CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105- 2219
VOICE (415) 904- 5200
FAX (415) 904- 5400
TDD (415) 597-5885

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Th15a

August 11, 2015

To: Coastal Commissioners and Interested Parties

From: Alison Dettmer, Deputy Director
Joseph Street, Environmental Scientist

Subject: **Addendum to 9-15-0162 – Southern California Edison SONGS Spent Fuel Pool Island Project**

This addendum provides correspondence on the above-referenced staff report, ex parte communications, proposed revisions to the staff report, and staff's response to comments. The proposed modifications to the staff report do not change staff's recommendation that the Commission **approve** CDP # 9-15-0162, as conditioned.

Correspondence Received

- Letter from Jonathan Bishop, State Water Resources Control Board, to Steve Kinsey, Chair, Coastal Commission, July 8, 2015
- Letter from Kim Anthony, Southern California Edison, to Joseph Street, Coastal Commission, August 7, 2015
- Letter from Donna Gilmore, SanOnofreSafety.org, to California Coastal Commission, August 9, 2015
- Letter from Capt. W. L. Whitmire, U. S. Marine Corps, to Joseph Street, Coastal Commission, August 10, 2015

Revisions to the Staff Report

Additions are shown below in underline and deletions in ~~strikethrough~~.

Page 1, Summary of Staff Recommendation, line 10:

> "The proposed project ~~represents a preliminary step in~~ is an interim measure prior to the decommissioning of SONGS Units 2 and 3 …"

Page 5, Special Condition 1:

"1. **System Inspection and Maintenance Plan.** PRIOR TO THE COMMENCEMENT OF OPERATION of the Spent Fuel Pool Island Cooling System, SCE shall submit, for the Executive Director's review and approval, an Inspection and Maintenance Plan for the SFPI system. At a minimum, the Plan shall describe the procedures for inspecting and maintaining each major SFPI system component, including the chillers, heat exchangers, all piping and plumbing on both the primary and secondary cooling loops, and all newly installed pumps. The Plan shall also indicate the frequency at which inspections will be carried out for each set of components. SCE shall not begin operation of the SFPI system without the Executive Director's written approval of the above-submitted information. Minor adjustments to the inspection and maintenance regime in the approved Plan may be allowed by the Executive Director if such adjustments: (1) are deemed reasonable and necessary; and (2) do not have the potential to adversely impact coastal resources."

Page 5, Section IV.A, Background, Paragraph 1, Line 1:

"SCE permanently ceased operation of SONGS Units 2 and 3 in June 2013 and has begun ~~the process of~~ preparations for plant decommissioning."

Page 5, Section IV.A, Background, Paragraph 2, Line 1:

"SCE has stated that the proposed Spent Fuel Pool Island (SFPI) cooling system would facilitate future plant decommissioning because it is smaller, simpler and more localized (to the spent fuel areas) than the existing once-through cooling system …"

Pages 10-11, Section IV.C, Reduced Seawater Intake:

"At present, the maximum ocean water ~~daily~~ intake capacity ~~of ocean water~~ at SONGS is approximately 98 MGD, or about 4% of the full operational flow when the plant was operational. Even at this reduced level of intake, the plant remains a major user of once-through cooling water, and results in the mortality of large numbers of marine organisms~~,~~ ~~both~~ chiefly through entrainment of planktonic organisms in the intake stream. ~~and through impingement against the intake screens.~~ Installation of the SFPI system, along with a previously-approved retrofit of the plant HVAC system and installation of smaller intake pumps (CDP waiver 9-15-0417-W), would eliminate the need for once-through cooling water and halve the plant's ~~rate of~~ ocean water intake capacity, to approximately 48 MGD.[1] This reduction in ocean water intake would result in commensurate reductions in ~~entrainment and impingement~~ impacts on marine organisms, and will thus improve biological productivity and enhance marine resources in nearby coastal waters, compared to existing conditions."

Pages 10-11, Section IV.C, Footnote 2:

"At present, SONGS takes in and discharges ~~approximately~~ up to 98 million gallons per day (MGD) of ocean water through the offshore conduits … However, the plant would still take in and discharge ~~approximately~~ up to 48 MGD of seawater for the purpose of diluting SONGS waste streams."

Staff Response to Comments

In the attached correspondence, the commenters provide disparate perspectives on the proposed project and staff recommendation. Southern California Edison (SCE) offers several comments and clarifications but generally supports the staff recommendation. Donna Gilmore provides a detailed critique of the project and urges the Commission to deny SCE's coastal development permit (CDP) application. The State Water Resources Control Board supports the project because it will decrease the need for ocean water intake at SONGS. The U. S. Marine Corps does not comment on the project itself, but argues that the Commission lacks jurisdiction to require or issue a CDP for development at the San Onofre Nuclear Generating Station (SONGS) site. Commission staff provides the following summary and response to the points made by the commenters and hereby amends its proposed Commission findings to include these responses:

SCE Comments:

The Proposed Project is Not a Part of SONGS Decommissioning (SCE Comments #1, 3, & 4)

Several SCE comments (#1, 3, and 4) are intended to clarify that the "decommissioning" of SONGS Units 2 and 3 is a formal process, involving several distinct phases and steps, governed by Nuclear Regulatory Commission (NRC regulations), and that the proposed spent fuel pool island (SFPI) project is not a decommissioning project. Rather, the SFPI project is an interim measure that is preliminary or preparatory to formal plant decommissioning, which has not yet begun.

As indicated above, the staff report has been modified to more accurately describe the SFPI project in relation to formal decommissioning.

Requested Change to Special Condition 1 (SCE Comment #2)

SCE is concerned that the language of **Special Condition 1** is unclear, and could be interpreted as requiring any future changes or modifications to the Maintenance and Inspection Plan to be submitted to the Executive Director for review and approval prior to implementation. SCE requests that this condition be revised to require only the notification of Commission staff and provision of a copy of the revised Plan in the event of significant future modifications.

The purpose of **Special Condition 1** is to ensure that the proposed SFPI cooling system and its components are regularly inspected for problems or defects, and maintained in a condition such that they will resist ground shaking during an earthquake according to its design basis. Based on the staff's analysis, this condition is necessary to assure conformance with Coastal Act Section 30253 over the life of the project. Major modifications to the Plan could weaken the inspection or maintenance regime and undermine the stability and structural integrity of the proposed facility in the event of major earthquake, and would require Coastal Commission review as a permit amendment. Staff agrees with SCE that the language of the condition is ambiguous, and has modified the condition to clarify that minor adjustments to the Plan may be allowed by the Executive Director without a permit amendment.

Other Nuclear Plants Have Similar Independent Cooling Systems (SCE Comment #5)

Commission staff is not aware of any other nuclear power plants that currently use chillers as the primary means of cooling spent fuel pools. While chillers were once used in the primary spent

fuel cooling system at Rancho Seco, the spent fuel at this plant has since been moved to dry cask storage. Staff's understanding is that the Crystal River plants (Brunswick and Robinson) have used chillers only in secondary or temporary cooling systems to supplement a primary system employing cooling towers. Thus, the statement in the staff report that "no other plant is currently using a system configuration identical to that proposed at SONGS" is accurate.

Seawater Intake and Impacts to Marine Organisms (SCE Comments #6-10)

SCE comments #6, 8 and 9 are intended to clarify that present and post-project seawater intake and discharge volumes cited in the staff report -- 98 million gallons per day (MGD) at present; 48 MGD in the future -- represent maximum withdrawal and discharge capacities, and that the actual volumes are (and will be) substantially less. SCE also states (comments #7, 10) that plant shutdown has significantly reduced impacts to marine organisms from entrainment during seawater intake, and that impingement no longer occurs, and requests that the discussion in the staff report be modified to account for these changes.

Commission staff agrees that the greatly reduced rates of ocean water intake at SONGS have reduced impacts to marine organisms, and that the proposed project, which would eliminate the use of ocean water for spent fuel pool cooling, would further reduce ocean water intake and its associated impacts. Staff also agrees that the reduced intake has also led to much lower flow velocities at the intake screens, reducing the potential for the impingement of larger organisms against the screens. However, without further evidence of the actual effects of the reduced flow volume on impingement, staff cannot conclude that this source of mortality has been completely eliminated. As indicated above, the staff report has been modified to clarify these points.

Donna Gilmore's Comments:

1. *The proposed SFPI cooling system is unproven and untested; chillers have not been used in comparable systems at other nuclear power plants; the proposed system may not be adequate and reliable enough to cool SONGS spent fuel.*
5. *The Commission needs to consider the lifespan of the system in a corrosive marine environment and based on the potential for a much longer lifespan than estimated by SCE.*
7. *Additional substantiation and independent verification is needed for the adequacy of the proposed air chiller system.*
8. *There are inadequate redundancies and backup plans in this system; there appear to be many single points of failure; workers may not be able to access the facility in a severe earthquake to make repairs;*
9. *What is the expected lifespan of the various parts of the system?*

In her comment letter of August 9, 2015, Ms. Gilmore offers numerous arguments for why the proposed SFPI cooling system may be inadequate or inappropriate for cooling the SONGS Units 2 and 3 spent fuels. She notes that other nuclear power plants have seldom used chillers for spent fuel cooling, and then only as secondary cooling systems or in pools with relatively low heat loads. She notes that the SONGS spent fuel pools contain a large number of high burn-up fuel assemblies, which generate greater amounts of heat, for longer periods, than regular nuclear

fuel. She also notes that SONGS is located in a corrosive marine environment that will degrade the cooling system components more rapidly than at inland locations.

Without assessing the validity of these concerns, the Commission staff notes that the consequences of any failure, malfunction, or defects in the proposed cooling system are related to radiological safety, which is under the exclusive jurisdiction of the federal Nuclear Regulatory Commission (NRC). The state is preempted from imposing upon operators of nuclear facilities any regulatory requirements concerning radiation hazards and nuclear safety. Thus, the findings contained in the staff recommendation address only those state concerns related to conformity to applicable policies of the Coastal Act, and do not evaluate or condition the proposed project with respect to nuclear safety or radiological issues. Information provided by SCE indicates that the proposed air chillers have a cooling capacity of approximately twice that needed to dissipate the current heat load from the spent fuel pools. SCE has also indicated that contingency plans are in place in the event of a cooling system failure, and that multiple sources of "make-up water" to allow for emergency cooling of the spent fuel would available.

The Commission understands that any industrial system, particularly in a coastal environment, will experience wear-and-tear and will need regular maintenance in order to retain its structural integrity and to remain functional. For the purposes of assuring the stability and structural integrity of the proposed system, and of minimizing risks to life and property from seismic hazards, as required by Coastal Act Section 30253(a) and (b), staff has recommended **Special Condition 1**, which requires SCE to submit, for Executive Director review and approval, an Inspection and Maintenance Plan detailing the type and frequency of system inspections and the procedures that will be followed to maintain the SFPI system in good working condition and enable it to perform according to its design basis during an earthquake. SCE has also stated that it will maintain a supply of replacement parts onsite to facilitate repairs as they become necessary.

2. *Other cooling options should be considered, including continuing to use the existing cooling system*

Other cooling options were considered by SCE and reviewed by Commission staff, including the use of evaporative cooling towers and the "no action" alternative of continuing to use the existing cooling system. For the coastal resource considerations within Coastal Commission purview (excluding radiological aspects of the project), the proposed project, using chillers to dissipate the heat of the spent fuel pools, has the advantages of reducing SONGS's daily intake of ocean water for once-through cooling, and avoiding potential visual concerns (large profile, steam plumes) associated with cooling towers. The Commission staff is not recommending any findings on the relative merits of the cooling options in terms of nuclear safety.

3. *The Coastal Commission should not accept SCE's short estimate of the length of time the system will be needed.*

Ms. Gilmore states that SCE's assumption that all the spent fuel will be unloaded from the pools to dry storage by December of 2020 is unrealistic, and goes on to list numerous concerns related to SCE's proposed dry cask storage facility and the need to retain the spent fuel pools for future emergency use.

SCE has proposed to install and operate the SFPI cooling system for a period of five years, based on its estimated schedule for transferring the spent fuel to dry storage. The Coastal Commission recognizes that this schedule may change, for example due to delays in the construction of the dry storage facility and/or in the unloading of the spent fuel. If SCE desires to retain the SFPI cooling system beyond the proposed project term, it must seek new authorization from the Commission (e.g., CDP extension or amendment). Any extension or renewal of the CDP would include a re-evaluation of the SFPI system's ability to meet Coastal Act standards for stability and structural integrity over the period of the proposed extension.

4. *The SCE Inspection and Maintenance Plan should be reviewable by the public prior to the issuance of any Coastal permit.*

Any interested member of the public can request a copy of the Inspection and Maintenance Plan submitted to the Executive Director, as it is would be a public document once it is submitted to the Executive Director.

6. *Chillers are known to be extremely loud and may result in noise impacts to coastal resources.*

Commission staff examined this issue and determined that the proposed chillers would not generate sufficient noise to adversely affect coastal resources (e.g., environmentally sensitive habitats, species, or coastal recreation). Based on information provided by SCE, the Trane Model RTAC 200 STD chillers proposed for use in the SFPI system generate noise levels of 75 dBA at a distance of 30 feet from the chiller. Noise from the chillers would attenuate to below ambient levels (measured at 45 – 65 dBA at sites along the SONGS perimeter) before reaching the nearest "sensitive receptors" to the project site, which include the public access walkway along the SONGS shoreline (≥580 ft from chillers), San Onofre State Beach (≥940 ft), and sensitive habitat on the bluff top southeast of SONGS (≥760 ft).

10. *What pollutants would be dumped into the ocean, even if this system is installed, since only part of the once-through system will be discontinued?*
14. *What is the coastal impact if this system fails (staff report needs to address the discharge of fluids or contaminants to coastal waters)?*

The proposed project, which includes only the installation of the new SFPI cooling system, would not result in any new operational discharges of pollutants to the ocean. As described in the staff report, the potential for construction-related discharges would be minimized through the implementation existing of spill prevention and storm water management plans, and procedures are in place for the clean-up of accidental spills and leaks to minimize discharges to the ocean. As discussed on page 10, footnote #2 in the staff report, the maximum possible accidental release of fluids from the secondary loops of the SFPI system would be 2000 gallons of fresh water treated with an anti-corrosion agent, representing only a tiny fraction of the daily discharge from SONGS. This maximum leak would be massively diluted with seawater in the SONGS waste stream prior to reaching the ocean and would not have a significant or lasting effect on marine resources. Leaks from the primary cooling loop would contain radioactive contaminants, the discharge of which is regulated by the NRC. If and when the SFPI system is operational, the

discharge of once-through cooling water serving the spent fuel pools would cease, but SONGS would continue to discharge other waste streams (e.g., from storm drains, wastewater system, etc.) in accordance with its existing National Pollution Discharge Elimination System (NPDES) permits administered by the San Diego Regional Water Quality Control Board.

