	*List Protection or schedule to protect*
The new permanent plant equipment will be designed for the design basis high ambient temperature. The FLEX equipment will be designed and stored to withstand the design basis high ambient temperature, as defined in Reference 5.	

Maintain Core Cooling & Heat Removal		
Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The diesel-driven FLEX pumps will be stored at their respective deployment locations east of the Tank Buildings. Other FLEX-related equipment (e.g., fire hose, fuel carts) will be stored in an area that is clear of interactions from Seismic Category II and III structures (including potential sink holes from fire water system rupture). The deployment locations for the FLEX pumps and the deployment paths for the fire hose are shown on Attachments 3-4 and 3-5. Suction and discharge valves on the permanent plant piping will be opened manually to align the portable pumps for injection.	Storage pads, suction and discharge connections are added as described under Phase 2 details above.	The suction connection from [...] will be located in each unit's Seismic Category I, flood protected [...]. The makeup connection to each unit's [...] will be located above the flood level outside of the Seismic Category I [...]. The *primary* connection for injection to the steam generators [...] will be located above the flood level in a Seismic Category I [...]. The *alternate* connection for injection to the steam generators [...] will be located [...] of each unit's Seismic Category I [...]. The *primary* connection for injection to the RCS [...] will be located in [...] of each unit's Seismic Category I, flood protected [...]. The *alternate* connection for injection to the RCS [...] will be located in [...] of each unit's Seismic Category I, flood protected [...].
Notes:		

Maintain Core Cooling & Heat Removal
PWR Portable Equipment Phase 3
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods and strategy(ies) utilized to achieve this coping time. The Phase 2 strategies for core cooling and RCS heat removal are continued in Phase 3. Additional demineralized water sources and use of the RWSTs are described in the Safety Functions Support section below.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.*
Same as Phase 2 Core Cooling and Heat Removal described above.	
Identify modifications	*List modifications necessary for phase 3*
Same as Phase 2 Core Cooling and Heat Removal described above.	
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same as Phase 2 Core Cooling and Heat Removal described above.	

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Same as Phase 2 Core Cooling and Heat Removal described above.	Same as Phase 2 Core Cooling and Heat Removal described above.	Same as Phase 2 Core Cooling and Heat Removal described above.
Notes:		

Maintain RCS Inventory Control

Determine Baseline coping capability with installed coping[2] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

- **Low Leak RCP Seals or RCS makeup required**
- **All Plants Provide Means to Provide Borated RCS Makeup**

PWR Installed Equipment Phase 1:

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time.

For Phase 1, RCS inventory control is maintained by low leakage Reactor Coolant Pump (RCP) seals and the SITs after isolating RCS leakage paths (letdown, RCP controlled bleedoff, and RCS sample lines) (Reference 7). Letdown, RCP controlled bleedoff flow to the Volume Control Tank, and the RCS sample lines are isolated from the MCR (Reference 18). Isolation of RCP controlled bleedoff flow to the Quench Tank requires use of portable equipment, described in Phase 2 below.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*

Existing EOIs currently address implementation of this strategy (Reference 18).

Identify modifications	*List modifications*

No modifications are required for this Phase 1 strategy.

Key Reactor Parameters	*List instrumentation credited for this coping evaluation.*

- Pressurizer level
- Reactor vessel water level
  Safety Injection Tanks (SITs) wide range level (non-1E, read via portable instruments at instrument rack terminations in MCR; see RCS Inventory Control Phase 2 for discussion of these portable instruments)

Notes:

[2] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain RCS Inventory Control

PWR Portable Equipment Phase 2:

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods(Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time.

A portable power pack will be connected near the applicable Motor Control Center (MCC) to close the 480 VAC motor operated valve in the RCP controlled bleedoff line to the Quench Tank. Two portable power packs will be provided, one in each unit's [...]. Should one pack fail, the other can be moved [...] to the other unit.

Wide range level instruments for at least two SITs on opposite loops will be used to monitor the approach to nitrogen injection as water is injected from the SITs to the RCS. These instruments are non-1E powered, and will not be re-energized by repowering of the 480 VAC Class 1E system from the portable FLEX DGs. They will be read locally at the instrument process rack terminations at the back of the MCR using portable instruments (e.g., Fluke). The *primary* method is to locally read the wide range level instruments for two SITs in opposite loops. The *alternate* method is to locally read the wide range level instruments for the other two SITs (Reference 61). Two portable instruments will be provided to meet the N requirement for support equipment and stored seismically in the Auxiliary Building Control Area.

The 125 VDC solenoid vent valves or 480 VAC motor operated isolation valves for the 4 SITs will be repowered to vent the remaining nitrogen into containment or to isolate the SITs before nitrogen injection from the SITs to the RCS could occur (for example, when the SIT wide range level decreases to approximately 10 percent) (Reference 63). These valves are powered by the Class 1E electrical distribution system. Each train powers the solenoid valves on two SITs and the motor operated isolation valves on the remaining two SITs (Reference 64). The *primary* method is to re-energize one train of SIT vent and isolation valves from the FLEX DGs. The *alternate* method is to re-energize the other train of SIT vent and isolation valves from the FLEX DGs.

After 72 hours, the *primary* method of maintaining RCS inventory control is to re-energize at least one permanent plant charging pump in each unit from the Train re-energized by the FLEX DGs, to inject borated water from the Boric Acid Makeup (BAMU) Tanks and RWSTs to maintain RCS inventory (Reference 65). There are two *alternate* methods. The first *alternate* method is to re-energize at least one permanent plant charging pump from the other Train in each unit from the FLEX DGs. The water tight door on the room with the re-energized charging pump will be opened for room cooling, and portable ventilation fans deployed if needed to control temperature in the room. The second *alternate* method is to use a portable high pressure pump from the RRC, as discussed under Phase 3 below. See Safety Functions Support for BAMU/RWST capacities.

Other equipment including fuel pumps, carts, and FLEX DGs used in support of reactor core cooling, SFP cooling, and containment functions are described under Safety Functions Support below.

Maintain RCS Inventory Control	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*

Procedures and guidance to support deployment and implementation including interfaces to EOIs, AOIs and system operating procedures, will be developed in accordance with Section 11.4 of Reference 4.

Identify modifications	*List modifications*

Connections for a portable power pack will be installed near the applicable MCC for the 480 VAC motor operated valve in the RCP controlled bleedoff line to the Quench Tank.

Other modifications required for Phase 2 (i.e., electrical) are described under the Safety Functions Support section below.

Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Same as for Phase 1 plus:

- SIT wide range level for two SITs in opposite loops (non-1E, read via portable instruments at instrument rack terminations in MCR)

Storage / Protection of Equipment:

Describe storage / protection plan or schedule to determine storage requirements

Seismic	*List Protection or schedule to protect*

The charging pumps, BAMU tanks, RWSTs, piping and valves, and motor control centers are Seismic Category I and are located in Seismic Category I, flood protected structures (Reference 66).

The new permanent plant equipment will be designed to withstand the DBE, as defined in Reference 55. The portable FLEX equipment will be demonstrated to be seismically robust, and will be seismically secured at their respective FLEX storage locations. Seismic exclusion zones will be established around the FLEX equipment storage and deployment locations per the seismic control program (Reference 8).

Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect*

The charging pumps, BAMU tanks, RWSTs, piping and valves, and motor control centers are located in Seismic Category I, flood protected structures (Reference 66).

Maintain RCS Inventory Control	
The new permanent plant equipment will be protected against the effects of local intense precipitation, tropical storm and tsunami. The portable FLEX equipment will be protected against the effects of local intense precipitation, tropical storm, and tsunami at both the storage and deployment locations. From Reference 2, the tropical storm and tsunami flood elevation is +27 ft. mllw. This flood elevation is below plant grade in the Units 2 and 3 PA (elevation +30 ft. mllw). Local intense precipitation results in flooding above plant grade. Therefore, the portable FLEX equipment will be stored above the current design basis flood elevation of +31 ft. mllw (1 ft. above plant grade) (Reference 2), by mounting on a trailer or skid, or storing in a cargo container with a floor above this elevation.	
Severe Storms with High Winds	*List Protection or schedule to protect*
Severe storms with high winds and tornado hazards are ***screened out*** based on Figure 7-2 of Reference 4.	
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect*
Snow, ice, and extreme cold hazards are ***screened out*** based on Figures 8-1 and 8-2 of Reference 4.	
High Temperatures	*List Protection or schedule to protect*
The new permanent plant equipment will be designed for the design basis high ambient temperature. The FLEX equipment will be designed and stored to withstand the design basis high ambient temperature, as defined in Reference 5.	

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Use a portable power pack to close the motor operated isolation valve for the RCP controlled bleedoff path to the Quench Tank (2(3)HV9216).	Install connections near MCC 2(3)BA to repower motor operated isolation valve 2(3)HV9216.	MCC 2(3)BA is in the respective unit's Seismic Category I, flood protected electrical penetration area.

Maintain RCS Inventory Control		
Storage and deployment of the FLEX DGs, to (re)power charging pumps, SIT isolation and SIT vent valves, is described under the Safety Functions Support section below.	Modifications associated with the FLEX DGs are described under the Safety Functions Support section below.	Protection of the FLEX DGs and distribution boards is described under the Safety Functions Support section below.
Notes:		

Maintain RCS Inventory Control

PWR Portable Equipment Phase 3:

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time.

The Phase 2 strategies using permanent plant charging pumps will be continued in Phase 3. The second *alternate* method of maintaining RCS inventory control after 72 hours is to use a portable high pressure pump from the RRC to inject borated water from the RWSTs as shown conceptually in Attachment 3-5. (The first *alternate* method of maintaining RCS inventory control is to re-energize at least one permanent plant charging pump in each unit from the FLEX DGs, as discussed in Phase 2 above.)

For this method, fire hoses are routed from the existing valved hose connection from [...] to the diesel driven pump from the RRC, and high pressure hoses are routed from the pump to a connection on [...].

Additional borated water sources are described under Safety Functions Support below.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*

Procedures and guidance to support deployment and implementation including interfaces to EOIs, AOIs, and system operating procedures, will be developed in accordance with Section 11.4 of Reference 4.

Identify modifications	*List modifications*

Implementation of the modifications described below will be per the Milestone Schedule (Attachment 2).

The connections for this strategy are shown conceptually in Attachment 3-5.

Injection path:

A valved pipe stub for a high pressure hose connection will be installed in each unit on [...] to connect the high pressure RCS makeup pump delivered from the RRC [...].

Suction path:

No modifications are required.

Maintain RCS Inventory Control	
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same as for Phase 2, except for additional instrumentation needed to operate portable equipment, including pump flow, discharge pressure, and fuel tank level.	

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The portable FLEX high pressure makeup pump will be delivered from the RRC via an offsite staging area. The method of delivery to the Protected Area (ground, barge or helicopter) will be determined during RRC playbook development. [OPEN ITEM OI-2] Fire hoses will be used to connect the pump suction to the RWSTs and high pressure hoses to connect the pump discharge to the Train B HPSI header as shown in Attachment 3-5.	A valved pipe stub for a high pressure hose connection will be installed in each unit on […]	The connection for injection to the RCS […] will be located in […] of each unit's Seismic Category I, flood protected […].

Notes:
OPEN ITEM OI-2: Determine on-site deployment locations, transportation mode, route and communications from the staging area to the deployment locations for Phase 3 equipment from the RRC.

Maintain Containment

Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

- Containment Spray
- Hydrogen igniters (ice condenser containments only)

PWR Installed Equipment Phase 1:

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/Hydrogen igniter) and strategy(ies) utilized to achieve this coping time.

A site-specific containment pressure/temperature analysis (Reference 69) was performed which demonstrated that passive coping (heat sinks) are sufficient to maintain containment pressure and temperature during the ELAP event within design limits for more than 17 days. As such, the strategy for maintaining containment in Phase 1 is to monitor containment pressure.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*

Existing EOIs currently address implementation of this strategy (Reference 23).

Identify modifications	*List modifications*

No modifications are required for this Phase 1 strategy.

Key Containment Parameters	*List instrumentation credited for this coping evaluation.*

Containment pressure (wide range)

Notes:

[3] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain Containment

PWR Portable Equipment Phase 2:

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time.

A site-specific containment pressure/temperature analysis (Reference 69) was performed, which demonstrated that passive coping (heat sinks) are sufficient to maintain containment pressure and temperature during the ELAP event within design limits for more than 17 days. As such, no active strategy for maintaining containment is required for Phase 2.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*

Same as Phase 1.

Identify modifications	*List modifications*

No modifications are required for this Phase 2 strategy.

Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Same as Phase 1.

Storage / Protection of Equipment:

Describe storage / protection plan or schedule to determine storage requirements

Seismic	*List how equipment is protected or schedule to protect*

The containment pressure instruments are Seismic Category I and are located in Seismic Category I, flood protected structures (Reference 66). Existing seismic controls apply to protect this equipment per the seismic control program (Reference 8).

Flooding	*List how equipment is protected or schedule to protect*

The containment pressure instruments are located in Seismic Category I, flood protected structures (Reference 66).

Severe Storms with High Winds	*List how equipment is protected or schedule to protect*

Severe storms with high winds and tornado hazards are ***screened out*** based on Figure 7-2 of Reference 4.

Maintain Containment	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*
Snow, ice, and extreme cold hazards are ***screened out*** based on Figures 8-1 and 8-2 of Reference 4.	
High Temperatures	*List how equipment is protected or schedule to protect*
The containment pressure instruments are designed to withstand the design basis high ambient temperature, as defined in Reference 5.	

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Storage and deployment of the FLEX DGs to (re)power instrumentation is described under the Safety Functions Support section below.	Modifications associated with the FLEX DGs are described under the Safety Functions Support section below.	Protection of the FLEX DGs and distribution boards is described under the Safety Functions Support section below.
Notes:		

Maintain Containment

PWR Portable Equipment Phase 3:

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time.

A site-specific containment pressure/temperature analysis (Reference 69) was performed, which demonstrated that passive coping (heat sinks) are sufficient to maintain containment pressure and temperature during the ELAP event within acceptable limits for 120 days. (Containment temperature reaches 295 °F vs. the 300 °F design limit (Reference 69), and containment pressure reaches approximately 71 psig vs. the containment rupture pressure of approximately 139 psig (Reference 69).)

However, because containment would be challenged (pressure would exceed the 60 psig design pressure) within 17 to 20 days (Reference 69), containment spray capability will be provided from a portable diesel engine driven pump delivered from the RRC.

The portable FLEX containment spray pump will be connected to one unit at a time through high pressure hose to an existing valved pipe stub on the test connection piping of one containment spray header of each unit (Reference 73) as shown conceptually in Attachment 3-7.

Due to the high flow rate required, the pump deployment location is limited by head losses in the suction piping from the grade-level tanks. To address this, the spray pump will be located in the area of the suction connection to the seismic piping from [...]. On Unit 2, this may require clearing the debris from the collapse of a nearby building that is not Seismic Category I.

The makeup to CST T120 to support containment spray may be condensate, borated water, or seawater.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*

Procedures and guidance to support deployment and implementation including interfaces to EOIs, AOIs and system operating procedures, will be developed in accordance with Section 11.4 of Reference 4.

Identify modifications	*List modifications*

Implementation of the modifications described below will be per the Milestone Schedule (Attachment 2).

Injection path:

No modifications are required to the existing injection path.

Maintain Containment	
Suction path: The connection modifications to the seismic portion of the existing CST T120 drain/fill piping are the same as described for Phase 2 of Core Cooling and Heat Removal, above.	
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same as for Phase 1, except for additional instrumentation needed to operate portable equipment, including pump flow, discharge pressure, and fuel tank level.	

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The portable FLEX containment spray pump will be delivered from the RRC via an offsite staging area. The method of delivery to the Protected Area (ground, barge or helicopter) will be determined during RRC playbook development. [OPEN ITEM OI-2] Fire hoses will be used to connect the pump suction to CST T120 and high pressure hoses to connect the pump discharge to the containment spray header as shown conceptually in Attachment 3-7. Suction and discharge valves on the permanent plant piping will be opened manually to align the portable pump for injection.	The modifications to the seismic portion of the existing CST T120 drain/fill piping are the same as described for Phase 2 of Core Cooling and Heat Removal, above.	The valved stub connection for suction from the CST T120 will be protected as described for Phase 2 of Core Cooling and Heat Removal, above . The valved pipe stub connection for injection into the containment spray system is located in the Seismic Category I, flood protected […].

Maintain Containment
Notes: OPEN ITEM OI-2: Determine on-site deployment locations, transportation mode, route and communications from the staging area to the deployment locations for Phase 3 equipment from the RRC.

Maintain Spent Fuel Pool Cooling	
Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Makeup with Portable Injection Source**	
PWR Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source)and strategy(ies) utilized to achieve this coping time. Phase 1 cooling is passive by heat up and evaporation from the SFP.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
Existing AOI for Loss of Spent Fuel Pool Cooling (Reference 82) directs operators to SONGS B.5.b Mitigation Strategies (Reference 76) to establish alternate cooling. Alternate cooling for the ELAP event is addressed under Phase 2 below.	
Identify modifications	*List modifications*
No modifications are required for this Phase 1 strategy.	
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.*
SFP level per EA 12-051.	
Notes:	

[4] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain Spent Fuel Pool Cooling

PWR Portable Equipment Phase 2:

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source)and strategy(ies) utilized to achieve this coping time.

Makeup and spray to the SFP for SFP cooling will be provided using a portable diesel-driven FLEX pump, with suction from the condensate storage tanks or RWSTs, and discharge through fire hoses to one of two makeup pathways or a spray pathway as shown conceptually in Attachment 3-6. Two portable 1000 gpm diesel-driven FLEX pumps are provided for each unit (total of four pumps). The same set of two 1000 gpm diesel-driven pumps per unit used for core cooling and heat removal will also be used to satisfy this requirement. Each pump will be capable of supplying water simultaneously to both unit's two steam generators (or to the RCS when the steam generators are not available) and to both unit's spent fuel pools (Reference 34). The pumps will be seismically stored in their deployment locations as described under core cooling and heat removal above.

<u>SFP Makeup</u>

Per Reference 74, the design basis maximum SFP heat load is the decay heat from one full core at equilibrium conditions after 150 hours decay and one refueling load at equilibrium conditions after 36 days decay, which totals 51.3 MBTU/hr. A minimum of 93 gpm makeup to the SFP is required to match the boiloff rate at this heat load (Reference 75). The maximum SFP heat load without the full core offload is about 21.2 MBTU/hr, for which a minimum of 39 gpm makeup is required to match the boiloff rate (Reference 75).

Makeup via hoses on refueling floor:

For this strategy the FLEX portable pumps are connected by fire hoses to the seismic fire risers in the Auxiliary Building Radwaste area and hoses are run from the seismic fire risers to the refueling deck. This strategy has a capability of at least 200 gpm (Reference 76) and exceeds the makeup rate required for boiloff at the design basis maximum heat load (Reference 75).

Makeup via connection to SFP cooling piping or alternate location:

For this strategy, the FLEX portable pumps are connected by fire hoses to a hard piped makeup path accessible from outside the pool room, with connections in a location diverse from the Auxiliary Building Radwaste area stairwells, and shielded from Containment (in case of subsequent core damage). This makeup path will support a flow rate of at least 200 gpm (Reference 78), which exceeds the makeup rate required for boiloff at the design basis maximum heat load described above.

Maintain Spent Fuel Pool Cooling
Steam vent path A steam path has been defined in response to INPO IER L1 11-4, and is currently implemented in the procedures for 10 CFR 50.54(hh)(2) (Reference 76). This pathway relies on manually opening dampers and access panels in [...]. Condensate is expected to collect in the lowest point of the ducting, which is located on [...]. One or more valved drain connections will need to be installed on the ducting in this area, with tailpiece connections for hoses routed to floor drains. SFP spray [...] and consequently spray capability consistent with 10 CFR 50.54(hh)(2) is required. SFP spray is provided by [...]. To meet the 10 CFR 50.54(hh)(2) standoff criterion, the equipment [...]. The 200 gpm flow rate would not be concurrent with maximum SG makeup flow per NEI 06-12 guidance for 10 CFR 50.54(hh)(2) (Reference 80). SFP level monitoring: SFP level monitoring is being provided in accordance with EA-12-051 and applicable NRC ISG and NEI guidance (Reference 81).

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
Procedures and guidance to support deployment and implementation, including interfaces to EOIs, AOIs, and system operating procedures, will be developed in accordance with Section 11.4 of Reference 4. Note: Existing AOI for Loss of SDC (Reference 82) direct operators to SONGS B.5.b Mitigation Strategies (Reference 76) to establish alternate cooling.	
Identify modifications	*List modifications*
Implementation of the modifications described below will be per the Milestone Schedule (Attachment 2). SFP vent path Valved drain connections will be installed on [...]. Permanent ladders and platforms will be installed for access to the drain valves and [...].	