11. The earthquake evaluations appear to be pre-Fukushima and not taken into consideration the new USGS data; San Onofre "design basis" pre-dates Fukushima.

12. The Tsunami analysis is pre-Fukushima and is also based on the short project life span; what if the tsunami wall failed?

The seismic design analysis performed by SCE followed the procedures required by the 2013 California Building Code (CBC) and American Society of Civil Engineers guidelines (ASCE 7, last updated in 2013), and used U.S. Geological Survey (USGS) probabilistic seismic hazard tools, which are based on the 2014 update of the United States National Seismic Hazard Maps. The review performed by Commission staff considered various studies of seismic hazards in the vicinity of SONGS performed over the last several decades, including the most recent assessments and tools developed by the USGS and California Geological Survey (CGS). The site-specific ground-shaking estimates provided by the USGS tools are based on probabilistic modeling of potential ruptures along known faults in the SONGS region, taking into account the best available information at the time of the last update in 2014. Commission staff is aware of newer USGS research into seismic hazards in Southern California, but the implications of this research for earthquake risks and ground-shaking at the SONGS site are not clear, and the USGS resources dating from 2014 remain the best available tools for quantitative seismic hazard analysis. As a part of its review, Commission staff considered the older studies underlying the SONGS Units 2 and 3 design basis, but also considered newer studies and sources.

The tsunami hazard analyses relied on by Commission staff included studies by both SCE and, independently, the California Emergency Management Agency and CGS. The tsunami run-up elevations for SONGS projected in these studies was based on modeling of a suite of potential tsunami source events (i.e., earthquakes and submarine landslides), including both distant and local sources. The modeled source events included subduction zone earthquakes off the coast of Japan similar in magnitude to the Tohoku event which led to the Fukushima disaster. Both the SCE and California tsunami hazard analyses are independent of the proposed life of the SFPI project. The life of the project is only a factor in that the longer a project is in place, the more likely it is that a tsunami would occur during its period of emplacement. As discussed in the staff report, the proposed SFPI system is located at an elevation well above the maximum projections of tsunami run-up at the SONGS site. The existing seawall/bulkhead in front of SONGS Units 2 and 3 is thus not *necessary* to protect the SFPI project from credible tsunami hazards, but does provide a degree of additional protection while it is in place.

13. What is the daily intake of ocean water reduction due to this chiller system?

At present, the intake of ocean water for cooling and dilution purposes is variable. The capacity of the existing pump configuration is approximately 98 MGD, but SCE reports that this maximum rate of intake is seldom required. The existing once-through cooling system for the

spent fuel pools typically accounts for approximately 25% of the daily ocean water intake at SONGS.

14. SCE reimbursements and mitigation are only partially addressed.

Commission staff is recommending that the Commission find that the project, as conditioned, would not have a significant adverse effect on coastal resources. This finding excludes impacts related to radiological and nuclear safety, which are under the sole jurisdiction of the NRC and are pre-empted from Coastal Commission regulation. In the absence of a finding of significant effects on coastal resources, the staff is not recommending that the Commission impose any mitigation measures.

U. S. Marine Corps Comments:

On August 10, 2015, Commission staff received a letter from the United States Marine Corps asserting that the Commission lacks jurisdiction to require or issue a CDP for development occurring on the SONGS site. The basis for the Marine Corps position is that under the Federal Coastal Zone Management Act (CZMA), land, "the use of which is by law subject solely to the discretion of … the Federal Government, its officers or agents" is excluded from the definition of the coastal zone. (16 U.S.C. § 1453(1)).

The U.S. Supreme Court, however, has addressed this issue and determined that the CZMA does not pre-empt application of the California Coastal Act to private activities on federal land. It held that "[b]ecause Congress specifically disclaimed any intention to pre-empt pre-existing state authority in the CZMA, we conclude that even if all federal lands are excluded from the CZMA definition of 'coastal zone,' the CZMA does not automatically pre-empt all state regulation of activities on federal lands." *California Coastal Commission v. Granite Rock Co.* (1987) 480 U.S. 572, 593. Thus, under *Granite Rock*, the Commission retains the authority under the Coastal Act to require coastal development permits for non-federal activities taking place on federal land, such as Southern California Edison's proposed project pending before the Commission.

The U.S. Marine Corps supports its argument that the Commission does not have coastal development permit jurisdiction on federal land by reference to an unpublished U.S. District Court decision, *Manchester Pacific Gateway v. California Coastal Commission* (2008 WL 5642245 (S.D. Cal.)). First, to the extent that the *Manchester* case is inconsistent with the Supreme Court holding in *Granite Rock*, the Supreme Court's decision in *Granite Rock* controls. Second, the *Manchester* case is factually distinguishable from the situation presented by the pending proposal from SCE. The *Manchester* case involved a Congressionally authorized public-private venture that resulted in the Navy obtaining new office space at no cost to the federal government. *Id*. at 1. The court acknowledged that the purpose of that project, as mandated by Congress, was to "provide for the use of private parties to accomplish the federal objective to construct Navy administrative facilities." *Id.* at 5. The project was authorized through legislation that spelled out the general parameters of the project and specifically authorized the project to be jointly developed by the Navy and the private developer. *Id.* at 6. Thus, the project was both a Navy and a private project.

The pending application from SCE does not involve a joint public-private venture. Thus, the facts are not analogous to those presented in the *Manchester* case. Thus, both under *Granite Rock* and due to factual distinctions between these facts and those raised in the *Manchester* case, the CZMA does not pre-empt the California Coastal Act here, and the Commission does have the jurisdiction to require a coastal development permit for the proposed development.

9-15-0162

SONGS “Spent Fuel Pool Island” (SFPI)

- PUBLIC COMMENTS

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

July 08, 2015

Mr. Steve Kinsey
Chairman, California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105

Dear Chair Kinsey:

RE: SOUTHERN CALIFORNIA EDISON
SAN ONOFRE NUCLEAR GENERATING STATION
SPENT FUEL ISLAND PROJECT

It is our understanding from information supplied to us in a February 18, 2015 letter from Southern California Edison (SCE), that later this year, SCE plans to seek a Coastal Development Permit to install an independent Spent Fuel Pool Island cooling system at San Onofre Nuclear Generating Station (SONGS). Furthermore, we understand that the Spent Fuel Pool Island is a system that is entirely independent from ocean cooling water. We understand that the system utilizes make-up water from the existing demineralizer tanks located onsite. Because of this, the Spent Fuel Island requires no withdrawal of ocean water for cooling the spent fuel.

While SONGS is currently in compliance with Track 1 of the State's Once-Through Cooling Policy[1], the State Water Resources Control Board supports projects that will further decrease SONGS' need to withdraw ocean water for cooling the spent fuel. Any reduction in ocean water intake results in decreased marine life impacts from impingement and entrainment. Reducing and eventually eliminating the environmental impacts of ocean water withdrawals for power plant cooling remains the goal of the Once-Through Cooling Policy.

Should you have any questions regarding the State Water Resource Control Board's position on this project, please do not hesitate to contact me at (916) 341-5820 or by email at Jonathan.Bishop@waterboards.ca.gov.

Sincerely,

Jonathan Bishop
Chief Deputy Director
State Water Resources Control Board

[1] *Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Water for Power Plant Cooling*, California State Water Resources Control Board, October 1, 2010.

cc: Alison Dettmer
Deputy Director
Energy, Ocean Resources and Federal Consistency Division
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

August 7, 2015

Dr. Joseph Street
45 Fremont Street, Suite 2000
San Francisco, CA 94105

RE: SCE Comments on the Staff Report for CDP Application #9-15-0162, Item Th15a

Dear Dr. Street,

On behalf of its co-owners (San Diego Gas & Electric Company, the City of Anaheim and the City of Riverside), Southern California Edison Company (SCE) submits the enclosed comments on the Staff Report for the Spent Fuel Pool Island (SFPI) Project. We appreciate the opportunity to review and thank you for generating a thorough Staff Report recommending approval of the Project. SCE agrees with the overall analysis and findings contained in the Staff Report and offers these minor comments as clarifications.

The attached table includes comments that primarily pertain to technical information and clarification of specific statements. In addition, SCE wishes to clarify the role of the U.S. Nuclear Regulatory Commission (NRC) in its evaluation and inspection of the SFPI system. The Staff Report includes the following statement on page 8:

"NRC staff has communicated to Coastal Commission staff that the project is being reviewed under Section 50.59 screening criteria, and that the NRC would conduct an inspection of the facility after project completion."

SCE now has more current information regarding the NRC's review of the Project. SCE has recently determined that a license amendment will be submitted to the NRC before the existing spent fuel pool cooling equipment is fully retired. The license for an operating plant includes certain requirements that are more stringent than is needed for a permanently shutdown plant. When a plant is retired, the operating license is amended to reflect the reduced safety risks associated with a shutdown plant. All decommissioning plants undergo license amendment processes to address various site-specific changes to the plant. SONGS has already obtained

approval of license amendments, including the "Permanently Defueled Emergency Plan" and the "Permanently Defueled Technical Specifications."

With respect to the spent fuel pools, at an operating nuclear plant freshly offloaded fuel is routinely added to the pools to cool. At SONGS, the fuel has been cooling for approximately 3.5

years and the heat load is significantly lower now than it was while the plant was operating (representing a more than 90 percent reduction in heat load). However, the current license still contains requirements for a cooling system that supports the higher heat loads for an operating plant. This includes a commitment to design spent fuel pool cooling equipment to withstand a design basis seismic event, which is unnecessarily conservative for a permanently shutdown plant.

At SONGS now, as a result of the reduced heat load, response time to any interruption in cooling has increased from a few hours during normal plant operation to more than five days. Therefore, applying the more restrictive operating plant seismic design criteria is no longer needed for the spent fuel pool's ancillary cooling equipment (however, the spent fuel pool structure itself would continue to meet the NRC's seismic design criteria). The proposed SFPI equipment will be installed in accordance with seismic design requirements specified by the California Building Code. Several other shutdown plants have used a similar approach in applying non-seismic design criteria for spent fuel pool cooling modifications.

To implement this approach, SCE is preparing a license amendment that will be reviewed in accordance with the NRC's exclusive jurisdiction over the safety and other radiological aspects of the Project. The license amendment only addresses whether the SFPI can entirely replace the current cooling system. Therefore, the license amendment is not necessary for installation of the SFPI; however, the existing cooling system will remain available pending approval of the license amendment. It is anticipated that the license amendment process will take approximately six months and will be conducted in parallel with the installation and testing of the SFPI. Upon approval of the license amendment, SCE would permanently retire the existing cooling system.

To proceed with installation of the Project, SCE is seeking approval of the Coastal Development Permit. The CCC is reviewing potential environmental impacts of the Project and authorizing the construction activities associated with installation of the SFPI system. CCC Staff has concluded that the Project is consistent with the Coastal Act. Therefore, SCE requests that the CCC approve the application as recommended by Staff.

SOUTHERN CALIFORNIA EDISON
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Thank you for considering our comments. If you have any questions, please feel free to contact me at (626) 302-8553 or via email at *kim.anthony@sce.com*.

Sincerely,

Kim Anthony
Environmental Project Manager
SONGS Decommissioning Projects

Encl: SCE Comments on SFPI Staff Report

CC VIA EMAIL:

Tom Luster, CCC
Louise Warren, CCC
Tom Palmisano, SCE
Ron Pontes, SCE
Linda Anabtawi, SCE
Colin Lennard, SCE
David Asti, SCE

Elizabeth Cason, SDG&E
Bob Tang, City of Riverside
Roy Xu, City of Riverside
Steve Sciortino, City of Anaheim
Carrie Thompson, City of Anaheim
Michael DeMarco, SDG&E

SCE Comments on SFPI Staff Report

No.	CCC SFPI Staff Report	SCE Comment
1	**Page 1, Summary:** "…represents a preliminary step in the decommissioning of SONGS Units 2 and 3…"	To clarify, the proposed project is not a step in the decommissioning process. The purpose of the proposed project is more accurately described as an important interim measure that helps set the stage for decommissioning SONGS Units 2 and 3. In concert with the other Cold & Dark modifications, the SFPI helps achieve a safe operating configuration in preparation for decommissioning.
2	**Page 5, Section III, Special Condition 1:** "…SCE shall submit, for the Executive Director's review and approval, an Inspection and Maintenance Plan for the SFPI system."	SCE is concerned that the language of this condition implies that any subsequent changes or modifications to the Inspection and Maintenance Plan would also have to be reviewed and approved by the Executive Director before implementation. SCE requests that this condition be revised to state that SCE will notify staff and provide a copy of the revised Plan for the CCC's records if the Plan is significantly modified following its initial submittal to the CCC.
3	**Page 5, Section IV.A, Background:** "SCE permanently ceased operation of SONGS Units 2 and 3 in June 2013 and has begun the process of plant decommissioning."	To clarify, SCE has not begun the process of plant decommissioning. SCE is in the preparatory stages of decommissioning and will obtain all required permits for the project prior to commencement of major decommissioning activities.
4	**Page 5, Section IV.A, Background:** "SCE has stated that the proposed Spent Fuel Pool Island (SFPI) cooling system would facilitate plant decommissioning because it is smaller, simpler…"	Same as Comment No. 1.
5	**Page 6, Section IV.A, Background:** "While no other plant is currently using a system configuration identical to that proposed at SONGS…"	The Rancho Seco and Crystal River nuclear plants have very similar systems/configurations to that of the proposed project.