Injection and spray paths: A SFP makeup pipe will be installed in each unit with a valved fire hose connection located at grade level on the end of the FHB and routed up through the FHB truck bay to the east wall of the pool room as shown conceptually in Attachment 3-6. Suction path: Modifications will be completed as described for Phase 2 of Core Cooling and Heat Removal. Additional seismic flood-protected suction sources: Modifications will be completed as described for Phase 2 of Core Cooling and Heat Removal.	
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.*
SFP Level Per EA 12-051	

Maintain Spent Fuel Pool Cooling	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect*
The new permanent plant equipment will be designed to withstand the DBE, as defined in Reference 1. The portable FLEX equipment will be protected as described for Phase 2 of Core Cooling and Heat Removal (References 55 and 56).	
Flooding	*List how equipment is protected or schedule to protect*
The new permanent plant equipment will be protected against the effects of local intense precipitation, tropical storm and tsunami. The portable FLEX equipment will be protected against the effects of local intense precipitation, tropical storm, and tsunami. From Reference 2, the tropical storm and tsunami flood elevation is +27 ft. mllw. This flood elevation is below plant grade in the Units 2 and 3 PA (elevation +30 ft. mllw). Local intense precipitation results in flooding above plant grade. Therefore, the portable FLEX equipment will be stored above the current design basis flood elevation of +31 ft. mllw (1 ft. above plant grade) (Reference 2), by mounting on a trailer or skid, or storing in a cargo container with a floor above this elevation.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*
Severe storms with high winds and tornado hazards are ***screened out*** based on Figure 7-2 of Reference 4.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*
Snow, ice, and extreme cold hazards are ***screened out*** based on Figures 8-1 and 8-2 of Reference 4.	
High Temperatures	*List how equipment is protected or schedule to protect*
The new permanent plant equipment will be designed for the design basis high ambient temperature. The FLEX equipment will be designed and stored to withstand the design basis high ambient temperature, as described for Phase 2 of Core Cooling and Heat Removal (Reference 5).	

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**

Maintain Spent Fuel Pool Cooling		
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Storage and deployment of the FLEX pumps and other FLEX equipment for SFP makeup and spray are the same as described for Phase 2 of Core Cooling and Heat Removal. The deployment locations for the FLEX pumps are shown in Attachment 3-6.	The modifications for storage and deployment of the FLEX pumps and other FLEX equipment are the same as described for Phase 2 of Core Cooling and Heat Removal.	The suction connections are protected as described for Phase 2 of Core Cooling and Heat Removal.
The deployment paths for fire hose to the SFP makeup and spray connections are shown in Attachment 3-6.	A SFP makeup pipe will be installed in each unit with a valved fire hose connection located at grade level on the end of the FHB and routed up through the FHB truck bay to the east wall of the pool room above the SFP.	The seismic fire riser in the Radwaste area is located in the Seismic Category I, flood protected Auxiliary Building. The valved pipe stub connection for injection into the spent fuel pool is Seismic Category I and located above the design basis level on the end of the Seismic Category I Fuel Handling Building.
Notes:		

Maintain Spent Fuel Pool Cooling	
PWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source)and strategy(ies) utilized to achieve this coping time.	
The Phase 2 strategies for SFP cooling are continued in Phase 3. Additional demineralized and borated water sources are described in the Safety Functions Support section below.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
Same as Phase 2.	
Identify modifications	*List modifications*
Same as Phase 2.	
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.*
SFP Level per EA 12-051	

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Same as Phase 2.	Same as Phase 2.	Same as Phase 2.
Notes:		

Safety Functions Support

Determine Baseline coping capability with installed coping[5] modifications not including FLEX modifications.

PWR Installed Equipment Phase 1

Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

At the initiation of the beyond-design-basis external event, operators will enter the EOIs for Standard Post Trip Actions (Reference 17) and Station Blackout (SBO) (Reference 18). Abnormal Operating Instructions (AOIs) for Earthquake (Reference 33), Severe Weather (Reference 19), and/or for Loss of Component Cooling Water (CCW) / Loss of Saltwater Cooling (SWC) (Reference 20) will also be entered as applicable. An ELAP event will be diagnosed when SBO conditions are present on either unit and are expected to last more than 4 hours. Actions for ELAP will be controlled from the EOIs and performed under the Flex Support Guidelines (FSGs) (Reference 30). Command and control of the site will be maintained within the EOIs. The actions for ELAP include RCS cooldown and depressurization to SDC entry conditions, additional Class 1E battery load reduction beyond current licensing bases, and deployment of portable FLEX equipment.

<u>Water</u>

Water for core cooling and heat removal will be provided from the Condensate Storage Tanks (CSTs). The AFW suction source is Seismic Category I CST T121. The Technical Specification minimum water inventory of CST T121 is sufficient for 2 hours at hot standby followed by cooldown to SDC entry conditions (Reference 31). Makeup to CST T121 is available from seismically reinforced CST T120 and from the Seismic Category I vault for CST T120 should T120 fail. The combined Technical Specification minimum water inventory of CSTs T120 and T121 is sufficient for 24 hours of steaming including 4 hours at hot standby followed by cooldown to SDC entry conditions (Reference 32). Concurrent use of the CSTs for SFP makeup is discussed in Phase 3 of Safety Functions Support below.

Existing procedures include operator actions and completion times to isolate branch piping to ensure that these sources of water remain available (Reference 33). See Attachment 1A Sequence of Events Timeline for details.

<u>Power</u>

Power for essential instrumentation and controls will be maintained from the Class 1E batteries, the Class 1E 125 VDC distribution system, and the Class 1E 120 VAC vital power inverters and distribution system (Reference 6). DC electrical load shedding (Reference 84) and 125 VDC

[5] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Safety Functions Support

distribution panel cross-ties will be used to extend the coping duration for these systems. The controls that remain powered for Phase 1 include the TDAFW pump system and the ADVs as described in Core Cooling and Heat Removal above. Used sequentially, the Class 1E batteries can maintain power for essential instrumentation and controls for 54 hours (27 hours per train) without recharging (Reference 85). However, the swing battery chargers are expected to be re-energized from portable equipment before this time, as described under Phase 2 below.

Communications

The plant 800 MHz radio system, Protected Area public address system and power block portion of the Private Automatic Exchange (PAX) phone system will remain powered from local battery banks for approximately 1 hour. (Each location is powered by two 48 VDC supplies, each of which provides approximately 30 minutes of operation.) (Reference 86) The sound powered phone system between safe shutdown locations (described in Appendix D of Reference 87) remains available indefinitely.

Lighting

Lighting in the MCR and safe shutdown areas will be maintained by the Essential Lighting System (for approximately 90 minutes) and Appendix R light packs (for approximately 8 hours), which are powered from local battery banks (Reference 88).

Ventilation

MCR cabinet doors and Class 1E 120 VAC / 125 VDC distribution room doors will be opened. However, the MCR does not require the doors to be opened or forced ventilation to be restored in order to remain below the SBO upper limit of 120 °F (Reference 89). The Class 1E electrical areas do not require the doors to be opened or forced ventilation for approximately 4.5 hours to remain below the SBO upper limit of 120 °F (Reference 90). The AFW pump room is vented directly to the outside and does not require forced ventilation to maintain accessibility or equipment operability (Reference 91).

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.*

Procedures and guidance to support deployment and implementation including interfaces to EOIs, AOIs and system operating procedures, will be developed in accordance with Section 11.4 of Reference 4.

Safety Functions Support	
Identify modifications	*List modifications and describe how they support coping time.*
No modifications are required for this Phase 1 strategy.	
Key Parameters	*List instrumentation credited for this coping evaluation phase.*
CST level Class 1E 125 VDC bus voltage	
Notes:	

Safety Functions Support

PWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Water

There are several water inventory strategies available with the FLEX pump capability, including: makeup to the SGs and SFP from the same tanks and pumps (CSTs or RWSTs), or makeup to the SGs and SFP from different tanks and pumps (CSTs to SGs, and RWSTs to SFP), with the PPMUT pumps used to makeup to the tanks in use. With the SGs available, condensate availability for makeup to the SGs is maximized by using the RWSTs for makeup to the SFP, and the CSTs and PPMUTs for makeup to the SGs. With the SGs unavailable, borated water availability for RCS heat removal is maximized by using the RWSTs for makeup to the RCS, and the CSTs and PPMUTs for makeup to the SFP.

Three of the four FLEX diesel driven pumps are required to implement the strategy for maximum condensate availability without interruption of flow: the unit with two functional pumps would supply the SGs and SFPs of both units, while the unit with one functional pump would transfer water from its CSTs and then RWSTs to the other unit. Two of the four FLEX diesel driven pumps (one at each unit) can implement this strategy if one provides SG makeup to both units from its CSTs, and the other provides SFP makeup to both units from its RWSTs and flow is periodically interrupted to reconnect to the other tank for water transfer between units.

CSTs and PPMUTs:

The Seismic Category I flood protected CSTs can support core cooling and heat removal for 24 hours (Reference 12). For makeup from the CSTs, the FLEX diesel driven pump would connect to [...].

Makeup to each unit's CSTs is available from the plant-common Seismic Category I, flood protected Primary Plant Makeup Tanks (PPMUTs) T055 and T056, using an electric motor-driven FLEX pump, piping, and electrical connections in each of the PPMUT vaults, as shown conceptually in Attachments 3-8 and 3-9. A set of two redundant pumps will be provided in each PPMUT vault (total of four pumps) to meet the N+1 (2*N) requirement. These pumps can be powered from portable FLEX DGs when needed for FLEX. Each FLEX PPMUT pump will be capable of supplying a total of 1000 gpm to one unit (or 500 gpm to both units simultaneously) to either CST T121 (*primary* connection point) or CST T120 (*alternate* connection point) for each unit (Reference 42). The PPMUT inventory from one tank will extend the supply of condensate for a unit to more than 72 hours (Reference 43).

RWSTs:

The Seismic Category I flood protected RWSTs contain a minimum of 362,800 gallons of borated water (Reference 44). This inventory will support SFP makeup for about 71 hours at the maximum

Safety Functions Support

SFP heat load including full core offload, and 170 hours at the maximum SFP heat load without full core offload (Reference 43). The SFP boron concentration would increase from 2800 ppm to about 6600 ppm after the RWST inventory is used for makeup, which is well below the precipitation limit (Reference 75). The 170 hour case with the core still in the reactor vessel is the one for which RCS makeup would be needed. As discussed under RCS Inventory Control above, borated water from Seismic Category I, flood protected RWSTs T005 and T006 is not needed for RCS makeup until after 72 hours. To support the RCS makeup strategy, SFP makeup will be shifted from the RWSTs to the CSTs as discussed in Phase 3 Safety Functions Support.

For makeup from the RWSTs, the portable FLEX pump would connect to [...].

In Modes 5 and 6, with the steam generators not available for core cooling and heat removal, one FLEX diesel driven portable pump will draw from the RWSTs for injection to the RCS while the other FLEX diesel driven portable pump draws from the CSTs for SFP makeup. The RWSTs can support this strategy for about 40 hours (Reference 44).

Safety Functions Support

Boric Acid Makeup (BAMU) Tanks:

The BAMU tanks are the initial suction source for RCS makeup and reactivity control using the charging pumps. The minimum borated water inventory required in the BAMU tanks is sufficient for 132 minutes (2.2 hours) of operation of a charging pump (Reference 62).

Power

The primary means to maintain or re-establish essential power in each unit is a portable FLEX DG to re-energize portions of one train of the Class 1E 480 VAC distribution system (including load centers that power essential instrumentation, the swing battery chargers, essential lighting and ventilation), one of the two redundant FLEX PPMUT pumps and SFP level instruments (through a local distribution panel), and a submersible seawater pump (described under Phase 3 Safety Functions Support below). The alternate means will be to re-energize portions of the other train of the Class 1E 480 VAC distribution system. Each FLEX DG is rated to carry the total load for both units (2*N configuration) (Reference 92). The generators will be stored in their deployment locations on the east side of the Auxiliary Building as shown on Attachments 3-3 and 3-9.

Fuel

The FLEX portable diesel driven pumps and DGs will be stored with fuel in their on-board tanks. Each pump or generator will be designed to operate for approximately 24 hours before requiring refueling. The onboard tanks will be resupplied using fuel carts, hand pumps, and hoses sized for at least 210 gph (Reference 99). One fuel cart, pump and hose set will be stored in a cargo container at each unit. The fuel carts will be filled from the drain connections of the two diesel fuel oil day tanks in each Emergency Diesel Generator (EDG) Building. Each fuel oil day tank contains sufficient diesel fuel for approximately 2.5 hours of FLEX equipment operation (Reference 94). The *primary* method of refilling the day tanks is from the EDG fuel oil storage tanks by re-energizing one of the two EDG fuel transfer pumps from the train of the 480 VAC Class 1E distribution system that has been repowered by a FLEX DG. This will refill one of the two day tanks in each EDG building from one of the two EDG fuel oil storage tanks for each unit. There are two *alternate* methods. The first *alternate* method is to re-energize one of the two EDG fuel transfer pumps from the other train of the 480 VAC Class 1E distribution system using a FLEX DG. This will refill the other day tank in each EDG building from the other EDG fuel oil storage tank. The second *alternate* method is to re-energize one of the two EDG fuel transfer pumps from portable generators connected at the motor control centers in the EDG Building. If heavy equipment is available to remove the access plugs from the EDG fuel oil storage tank vaults, the portable generators could also be connected at the motor terminals of the diesel fuel transfer pumps. Together, the two (2) EDG fuel oil day tanks and one EDG fuel storage tank (with the re-energized transfer pump) in each unit contain sufficient fuel oil for approximately 20 days of operation before resupply from the RRC would be required (References 94 and 95).

Communications

The *primary* means to maintain or re-establish communications will be re-energizing one unit's Class 1E 480 VAC distribution system, as described under Power above, in order to re-power the

Safety Functions Support

permanent plant communications systems (radio, PA public address system and power block portion of PAX) from portable FLEX DGs located on the east side of the plant as shown on Attachment 3-9 (Reference 92).

Two *alternate* means to maintain or re-establish communications will be provided. The first *alternate* means will be re-energizing the other unit's Class 1E 480 VAC distribution system in order to repower the permanent plant communications systems (radio, PA public address and power block of PAX) (References 82 and 92). The second *alternate* means will be the use of portable FLEX equipment (satellite phones, chargers, and portable generators). Sufficient chargers and spare batteries will be provided to maintain uninterrupted satellite phone communication.

Lighting and ventilation

The *primary* means to maintain or re-establish lighting and ventilation will be re-energizing one unit's Class 1E 480 VAC distribution system to repower the permanent plant essential lighting (Reference 88) and emergency ventilation systems from portable FLEX DGs located on the east side of the plant, as shown conceptually in Attachment 3-9.

For the MCR, the *primary* means of cooling will be re-established by repowering MCR emergency air supply fan A207 and/or A206 from the Class 1E distribution system, which is energized by portable FLEX DGs (Reference 89).

Two *alternate* means to maintain or re-establish lighting and ventilation will be provided. The first *alternate* means will be re-energizing the other unit's Class 1E 480 VAC distribution system in order to repower the permanent plant lighting and ventilation. The second *alternate* means will be portable FLEX equipment (fans, lights, and DGs) moved manually from the FLEX storage locations to their deployment location on the west side of the plant.

Safety Functions Support	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.*

Procedures and guidance to support deployment and implementation including interfaces to EOIs, AOIs and system operating procedures, will be developed in accordance with NEI 12-06, Rev. 0, Section 11.4.

Identify modifications	*List modifications necessary for phase 2*

Implementation of the modifications described below will be per the Milestone Schedule (Attachment 2).

Water

A valved pipe stub for a fire hose connection will be installed in [...] as discussed in Phase 2 Core Cooling and Heat Removal above and shown conceptually in Attachment 3-4. This connection will serve as the *primary* injection point for makeup to the CSTs while they are being used for RCS heat removal by the TDAFW pump [...].

An additional valved pipe stub for a fire hose connection will be installed on [...], as discussed in Phase 2 Core Cooling and Heat Removal above and shown conceptually in Attachment 3-4. This connection will serve as an *alternate* injection point for makeup to the CSTs while they are being used for RCS heat removal by the portable diesel-driven FLEX pumps [...].

A set of two redundant seismically robust electrical motor-driven FLEX pumps, piping, and wiring will be permanently installed in each unit's below grade PPMUT vault that can be powered from portable FLEX DGs (Reference 51) as shown conceptually in Attachments 3-8 and 3-9. A new suction nozzle will be installed on each PPMUT for these pumps. Each PPMUT vault is accessible via [...].

No modifications are required for suction from the RWSTs. The existing hose connection [...] as shown conceptually in Attachment 3-6.

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Power

Electrical connections, distribution panels, and permanent plant cabling from the roll up door area of Auxiliary Building Radwaste area to the Class 1E 480 VAC switchgear, and from the Class 1E switchgear to the deployment locations for the submersible seawater pumps, will be installed for use by the portable generators as shown conceptually in Attachment 3-9.

Fuel

The drain lines from the four (4) EDG fuel oil day tanks will be modified to include a suction connection, above the design basis flood level, for the portable hand pump.

Communications

As described in the SCE Communications Assessment performed for Near Term Task Force Recommendation 9.3 (Reference 98), the current in-plant telephone (PAX) system will be modified to allow continued use without reliance on PAX equipment in the Owner Controlled Area, and a satellite phone system will be installed and connected to the site telephone system to enable selected PAX/Private Branch Exchange (PBX) lines to access satellite communications.

Lighting and ventilation

MCR emergency air supply fan A207 and/or A206 will be repowered from the FLEX DGs through the Class 1E distribution system as discussed under Power above.

Key Parameters	*List instrumentation credited or recovered for this coping evaluation.*

CST level (T121)
RWST level
Class 1E 480 VAC bus voltage
480 VAC portable generator volts, amps and fuel tank level(local)
FLEX diesel driven pump fuel tank level
EDG day tank level

Storage / Protection of Equipment :
Describe storage / protection plan or schedule to determine storage requirements

Seismic	*List how equipment is protected or schedule to protect*

The new permanent plant equipment will be designed to withstand the DBE, as defined in Reference 1.

The portable FLEX DGs will be demonstrated to be seismically robust, and will be seismically secured at their respective FLEX storage / deployment location (outside the Seismic Category I Auxiliary Building Radwaste area).

Safety Functions Support
Distribution panels for the FLEX DG power will be installed inside the truck bay area of the Seismic Category I Auxiliary Building Radwaste area. Cables will be long enough to reach all generator pads from the distribution panels such that relocation of inoperative equipment will not be needed to implement the strategies. Permanent pads will be installed for the equipment with seismic tie-downs. FLEX fuel carts, hand pumps and hoses, portable ventilation and lighting equipment will be stored in cargo containers demonstrated to remain upright and intact in the event of a DBE in an area that is clear of interactions from Seismic Category II and III structures (including potential sink holes from fire water system rupture), and near to their deployment locations. Satellite phones will be stored seismically in the Seismic Category I Auxiliary Building Control area. Seismic exclusion zones will be established around the FLEX equipment storage and deployment locations consistent with the existing seismic control program (Reference 8).

Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect*

The new permanent plant equipment will be protected against the effects of local intense precipitation, tropical storm and tsunami. The portable FLEX equipment will be protected against the effects of local intense precipitation, tropical storm, and tsunami at both the storage and deployment locations.

From Reference 2, the tropical storm and tsunami flood elevation is +27 ft. mllw. This flood elevation is below plant grade in the Units 2 and 3 PA (elevation +30 ft. mllw) and above plant grade in the North Industrial Area (elevation +20 ft. mllw).

Local intense precipitation results in flooding above plant grade, and therefore the equipment will be stored above the current design basis flood barrier elevation of +31 ft. mllw (1 ft. above plant grade) (Reference 2) by mounting on trailer or skid, or storing in a cargo container with a floor above this elevation.

Severe Storms with High Winds	*List how equipment is protected or schedule to protect*

Severe storms with high winds and tornado hazards are ***screened out*** based on Figure 7-2 of Reference 4.

Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*

Snow, ice, and extreme cold hazards are ***screened out*** based on Figures 8-1 and 8-2 of Reference 4.

Safety Functions Support	
High Temperatures	*List how equipment is protected or schedule to protect*
The new permanent plant equipment will be designed for the design basis high ambient temperature. The FLEX equipment will be designed and stored to withstand the design basis high ambient temperature, as defined in Reference 5.	

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The electrical motor-driven FLEX pumps in the PPMUT vaults will be used to make up to the CSTs through the primary or alternate injection points as shown conceptually in Attachment 3-8. These pumps will be powered by the FLEX DGs as shown conceptually in Attachment 3-9.	The electrical motor-driven FLEX pumps, piping, and wiring will be permanently installed in each unit's below grade PPMUT vault. A new suction nozzle will be installed on each PPMUT for these pumps.	The suction and discharge connections for the FLEX PPMUT pumps will be located in the Seismic Category I, flood protected PPMUT vaults. The makeup connections for the CSTs are described in Phase 2 Core Cooling and Heat Removal above. The makeup connection for the RWSTs will be located at the tank manways at the top of the Seismic Category I tanks .
The FLEX DGs will be stored at their respective deployment location east of the Auxiliary Building. Other FLEX-related equipment (e.g., carts, cabling) will deployed from an area that is clear of interactions from Seismic Category II and III structures (including potential sink holes from fire water system rupture). The deployment locations for the FLEX DGs and the power distribution boards are shown	Storage pads, electrical connections and distribution boards are added as described under Phase 2 details above.	The cables from the FLEX DGs to the power distribution boards will be stored in the Generator Control Panel. The cable ends will be capped to protect from potential mechanical damage. Distribution Boards will be installed in the FHB truck bay. The cables will be routed from the distribution boards to the 480VAC Load Centers, located in the Class 1E switchgear rooms, via new rigid conduit and existing trays. One end of

Safety Functions Support		
in Attachment 3-9. Each FLEX DG will power one Train of the 480 VAC distribution system in each unit, one PPMUT pump, and (in Phase 3) one submersible seawater pump. Selected loads will be re-energized in the repowered 480 VAC Train.		the cable end will be connected at the distribution board and the other end will be capped and kept on the cable tray for the load center or in a suitable location near the load center. Cables from the distribution panels will be routed to the FLEX PPMUT pump motors via rigid conduit and both ends of the cable will be terminated. Cables from the 480VAC Load Centers to the FLEX Seawater pumps will be routed via rigid conduit. The cables at the load centers end will be capped and kept near the load centers and the other end will be connected to the terminal box for the pump motors.
The FLEX portable pumps and DGs will be refueled using fuel carts, hand pumps and hoses. The fuel carts will be filled from the drain connections of the two diesel fuel oil day tanks in each DG Building. One fuel oil day tank in each DG Building will be refilled from the respective diesel fuel oil storage tanks by re-energizing one of its two diesel fuel transfer pumps from a FLEX portable generator through the Class 1E 480 VAC distribution system.	The drain lines from the four (4) diesel fuel oil day tanks will be modified to include a suction connection, above the design basis flood level, for the hand pump on the fuel cart.	FLEX fuel carts, hand pumps, and hoses will be stored above the design basis flood level, in cargo containers demonstrated to remain upright and intact in the event of a DBE in an area that is clear of interactions from Seismic Category II and III structures (including potential sink holes from fire water system rupture), and near to their deployment locations. The EDG fuel oil day tanks and storage tanks are located in Seismic Category I, flood protected structures.
Permanent plant communications systems (radio, public address, and	Modification of the current in-plant phone (PAX) system to allow continued use without	The permanent plant communication systems are located in Seismic Category I,

Safety Functions Support		
PAX) will be re-energized from portable FLEX DGs. Sound powered phones and satellite phones will be used until the communication systems are re-energized from either unit's Class 1E 480 VAC distribution system. If the communications systems cannot be re-energized, portable 120 VAC generators will be used to power battery chargers for the satellite phones.	reliance on PAX equipment in the Owner Controlled Area (Reference 98). Installation of a satellite phone system and interconnection with the site PAX system to enable selected PAX/Private Branch Exchange (PBX) lines to access satellite communications (Reference 98).	flood protected structures. The satellite phones will be stored in the Seismic Category I, flood protected Auxiliary Building Control area.
Essential lighting and emergency ventilation systems will be re-energized from portable FLEX DGs. Portable ventilation and lighting will be used if the permanent systems cannot be re-energized from either unit's Class 1E 480 VAC distribution system.	MCR emergency air supply fans A207 and/or A206 will be re-powered from Class 1E 480 VAC distribution system, which will be energized by portable FLEX DGs.	The permanent plant lighting and ventilation systems are located in Seismic Category I, flood protected structures. FLEX portable ventilation and lighting equipment will be stored above the design basis flood level, in cargo containers demonstrated to remain upright and intact in the event of a DBE in an area that is clear of interactions from Seismic Category II and III structures (including potential sink holes from fire water system rupture), and near to their deployment locations.
Notes:		

Safety Functions Support

PWR Portable Equipment Phase 3

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Water

Phase 3 FLEX equipment will be used to provide makeup to the CSTs after 72 hours, as shown conceptually in Attachment 3-8. Once this makeup strategy is in service, SFP makeup can be shifted from the RWSTs to the CSTs in order to preserve the remaining borated water in the RWSTs for RCS makeup.

The FLEX 480 VAC portable generators will be used to energize a submersible seawater pump. The *primary* means is to re-energize portions of one train of the Class 1E 480 VAC distribution system. The *alternate* means will be to re-energize portions of the other train of the Class 1E 480 VAC distribution system (References 88 and 92).

Water purification equipment will be deployed from the RRC to provide at least 142 gpm per unit of purified water from the submersible seawater pump supply (Reference 40). This output is sufficient to meet reactor decay heat removal requirements at approximately 48 hours post reactor trip, and concurrent SFP heat removal requirements at the maximum SFP heat load without full core offload (Reference 40).

Power

The Phase 2 strategies for power will be continued in Phase 3.

Fuel

Additional diesel fuel oil will be delivered from the RRC to replenish the underground EDG fuel oil storage tanks to permit continued operation of the FLEX portable pumps and generators.

Communications, lighting and ventilation

The Phase 2 strategies for communications, lighting and ventilation will be continued in Phase 3.

Debris removal

Heavy equipment (e.g., bulldozers, front end loaders, dump trucks) may be needed to clear a roadway from the top of the bluffs to the PA, and/or to clear debris within the PA for a landing zone for delivery of equipment from the RRC. The method of delivery for Phase 3 equipment from the staging area to the Units 2 and 3 PA (road, barge or helicopter) will be determined during RRC playbook development for SONGS. [OPEN ITEM OI-2]

Safety Functions Support	
Heavy equipment (e.g., bulldozers, front end loaders, dump trucks) is available from the RRC and from Marine Corps Base Camp Pendleton through a mutual aid agreement with SONGS (Reference 68).	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.*
Procedures and guidance to support deployment and implementation including interfaces to EOIs, AOIs and system operating procedures, will be developed in accordance with NEI 12-06, Rev. 0, Section 11.4.	
Identify modifications	*List modifications necessary for phase 3*
Storage pads will be installed for the submersible seawater pumps and mobile crane. Fixtures will be installed in the circulating water screen well area to hold the pumps in their deployed (submerged) locations.	
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same instrumentation as Phase 2, plus instrumentation needed to operate portable equipment, including seawater pump flow and discharge pressure, and water purification system flow, pressure and fuel tank level.	

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The FLEX DGs will be stored and deployed as described under Phase 2 above.	Starter panels, connection panels, and electrical cables from the Class 1E 480 VAC distribution system will be installed for the submersible seawater pumps.	The starter panels, connection panels, and electrical cables will be installed above the design basis flood level in Seismic Category I structures.
The submersible seawater pumps and strainers, and the mobile crane for their deployment will be stored in	Storage pads will be installed for the pumps and mobile crane.	The submersible pump electrical and hydraulic connections are on the pumps. The pumps will be stored in

Safety Functions Support		
the circulating water intake gate area. The crane will be used to deploy the pumps and strainers to the circulating water intake screen well area. Fire hoses will be used to connect the discharge of the seawater pumps to the water purification equipment delivered from the RRC as shown conceptually in Attachment 3-8.	Fixtures will be installed in the circulating water screen well area to hold the pumps in their deployed (submerged) locations.	seismic racks above the design basis flood level. When deployed, the connections will be sealed for submergence and the pump placed in a fixture that prevents rotation due to torque or displacement due to seismic accelerations.
The water purification system will be delivered from the RRC via an offsite staging area. The method of delivery from the staging area to the Units 2 and 3 PA (road, barge or helicopter) will be determined during RRC playbook development for SONGS. Fire hoses will be used to connect the discharge of the water purification system to the makeup connections on the condensate tanks or RWSTs. Valves on the permanent plant piping will be opened manually to align the systems for makeup.	None	Equipment from the RRC is stored remotely and delivered via an offsite staging area.

Notes:
OPEN ITEM OI-2: Determine on-site deployment locations, transportation mode, route and communications from the staging area to the deployment locations for Phase 3 equipment from the RRC.

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Four (4) diesel-driven pumps:	X	X	X			1000 gpm @ 286 ft., 120 HP, 480 V	Will follow EPRI template requirements
Six (6) Diesel Generators				X	X	120 VAC Rating and number per set to be determined based on evaluation of portable lighting and ventilation requirements. They must be seismically robust and sufficiently compact to be moved manually from the FLEX storage locations to the west side of the plant.	Will follow EPRI template requirements
Two (2) Standby Diesel Generators	X		X	X	X	480 V, 60 Hz, 1000 kW/1250 kVA	Will follow EPRI template requirements
Two (2) set of Fuel Transfer Pumps and Carts	X		X	X		210 gph	Will follow EPRI template requirements
Two (2) sets of Fire Hoses, Fittings, and Couplings	X		X			Number per set and size to be determined based on deployment and connection locations.	NFPA requirements per Fire Protection program
Four (4) pairs of monitor nozzles for SFP spray			X			125 gpm	NFPA requirements per Fire Protection program

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Two (2) sets of Electrical cables	**X**		**X**	**X**		Size and number per set to be determined based on deployment and connection locations.	Will follow EPRI template requirements
Portable lighting and ventilation					**X**	Rating and number per set to be determined based on evaluation of lighting and ventilation requirements. They must be seismically robust and sufficiently compact to be moved manually from the FLEX storage locations to the west side of the plant.	Will follow EPRI template requirements
Two (2) 480VAC power packs for MOV operation	**X**					Rating to be determined based on capacity to close two MOVs sequentially for RCP CBO isolation	Will follow EPRI template requirements
Two (2) sets of forced entry tools	**X**	**X**	**X**	**X**	**X**	Tools set sufficient to force entry (e.g., through Radwaste area roll up door) following a seismic event.	Will follow EPRI template requirements
Two (2) sets of portable instruments (e.g. Fluke)	**X**	**X**	**X**	**X**		Number and rating to be determined based on reading instrument loops at instrument rack terminations in Main Control Room.	Will follow EPRI template requirements

PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
One (1) High Pressure Injection Pump	**X**					60 gpm, 1525 psia	The specified output is for the proposed RRC pump. Backup to primary and alternate methods of high pressure makeup to RCS. Equipment will be provided from RRC. Positive Displacement Pump, Portable AC motor driven skid mounted. One pump required (can be moved between units).
Two (2) sets of High Pressure Hoses, Fittings and Couplings	**X**					Suitable for use with high pressure injection pump.	Backup to primary and alternate methods of high pressure makeup to RCS. Equipment will be provided from RRC. Number per set and size to be determined based on deployment and connection locations.
Three (3) Submersible Pumps and Strainers	**X**	**X**	**X**			500 gpm @325 ft. (141 psi), 70 HP, 480 V	Stored on site in PA.
Two (2) Mobile Cranes	**X**	**X**	**X**		**X**	Rating to lift and deploy submersible pumps and strainers in circulating water intake structure	The mobile cranes used as support equipment for this strategy will be the crane in use for normal operational activities in the circulating water intake area, and any additional mobile crane from on site or offsite (via mutual aid agreement or RRC).
Three (3) Water Purification	**X**	**X**	**X**			142 gpm of fresh water per system from seawater.	Equipment will be provided from RRC. The specified output of each system is

PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Systems							sufficient to meet one unit's reactor decay heat removal requirements at approximately 48 hours post reactor trip, and concurrent SFP cooling (Reference 40). Three systems are required for N+1 to ensure no interruption in cooling should one system fail-in-use or need to be removed from service for maintenance.
Boration Equipment and Consumables	**X**					Supply 60 gpm of 2850 ppm.	Equipment will be provided from RRC. The specified output is for the proposed RRC pump at Technical Specification concentration for the RWSTs
One (1) Containment Spray Pump		**X**				1800 gpm at 300 psi total developed head	Equipment will be provided from RRC. One pump required (can be moved between units).
Debris removal equipment (front end loaders, bulldozers, dump trucks)					**X**	Restore a roadway from the top of the bluffs to the plant's PA, and/or clear debris from pathway in PA or landing zone within PA for deployment of the Phase 3 equipment. (Specific deployment means will be determined as part of RRC playbook development.)	Earth moving equipment at Marine Corps Base Camp Pendleton is available through the mutual aid agreement with SONGS. Additional equipment is available through the state-wide mutual aid network and RRC.

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	
Commodities • Food • Potable water	
Fuel Requirements • Diesel fuel bladders • Fuel transfer carts and pumps	
Heavy Equipment • Transportation equipment • Debris clearing equipment	

Attachment 1A: Sequence of Events Timeline

Action item	Elapsed Time	Action	New Time Constraint Y/N [6]	Time Constraint (hr)	Reference(s)	Remarks
	0	**Event Starts**	**NA**			Plant @100% power
1	15 minutes	Standard Post Trip Actions (SPTAs) include verifying reactor tripped and AFW flow initiated to at least one SG	N		101	
2	20 minutes	Diagnose SBO, enter EOI for SBO. Perform initial actions (minimize steam generator inventory loss, verify TDAFW pump operation and RCS heat removal, minimize RCS leakage)	N		18	
3	20 minutes	Diagnose earthquake, enter AOI for Earthquake	N		33	
4	30 minutes	Open MCR cabinet doors to address loss of HVAC	N		18, 89, 102	
5	30 minutes	Complete initial Class 1E battery load reduction	N		18, 103, 110	
6	30 minutes	Isolate CSTs T120/T121 makeup header [close S2(3)1414MU092]	N		33, 111	
7	45 minutes	Complete initial non-Class 1E 125 VDC battery load reduction	N		18, 104	
8	60 minutes	Open Class 1E 120 VAC/125 VDC distribution room doors to address loss of HVAC	N		90, 102	
9	90 minutes	Isolate condensate transfer pump suction from CST T120 [close 2(3)HV5715]	N		33, 111	
10	90 minutes	Complete additional non-Class 1E 125 VDC and 250 VDC battery load reduction	N		18, 104, 110	

[6] Instructions: Provide justification if No or NA is selected in the New Time Constraint column
If yes include technical basis discussion as required by NEI 12-06 section 3.2.1.7

Action item	Elapsed Time	Action	New Time Constraint Y/N [6]	Time Constraint (hr)	Reference(s)	Remarks
11	2 hours	If DC busses cross-tied, open supply breakers for Y003 (Train C) and Y004 (Train D) inverters	N		103	
12	2 hours	Isolate chemical addition system from AFW	N		33	
13	2 hours	Diagnose ELAP event if loss of AC power expected to last longer than Licensing Basis SBO coping time of 4 hours. Consider 10 CFR 50.54(x) and 50.54(y) to support additional Class 1E battery load reduction. Begin use of FLEX Support Guidelines as needed.	Y	2 hours	20 & 30	
14	2 hours	Initiate plant cooldown/depressurization at 75 °F/hr. to SDC entry conditions (T-hot < 375 °F) using both steam generators and Atmospheric Dump Valves (ADVs)	Y	2 hours	12, 18, 105, 106	
15	2 hours	Request Phase 3 equipment delivery from RRC to staging area. (Staging areas will be determined during RRC playbook development for the site.)	N			New action. Delivery of Phase 3 equipment to staging area at request + 24 hours is at least 46 hours before needed in service.
16	2.5 hours	Complete additional Class 1E battery load reduction: • Re-energize one train of Class 1E 480 VAC distribution system from a FLEX DG and re-power swing battery charger(s) to maintain 2 divisions of Class 1E 120 VAC / 125 VDC, and de-energize other train (2 divisions) of Class 1E 120 VAC / 125 VDC. • If no Class 1E battery chargers have been re-powered, de-energize 3 of 4 Class 1E 120 VAC / 125 VDC divisions and begin using the batteries sequentially	Y	2.5 hours	103, 110	The additional Class 1E battery load reductions are beyond SBO licensing basis. Re-energizing one train of 480VAC with FLEX DG is a new action.

Action item	Elapsed Time	Action	New Time Constraint Y/N [6]	Time Constraint (hr)	Reference(s)	Remarks
17	4 hours	Re-establish MCR ventilation and cooling by: • Running the 100% capacity MCR emergency supply air fan from a re-energized Class 1E power source, or • If a MCR emergency supply air fan cannot be started, by deploying portable fans.	N		89	MCR will not exceed 104 °F with or without fan operation.
18	4 hours	Re-establish Class 1E switchgear and distribution room cooling by opening doors and: • Running the battery room exhaust fans from an energized Class 1E power source, or • If the battery room exhaust fans cannot be started, by deploying portable fans.	Y	4	114	New action.
19	3 hours or 6 hours	If neither train of the Class 1E 480 VAC distribution system has been re-energized, transfer L411 panel to G005 portable generator. (Action required at 3 hours if DC busses cross-tied, or 6 hours if not.)	N		18	L411 is the Essential Plant Parameter Monitoring Panel
20	4 hours	Connect portable pack and isolate the RCP controlled bleedoff relief path to the Quench Tank [close S2(3)HV9216]	N		60	New action. See Table 1B for further discussion of the basis.
21	4 hours	Isolate boric acid injection to AFW	N		33	
22	6 hours	Open cross-tie from CST T120 (or T120 vault) to T121	N		108, 111	CST T121 inventory supports 2 hours at hot standby plus cooldown to SDC entry conditions. Action based on tank level indication in MCR or locally in AFW pump room

Action item	Elapsed Time	Action	New Time Constraint Y/N [6]	Time Constraint (hr)	Reference(s)	Remarks
23	6 hours	Cooldown and depressurization completed	N		46	SDC entry conditions reached within 6 hours even if cooldown rate of 75 °F/hr cannot be maintained
24	8 hours	Begin local manual operation of Atmospheric Dump Valves	N		12	The ADV nitrogen accumulators have an 8 hour capacity
25	14 hours	SFP vent path established through ventilation exhaust system	Y	14 hours	75, 76, 78	Based on time to boil for maximum SFP heat load with core still in reactor vessel
26	14 hours	SFP makeup initiated	Y	14 hours	75, 76, 78	Based on time to boil for maximum SFP heat load with core still in reactor vessel. Alternate makeup path depends on access to SFP operating deck, which is precluded after boiling begins.
27	24 hours	Initiate makeup to CST T120 or T121 from Primary Plant Makeup Tank using FLEX pump powered from FLEX DG.	Y	24hours	12	New action. Will be based on tank level indication (in MCR or locally in AFW pump room) vs. time
28	24 hours	Refuel onboard tanks of the FLEX portable pumps and DGs from the EDG day tanks and re-energize the EDG fuel transfer pumps to makeup to the EDG day tanks from the diesel fuel oil storage tanks	Y	24 hours	92, 94, 95	New action.

Action item	Elapsed Time	Action	New Time Constraint Y/N [6]	Time Constraint (hr)	Reference(s)	Remarks
29	26 hours	Phase 3 equipment begins to arrive at staging area near site.	N		4	Delivery of Phase 3 equipment to staging area at request + 24 hours is at least 46 hours before needed in service.
30	72 hours	Complete clearing of a pathway into or landing zone within the PA using debris removal equipment from Marine Corps Base Camp Pendleton or RRC. Deploy water purification units delivered from RRC	Y	72 hours	68, 120	New action. Specific delivery method from staging area (ground transportation, barge, or cargo helicopter) will be determined during RRC playbook development for the site. [OPEN ITEM OI-2]
31	72 hours	Initiate makeup to CST T120 or T121 from submersible seawater pumps and strainers through the water purification units. Shift SFP makeup from RWSTs to CSTs.	Y	72 hours	43	New action. Shifting SFP makeup to CSTs preserves remaining RWST inventory for RCS makeup
32	72 hours	Start a charging pump to inject boric acid to the RCS for makeup and reactivity control: • From the Boric Acid Makeup tanks then RWSTs using a permanent charging pump powered through the 480 VAC distribution system from a FLEX DG, or • From the RWSTs using a portable charging pump.	N		118	Earliest time at which pumped RCS makeup may be needed. Actual time depends on RCS leakage.
33	17 days	Initiate containment spray using portable pump from RRC.	N		69	New action. Containment pressure exceeds design between 17 and 20 days but only reaches about 71 psig at 120 days.