6	**Pages 10, Section IV.C, Reduced Seawater Intake:** "At present, the daily intake of ocean water at SONGS is approximately 98 MGD…"	Although SONGS is capable of withdrawing a maximum of 98 MGD under the current pump configuration, SONGS has, in fact, been withdrawing a substantially reduced volume of ocean water.
7	**Page 10, Section IV.C, Reduced Seawater Intake:** "…results in the mortality of large numbers of marine organisms, both through entrainment in the intake stream and through impingement against the intake screens."	Since the plant shutdown, entrainment was significantly reduced with a 96-97% reduction in flow rate. In addition, no animals (fish or otherwise) have been impinged. The mortality of large numbers of marine organisms is no longer a concern due to the reduction of flow. SCE requests that this discussion be revised to clarify that there is no impingement currently occurring at SONGS, and the proposed project would result in even further reductions of entrainment.
8	**Page 10, Section IV.C, Operational Discharges, footnote 2:** "…discharges approximately 98 million gallons per day…"	Same as Comment No. 6.
9	**Page 11, Section IV.C, Reduced Seawater Intake:** "…to approximately 48 MGD."	Once again, the 48 MGD represents a maximum capability and SONGS would withdraw a lower volume of seawater once the SFPI is implemented, due to the modified pump configuration.
10	**Page 11, Section IV.C, Reduced Seawater Intake:** "This reduction in ocean water would result in commensurate reductions in entrainment and impingement impacts on marine organisms…"	Same as Comment No. 7.

To: **California Coastal Commission** Date: August 9, 2015
Joseph.Street@coastal.ca.gov
Tom.Luster@coastal.ca.gov

From: **Donna Gilmore**
SanOnofreSafety.org
dgilmore@cox.net

Re: **Application No. 9-15-0162 Application of Southern California Edison (SCE) to install independent cooling system, known as "Spent Fuel Pool Island" (SFPI) [using air chillers] and replace existing once-through ocean water cooling system serving spent nuclear fuel pools at San Onofre Nuclear Generating Station**

Please reject the application for this experimental Spent Fuel Pool Island air chiller cooling system. The proposed system for primary cooling of spent fuel pool water (similar to technology used to cool fish aquariums) is unproven and untested. SCE has provided inadequate evidence that this technology will work or can be maintained for the thousands of extremely hot fuel assemblies that currently require constant cooling. SCE's only example of primary air chiller spent fuel pool cooling, Rancho Seco, is not comparable. It was only used for three years, had less fuel and much cooler fuel. SCE's other two examples did not use chillers for primary cooling. See attachment for details. If the spent fuel pools are not cooled adequately, even a partial boil-off of the water below the level of the assemblies can cause a failure of the system that could result in loss of coastal access, including Interstate 5 and other potential impacts.

The assumption this system is needed for only a few years has not been substantiated by SCE. On the contrary, this system will likely be needed for decades, maybe longer. This affects seismic and other analysis provided in the Coastal Commission staff report and by SCE.

There is nothing in the documentation that addresses the impact if this system fails. There is nothing in the documentation that addresses the impact or plan if there is a need to revert back to ocean cooling. Reimbursement or mitigation for any impacts to the coastal environment caused by malfunction of this system, including loss of I-5 coastal access, is not adequately addressed.

SCE has provided inadequate substantiation to the Coastal Commission that this experimental unproven system will function properly to cool San Onofre's extremely hot spent nuclear fuel and for the duration this system is needed to work. Destroying the existing cooling system prior to ensuring this new system will work is unacceptable.

The SCE Inspection and Maintenance Plan should be part of the documentation that the public can review and comment on prior to any Coastal permit approval. There is no urgency that requires the permit be approved before this is done.

We urge you to not rely on SCE statements without verification, given SCE's past "misstatements". The Nuclear Regulatory Commission (NRC) does not plan to inspect this system until after it is installed. Therefore, there will be no review other than from the Coastal Commission. Our communities appreciate actions you have taken in the past on this issue and rely on the Coastal Commission to continue to protect our Coastal environment. Thank you.

Reasons to deny San Onofre Air Chiller Cooling System Coastal Permit

1. **SCE's only example of air chillers used for primary cooling of spent nuclear fuel is Rancho Seco and this is not comparable to San Onofre's extremely hot fuel**.

   a. SCE provided names of nuclear plants that use Spent Fuel Pool Islands, but none besides Rancho Seco that used air chillers for primary cooling of spent fuel pools.

   b. Rancho Seco used air chillers for only three years and their fuel was not as hot as San Onofre's fuel, so their cooling and maintenance requirements were significantly less demanding. Rancho Seco had only 6 full power years of operation, had fewer fuel assemblies, had no high burnup fuel, and their fuel cooled many more years in the pool before it was converted to an air chiller cooling system. Therefore, Rancho Seco's cooling and maintenance requirements were significantly less demanding than San Onofre's, so provides insufficient justification that this will be an adequate and reliable system.

   c. Unlike Rancho Seco, San Onofre is located in a corrosive marine environment which more quickly degrades chiller equipment and related systems. Chiller manufacturers have different requirements and sometimes shorter warranties for this environment.

   d. SCE has demonstrated their plan to change the cooling system for the spent fuel pools, relying on air chillers instead of ocean water to keep the spent fuel assemblies cool, was based on incomplete analysis. SCE initially said there were numerous nuclear plants using "spent fuel pool islands" and made the decision to use the air chiller system without knowing or providing the names of any nuclear plants that used air chillers in their spent fuel pool island systems. When Coastal Commission staff and I asked Tom Palmisano (SCE) which nuclear plants used air chillers to cool the spent fuel pools, the initial information provided did not contain any plants that used air chillers to cool the pools.

   e. After SCE's permit waiver was denied by the Coastal Commission, SCE could find only one plant that used air chillers for primary cooling of spent fuel pools (Rancho Seco).

   f. SCE named one plant (Brunswick) that used air chillers to supplement their primary cooling tower system during outages. This is not comparable to using air chillers for primary cooling.

   g. SCE named one plant (Robinson) that used water chillers (not air chillers) as a temporary supplement to their primary cooling tower system. This is not comparable to using air chillers for primary cooling.

   h. As stated by SCE, other plants use evaporative cooling systems (e.g., towers), which is the proven standard for cooling nuclear fuel.

   i. SCE's statement that other nuclear plants use Spent Fuel Pool Islands is misleading. That term does not describe the cooling system, which is the critical and relevant information.

   j. Rancho Seco has no high-burnup fuel[1] and only 493 fuel assemblies. The fuel cooled for many more years than San Onofre's fuel, so the demand for cooling at Rancho Seco

[1] High burnup fuel is defined as over 45 gigawatt days per metric tons of uranium (GWd/MTU). It burns longer in the reactor, resulting in fuel that is over twice as hot as lower burnup fuel.

is much less than San Onofre requirements. From its start in 1975 to the permanent shutdown in 1989 Rancho Seco only had a total equivalent of 6 full power years.[2]

k. In contrast, San Onofre has a large percentage of high burnup fuel (up to 52 GWd/MTU) and 2776 spent fuel assemblies in the pools.[3, 4] This fuel is over twice as hot as lower burnup fuel cooled for the same time period.

l. Maine Yankee was on one of SCE's list of Spent Fuel Islands. However, they rejected the use of chillers."[5] Maine Yankee is a pressurized water reactor (825 MWe) last operated in December 1996. After final defueling, the fuel pool housed 1432 assemblies. None of it was high burnup fuel.

m. On August 21, 2002, Rancho Seco completed placing all 493 spent fuel assemblies in dry storage at the onsite Independent Spent Fuel Storage Installation (ISFSI).[6] Rancho Seco fuel assembly burnup maximum is 38.2 GWd/MTU.[7]

2. **Other cooling options should be considered.**

a. The Commission staff report (page 6) appears to state there are only two options for cooling the pools − chillers or evaporative cooling units towers.[8] However, other options should be considered.

b. For example, continue with the current cooling system until the fuel is removed from the pools. Once the fuel is removed, the system usage would be reduced or eliminated unless and until there is a need to reload fuel back into the pools, or until the fuel is relocating to another operating plant or other location that has pools.

3. **The Coastal Commission should not accept SCE's short estimate of the length of time the system will be needed.**

a. SCE's assumption of only a 5 year use is predicated on being able to unload all the fuel by December 2020 and then destroy the pools. There are numerous problems with this assumption.

b. The Holtec spent fuel dry storage system SCE proposes is not approved by the Nuclear Regulatory Commission. In addition, SCE's modification of the design, showing this

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[2] Rancho Seco NRC Inspection Report, August 31, 1999, page 11
https://sanonofresafety.files.wordpress.com/2013/06/ml003772459ranchosecoinspectionreport1999-08-31foiapage44-64.pdf
[3] Attachment 32 - Unit 2 San Onofre Reactor Data (DOE Form GC-859 Schedule C)
https://sanonofresafety.files.wordpress.com/2013/06/songs-4702-masterfromformgc859.pdf
[4] Unit 3 San Onofre Reactor Data (DOE Form GC-859 Schedule C)
https://sanonofresafety.files.wordpress.com/2013/06/songs-4703-masterfromformgc859.pdf
[5] Conceptual Project Assessment, Spent Fuel Pool Island Project, CPA NO. 97-42, October 1997, P. 9 [5] Conceptual Project Assessment, Spent Fuel Pool Island Project, CPA NO. 97-42, October 1997, P. 9
https://sanonofresafety.files.wordpress.com/2015/05/19971000-my-jmb-spent-fuel-pool-island-conceptual-designmaineyankee.pdf
[6] Rancho Seco Post Shutdown Decommissioning Activities Report, Amendment 4, 7/31/2003, Page 3
http://pbadupws.nrc.gov/docs/ML0322/ML032260147.pdf
[7] Rancho Seco Facility and Independent Spent Fuel Storage Installation (ISFSI) NRC Inspection Report 05000312/2013007 and 07200011/2013001, August 22, 2013, Attachment 2 Loaded Canisters at Rancho Seco ISFSI *http://pbadupws.nrc.gov/docs/ML1323/ML13235A252.pdf*
[8] CC Staff Report Page 6: *SCE states that it selected the chiller-based design instead of a system depending on evaporative cooling in order to avoid the high water usage and highly-visible vapor plumes associated with evaporative cooling units. http://documents.coastal.ca.gov/reports/2015/8/th15a-8-2015.pdf*

"underground" system sitting only half underground has not been evaluated by the NRC, so may require an additional NRC license amendment.

c. The dry storage system has not been permitted by the Coastal Commission nor have funds been approved by the California Public Utilities Commission (CPUC) for the chiller and dry storage systems. I am an intervener in the current CPUC San Onofre decommissioning proceeding and have submitted testimony challenging SCE's chiller and dry storage system assumptions and related spent fuel management concerns.

d. If SCE destroys the pools there will be no method to unload fuel from a failed canister.

e. SCE's DOE standard contract requires SCE load fuel assemblies into a DOE approved cask.[9] If the pools are destroyed, they will not be able to comply with the DOE contract. This is one of many factors that may require the fuel to stay at the coastline for an indefinite period of time.

f. The NRC acknowledged in their August 26, 2014 Continued Storage decision, fuel may need to stay at each nuclear plant for over 100 years and require canister replacement.[10] Without a pool, this is not possible.

g. The NRC states the thin steel dry storage canisters are subject to stress corrosion cracking, particularly from coastal environments.

h. The Koeberg Plant in South Africa had a similar component leak from cracks in 17 years. It is in a similar coastal environment to San Onofre and the through-wall crack was 0.61" deep. San Onofre canisters are 0.625" deep. Diablo Canyon, Humboldt and Rancho Seco thin canisters are 0.5" deep.

i. If we have the same timeline as Koeberg for cracking, we will need to unload canisters in 5 years, since the first canisters at San Onofre were loaded in 2003.[11]

j. SCE has no inspection or repair tools that can be used to find or fix cracks. Holtec CEO, Dr. Kris Singh, states the cracks cannot be repaired, in the face of millions of curies of radiation released from even a microscopic crack.[12] SCE, as stated by Tom Palmisano the July 23, 2015 Community Engagement Panel meeting, is aware of these issues, but claimed the stainless steel they are using (316L) is better than the Koeberg component 304L steel.[13] However, the NRC states both of these steels are subject to stress corrosion cracking from corrosive marine environments and once a crack initiates, it can go through the wall of the canister in 16 years.[14] [15]

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[9] Research and Development Activities Related to the Direct Disposal of Dual Purpose Canisters, William Boyle, Director, Office of Used Nuclear Fuel Disposition R&D (NE-53), DOE, U.S. Nuclear Waste Technical Review Board Spring Board Meeting, April 16, 2013, slide 2 *http://www.nwtrb.gov/meetings/2013/april/boyle.pdf*

[10] Continued Storage of Spent Nuclear Fuel, August 26, 2014 *http://www.nrc.gov/waste/spent-fuel-storage/wcd.html*

[11] San Onofre Nuclear Generating Station, Units 1, 2, 3, and Independent Spent Fuel Storage Installation (ISFSI) Inspection Report 05000206/2014007, 05000361/2014007, 05000362/2014007, AND 07200041/2014001, NRC, February 13, 2014, Attachment 2 *http://pbadupws.nrc.gov/docs/ML1404/ML14045A317.pdf*

[12] Dr. Kris Singh, October 14, 2014 SCE Community Engagement Panel https*://www.youtube.com/watch?v=euaFZt0YPi4&feature=youtu.be*

[13] Dry Fuel Storage Defense in Depth, SCE, Tom Palmisano, July 23, 2015, slide 10 *http://www.songscommunity.com/docs/04_SCECEPISFSI-DID_072315.pdf*

[14] Chloride-Induced Stress Corrosion Cracking Tests and Example Aging Management Program, Darrell S. Dunn NRC/NMSS/SFST, Public Meeting with Nuclear Energy Institute on Chloride Induced Stress Corrosion Cracking Regulatory Issue Resolution Protocol, August 5, 2014, slide 9 & 10 *https://sanonofresafety.files.wordpress.com/2013/06/8-5-14-scc-rirp-nrc-presentation.pdf*

k. The existing steel canisters may already be cracking, but no one knows because they cannot be inspected.

l. There is no seismic rating for a cracked canister.

m. The dry casks need to cool for decades before they can be shipped to a permanent site. SCE plans to load 37 fuel assemblies in each Holtec canister and the majority of the fuel at San Onofre is high burnup fuel. The combination of a high number of fuel assemblies and hotter fuel will require decades of storage before fuel can be transported.[16] Therefore, it's critical we have a retrieval system and that requires a functional spent fuel pool.

4. **The SCE Inspection and Maintenance Plan should be part of the documentation that the public can review and comment on prior to any Coastal permit**. There is no urgency that requires the permit be approved prior to this. [17]

5. **The Commission needs to consider the lifespan of the system in a corrosive marine environment and based on the potential for a much longer lifespan than estimated by SCE**. What is the actual warranty of the chillers for our corrosive marine environment?

6. **Chillers are known to be extremely loud and there will be three to four of them in use**. What is the decibel level of these and is it acceptable?

7. **Additional substantiation and independent verification is needed for the adequacy of the proposed air chiller system.**

   a. The staff report (page 6) states "*In the present "defueled" state of Units 2 and 3, the heat load in the spent fuel pools is **significantly** lower than if freshly offloaded fuel was still being added to the pools. The SFPI system would have a **cooling capacity roughly twice that needed to dissipate the current heat load**, and thus can provide an interim system for spent fuel cooling until the fuel can be transferred to dry cask storage*."

   b. The word "significantly" is subjective and not quantified. Significantly lower does not mean low enough.

   c. How was the cooling capacity determined? Rancho Seco ran a test to see how long the fuel would take to almost reach the boiling point, due to the margin of error in attempting to calculate this. This is not something to rely on with an estimate. As we know from the steam generator project, SCE has relied on incorrect calculations in the past.

   d. If fuel assemblies must be returned to the pool from the dry casks, they may be much hotter. This variable need to be analyzed. Since this is an experimental system and unloading fuel

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[15] NRC Summary of August 5, 2014 Public Meeting with the Nuclear Energy Institute on Chloride Induced Stress Corrosion Cracking Regulatory Issue Resolution Protocol
https://sanonofresafety.files.wordpress.com/2013/06/ml14258a081-8-5-14meetingsummary.pdf

[16] Ibid, Slide 10

[17] *However, because no specific plan is currently available, Commission staff recommends Special Condition 1, which would require SCE to submit, for the Executive Director's review and approval, an Inspection and Maintenance Plan detailing the type and frequency of system inspections and the procedures that would be followed to assure that SFPI system remains in good working condition and will continue to meet its initial seismic safety design throughout the project life.*, Spent Fuel Pool Island Cooling System– CC Staff Report 7/24/2015
http://documents.coastal.ca.gov/reports/2015/8/th15a-8-2015.pdf

back into the pools has never been done, it's a significant unknown. Returning hotter fuel to a cooler pool might cause a problem.[18]

e. Given this system has never been used as primary cooling of high burnup fuel and there is a large amount that is still extremely hot, there is not a large margin for error.

f. SCE has yet to provide substantiation for the adequacy and reliability of this system over the lifespan needed.

g. Independent verification is needed of SCE's statements.

h. Who is the technical source of the above claims? What are their qualifications? Is SCE relying on the vendor for these claims?

8. **There appear to be inadequate redundancies and backup plans in this system.**

   a. Regarding the four chillers (two for each spent fuel pool) as referenced on Page 7, doesn't the use of only one spare chiller and use of crossties reduce the needed redundancies?

   b. There appear to be many single points of failure and reliance on workers to be able to access the facility in a severe earthquake and make the needed repairs.

   c. SCE admitted not all portions of the cooling system are earthquake safe.

9. **What is the expected lifespan of the various parts of the system?**

10. What pollutants will still continue to be dumped into the ocean, even if this system is installed, since only part of the once-through system will be discontinued?

11. **The earthquake evaluations appear to be pre-Fukushima and have not taken into consideration the new USGS data**, including the information about faults able to jump 9 feet to another fault. And the new information about strike-slip faults and other information about the lessons learned from Fukushima for earthquakes and tsunamis.[19] San Onofre "design basis" predates Fukushima.

12. **The Tsunami analysis is pre-Fukushima and is also based on the short project life span**, which is not a conservative assumption. Also, what if the Tsunami wall failed? What is the lifespan of the Tsunami wall and has it be inspected and evaluated?

13. **What is the daily intake of ocean water reduction due to this chiller system? Please revise Executive Summary.**

    a. The staff Executive Summary (Page 2) states this alternative spent fuel cooling system will eliminate the plant's use of ocean cooling water. However, Page 11 states daily intake of ocean water will only be reduced **from approximately 98 MGD to 48 MGD** and a **portion of this reduction is due to changes other than the air chiller cooling system**. This should be clarified and also indicate the actual reduction due to the air chillers and included in the Executive Summary. [20]

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[18] Viability of Existing INL Facilities for Dry Storage Cask Handling, Randy Bohachek et. al., Rev. 1, April 30, 2013, Idaho National Laboratory, FCRD-UFD-2013-000027. INL/EXT-13-29035, Page 2 *http://energy.gov/sites/prod/files/2013/12/f5/INLFacilitiesDry%20StorHBUFViabilRptR1b.pdf*

[19] Earthquake Risks *http://sanonofresafety.org/earthquake-and-tsunami-risks/*

[20] CC Staff Report, Page 11: *At present, the daily intake of ocean water at SONGS is approximately 98 MGD, or about 4% of the full operational flow when the plant was operational. Even at this reduced level of intake, the plant remains a major user of once-through cooling water, and results in the mortality of large numbers of marine organisms, both through entrainment in the intake stream and through impingement against the intake screens.*

b. Can these other systems still be installed without the chiller system?

14. What is the coastal impact if this system fails?

a. The staff report needs to address the discharge of fluids or contaminants to coastal waters and affect on marine organisms if the system fails. It only addresses this for "under normal operating conditions" (page 2).

15. **SCE reimbursements and mitigation are only partially addressed.**

a. CC staff states SCE shall reimburse the Coastal Commission for all Coastal Commission costs and attorney fees. Other areas that may need reimbursement are not addressed.

b. Reimbursements for any impacts to the coastal environment caused by malfunction of this system, including loss of access to I-5 are not addressed.

c. What is impact if the system fails?

d. What if the mitigation of the system fails?

e. SCE said replacement reactor steam generators would last 40 to 60 years, yet failed after 1 year of operation of Reactor Unit 3 and with decades of premature wear in both Reactors. The NRC determined Southern California Edison was at fault. "…a significant design deficiency in replacement steam generators, resulting in rapid tube wear of a type never before seen in recirculating steam generators." In the NRC's 12/23/2013 the NRC cited SCE with a Notice of Violation. They stated: "…design control measures were not established to provide for verifying or checking the adequacy of certain designs."[21]

Installation of the SFPI system, along with a previously-approved retrofit of the plant HVAC system and installation of smaller intake pumps (CDP waiver 9-15-0417-W), would eliminate the need for once-through cooling water and halve the plant's rate of ocean water intake, to approximately 48 MGD.

[21] San Onofre Nuclear Generating Station – Final Significance Determination of White Finding and Notice of Violation, NRC Inspection Report 05000361/2012009 AND 05000362/2012009, NRC, December 23, 2013 *http://pbadupws.nrc.gov/docs/ML1335/ML13357A058.pdf*

UNITED STATES MARINE CORPS
MARINE CORPS INSTALLATIONS WEST-MARINE CORPS BASE
BOX 555010
CAMP PENDLETON, CALIFORNIA 92055-5010

Mr. Joseph Street
California Coastal Commission
45 Fremont St., Suite 2000
San Francisco, CA 94105

Dear Mr. Street:

The United States Navy (Navy) and the United States Marine Corps (USMC) take this opportunity to provide comments for the record on Southern California Edison's (SCE) coastal permit application No. 9-15-0162. This application is for the installation of an independent spent fuel cooling system at the San Onofre Nuclear Generating Station (SONGS) located on Marine Corps Base, Camp Pendleton, San Diego County. It is the Navy and Marine Corps' position that the California Coastal Commission lacks jurisdiction to require or issue a Coastal Development Permit (CDP) for actions at the SONGS site.

As the Staff Report for this application notes, the proposed project would occur entirely within the previously developed SONGS site. In 1963, Congress, through Public Law 88-82, authorized the Secretary of the Navy to issue an easement on this site to SCE and San Diego Gas & Electric "for the construction, operation, maintenance, and use of a nuclear generating station, consisting of one or more generating units, and appurtenances thereto." In 1964, the Secretary of the Navy (SECNAV) issued such an easement for a 60-year period. At the termination of the easement, the SECNAV may require SCE to remove all improvements and restore the site to its pre-easement condition.

The above clearly shows that the SONGS site is on land "the use of which is by law subject solely to the discretion of . . . the Federal Government, its officers or agents." (16 U.S.C § 1453(1)). As such, the SONGS site, under the Federal Coastal Zone Management Act (CZMA), is excluded from the coastal zone. While each State participating in the CZMA's federal-state cooperative program defines the boundaries of its coastal zone, Federal regulations require that the "boundary of a State's coastal zone *must* exclude lands owned, leased, held in trust or whose use is by law subject solely to the discretion of the Federal Government, its officers or agents." (Emphasis added). (15 C.F.R § 923.33). Thus, Federal law requires Federal land to be excluded from California's coastal zone as defined in the California Coastal Act. Since a CDP is issued for development in the coastal zone, the Commission is without jurisdiction to require or issue a CDP for actions outside the coastal zone, like the SONGS site.

The Navy and Marine Corps position on this matter is fully consistent with the ruling in *Manchester Pacific Gateway v. California Coastal Commission* (S.D. Cal. 2008)(*Manchester*) (the jurisdiction in which the SONGS site is located) that found that the Commission did not have the authority to require a CDP for development actions at the Navy Broadway Complex (NBC) in San Diego. Like the NBC site, the SONGS site is on Department of the Navy-owned land, under exclusive federal legislative jurisdiction, where a particular development was specifically authorized by Congress, and a real estate instrument for use of this site was issued by the Navy and Marine Corps. For

the SONGS site, the instrument at issue is an easement, in which the federal agency retains even more rights to access the site subject to the easement than it does with a lease similar to that addressed by the federal district court in *Manchester*. Therefore, the Navy and Marine Corps object to the Commission requiring or issuing a Coastal Development Permit for the proposed action at hand or for any other proposed action at the SONGS site.

Respectfully,

W. L. WHITMIRE
CAPT, CEC, USN
Assistant Chief of Staff, G-F
Marine Corps Installations West-
Marine Corps Base, Camp Pendleton

FORM FOR DISCLOSURE

OF EX PARTE

COMMUNICATION

Date and time of communication:	**July 9, 2015 3:30 pm**
Location of communication:	**San Onofre, CA**
Person(s) initiating communication:	**David Neish, David Neish Jr.Ron Pontes, David Asti, Julie Holt**
Person(s) receiving communication:	**Steve Kinsey**
Name or description of project:	**CDP 9-15-0162 Southern California Edison Company**

Detailed substantive description of content of communication:

Applicants' representatives provided an overview of the project plans and discussed the application history to date. A power point presentation was presented that identified project location, discussion of the proposed project, a description of the project purpose and benefits, a discussion of the impact on Coastal Resources, and regulatory oversight.

The applicants and representatives then presented a discussion on the Spent Fuel Island CDP that is coming to the Commission at the August hearings in Chula Vista. It was indicated that Edison was in support of the CCC Staff recommendation for approval and also the two (2) Special Conditions. It was explained that this application is for the purpose of the installation of an independent cooling system known as a "Spent Fuel Pool Island" that will replace the existing once-through cooling system at SONGS, Units 2 and 3. The proposed spent fuel pool island is a stand-alone cooling system that would use air-cooled industrial chillers to dissipate the heat generated by spent fuel submerged in large pools inside the SONGS spent fuel handling buildings. This new system would allow the spent fuel pools to be isolated from the existing once-through cooling system, which depends on the intake of seawater from the Pacific Ocean.

There was a brief explanation on the decommissioning process and the permits that the Coastal Commission will be reviewing and acting upon prior to decommissioning. It was indicated that another CDP application for the expansion of the Independent Spent Fuel Storage Installation (ISFSI) will be coming before the Commission in October, and that the current CDP application is totally separate from the matter that will be discussed in October.

Date

8/10/15

Commissioner

EX PARTE COMMUNICATION DISCLOSURE FORM

Filed by Commissioner: Carole Groom

1) Name or description of project: San Onofre Nuclear Plant (Th15a) -- Application No. 9-15-0162 (Southern California Edison Co., San Diego Co.)
2) Date and time of receipt of communication: August 3, 2015 at 10 AM
3) Location of communication: Telephone
(If not in person, include the means of communication, e.g., telephone, e-mail, etc.)
4) Identity of person(s) initiating communication:
Dave Neish
5) Identity of person(s) on whose behalf communication was made:
Dave Neish
6) Identity of persons(s) receiving communication:
Carole Groom
7) Identity of all person(s) present during the communication:
Carole Groom, Dave Neish, David Neish, Richard Alexander Bac

Complete, comprehensive description of communication content (attach complete set of any text or graphic material presented):

I received a briefing regarding the San Onofre Nuclear Plant in which the representatives went through a briefing booklet that was previously provided to staff (titled "Spent Fuel Pool Island" and dated August 13, 2015). The representatives stated that they are in agreement with the staff recommendation and the special conditions. They indicated that this item is distinct from the item that is coming before the Commission in October (Independent Spent Fuel Storage, or ISFS). According to the representatives, this item is solely about the creation of a spent fuel pool island, which is one step toward the decommissioning of the nuclear plant over the next 20 years. They stated that this project will improve the marine habitat and ecosystem in the ocean as the proposed plan eliminates the need for ocean cooling. The representatives also stated that a Safety and Operations Plan is included – which the Director and staff will have to approve before work begins.

Aug 7 2015
Date

carole Groom
Signature of Commissioner

TIMING FOR FILING OF DISCLOSURE FORM: File this form with the Executive Director within seven (7) days of the ex parte communication, if the communication occurred seven or more days in advance of the Commission hearing on the item that was the subject of the communication. If the communication occurred within seven (7) days of the hearing, provide the information orally on the record of the proceeding and provide the Executive Director with a copy of any written material that was part of the communication. This form may be filed with the Executive Director in addition to the oral disclosure.