Action item	Elapsed Time	Action	New Time Constraint Y/N [6]	Time Constraint (hr)	Reference(s)	Remarks
34	20 days	Makeup to Diesel Fuel Storage Tanks from fuel bladders delivered from RRC	Y	20 days	92, 94, 95	New action. Calculated fuel consumption does not include equipment delivered from RRC

Attachment 1B: NSSS Significant Reference Analysis Deviation Table

Item	Parameter of interest	WCAP value	WCAP page	Plant applied value	Gap and discussion
1	SG makeup pressure	300 psig	3-8	150 psig	The 300 psig generic pressure is required for Westinghouse reactors, but not for CE reactors. The site-specific capability of the portable SG feed system for the CE reactors at SONGS is based on removing decay heat at 1 hour (327 gpm per Reference 37) at the SG pressure corresponding to Shutdown Cooling (SDC) entry conditions (350 °F and 376 psia per Reference 12). SONGS cooldown is not limited by reactivity (Reference 9) and the RCS pressure remains above the minimum to prevent accumulator nitrogen injection (Reference 9) at the lower SG pressure.
2	Steam generator pressure at end of cooldown	120 psia	4-16	135 psia	The SONGS value is based on minimum SG pressure for operation of the TDAFW pump, which corresponds to T-cold of 350 F (Reference 24).
3	Time at which RCP CBO flow is isolated	20 minutes	4-27	4 hours	The AC motor-operated isolation valve in the RCP controlled bleedoff relief path to the Quench Tank cannot be closed in 20 minutes following an ELAP because portable power must be connected. The longer time for isolation has no impact on RCP seal integrity because the SONGS RCP seal design was tested for the conditions of a 4 hour SBO including continued bleedoff flow, and demonstrated no degradation of elastomer properties (References 59 and 60).
4	Cooldown rate	75 °F/hr maintained until SG pressure reaches 120 psia	4-27	75 °F/hr initial cooldown rate, decreasing after ADVs reach 100% open as SG pressure is reduced	SONGS ADVs are not sized to maintain a 75 °F/hr cooldown rate at lower SG pressure (Reference 93). Cooldown will still be completed within 6 hours post-trip even at a cooldown rate of 50 °F/hr (Reference 46).

Attachment 2: Milestone Schedule

	Unit 2	Unit 3
Submit FLEX Overall Integrated Plan to NRC	02/28/2013	
Regional Response Center 2 (Phoenix) operational	1Q2014	
Design of modifications	2Q2014	4Q2014
Equipment procurement	4Q2014	2Q2015
Procedure guidance development	4Q2015	
Installation	1Q2016	4Q2016
Training	1Q2016	4Q2016
FLEX implementation complete	1Q2016	4Q2016

Order EA-12-049 required full implementation of this Plan no later than two refueling cycles after submittal of the Overall Integrated Plan, or by December 31, 2016, whichever comes first.

FLEX implementation for Unit 2 is currently scheduled to be completed by February 16, 2016, based on the end of the second refueling outage for Unit 2 following submittal of this Plan.

FLEX implementation for Unit 3 is currently scheduled to be completed prior to December 31, 2016, because Unit 3 is in an extended outage and not expected to experience two refueling cycles prior to the end of 2016.

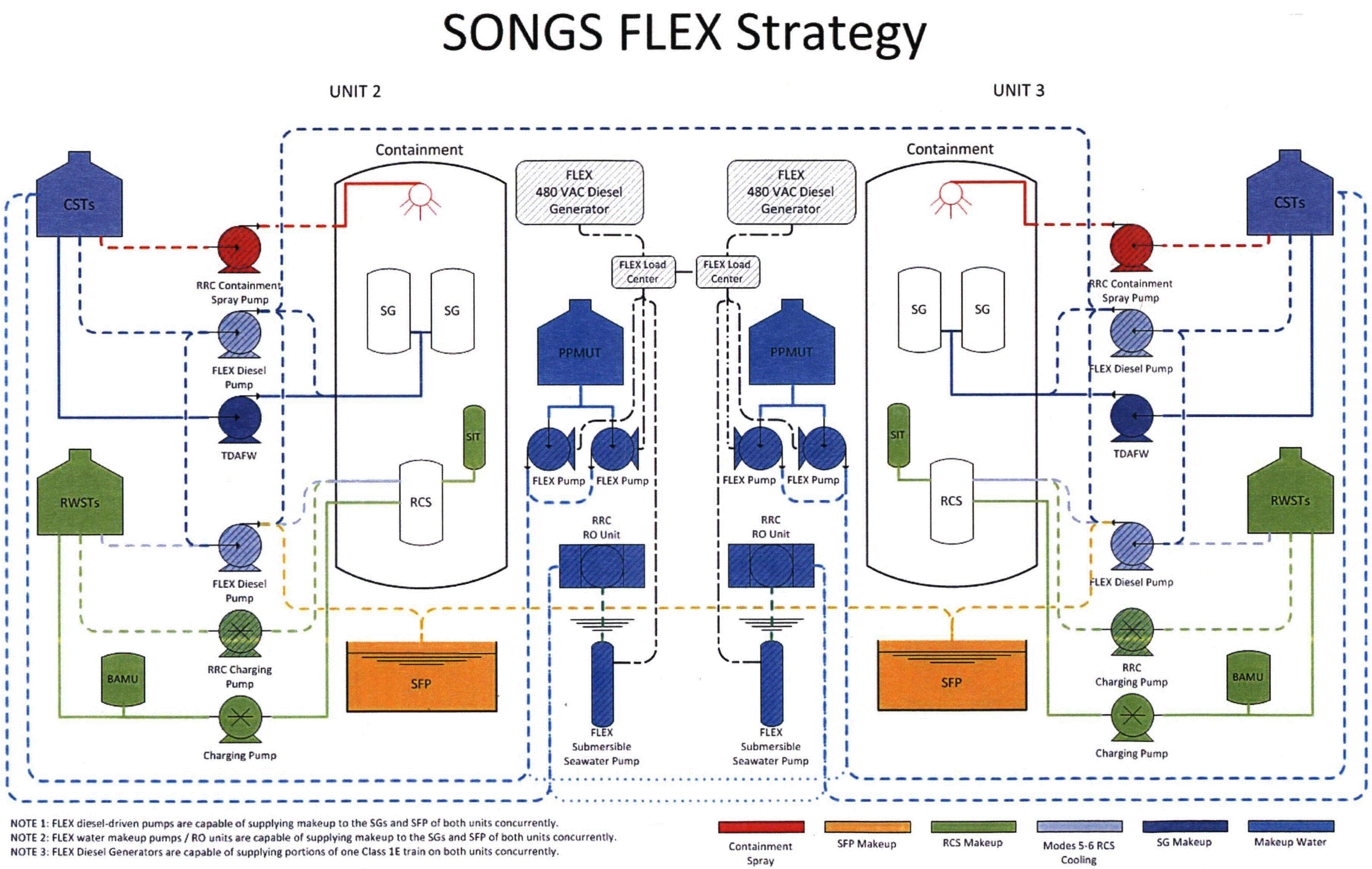
The dates specified by NRC Order EA-12-049 are regulatory obligations. Other dates above are planned dates subject to change.

Consistent with the requirements of the Order, status reports will be generated in six (6) month intervals from the submittal of this Plan. These submittals will outline progress made, any proposed changes in compliance methods and updates to the proposed schedule. Also, SCE will report to the NRC when full compliance with the requirements of Attachment 2 of Order EA-12-049 has been achieved.

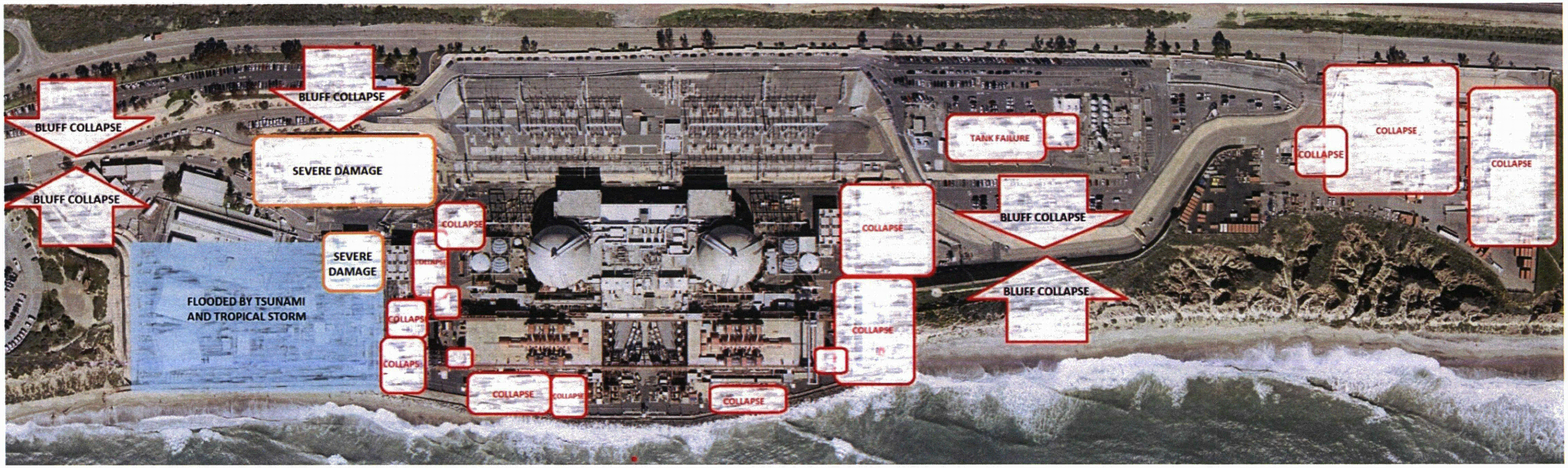
Attachment 3: Conceptual Sketches

Attachment 3-1	SONGS FLEX Strategy Diagram (1 sheet)
Attachment 3-2	Summary of Post-SSE Site Impacts (1 sheet)
Attachment 3-3	Summary of Post-SSE PA Impacts and FLEX Storage/Deployment (1 sheet)
Attachment 3-4	Steam Generator Makeup Conceptual Sketches (9 sheets)
Attachment 3-5	Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (8 sheets)
Attachment 3-6	SFP Makeup and Spray Conceptual Sketches (3 sheets)
Attachment 3-7	Containment Spray Conceptual Sketches (5 sheets)
Attachment 3-8	CST and RWST Makeup Conceptual Sketches (5 sheets)
Attachment 3-9	FLEX Diesel Generators and Power Distribution Conceptual Sketch (2 sheets)

Attachment 3-1: SONGS FLEX Strategy Diagram (Sheet 1 of 1)

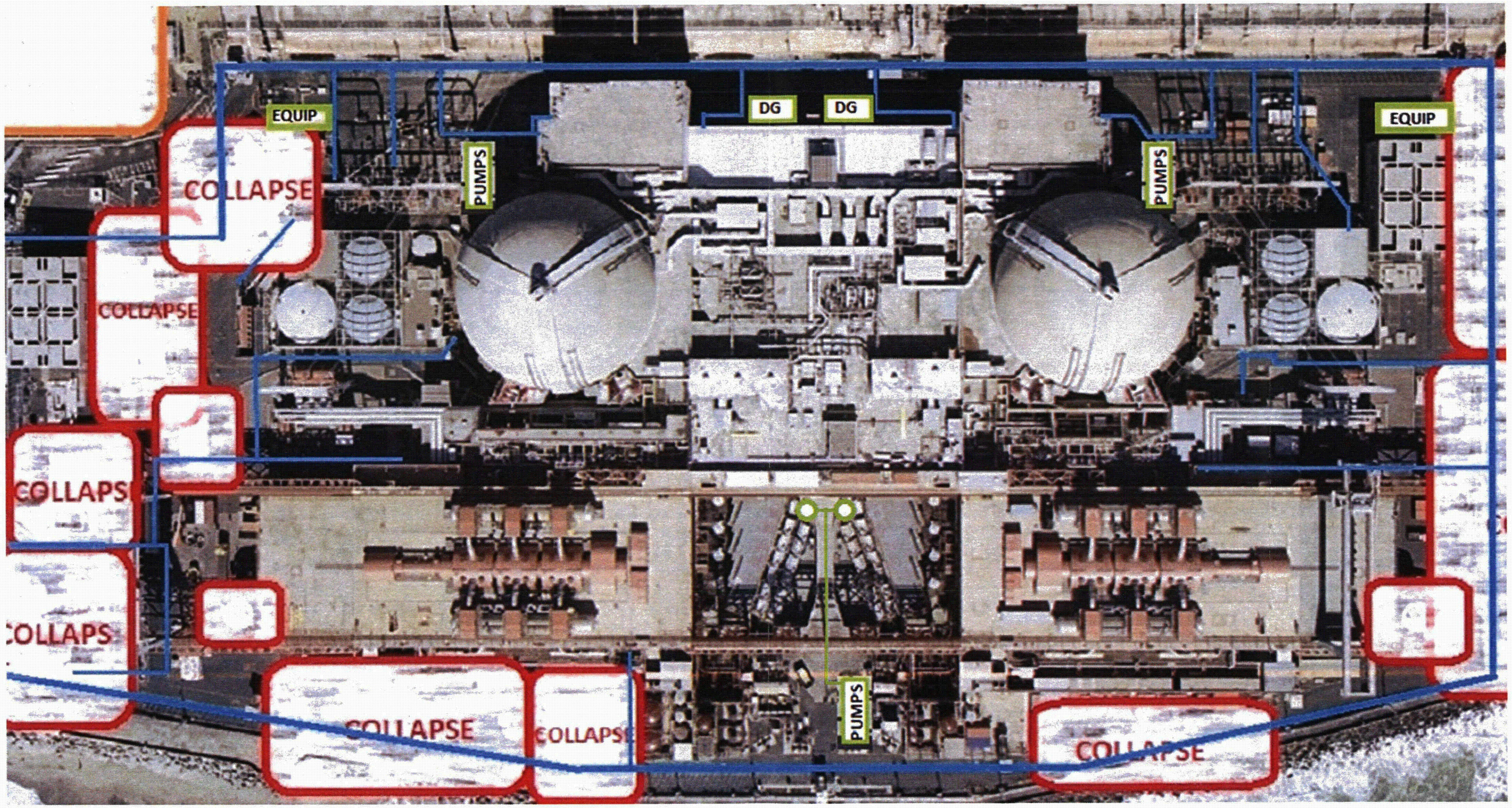


Attachment 3-2: Summary of Post-SSE Site Impacts (Sheet 1 of 1)



- Non-Seismic Category I slopes, structures and tanks assumed to fail as shown.
- North Industrial Area assumed to flood without credit for seawall flood barrier as shown.

Attachment 3-3: Summary of Post-SSE Protected Area Impacts and FLEX Storage/Deployment Locations (Sheet 1 of 1)



- Non-Seismic Category I structures and tanks assumed to fail as shown.
- Non-Seismic Category I Fire Water System buried piping assumed to fail causing sink holes.
- FLEX Diesel Generators and FLEX Diesel Pumps stored in deployment locations on east road as shown. Miscellaneous FLEX equipment stored in cargo containers on east road in approximate locations shown.
- FLEX Submersible Seawater Pumps stored in Circulating Water Intake gate area and deployed to Fish Elevator area along route shown.

Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 1 of 9)

Hose Routing to Primary Discharge Connections

[...]

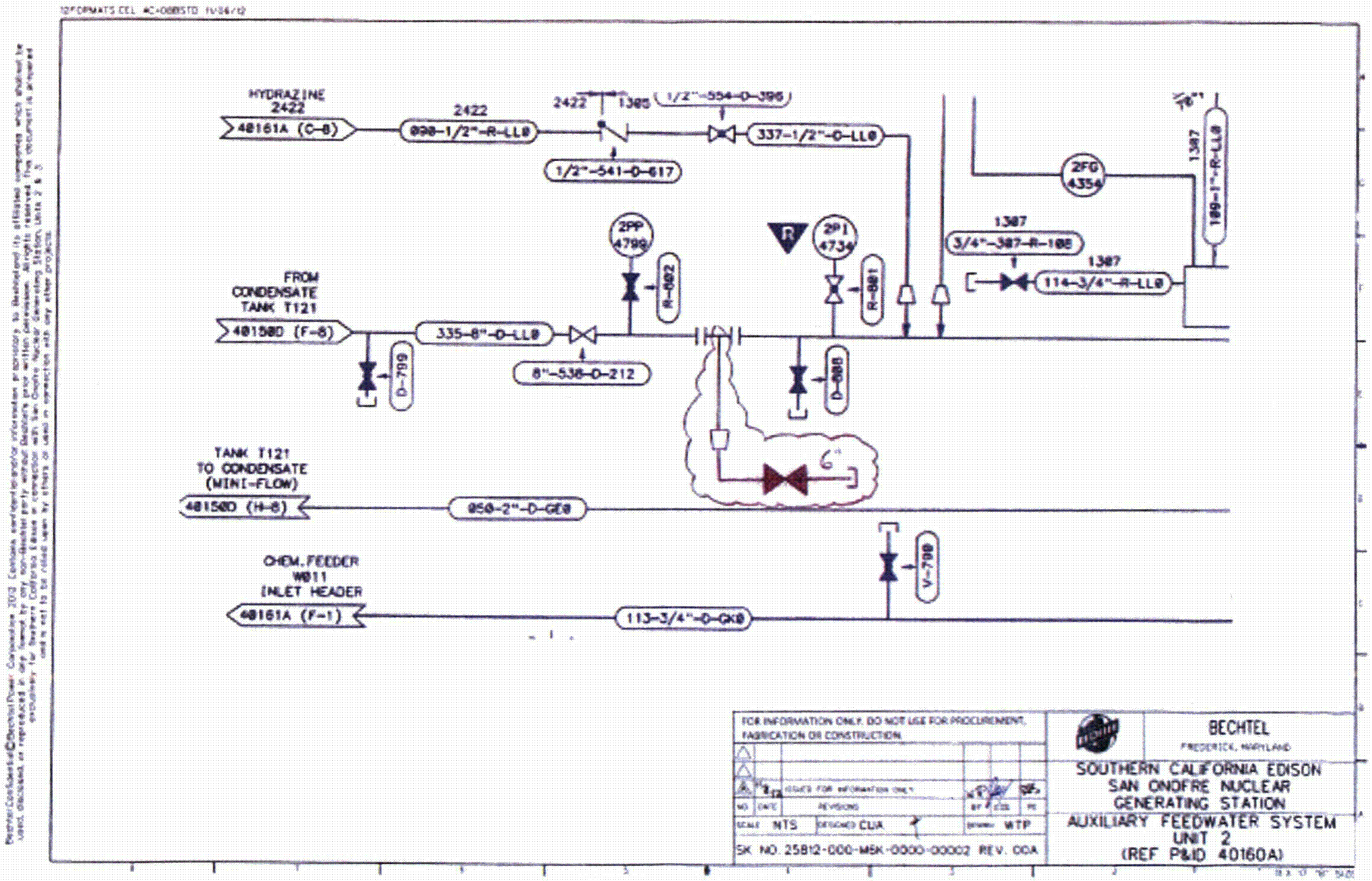
Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 2 of 9)

Hose Routing toAlternate Discharge Connections

[...]