EX PARTE COMMUNICATION DISCLOSURE FORM

Filed by Commissioner: GREG COX

1) Name or description of project: SONGS Spent Fuel Island
2) Date and time of receipt of communication: July 30, 2015 at 11AM
3) Location of communication: San Onofre Nuclear Power Plant
4) Identity of person(s) initiating communication: David B. Neish
5) Identity of person(s) on whose behalf communication was made: Southern California Edison
6) Identity of persons(s) receiving communication: GREG MURPHY for GREG COX
7) Identity of all person(s) present during the communication: David B. Neish, David J. Neish, Ron Pontes, Lou Bosch Julie Holt, Jon Manso, Mike Moran, Bob Tang, Maureen Brown, Jennifer Pugh, Greg Murphy and Luis Monteagudo

Complete, comprehensive description of communication content (attach complete set of any text or graphic material presented):

Greg Murphy and Luis Monteagudo on my staff met with the applicants' project team at San Onofre Nuclear Power Plant to conduct a site visit of the plant which has been shut down since 2012. First we met with the Edison representatives who lead us through a slide show of the overall SONGS decommissioning process. The decommissioning process will take approximately 20 years and will require several permits from the CCC in the coming years.

Next they focused on the upcoming Independent Spent Fuel Station Installation project which will be coming before the CCC in October. The applicant stated the need for an expansion to their current ISFSI in order to get the spent fuel out of the wet pool storage and into dry cask storage. Edison stated that the dry storage is the preferred method of storage for all power plants due to the Department of Energy not taking the spent fuel off site.

The other proposed project is a CDP on the August agenda for the Spent Fuel Island. This cooling system will allow the spent fuel pools to remain cool without having to use ocean once through cooling. This project will also allow Edison to shut down other plant operating systems that will allow for a safe decommissioning of the plant in the future. The Spent Fuel Island is a small compact chilling system that will help reduce by 50% the amount of ocean water needed during decommissioning.

After the presentation we were taken on a site tour of the retired plant. The primary areas focused on were the current ISFSI location and proposed expansion area, the location of the Spent Fuel Island, the control center for the plant, the plant switchyard and the ocean intake area. The tour lasted approximately an hour during which the Edison team answered various questions about the two upcoming projects and the overall decommissioning of the plant.

8/4/15

Date

Signature of Commissioner

FORM FOR DISCLOSURE
OF EX PARTE
COMMUNICATION

Date and time of communication:	**August 6, 2015 9:30 am**
Location of communication:	**Meeting in San Diego, CA**
Person on whose behalf communication was made:	**Southern California Edison**
Person(s) initiating communication:	**David Neish, David Neish Jr.**
Person(s) receiving communication:	**Greg Cox, Greg Murphy**
Name or description of project:	**CDP 9-15-0162 Southern California Edison Company**

Detailed substantive description of content of communication:

Applicants' representatives provided an overview of the project plan and discussed the application history to date. A power point presentation was presented that identified project location, discussion of the proposed project, a description of the project purpose and benefits, a discussion of the impact on Coastal Resources, and regulatory oversight.

The applicants support the CCC Staff recommendation for approval and also the two (2) Special Conditions. It was explained that this application is for the purpose of the installation of an independent cooling system known as a "Spent Fuel Pool Island" that will replace the existing once-through cooling system at SONGS, Units 2 and 3. The proposed spent fuel pool island is a stand-alone cooling system that would use air-cooled industrial chillers to dissipate the heat generated by spent fuel submerged in large pools inside the SONGS spent fuel handling buildings. This new system would allow the spent fuel pools to be isolated from the existing once-through cooling system, which depends on the intake of seawater from the Pacific Ocean.

There was a brief explanation on the decommissioning process and the permits that the Coastal Commission will be reviewing and acting upon prior to decommissioning. It was indicated that another CDP application for the expansion of the Independent Spent Fuel Storage Installation (ISFSI) will be coming before the Commission in October, and that the current CDP application is totally separate from the matter that will be discussed in October.

8/6/15
Date

Greg Cox
Commissioner

Safety | Stewardship | Engagement

Decommissioning
San Onofre
Nuclear Generating Station

Commissioner Uranga California Coastal Commission

Ron Pontes
Decommissioning Manager

July 31, 2015

Agenda

- Introductions
- Objectives
- Plant Overview
- Decommissioning Overview
- ISFSI Expansion
- Spent Fuel Pool Island
- Plant Tour
- Wrap-up

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Decommissioning
San Onofre
Nuclear Generating Station

Plant Layout

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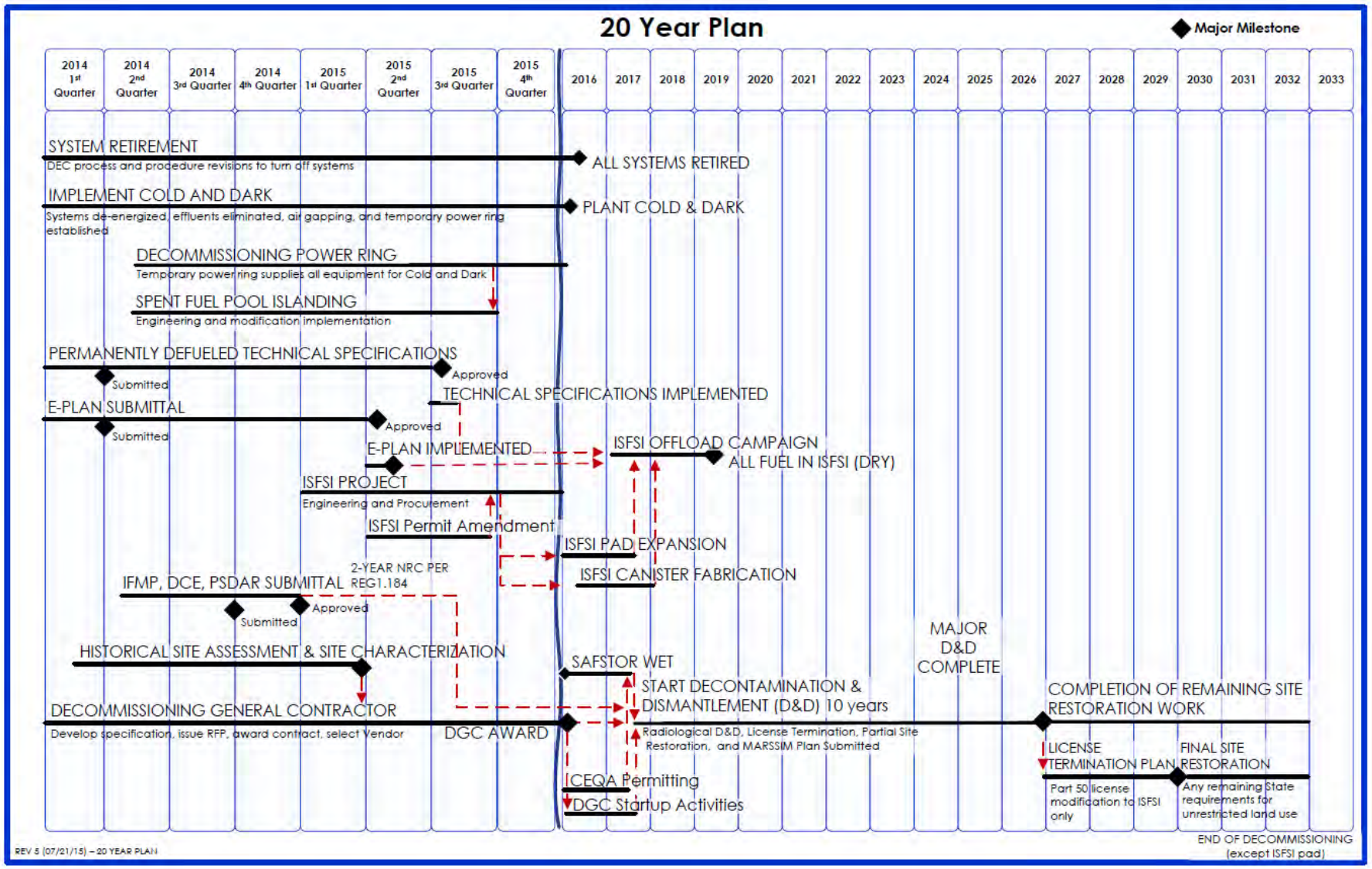
Decommissioning
San Onofre
Nuclear Generating Station

Decommissioning

Overview

Once a utility declares cessation of operation, specific activities are governed by NRC Regulations 10 CFR 50.82 with specific time periods:

Decommissioning Plan



Decommissioning San Onofre Nuclear Generating Station

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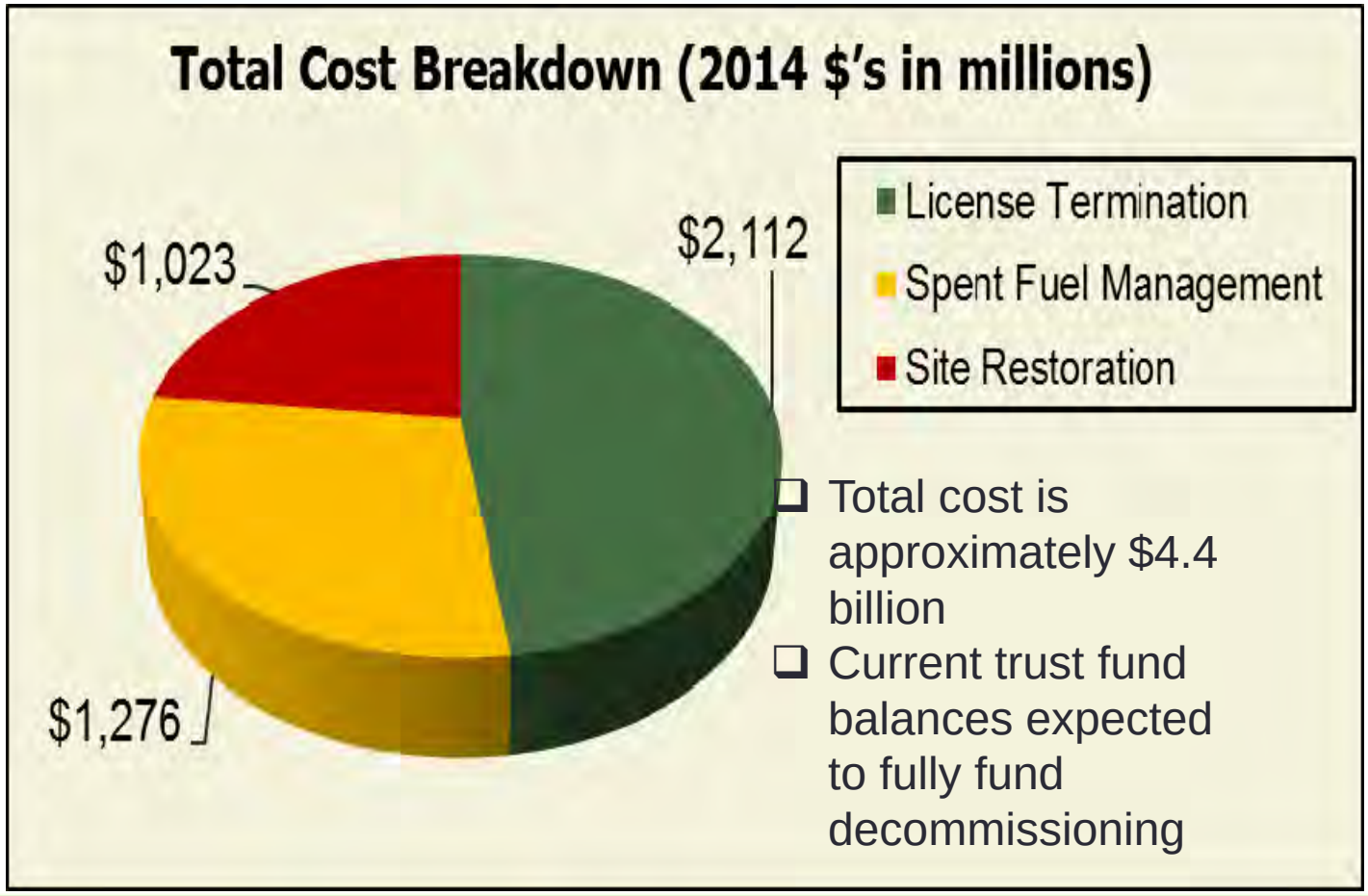
Decommissioning Cost Estimate



- Total cost is approximately $4.4 billion
- Current trust fund balances expected to fully fund decommissioning

Decommissioning San Onofre Nuclear Generating Station

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Permitting Milestones

August 12-14, 2015	CCC hearing on SFPI CDP
October 7-9, 2015	CCC hearing on ISFSI CDP
4Q 2015 to 1Q 2017	CEQA review of decommissioning
2Q 2017	CCC hearing on Decommissioning CDP
3Q 2017	Obtain other required permits including 401 and 404
TBD	Navy NEPA review