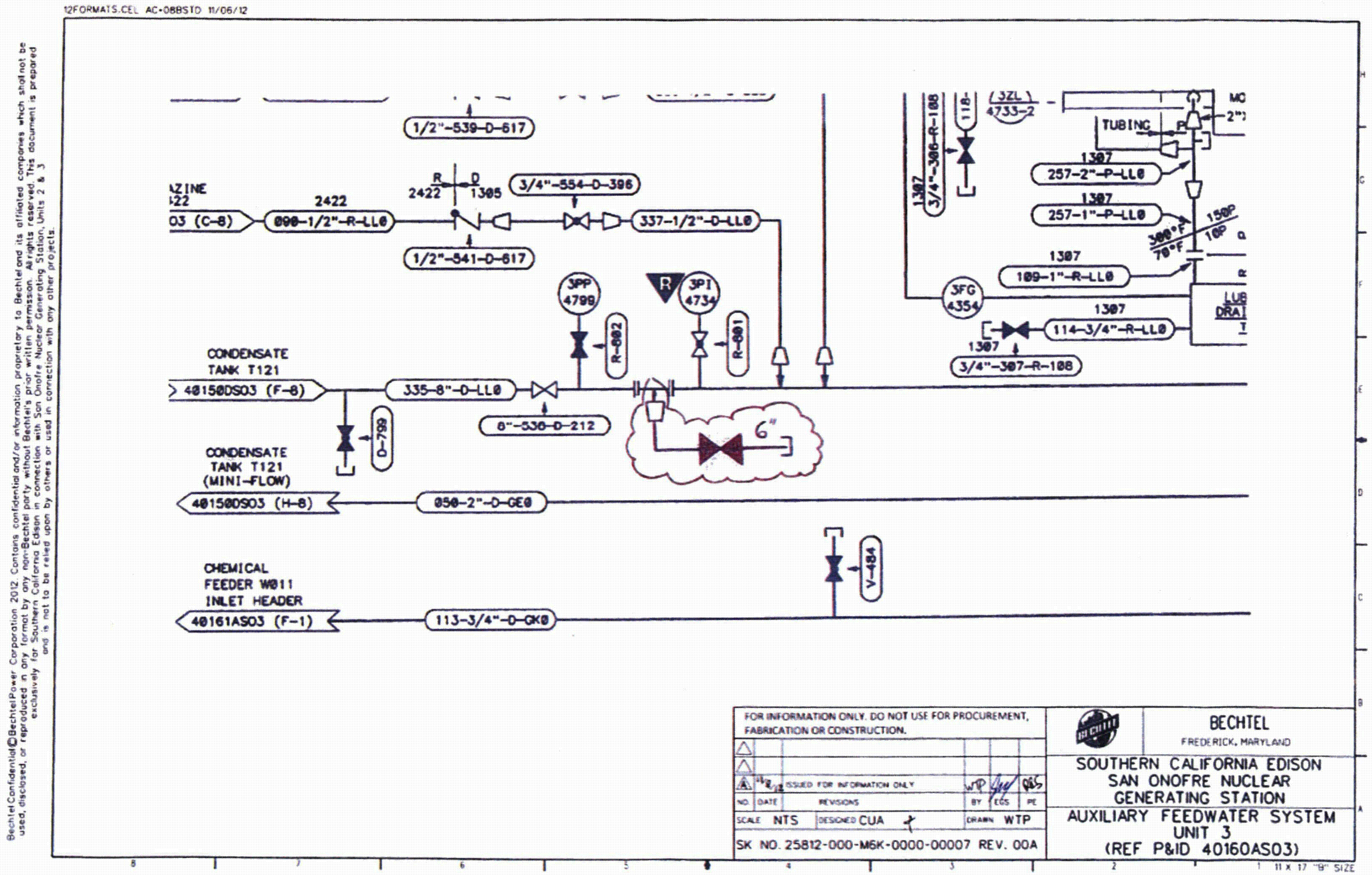
Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 3 of 9)

Primary Suction Connection in Unit 2 --NEW



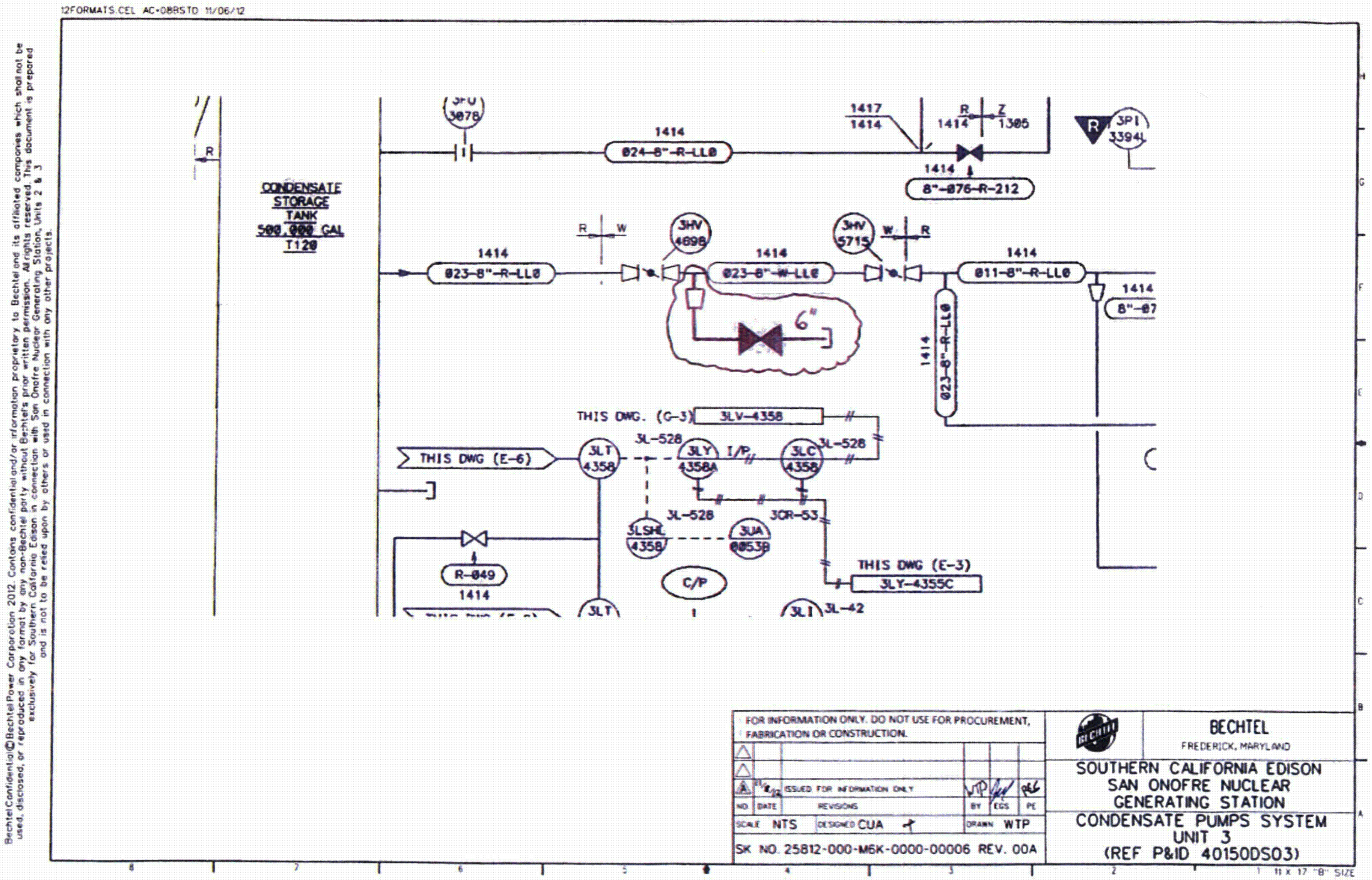
Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 4 of 9)

Primary Suction Connection in Unit 3 -- NEW



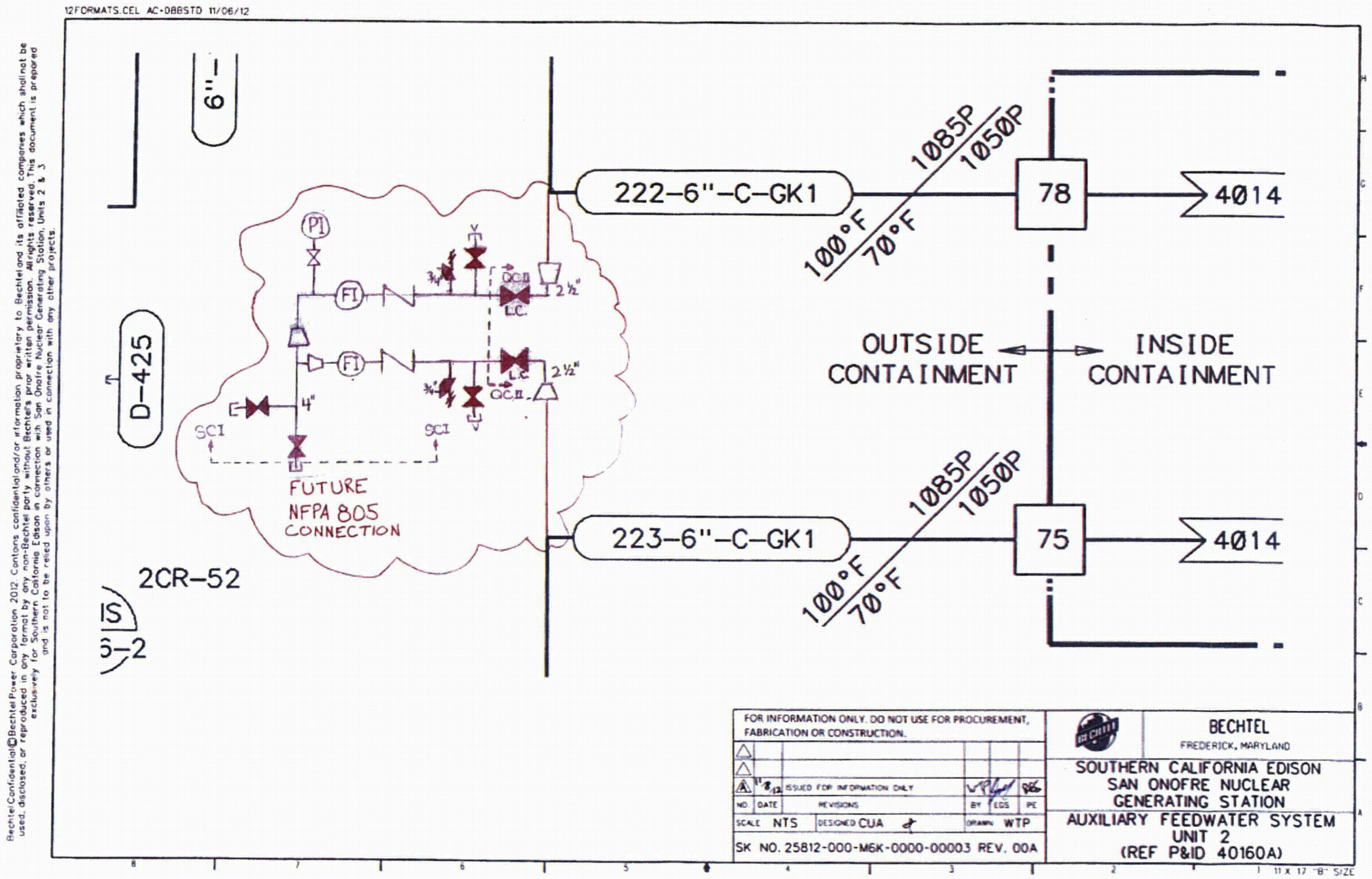
Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 5 of 9)

Alternate Suction Connection in Unit 3 -- NEW



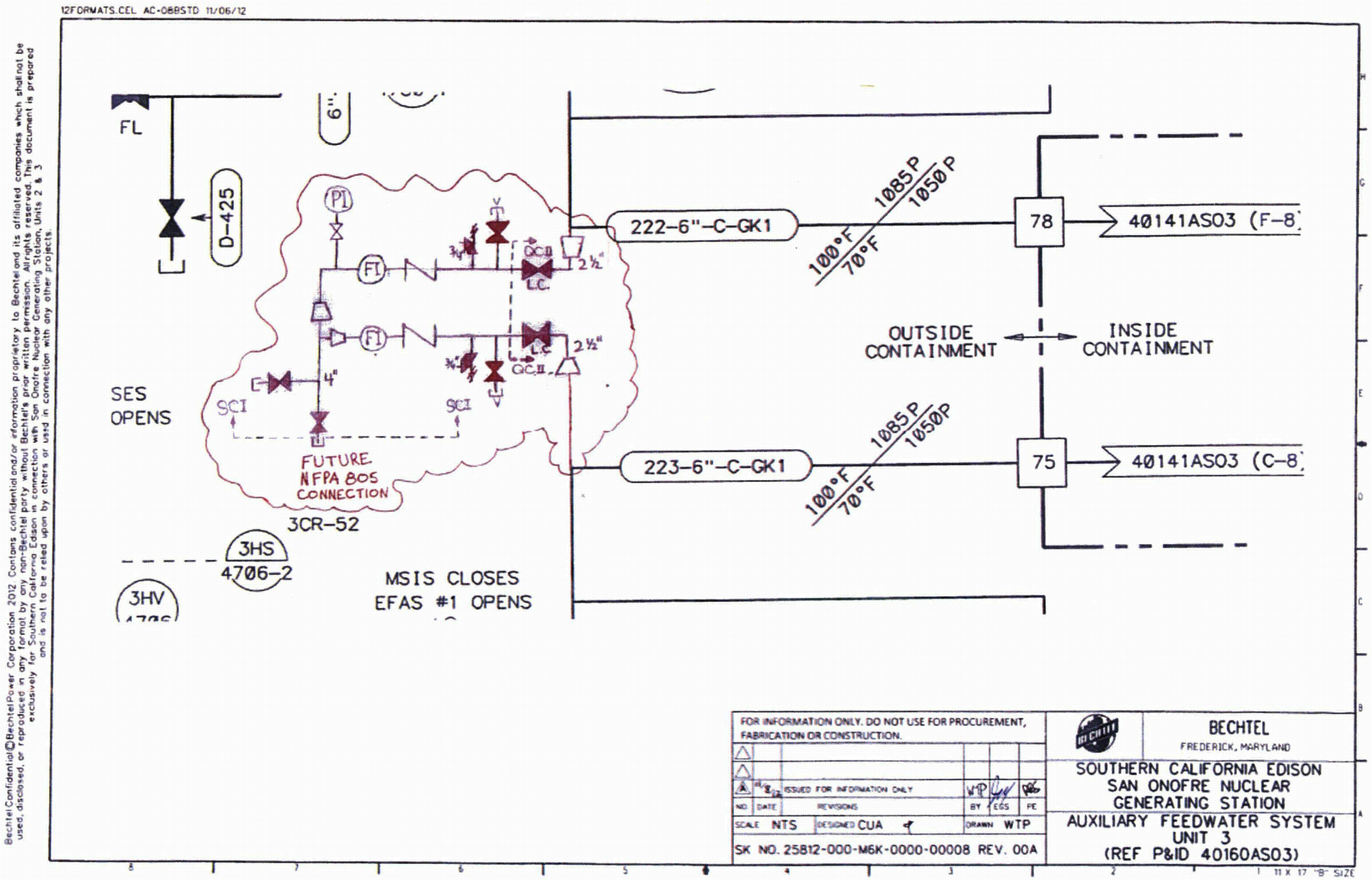
Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 6 of 9)

Primary Discharge Connection in Unit 2 -- NEW



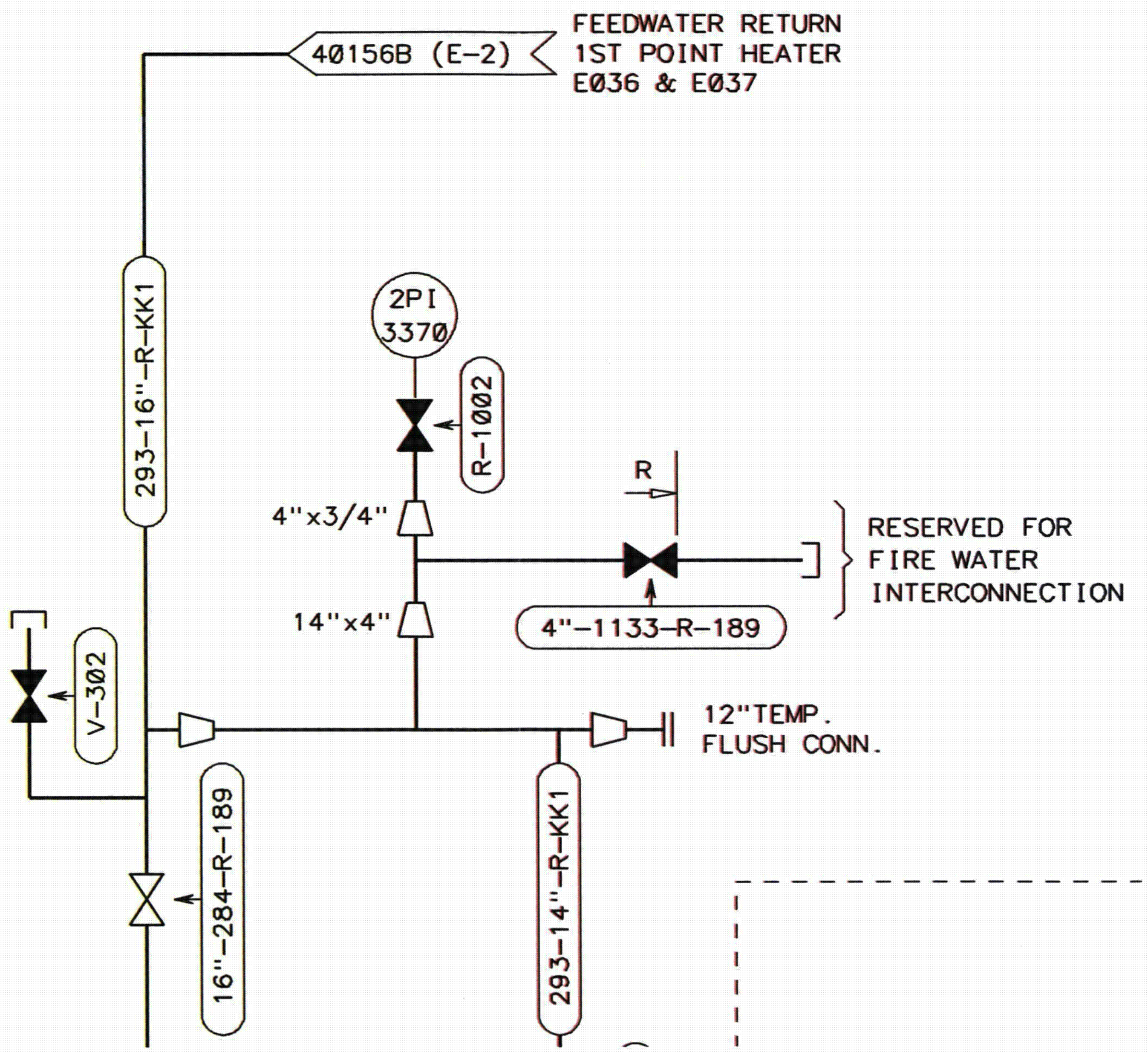
Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 7 of 9)

Primary Discharge Connection in Unit 3 -- NEW



Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 8 of 9)

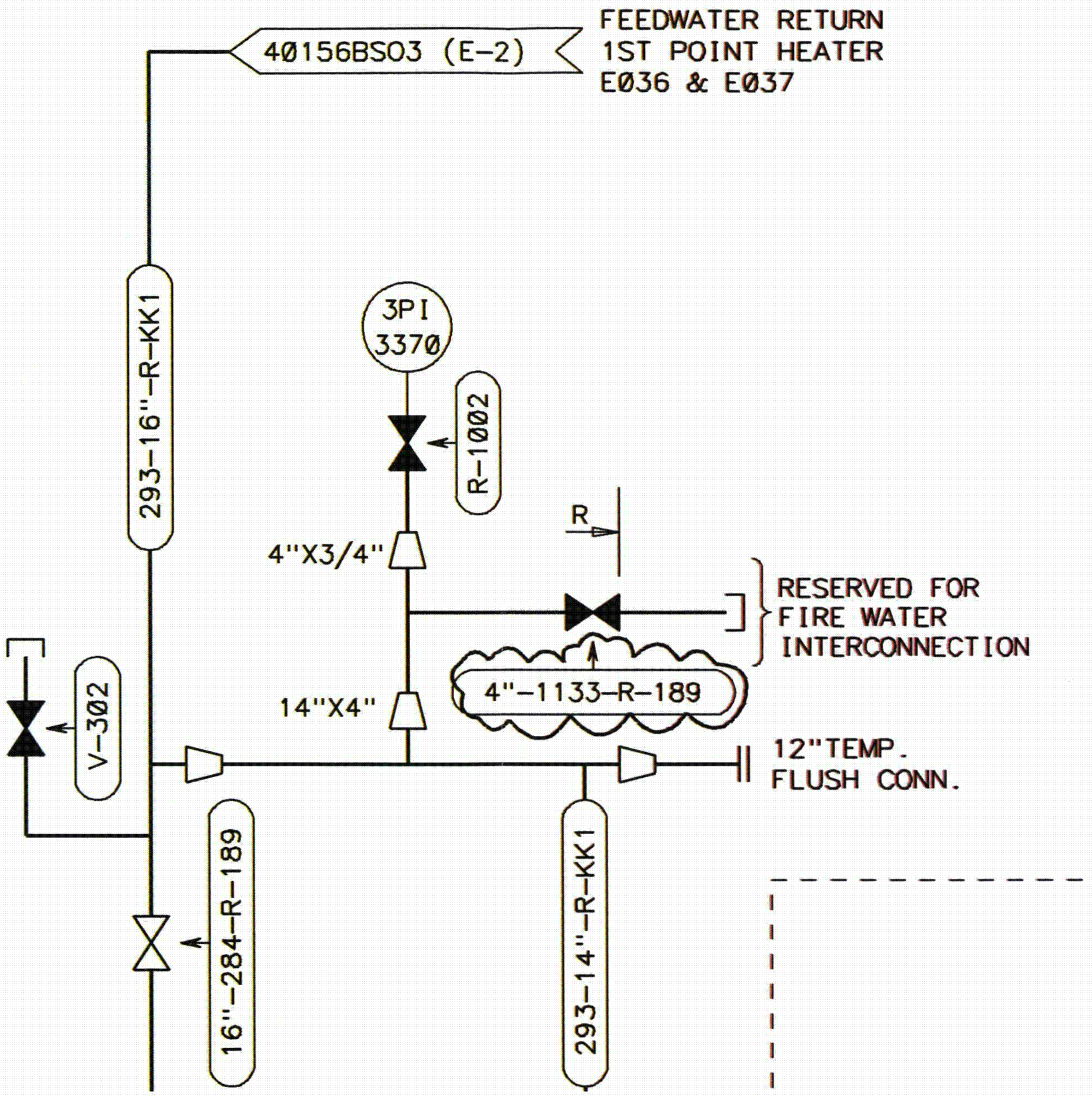
Alternate Discharge Connection in Unit 2 – EXISTING



From P&ID 40150A coordinate F-8

Attachment 3-4: Steam Generator Makeup Conceptual Sketches (Sheet 9 of 9)

Alternate Discharge Connection in Unit 3 -- EXISTING



From P&ID 40150ASO3 coordinate F-8

Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 1 of 8)

Hose Routing to Primary Discharge Connection

[...]

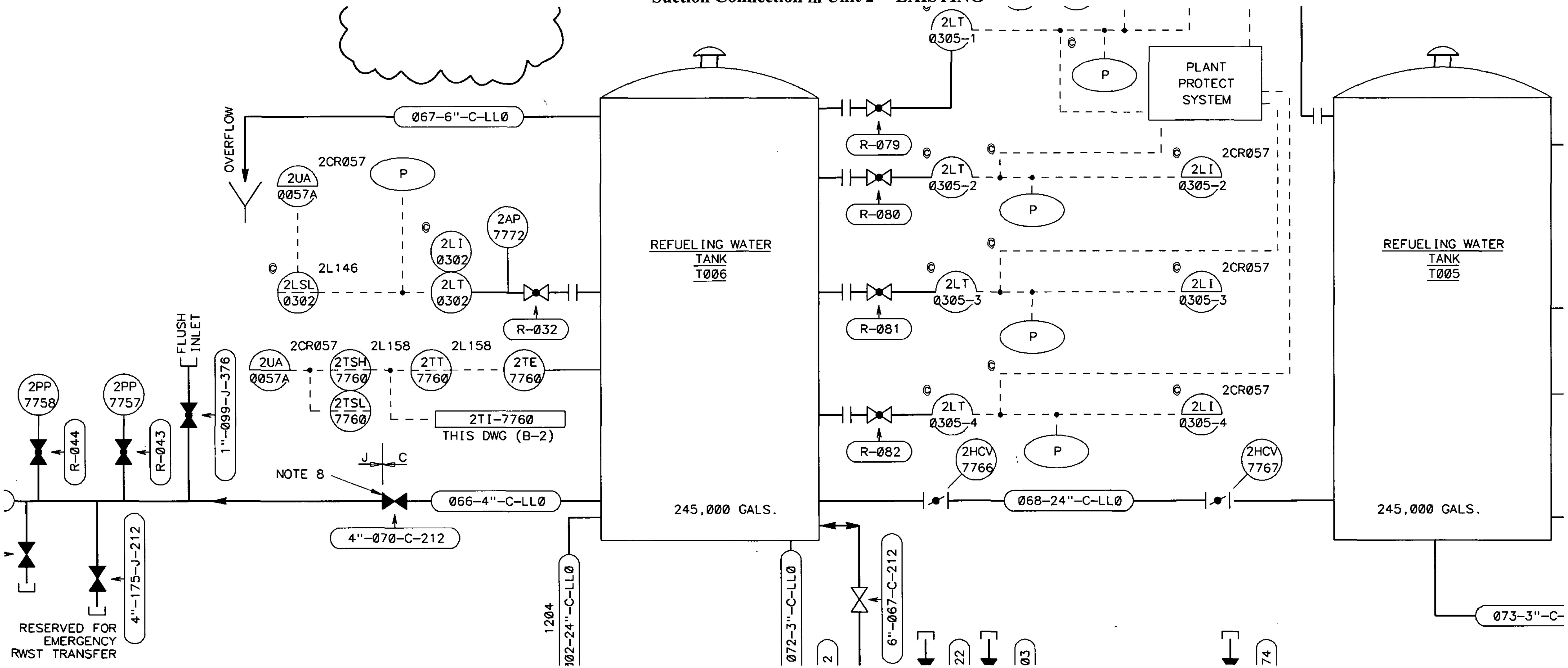
Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 2 of 8)

Hose Routing to Alternate Discharge Connection

[...]

Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 3 of 8)

Suction Connection in Unit 2 -- EXISTING

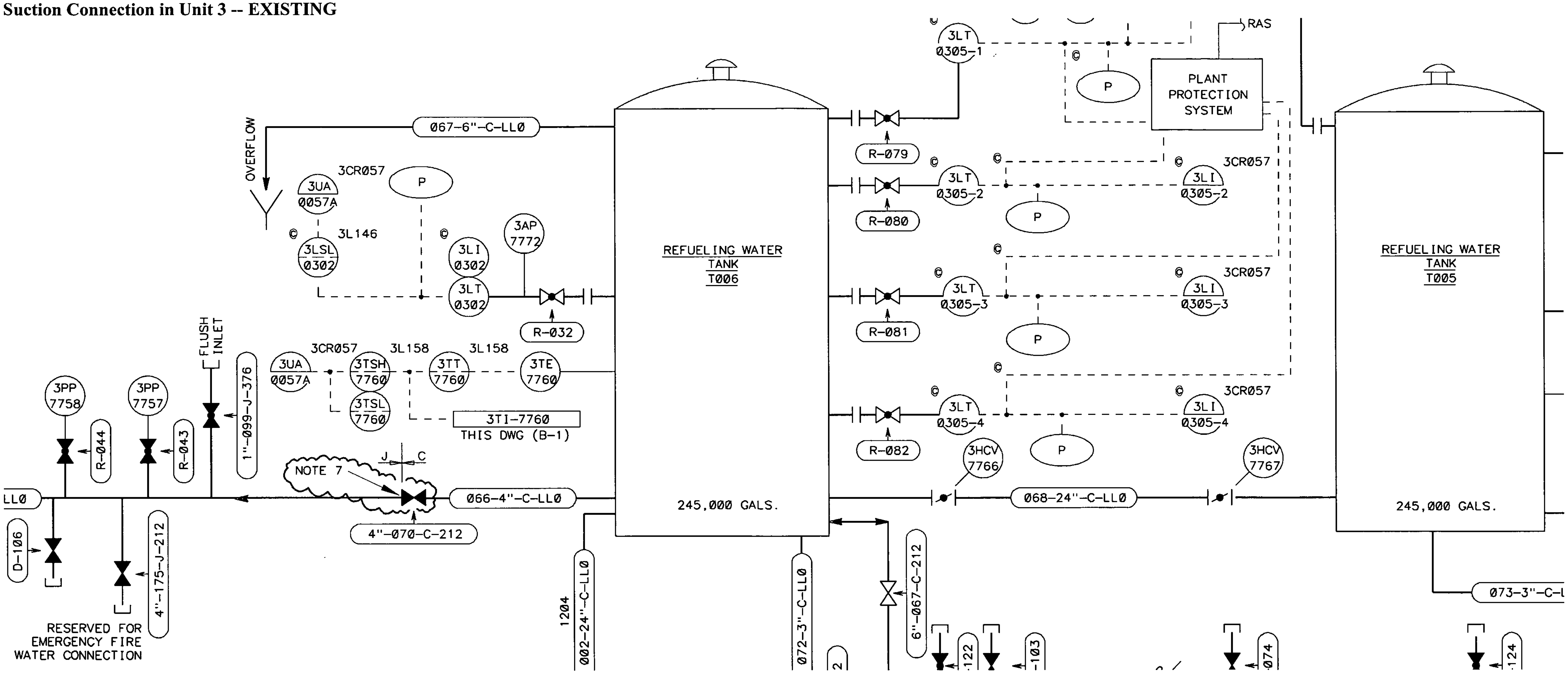


↑ CONNECTION FOR FLEX PORTABLE PUMP

From P&ID 40122A coordinates B-2 to B-6

Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 4 of 8)

Suction Connection in Unit 3 -- EXISTING

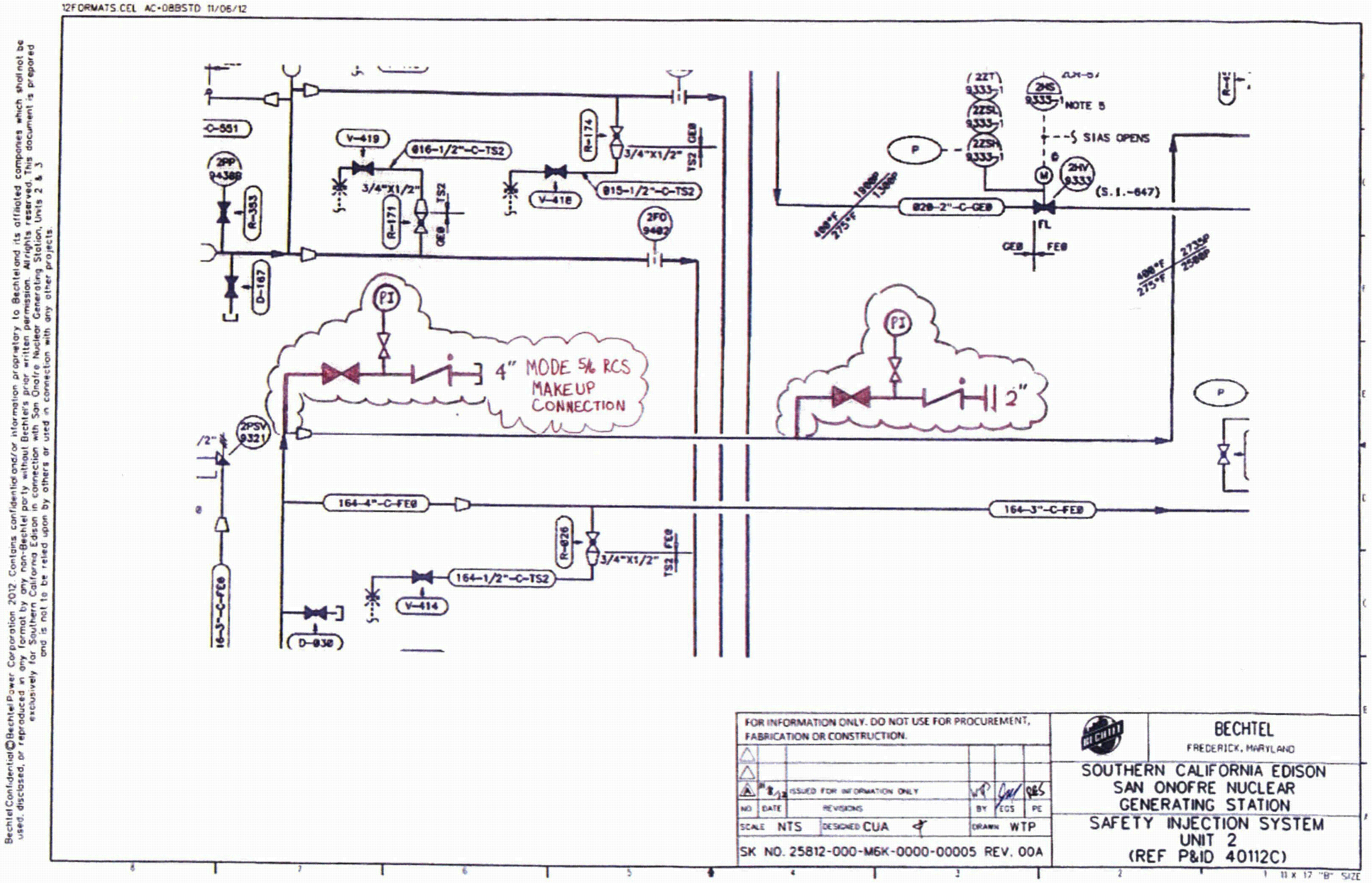


↑ CONNECTION FOR FLEX PORTABLE PUMP

From P&ID 40122ASO3 coordinates B-2 to B-6

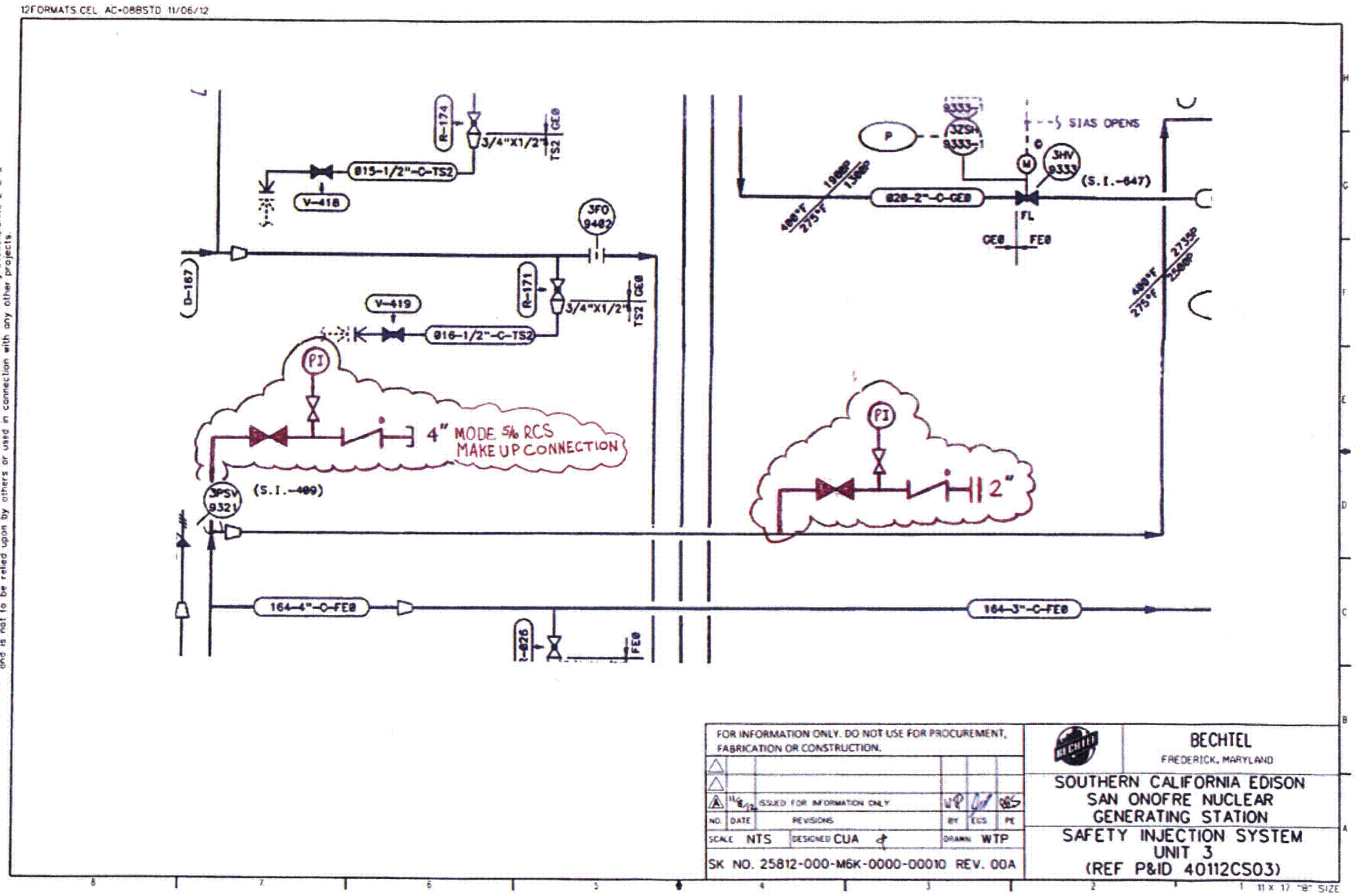
Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 5 of 8)

Primary Heat Removal and High Pressure Makeup Connections in Unit 2 -- NEW



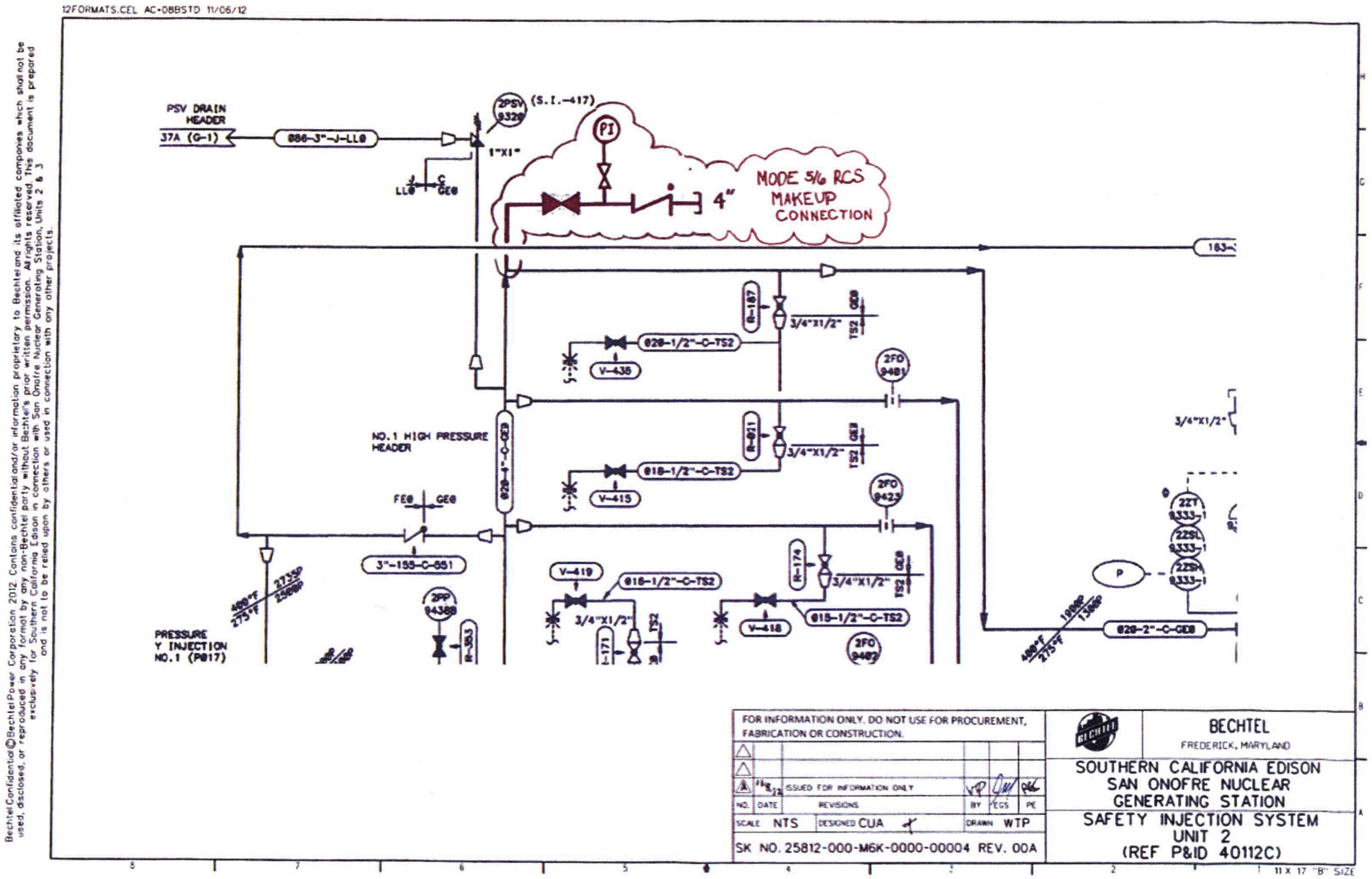
Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 6 of 8)