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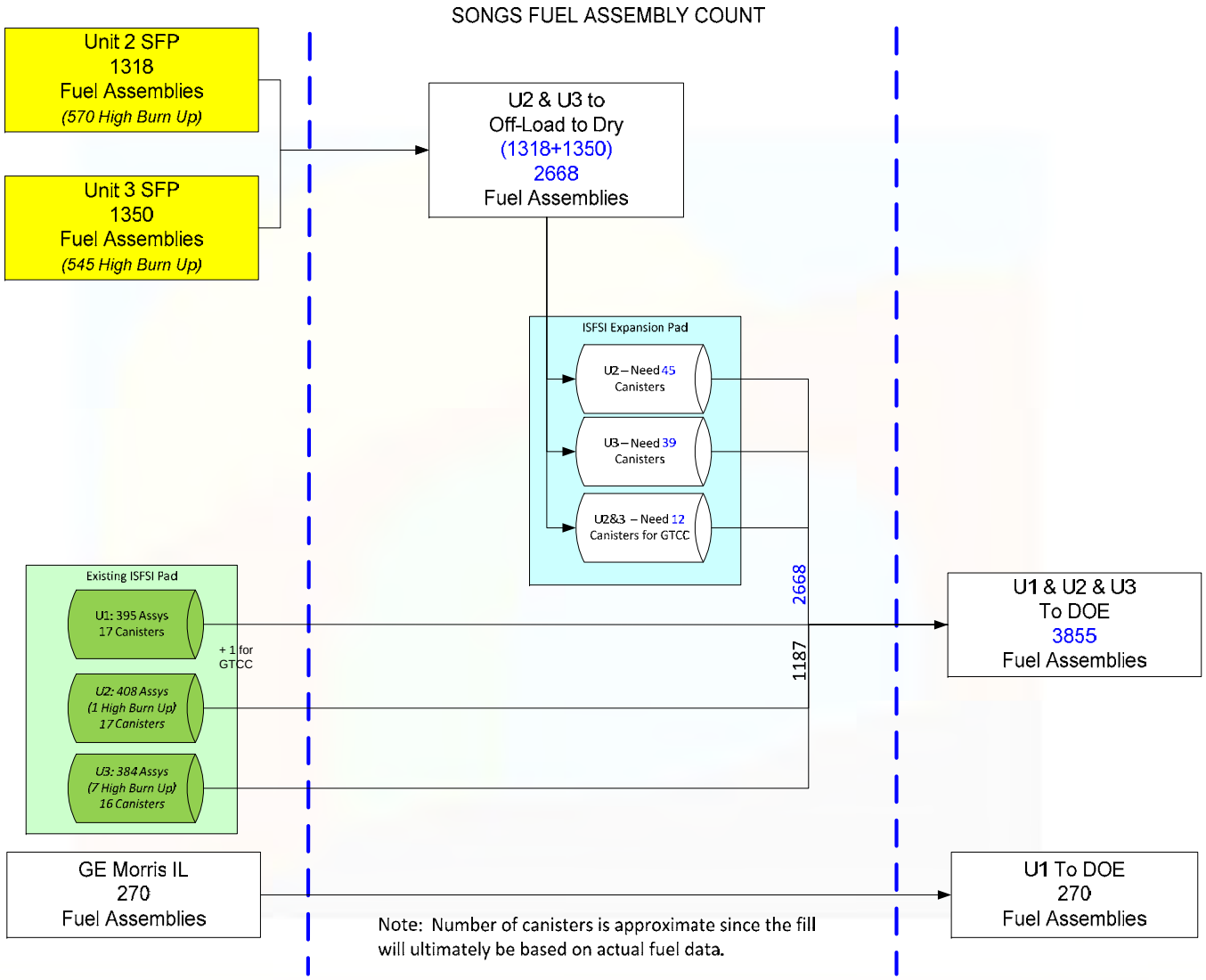
Decommissioning
San Onofre
Nuclear Generating Station

Used fuel Storage and Management

Used Fuel Storage



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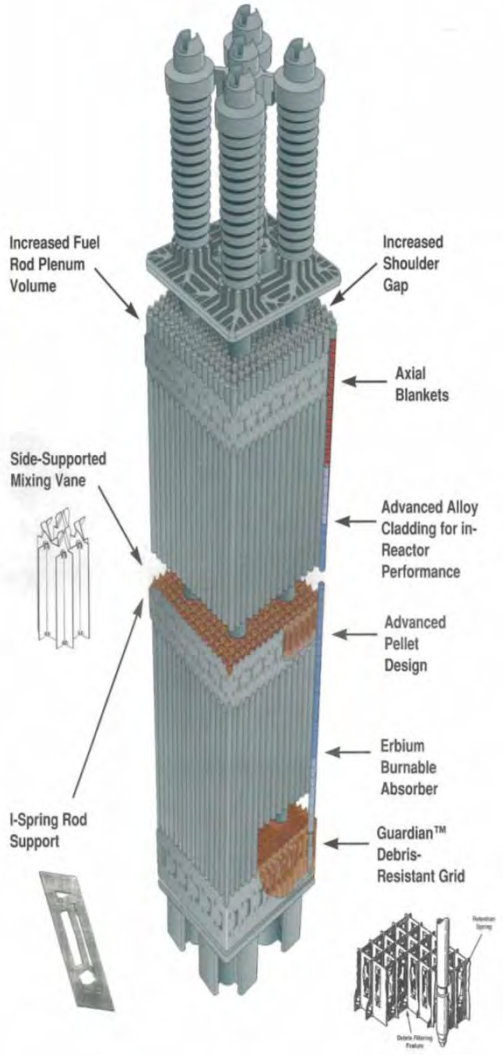
Fuel Assembly



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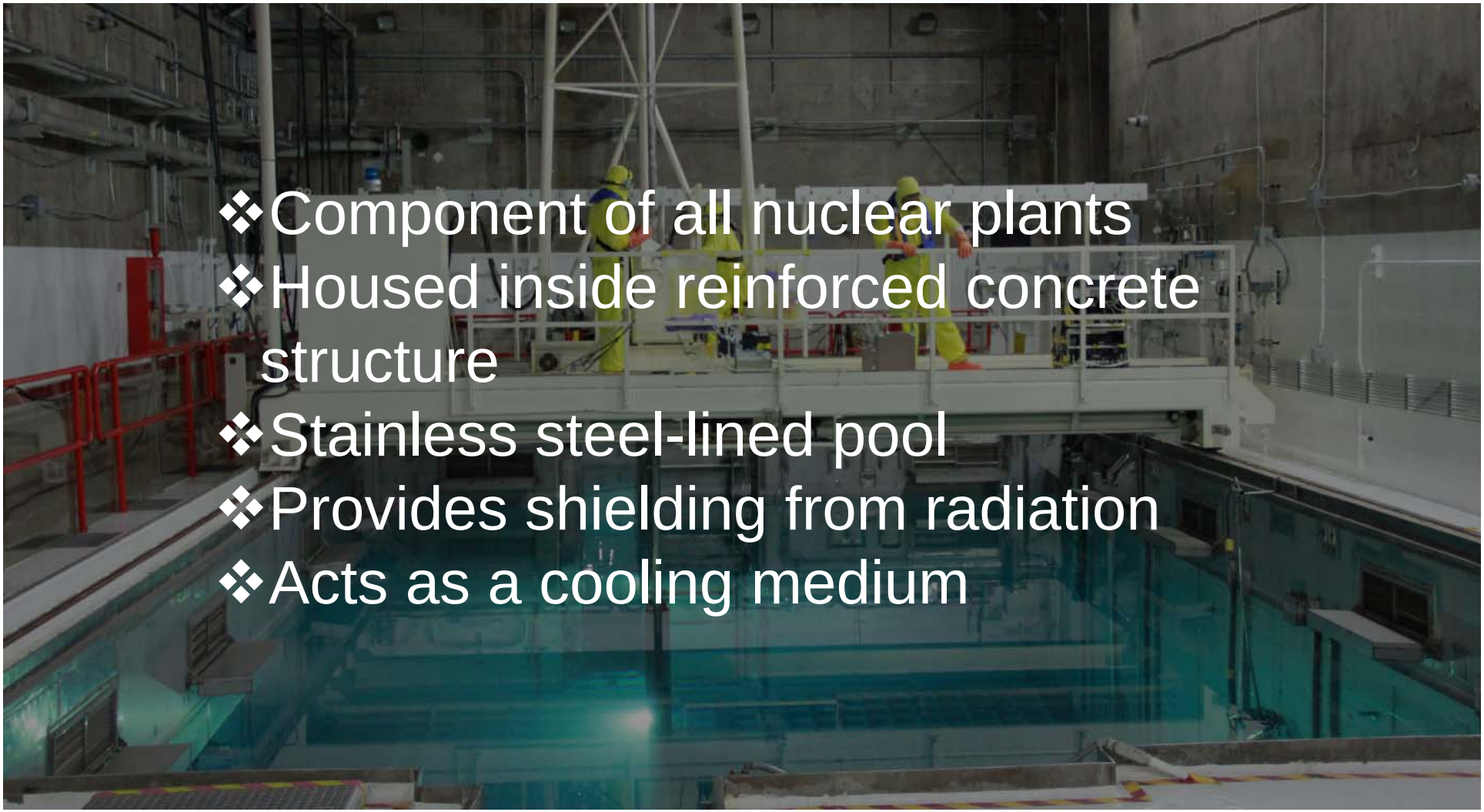
Nuclear Generating Station

Spent Fuel Pool "Wet Storage"



- Component of all nuclear plants
- Housed inside reinforced concrete structure
- Stainless steel-lined pool
- Provides shielding from radiation
- Acts as a cooling medium

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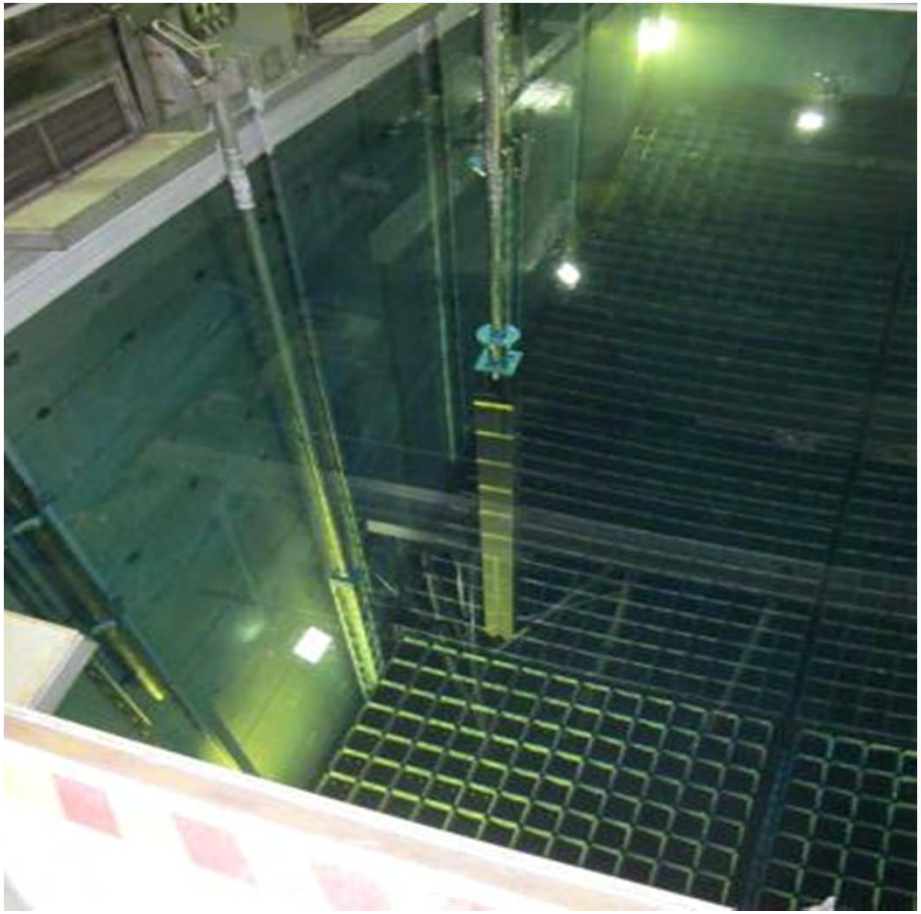
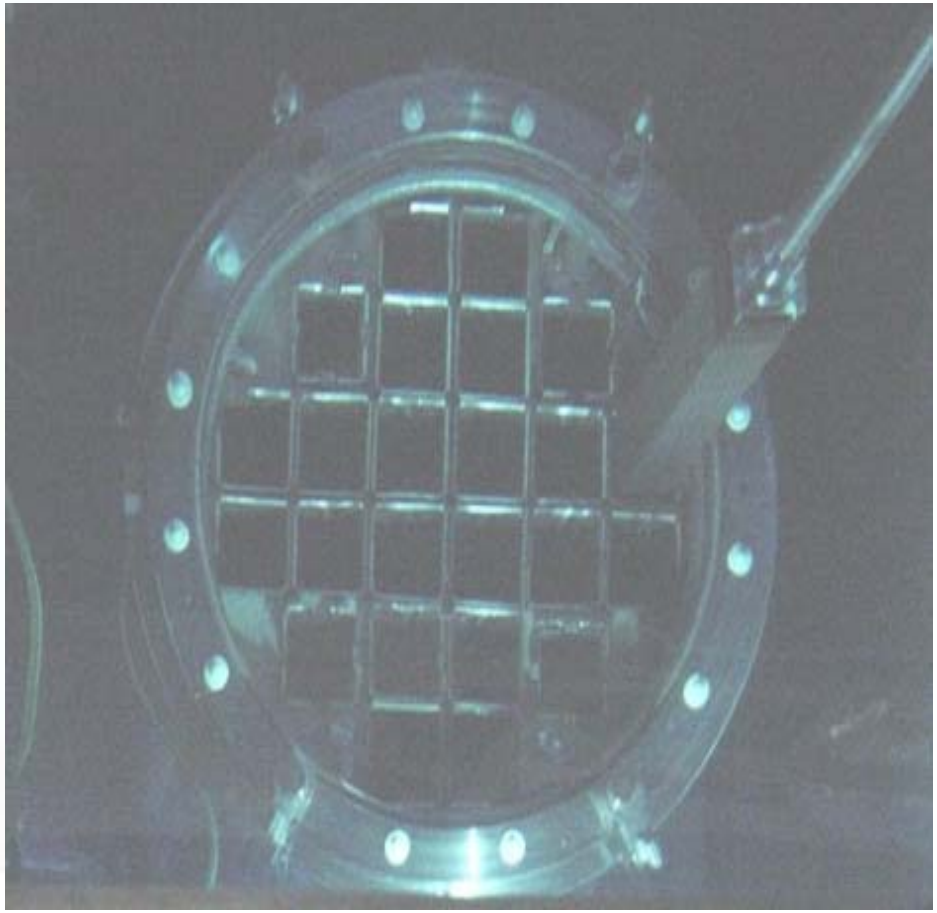
Spent Fuel Pool





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Spent Fuel Pool to Dry Fuel Storage

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San Onofre
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NUHOMS ISFSI

Decommissioning San Onofre Nuclear Generating Station

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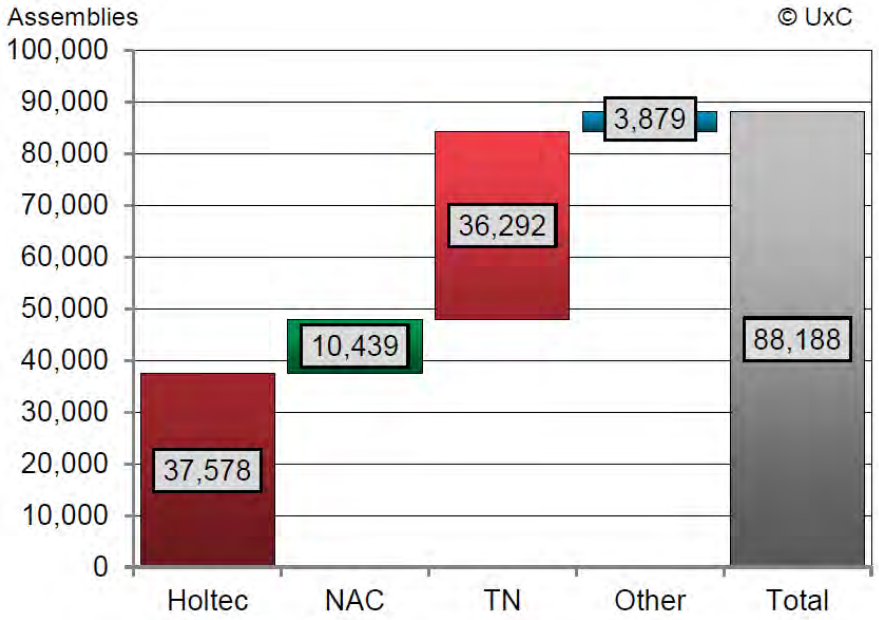
Existing Independent Spent Fuel Storage Installation (ISFSI)

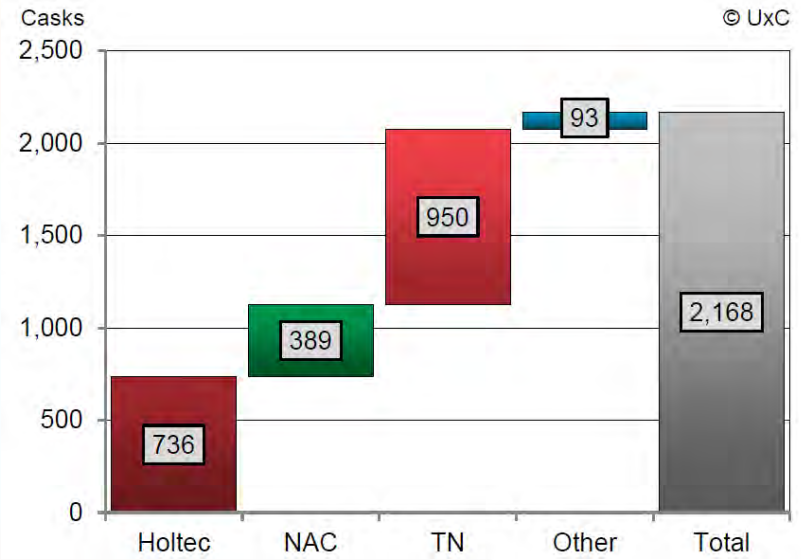
Decommissioning San Onofre Nuclear Generating Station

Industry Dry Storage Systems

Assemblies in Dry Storage in the U.S.



Dry Storage Systems Loaded in the U.S.



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ISFSI Expansion

ISFSI Expansion Project

- Expansion would accommodate transfer of all spent fuel to dry storage
  - Goal is to offload all spent fuel by mid-2019
  - Results in significant cost savings to ratepayers
- SCE selected Holtec technology for expansion
- Offsite alternatives infeasible
- Fuel onsite until interim storage facility or DOE repository becomes available (~2051)
- CCC CDP application filed February 2015

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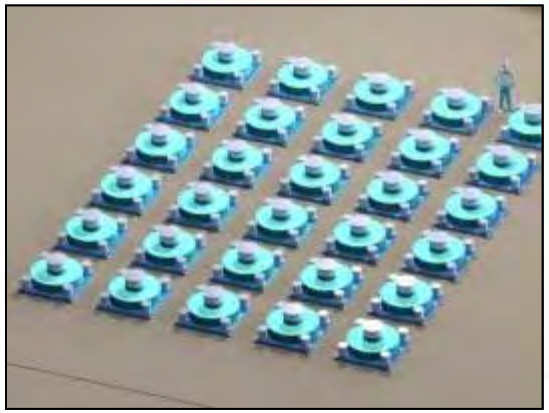
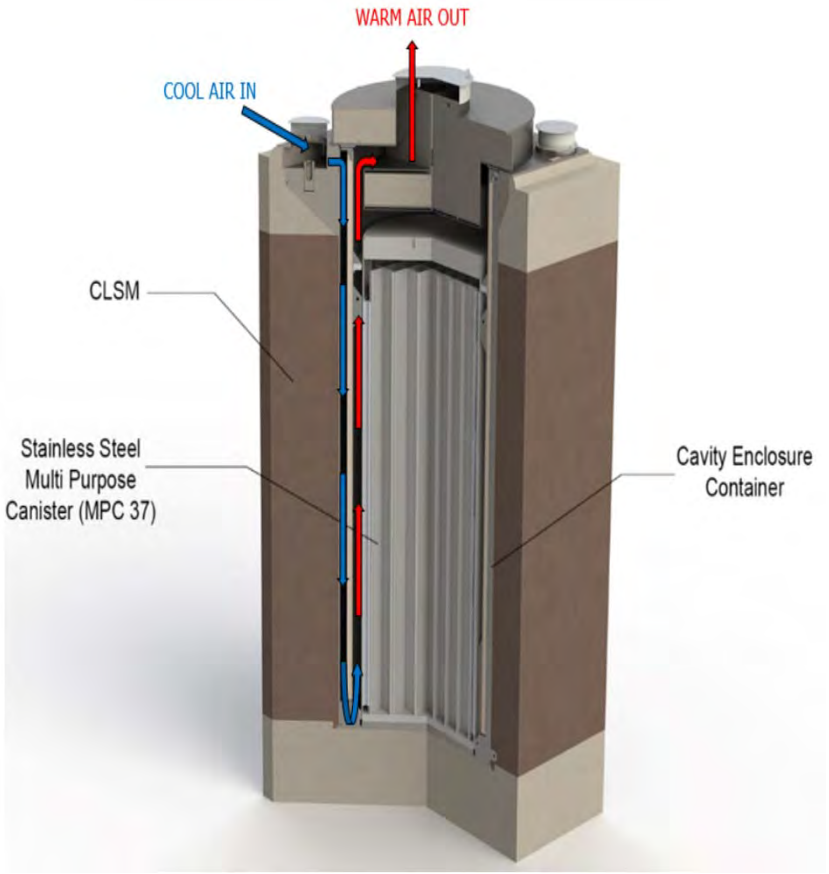
Holtec UMAX System





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Holtec System at Callaway

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ISFSI Proposed Expansion

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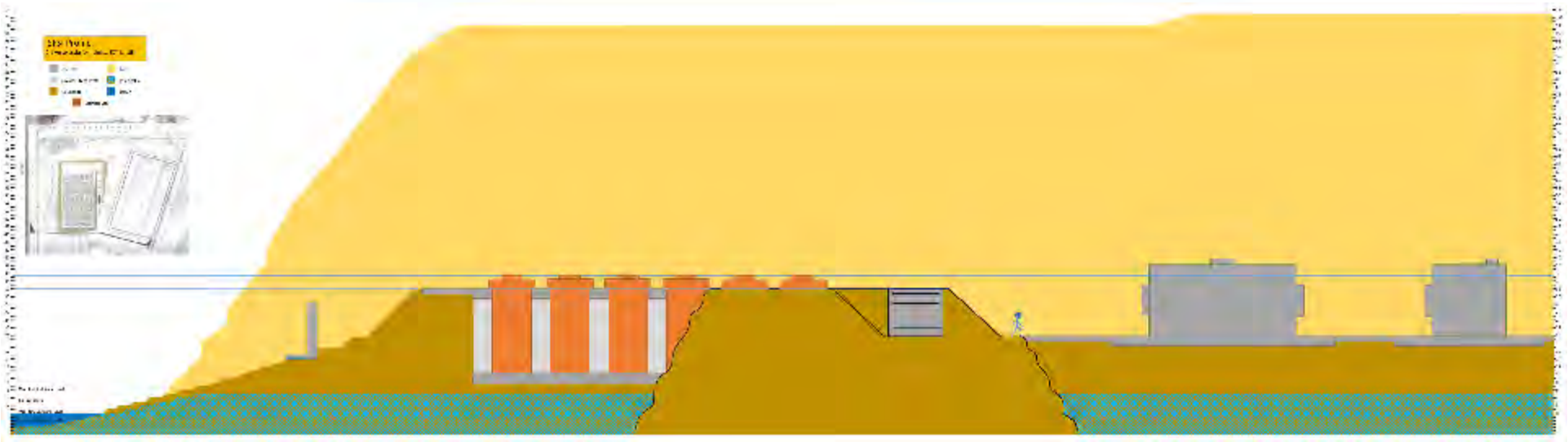
ISFSI Proposed Expansion



Decommissioning San Onofre Nuclear Generating Station

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ISFSI Schedule

- Project milestones
  - Oct 7-9, 2015: CCC meeting in Long Beach
  - Dec 2014 - Nov 2016: Engineering
  - Dec 2014 - Jan 2018: Fabrication
  - Oct 2015 - Aug 2017: Construction
  - Aug 2017 - Mid-2019: Fuel offload
- Impact of delay
  - $45M per year to maintain staff while fuel is located in the spent fuel pool

Community Concerns

- Sea Level Rise – Addressed by CDP for 100 years
- Canister Wall Thickness – Additional margin above Industry Standards
- Location Selection – Based on licensing and timely treatment of spent fuel
- Dry vs Wet Storage – Inherently more stable and economical

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Decommissioning
San Onofre
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Spent Fuel Pool Island

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Decommissioning San Onofre Nuclear Generating Station

Purpose & Need

- Sets stage for a safe and prompt decommissioning
  - Systems de-energized and drained
  - Safe dismantlement of systems and structures
- Modification achieves:
  - Elimination of once-through cooling
  - Continued safe management of used fuel
  - Reduced overall operating costs

Decommissioning San Onofre Nuclear Generating Station

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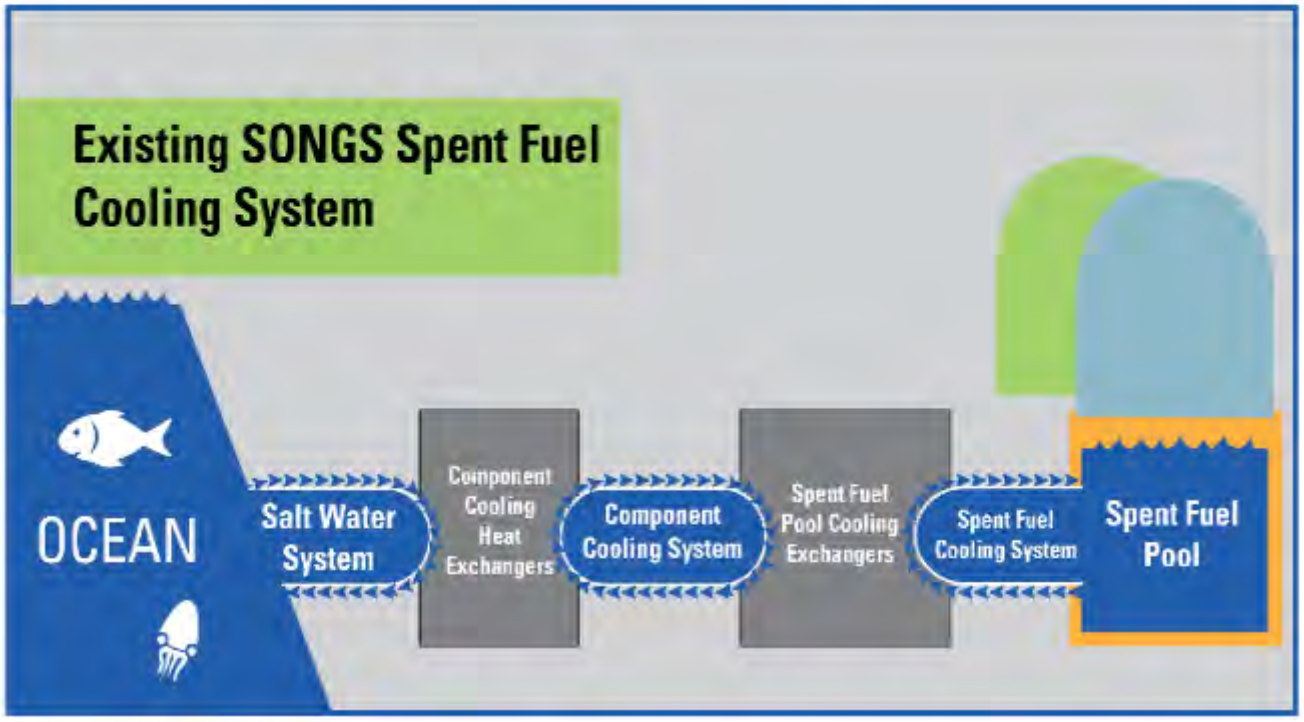
Spent Fuel Pool Cooling

Existing SONGS Ocean Cooling System — **1983-Present**



Project Description

- Replaces current ocean cooling system with a compact system better suited for decommissioning plant
- Spent Fuel Pool Island (SFPI) involves installation of chillers, heat exchangers, pumps, and piping
- System in use until all spent fuel is moved to dry storage