Primary Heat Removal and High Pressure Makeup Connections in Unit 3 -- NEW



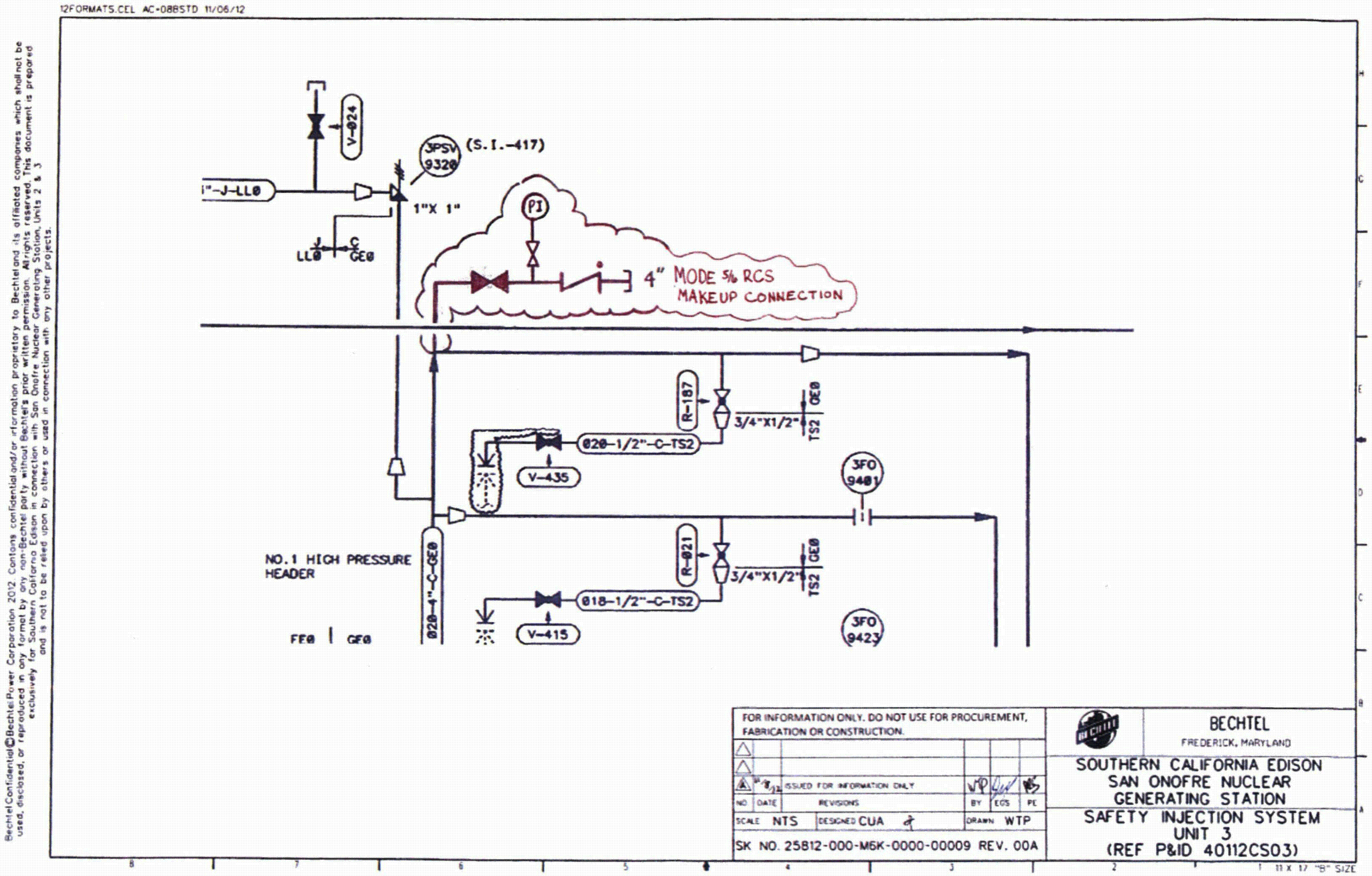
Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 7 of 8)

Alternate Heat Removal Connection in Unit 2 -- NEW



Attachment 3-5: Mode 5-6 Heat Removal and RCS Makeup Conceptual Sketches (Sheet 8 of 8)

Alternate Heat Removal Connection in Unit 3 – NEW



Attachment 3-6: Spent Fuel Pool Makeup and Spray Conceptual Sketches (Sheet 1 of 3)

Hose Routing to Primary Makeup Connection

[...]

Attachment 3-6: Spent Fuel Pool Makeup and Spray Conceptual Sketches (Sheet 2 of 3)

Hose Routing to Spray and Alternate Discharge Connection

[...]

Attachment 3-6: Spent Fuel Pool Makeup and Spray Conceptual Sketches (Sheet 3 of 3)

Suction Connections

Same as Attachment 3-4 Sheets 3, 4 and 5 for suction from Condensate Storage Tanks

Same Attachment 3-5 Sheets 3 and 4 for suction from Refueling Water Storage Tanks

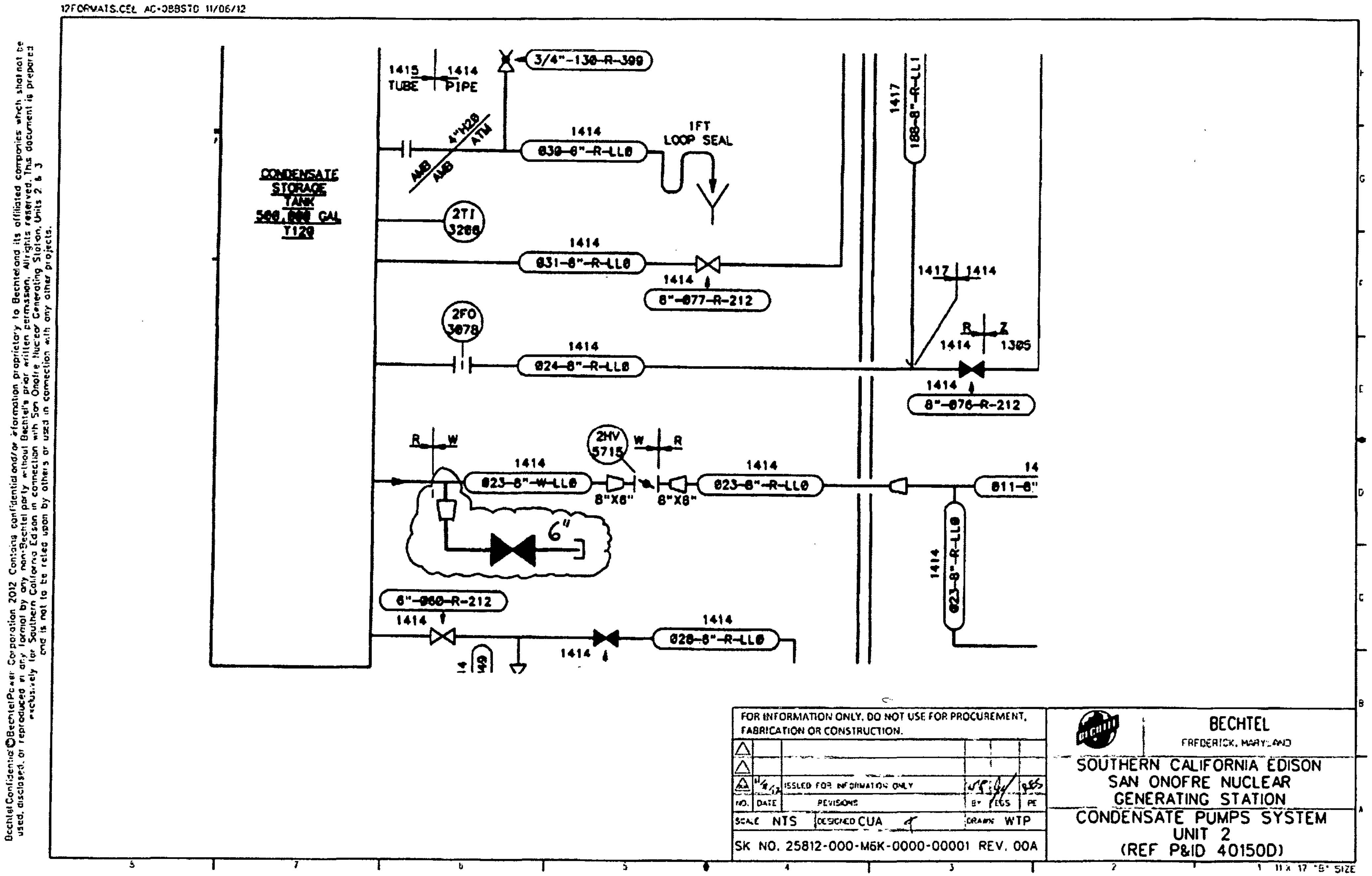
Attachment 3-7: Containment Spray Conceptual Sketches (Sheet 1 of 5)

Hose Routing

[...]

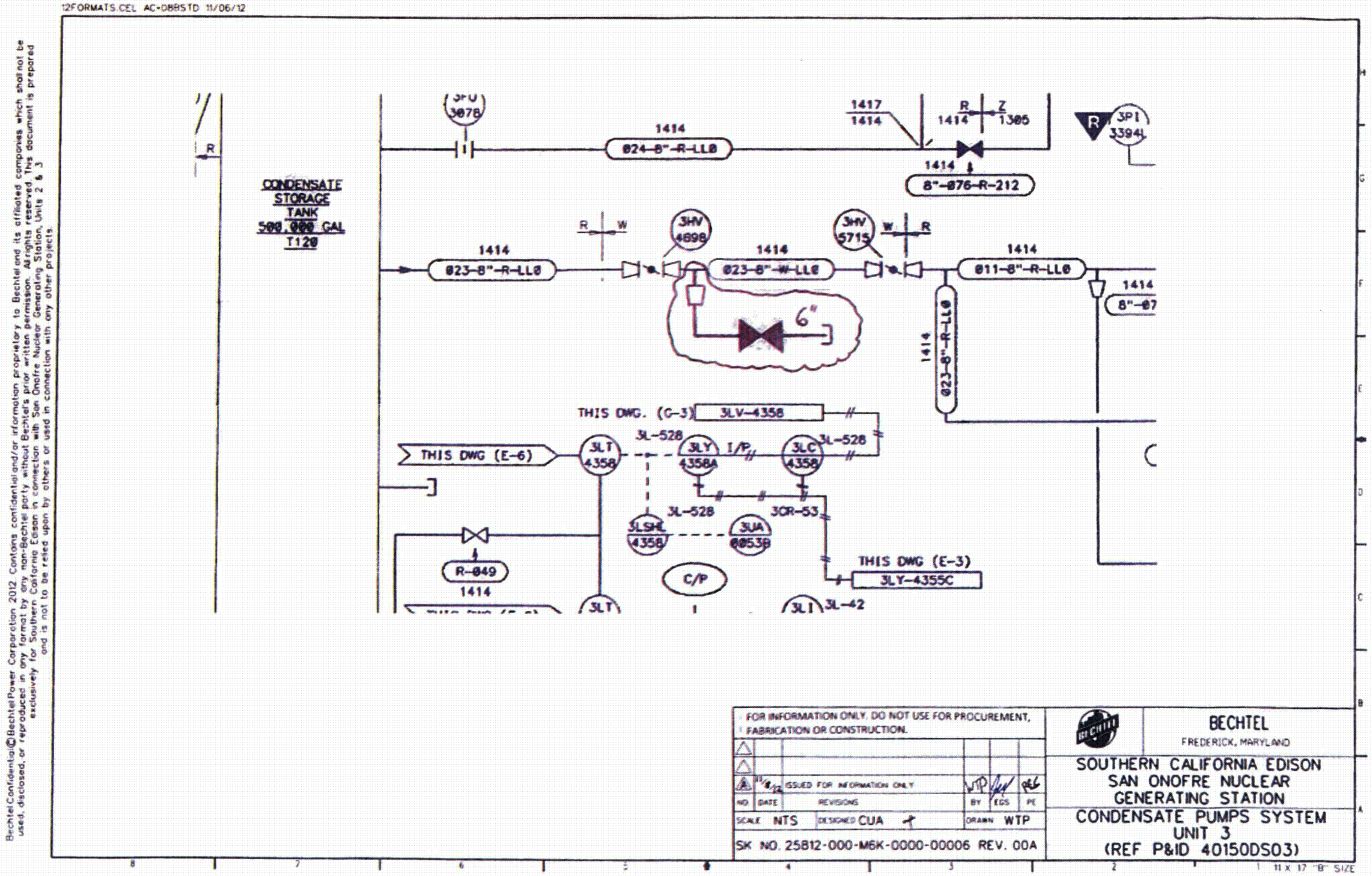
Attachment 3-7: Containment Spray Conceptual Sketches (Sheet 2 of 5)

Suction Connection in Unit 2 – NEW



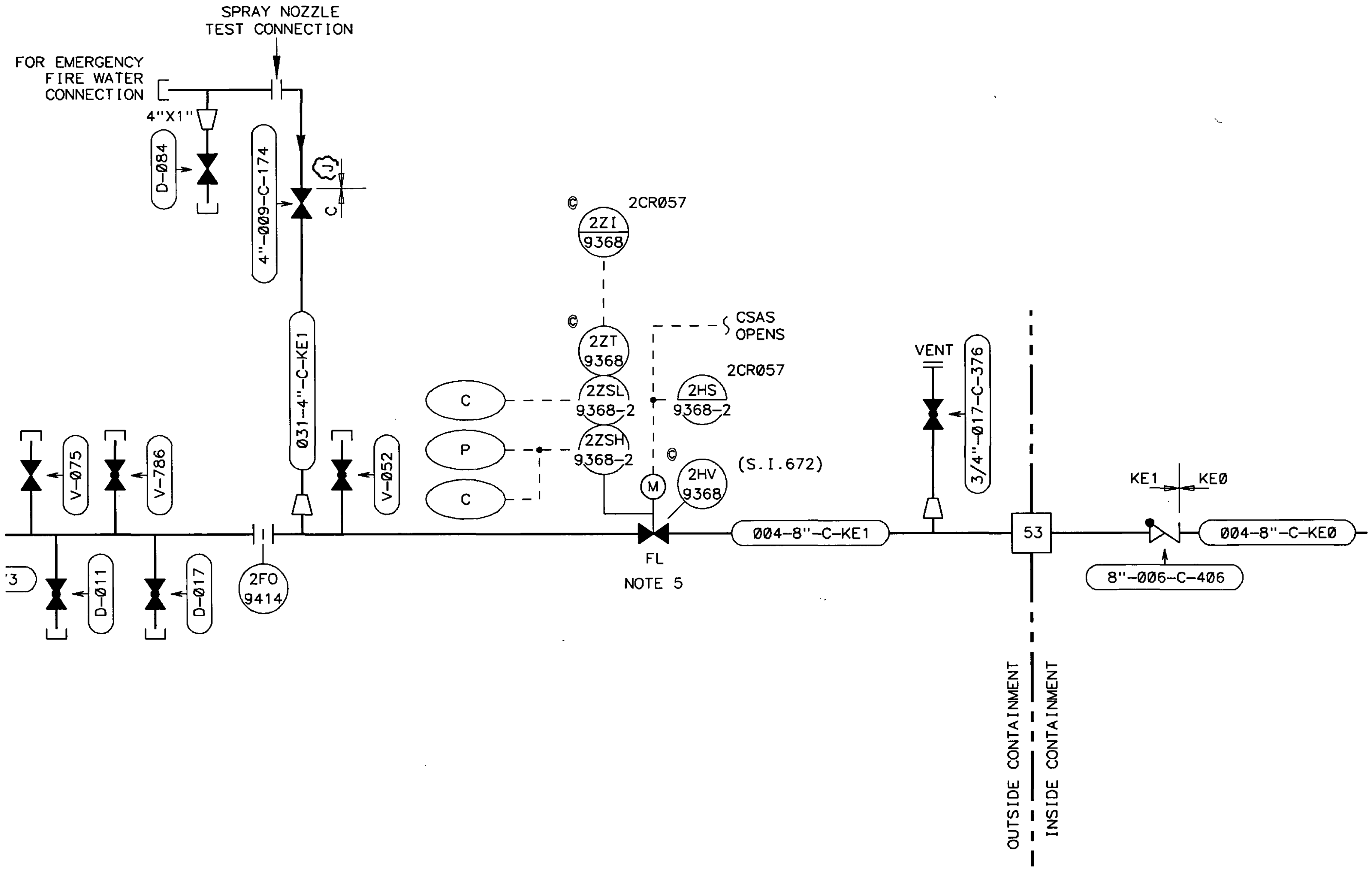
Attachment 3-7: Containment Spray Conceptual Sketches (Sheet 3 of 5)

Suction Connection in Unit 3 – NEW



Attachment 3-7: Containment Spray Conceptual Sketches (Sheet 4 of 5)

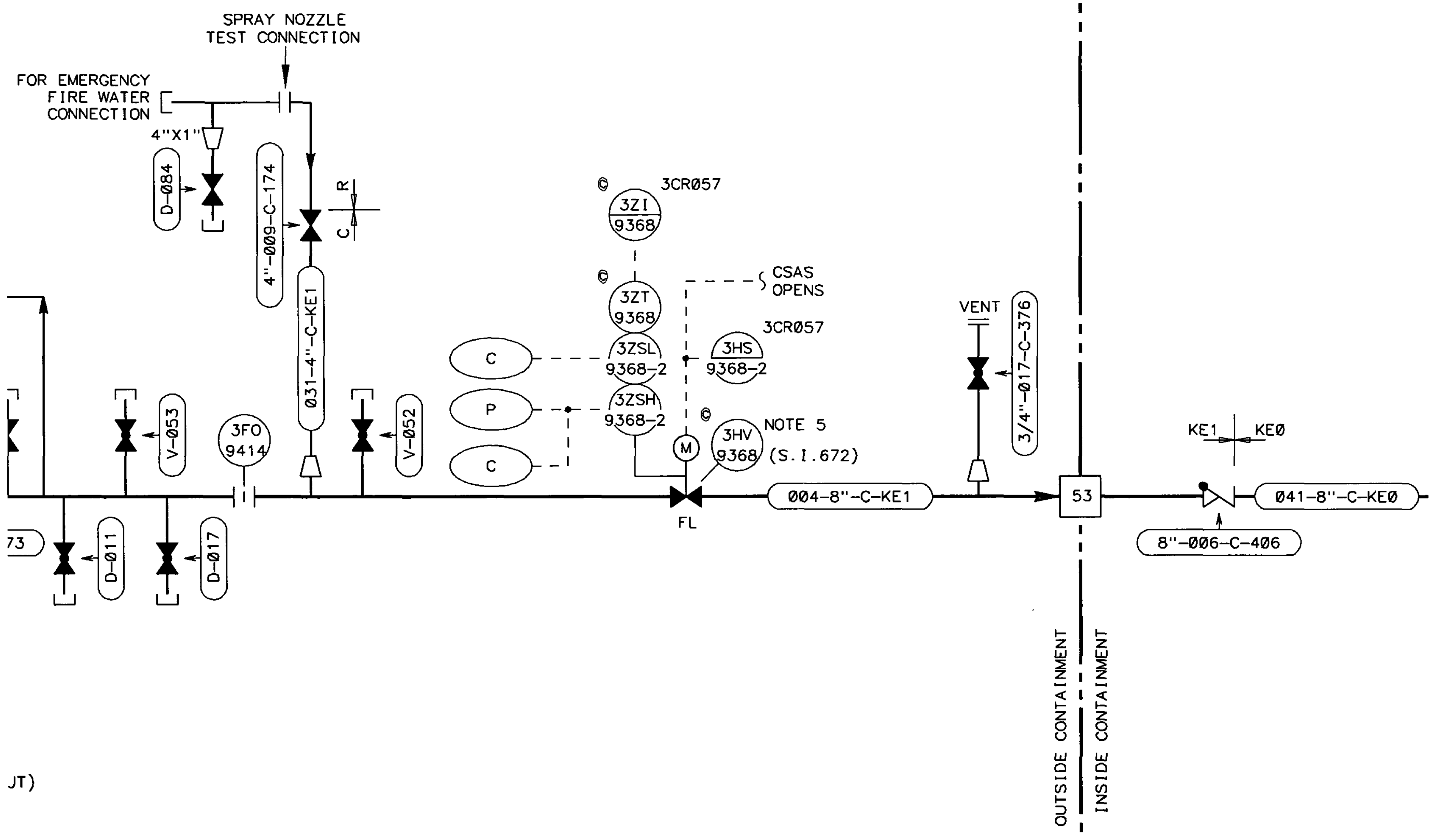
Discharge Connection in Unit 2 – EXISTING



From P&ID 40114B coordinate H4

Attachment 3-7: Containment Spray Conceptual Sketches (Sheet 5 of 5)

Discharge Connection in Unit 3 – EXISTING



From P&ID 40114BSO3 coordinate H-4

Attachment 3-8: CST and RWST Makeup Conceptual Sketches (Sheet 1 of 5)

Hose Routing from Primary Plant Makeup Tanks

[...]

Attachment 3-8: CST and RWST Makeup Conceptual Sketches (Sheet 2 of 5)

Hose Routing from Submersible Seawater Pumps

[...]

Attachment 3-8: CST and RWST Makeup Conceptual Sketches (Sheet 3 of 5)

Primary Plant Makeup Tank Pumps – NEW

[…]

Attachment 3-8: CST and RWST Makeup Conceptual Sketches (Sheet 4 of 5)

Primary Plant Makeup Tank Pump Connections – NEW

[...]

Attachment 3-8: CST and RWST Makeup Conceptual Sketches (Sheet 5 of 5)

Condenate Tank Makeup Connections

See Attachment 3-4 Sheets 3 and 4
Makeup will be via the connection not in use by FLEX Diesel Driven Pumps

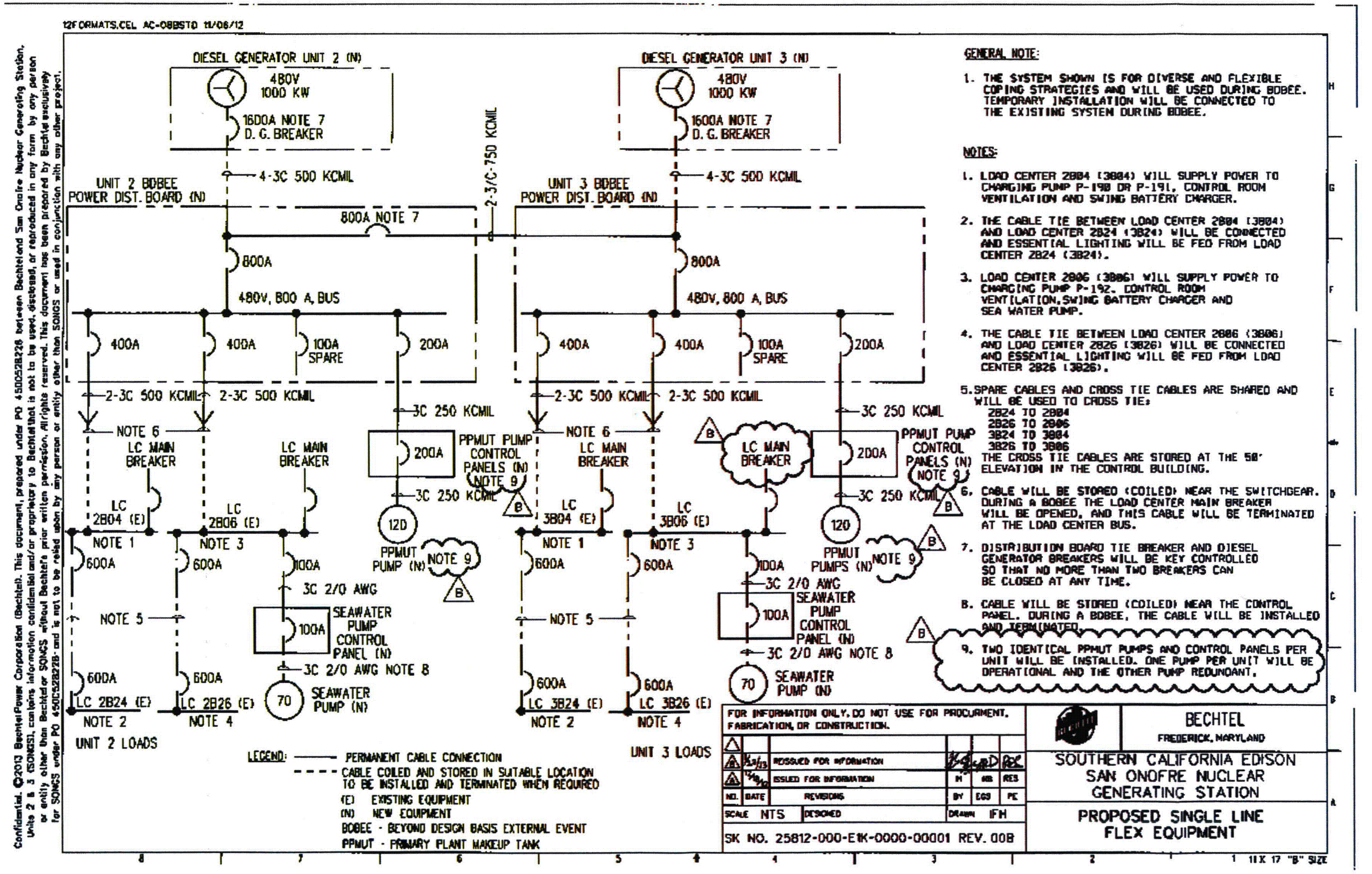
Refueling Water Storage Tank Makeup Connections

See Attachment 3-8 Sheets 2 and 3
Makeup will be via the manway on the roof of either tank

Attachment 3-9: FLEX Diesel Generators and Power Distribution Conceptual Sketch (Sheet 1 of 2)

[...]

Attachment 3-9: FLEX Diesel Generators and Power Distribution Conceptual Sketch (Sheet 2 of 2)



Attachment 4: Acronyms, References and Open Items

Attachment 4-1: List of Acronyms

°F	Degrees Fahrenheit
AC	Alternating Current
ADV	Atmospheric Dump Valve
AFW	Auxiliary Feedwater System
AOI	Abnormal Operating Instruction
BAMU	Boric Acid Makeup
BDB	Beyond Design Basis
BDBEE	Beyond Design Basis External Event
CBO	Controlled Bleedoff
CST	Condensate Storage Tank
DBE	Design Basis Earthquake
DC	Direct Current
DG	Diesel Generator
EDG	Emergency Diesel Generator
EFAS	Emergency Feedwater Actuation Signal
ELAP	Extended Loss of AC Power
EOI	Emergency Operating Instruction
EPRI	Electric Power Research Institute
FHB	Fuel Handling Building
FSG	FLEX Support Guideline
gph	Gallons per hour
gpm	Gallons per minute
HPSI	High Pressure Safety Injection

Attachment 4-1: List of Acronyms

INPO	Institute for Nuclear Power Operations
LOCA	Loss of Coolant Accident
MBTU/hr.	Million British Thermal Units per hour
MCR	Main Control Room
MFW	Main Feedwater
mllw	Mean Lower Low Water
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valve
MSSV	Main Steam Safety Valve
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NSSS	Nuclear Steam Supply System
OBE	Operating Basis Earthquake
PA	Protected Area
PPMUT	Primary Plant Makeup Tank
psi	Pounds per Square Inch
psia	Pounds per Square Inch Absolute
PWROG	Pressurized Water Reactor Owners Group
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RRC	Regional Response Center
RWST	Refueling Water Storage Tank
SAFER	Strategic Alliance for FLEX Emergency Response

Attachment 4-1: List of Acronyms

SBO	Station Blackout
SCE	Southern California Edison
SDC	Shutdown Cooling
SFP	Spent Fuel Pool
SIT	Safety Injection Tank
SOF	Statement of Fact
SONGS	San Onofre Nuclear Generating Station
SRI	Security Related Information
TDAFW	Turbine Driven AFW
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
VAC	Volts AC
VDC	Volts DC

Attachment 4-2: List of References

SOF Validation/ Reference Number	Type (Calc, Dwg, Other)	Name
1	UFSAR	Section 2.5.2.6 (pg 2.5-197) Section 2.5.2.7 (pg 2.5-198)
2	UFSAR	Section 2.4.2.3 (pg 2.4-8, -9) Section 2.4.5.3 (pg 2.4-34) Section 2.4.5.5 (pg 2.4-35) Section 2.4.6.6 (pg 2.4-40)
3	UFSAR NN ACN	Section 3.5.3 (pg 3.5-41 thru -43) NN 201856930-0006 ACN D0059390 (pg 43 thru 45)
4	Report	Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, NEI 12-06, Revision 0, August 2012 Section 3.2.1 (pgs 13 thru 17) Section 5.2 (pg 31) Section 6.2 (pg 34) Figure 7-2 (pg 42) Figure 8-1 and 8-2 (pgs 45, 46) Section 9.2 (pg 48) Section 11.4 (pgs 52 thru 55) Section 11.5 (pgs 55 and 56) Section 11.6 (pg 56) Section 11.8 (pg 57) Section 12.1 (pg 58) Appendix D, Table D-1 (pgs D-1 thru D-8)
5	UFSAR	Section 2.3.2.3 (pg 2.3-36) Section 9.4 (pg 9.4-1)
6	UFSAR	Section 8.1.2, 8.1.3 (pg 8.1-3) Section 8.1.4.2 (pg 8.1-4)
7	WCAP-17601-P	Section 5.5.2 (pg 5-148 thru 5-162)
8	Procedure	SO123-XV-1.20 Seismic Controls (all)
9	WCAP-17601-P	Section 5.6.2 (pg 5-175) Section 5.8.2 (pg 5-218)
10	Report	90051 Section 4.5 (pgs 33-34)
11	UFSAR	Section 10.3.2 (pg 10.3-6, 10.3-7)
12	UFSAR	Section 5.4.7 (pg 5.-77 thru -83)
13	UFSAR	Section 2.4.2.3 (pg 2.4-8 and -9) Section 2.4.5.5 (pg 2.4-35)
14	Drawing	21030 Sh 1, 21031 Sh 1, 21032 Sh 1, 21033 Sh 1
15	Not Used	
16	Not Used	
17	Procedure	SO23-12-1 (whole document)
18	Procedure	SO23-12-8 Station Blackout (pgs 4, 7, 14, 17, 19, 24, 25, 26, 28)
19	Procedure	SO23-13-8 Severe Weather (all)
20	Procedure	SO23-13-7 Loss of CCW / Loss of SWC (pgs 49, 63, 77, 91)

Attachment 4-2: List of References

SOF Validation/ Reference Number	Type (Calc, Dwg, Other)	Name
21	Not Used	
22	Not Used	
23	Procedure	SO23-12-8 (pg 7) SO23-12-10 (Attach SF-8 page 66) SO23-12-11 (FS-12 page 30)
24	Report Drawing	DBD-SO23-780, Revision 9 (pgs 45, 58, 59 and 82) 40160A Rev 45
25	Report	DBD-SO23-780, Revision 9 (pgs 21, 47, 50, 56, 69, 79, 85, 223, and 272)
26	Report	DBD-SO23-780, Revision 9 (pgs 23, 29, 37, 38, 39, 47, 50, 54, 55, 69, and 70) - seismic (pgs 45, 79, and 271) - flooding (pgs 29 and 271) - high temp
27	Procedure	SO23-2-4 (pg 6) SO23-9-5 (pg 39) SO23-3-2.18.1 Section 1.2, 6.1, 6.2, 6.3, Attachment 4
28	Procedure	SO23-13-15
29	Report	DBD-SO23-740 (pgs 39, 45, 51, 52, 65, 116)
30	PA-PSC-0965	PWROG FLEX Support Guidelines, Supplement 14
31	Report	DBD-SO23-780, Revision 9 (pgs 16 and 54)
32	Tech Specs Calculation	Technical Specification 3.7.6 Bases (pg B 3.7-36) M-0050-017 (Pgs 8 thru 10) CCN 1 (pgs 4 and 11) CCN 2 (pg 3) CCN 3 (pgs 2 and 3)
33	Procedure	SO23-13-3
34	Calculation	25812-000-M0C-WB-00003, Appendix A and Attachment 2
35	Drawing	40150A, 40150AS03
36	WCAP-17601-P PA-PSC-0965	Section 4.2.1 (pg 4-13) Section 4.2.3.2.5 (pg 4-29) Section III (pg 11)
37	Calculation	M-0083-047, Rev 1 (pgs 5 and 6)
38	Calculation UFSAR	25812-000-M0C-WB-00003, Attachment 2, Sheets 4, 5 , 9 and 10 Section 6.3.3.4 (pg 51-55, Figure 6.3-22)
39	Calculation	25812-000-M0C-WB-00003, Attachment 2, Sheets 1, 2, 6 and 7
40	Calculation	25812-000-MOC-WB-00006-001 (pg 8)
41	Drawing	23800 Sheet 1
42	Calc	Same as Ref 51 pg 2 and 11, Attachment 3 pg 1, Attachment 4 pg 1)
43	Calculation	25812-000-M0C-WB-00007-001 (all)
44	Tech Spec NN	Technical Specification 3.5.4 NN 201895384 Task 13
45	Drawing	40122B, 40122BS03

Attachment 4-2: List of References

SOF Validation/ Reference Number	Type (Calc, Dwg, Other)	Name
46	Calculation	NFM-2/3-TA-1623 Rev 2 Section 2.5 (pg 17), Appendix A (pg 59, 61) and Appendix B (pg 70, 72)
47	Calculation	25812-000-M0C-WB-00003, Attachment 2, Sheets 3 and 8
48	Not Used	
49	Calculation	Same as Ref 34, Attachment 2, Sheets 2 and 7
50	Calculation	Same as Ref 34, Attachment 2, Sheets 1 and 6
51	Calculation	25812-000-M0C-WB-00002 (all)
52	Not Used	
53	Calculation	Same as Ref 34 Attachment 2 Sheets 4, 5, 9 and 10
54	Not Used	
55	Report UFSAR	DBD-SO23-TR-PL (pgs 76 thru 80) Section 2.5 (in general)
56	Not Used	
57	Not Used	
58	Drawing UFSAR	40006 Section 2.4.2.3 (pg 2.4-8) Figure 2.4-13
59	Report	SO23-922-232-0, "Post Test Inspection for Loss of Cooling Test Performed on November 1, 1985"
60	ASME Paper CEOG CE NPSD-537	"O-Ring Static Seal Performance at Elevated Temperatures Simulating A Loss of Component Cooling Water Accident", Kalsi Engineering and Southern California Edison, 1987 ASME PVP Conference (June 28 – July 2, 1987) "An Evaluation of the Reactor Coolant Pump Seal Integrity Issue - Generic Issue 23"
61	UFSAR WCAP-17601-P	Section 6.3.5.3.2.3, 6.3.5.3.2.4, 6.3.5.3.3.1, 6.3.5.3.3.2 (pgs 6.3-65 and 6.3-66) Section 3.2 Objective #6 (pg 3-16), Section 3.4 (pg 3-20), Section 5.6.2 (pgs 5-174)
62	LCS 3.1.104 NN	Table 3.1.104-1 (pg 3.1.104-3) NN 201895384-14
63	WCAP-17601-P	Section 5.6.2 (pgs 5-174 thru 5-176)
64	Drawing	30113A, 30113ASO3, 30113B, 30113BSO3 (P&IDs)
65	UFSAR Tech Specs WCAP-17601-P	Section 6.3.1.3 (pg 6.3-2) Section 6.3.3.4.3 (pg 6.3-54) Bases 3.5.4 (pg B 3.5-25) Section 5.7.2.1 (pg 5-188)
66	Report Drawing	DBD-SO23-390, (pg 29, 33, 33, 34, 87) DBD-SO23-710 (pg 418) 90034 Q-List (pg 16, 22, 59)
67	Calculation	Same as Ref 34, Attachment 2, Sheets 5 and 10

Attachment 4-2: List of References

SOF Validation/ Reference Number	Type (Calc, Dwg, Other)	Name
68	MOU	Appendix 2 (SONGS Plan) to Annex C (Operations) to MCB Camp Pendleton AHP Plan 08 Letter of Agreement, Inter-jurisdictional Planning Committee, Doctors, Hospitals, Transportation, Fire, American Nuclear Insurers - Appendix A
69	Calculation	NFM-2/3-MI-1650 (pgs 7, 19 and 46)
70	Not Used	
71	Not Used	
72	Not Used	
73	Calculation Drawing	25812-000-M0C-WB-00004 Attachment 6 (pg 2) 40114B and 40114BS03
74	UFSAR	Section 9.1.3.1 (pg 9.1-21, -22, -27)
75	Calculation NN UFSAR	25812-000-M0C-VN-00001-001 (all) NN 201895384-0015 Section 6.3.3.4 (pg 53, Figure 6.3-22)
76	Procedure	SO23-V-5.100 (pgs 25-27) SOG-EO-0001 (pgs 1-21)
77	NRC Order	EA-12-049, "Issuance of Order to Modify Licenses with Regard to Beyond-Design Basis External Events" [Accession No. ML12054A735]
78	Calculation	Same as Ref 34 (pg 1 of 2 Appendix A)
79	INPO IER L1-11-4 Drawing	IER L1-11-4 Response (pgs 22, 23, 27, 32, 37) 40177A
80	Standard	NEI 06-12 Rev (pgs 11 thru 17)
81	SCE Letter	Response to EA-12-051 on SFP Level Monitoring
82	Procedure	SO23-13-23
83	Not Used	
84	UFSAR Procedure	Section 8.3.2.1.2.1 (pg 8.3-89) SO23-12-1 (pgs 22, 26, 27, 30) SO23-12-8 (pgs 4, 14, 24, 25) SO23-12-11 Attachment 20 (pgs 224 thru 260)
85	SCE Memo	Evaluation for Class 1E 125 VDC Batteries in Response to IER 11-4.
86	Calculation Drawing	E4C-124 (pgs 1 thru 17) E4C-124 CCN 1 (pgs 1 thru 7) E4C-124 ECN 1 (pgs 1 and 2) E4C-124 ECN 2 (pgs 1 thru 15) E4C-124 ECN 3 (pgs 1 and 2) 30119 (Sh 1 ECN and Sh 2)
87	Updated Fire Hazard Analysis	Appendix D (pgs D-47 and D-48)
88	UFSAR	Section 9.5.3 (pgs 9.5-12 thru 9.5-21)
89	Calculation	25812-000-M0C-VBJ-00001 (pgs 1 thru 13) M-0073-122 CCN1 (pgs 1 thru 17) 90051 (pgs 87 thru 93)

Attachment 4-2: List of References

SOF Validation/ Reference Number	Type (Calc, Dwg, Other)	Name
90	Calculation	25812-000-M0C-VBB-00001 (pgs 1 thru 17) M-0073-135 CCN1 (pgs 1 thru 20) 90051 (pgs 87 thru 93)
91	UFSAR	Section 9.4.3.7 (pgs 9.4-116 thru 9.4-119)
92	Calculation	25812-000-E0C-AN-00001 (pgs 1 thru 5)
93	Report	DBD-SO23-365 (pg 29, 80 and 81)
94	Calculation Drawing	25812-000-M0C-WB-00005 60397
95	Report	DBD-SO23-750 (pg 224)
96	Not Used	
97	Not Used	
98	SCE Letter	"Response to Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, San Onofre Nuclear Generating Station, Units 2 and 3", dated October 29, 2012, Enclosure 1 "Commitments" and Enclosure 2 "Communications Assessment"
99	Calculation	25812-000-M0C-WB-00005 (pg 8)
100	NRC Memo	Task Interface Agreement (TIA) 2004-04, "Acceptability of Proceduralized Departures from Technical Specifications (TSs) Requirements at the Surry Power Station," (TAC Nos. MC4331 and MC4332)," dated September 12, 2006. [Accession No. ML060590273]
101	Procedure	SO23-12-1 (pg 3 and 16)
102	Procedure	SO23-12-11, Attachment 9 (pgs 153 and 155)
103	Procedure	SO23-12-11, Attachment 20 (pgs 224 thru 227) SO23-6-15 (pgs 4, 104 thru 121)
104	Procedure	SO23-12-11, Attachment 19 (pgs 211, 214 thru 218, 220 thru 223)
105	WCAP-17601-P	Table 4.1.2.1-1 (pgs 4-5 thru 4-7) Section 4.2.1 (pg4-14) Section 4.2.3.2.3 (pg 4-27) Section 5.4.2.2.1 (pg 5-122) Section 5.5.2.1 (pg 5-148)
106	Procedure	SO23-12-11, Attachment 3 (pgs 94 thru 98, 107)
107	Not Used	
108	Procedure	SO23-12-11, Attachment 2 (pg 38) SO23-9-5 Attachment 9 (pgs 65 to 68)
109	Not Used	
110	Calculation	E4C-017 (pgs 10, 11, 31, 32, 33, 47, 65)
111	Procedure	SO23-9-5 (pgs 9, 24, 32, 47, 53, 66, 70, 71)
112	Not Used	
113	Not Used	

Attachment 4-2: List of References

SOF Validation/ Reference Number	Type (Calc, Dwg, Other)	Name
114	Calculation	25812-000-M0C-VBB-00001 (pgs 1 thru 17)
115	Not Used	
116	PA-PSC-0965 (Core Cooling Position Paper)	Section III (pg 11) Section IV (pg 15 and 16)
117	Not Used	
118	WCAP-17601-P PA-PSC-0965 (Core Cooling Position Paper)	Section 5.5.2.2.1 (pg 5-162) Section III (pg 11)
119	Not Used	
120	Contract	Southern California Edison Company and Pooled Equipment Inventory Company for Pooled Inventory Management (whole document)
121	SCE Letter	"Docket 50-361 and 50-362, 60 Day Response to March 12, 2012 Information Request Regarding Recommendation 9.3 of the Near-Term Task Force Report, San Onofre Nuclear Generating Station, Units 2 and 3", Dated May 9, 2012, Enclosure 1 Staffing [Accession No. ML12136A375]
122	Procedure	SO23-12-1 (pg 8) SO23-12-8 (pgs 5-6)

Attachment 4-3: List of Open Items

No.	Description	Resolution
OI-1	Validate timelines for new actions in Attachment 1A as part of Phase 2 staffing assessment to be performed per Reference 121.	
OI-2	Determine on-site deployment locations, transportation mode, route and communications from the staging area to the deployment locations for Phase 3 equipment from the RRC.	