Decommissioning San Onofre Nuclear Generating Station

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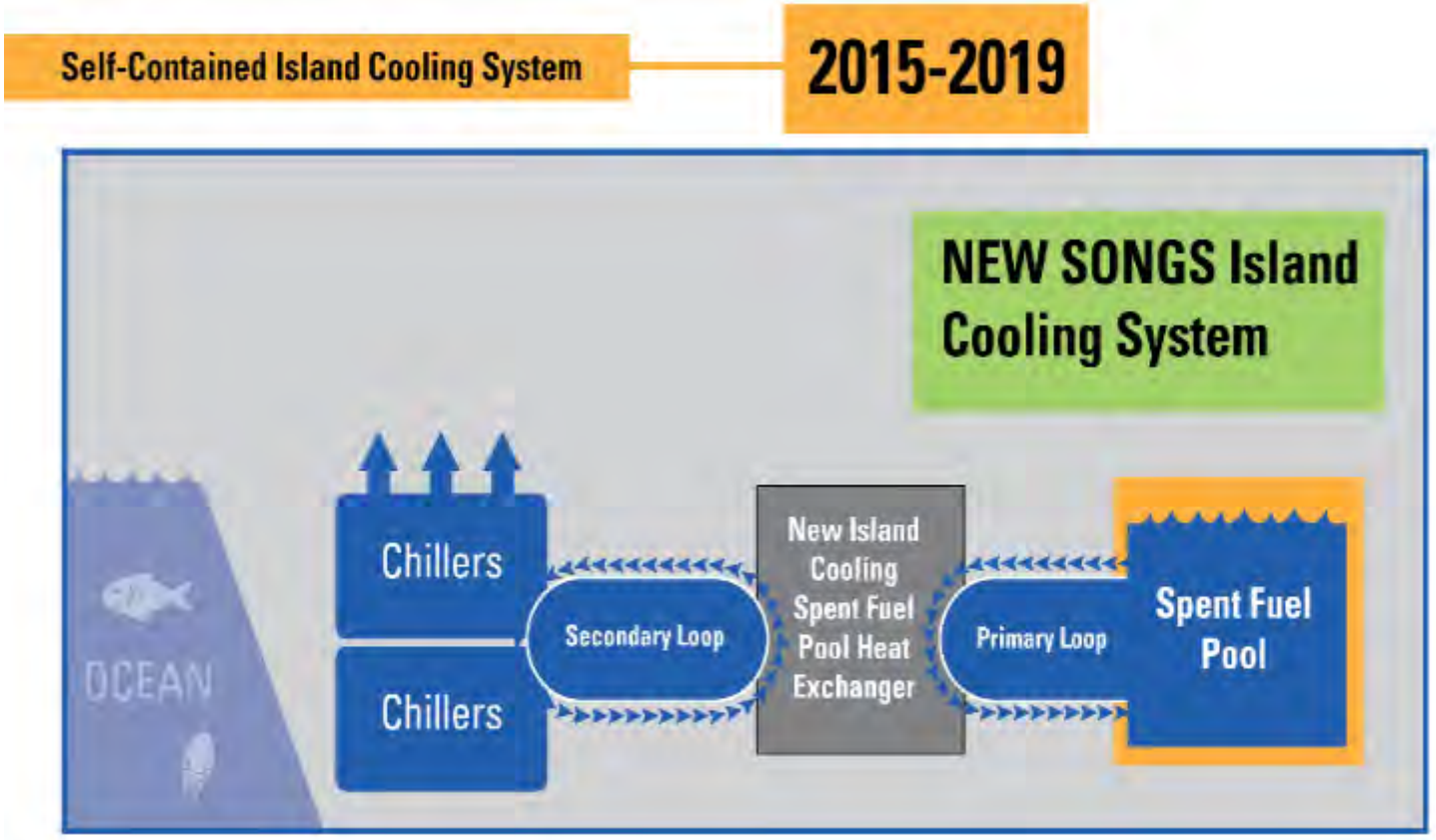
Spent Fuel Pool Island



Decommissioning San Onofre Nuclear Generating Station

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Selected Technology

- ✓ No water usage
- ✓ No vapor plumes
- ✓ Reliable, off-the-shelf technology
- ✓ Consistent temperature control


3
2
Unit 3
Fuel
Handling
Building
Unit 2
Fuel
Handling
Building
Shipping Container
Chiller Unit

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Spent Fuel Pool Cooling

Existing Spent Fuel Pool Cooling System

- Complex system
- Requires ~ 20% of the operating plant systems
- Requires ocean cooling

Proposed Spent Fuel Pool Cooling Island

- Simple and compact
- Self-contained system
- Eliminates ocean cooling
- Reduces by 50% amount of ocean water needed during decommissioning

SFPI Schedule

- Project Milestones
  - Aug 13, 2015: CCC Meeting in Chula Vista
  - Aug 31 - Oct 9, 2015: Installation
  - Oct 12 - 18, 2015: Testing
  - Oct 19 - 23, 2015: Operational

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Decommissioning
San Onofre
Nuclear Generating Station

Plant Tour

CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105- 2219
VOICE AND TDD (415) 904- 5200
FAX (415) 904- 5400

Th15a

Filed:	7/7/15
180th Day:	12/28/15
Staff:	J. Street - SF
Staff Report:	7/24/15
Hearing Date:	8/13/15

STAFF REPORT: REGULAR PERMIT

Application No.:	**9-15-0162**
Applicant:	**Southern California Edison Company**
Location:	San Onofre Nuclear Generating Station, San Diego County.
Project Description:	Install an independent cooling system known as a "Spent Fuel Pool Island" (SFPI) to replace the existing once-through cooling system at SONGS Units 2 and 3.
Staff Recommendation:	Approval with conditions.

SUMMARY OF STAFF RECOMMENDATION

Southern California Edison Company (SCE) proposes to install an independent cooling system to serve the existing spent fuel pools at Units 2 and 3 of the San Onofre Nuclear Generating Station (SONGS), on Camp Pendleton, in San Diego County (**Exhibit 1**). The proposed "spent fuel pool island" (SFPI) system is a stand-alone cooling system that would use air-cooled industrial chillers to dissipate the heat generated by spent nuclear fuel submerged in large pools inside the SONGS spent fuel handling buildings. The SFPI system would circulate warm water between the existing spent fuel pools and a set of heat exchangers, which would transfer the heat, but not the liquid, to secondary water loops connected to four air-cooled chillers. The SFPI system would allow the spent fuel pools to be isolated from the existing once-through cooling system, which depends on the intake of seawater from the Pacific Ocean. The proposed project represents a preliminary step in the decommissioning of SONGS Units 2 and 3, and would

provide an alternate system for spent fuel cooling while eliminating the plant's use of ocean cooling water, consistent with the State of California's Once-Through Cooling Water Policy.[1]

The SFPI system is proposed to be installed beginning in late August, 2015, and would be operated until all remaining spent fuel has been transferred to dry cask storage, currently estimated to be through December 31, 2020. Once the SFPI is no longer in operation the equipment would be removed as part of plant decommissioning.

Under normal operating conditions, the SFPI system would not require the discharge of any fluids or contaminants to coastal waters, and would not affect marine organisms or ecosystems. In order to minimize the potential for accidental leaks and spills from the system, SCE would continuously monitor key system parameters, and plans to implement a maintenance and inspection program. SCE would also implement the existing SONGS Spill Prevention, Control and Countermeasures Plan in order to prevent and contain any leaks and spills from the system. Construction and minor grading activities during the installation of the SFPI system would comply with existing water quality, storm water management and spill prevention plans, including the SONGS Storm Water Management Plan, and their associated best management practices, designed to control runoff and prevent sediment, debris, and contaminants from entering the storm drain system and reaching the ocean.

SCE has conducted probabilistic seismic hazard analyses to estimate the likelihood of a major earthquake near the SONGS site, and the intensity of ground-shaking that could occur during such an event. The SFPI system has been designed to withstand the ground-shaking associated with a major earthquake consistent with the requirements of the California Building Code. However, the ability of the SFPI system to perform according to its seismic design basis depends, at least in part, on the appropriate maintenance of system components. SCE has indicated that it is developing an inspection and system maintenance procedure following manufacturer recommendations. However, because no specific plan is currently available, Commission staff recommends **Special Condition 1**, which would require SCE to submit, for the Executive Director's review and approval, an Inspection and Maintenance Plan detailing the type and frequency of system inspections and the procedures that would be followed to assure that SFPI system remains in good working condition and will continue to meet its initial seismic safety design throughout the project life. The project site is not expected to be threatened by tsunami inundation or coastal erosion during the life of the project.

The project would occur entirely within the previously developed SONGS site, and would not have adverse effects on sensitive species and habitats, coastal access and recreation, or visual resources.

The staff recommends the Commission find that, as conditioned, the project would be consistent with Sections 30230, 30231, 30232, 30251 and 30253 of the Coastal Act, and, therefore recommends that the Commission **APPROVE** coastal development permit application 9-15-0162, as conditioned.

[1] Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling, effective Oct. 1, 2010. http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/policy.shtml

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I. MOTION AND RESOLUTION

Motion:

*I move that the Commission **approve** Coastal Development Permit 9-15-0162 subject to conditions set forth in the staff recommendation specified below.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of Commissioners present.

Resolution:

The Commission hereby approves the Coastal Development Permit for the proposed project and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

II. STANDARD CONDITIONS

This permit is granted subject to the following standard conditions:

1. **Notice of Receipt and Acknowledgment**. The permit is not valid and development shall not commence until a copy of the permit, signed by the applicant or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Expiration**. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. **Interpretation**. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. **Assignment**. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. **Terms and Conditions Run with the Land**. These terms and conditions shall be perpetual, and it is the intention of the Commission and applicant to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

This permit is granted subject to the following special conditions:

1. **System Inspection and Maintenance Plan.** PRIOR TO THE COMMENCEMENT OF OPERATION of the Spent Fuel Pool Island Cooling System, SCE shall submit, for the Executive Director's review and approval, an Inspection and Maintenance Plan for the SFPI system. At a minimum, the Plan shall describe the procedures for inspecting and maintaining each major SFPI system component, including the chillers, heat exchangers, all piping and plumbing on both the primary and secondary cooling loops, and all newly installed pumps. The Plan shall also indicate the frequency at which inspections will be carried out for each set of components. SCE shall not begin operation of the SFPI system without the Executive Director's written approval of the above-submitted information.

2. **Liability for Costs and Attorneys Fees:** SCE shall reimburse the Coastal Commission in full for all Coastal Commission costs and attorneys fees -- including (1) those charged by the Office of the Attorney General, and (2) any court costs and attorneys fees that the Coastal Commission may be required by a court to pay – that the Coastal Commission incurs in connection with the defense of any action brought by a party other than SCE against the Coastal Commission, its officers, employees, agents, successors and assigns challenging the approval or issuance of this permit, the interpretation and/or enforcement of permit conditions, or any other matter related to this permit. The Coastal Commission retains complete authority to conduct and direct the defense of any such action against the Coastal Commission.

IV. FINDINGS AND DECLARATIONS

A. BACKGROUND AND PROJECT DESCRIPTION

Background

SCE permanently ceased operation of SONGS Units 2 and 3 in June 2013 and has begun the process of plant decommissioning. Future planned decommissioning projects include the decontamination and dismantling of major structures, including the generating units and containment buildings, spent fuel pools and buildings, cooling water intake and discharge conduits, and other minor structures over the next 20 years. In the past year, SCE has sought Commission authorization for several preliminary projects that will enable decommissioning to proceed, including the installation of new electrical equipment and a ring-bus system needed to supply the plant with power now that electricity generation at SONGS has ceased (CDP Waiver # 9-14-1550-W), installation of back-up diesel generators (CDP Waivers # 9-14-1550-W and 9-15-0265-W), and replacement of the large ocean water intake pumps serving Units 2 and 3 with smaller pumps better suited to the plant's reduced water needs (CDP Waiver #9-15-0417-W).

SCE has stated that the proposed Spent Fuel Pool Island (SFPI) cooling system would facilitate plant decommissioning because it is smaller, simpler and more localized (to the spent fuel areas) than the existing once-through cooling system, and would enable the eventual decommissioning of the Units 2 and 3 seawater intake structures. SFPI systems, using a variety of different

technologies for dissipating the heat generated within the spent fuel pools, have been installed at a number of other U.S. plants in various stages of decommissioning. While no other plant is currently using a system configuration identical to that proposed at SONGS, information provided by SCE indicates that SFPI systems at three other plants use (or have in the past used) chillers to dissipate heat from spent fuel pools, while four others use a similar island cooling design concept, but with evaporative cooling units. SCE states that it selected the chiller-based design instead of a system depending on evaporative cooling in order to avoid the high water usage and highly-visible vapor plumes associated with evaporative cooling units.

In the present "defueled" state of Units 2 and 3, the heat load in the spent fuel pools is significantly lower than if freshly offloaded fuel was still being added to the pools. The SFPI system would have a cooling capacity roughly twice that needed to dissipate the current heat load, and thus can provide an interim system for spent fuel cooling until the fuel can be transferred to dry cask storage. An independent spent fuel storage installation (ISFSI), approved by the Coastal Commission in 2001 (CDP #E-00-014), exists on the SONGS site. SCE is separately applying for a CDP (Application #9-15-0228) for a new ISFSI to accommodate all the nuclear fuel currently stored in the spent fuel pools.

Project Description

The proposed SFPI cooling systems (one for each of the two spent fuel pools) would each be composed of two separate water loops designed to transfer heat from the spent fuel pool to the atmosphere. The primary loop, which includes the spent fuel pools themselves, would continue to operate as it does at present. Water would be circulated from the spent fuel pools to the primary side of a heat exchanger and then back to the pool. The only proposed changes affecting the primary loop are the installation of a new heat exchanger and the addition of new piping and water circulation pumps; no alterations would be made to the existing spent fuel pools themselves.

The secondary loop of the proposed system would replace the existing seawater cooling system. Water would be circulated in a closed loop from the heat exchanger to a set of 200-ton electric chillers which would dissipate the transferred heat to the atmosphere. Schematic diagrams of the existing and proposed spent fuel pool cooling systems are shown in **Exhibit 2**.

In combination, the proposed SFPI systems for Units 2 and 3 include the following major components:

- Four 200-ton industrial electric chillers (19 ft L x 8 ft W x 8.5 ft H) (Trane, 2.4 million BTU/hour capacity per unit);
- Two plate frame heat exchangers (Alfa Laval, 3.0 million BTU/hr capacity per unit);
- Two shipping containers (20 ft L x 8 ft W x 8.5 ft H) housing four new water pumps and piping necessary to circulate water through the system;
- Approximately 100 feet of pre-fabricated stainless steel piping to connect the spent fuel pools to the chillers (50% to be installed within the existing spent fuel buildings);
- Water purification filters, added as a side-branch to the primary loop;
- New instrumentation to monitor temperature, pressure, and flow within the SFPI systems and allow for the detection of leaks.

The new equipment would be installed in and around the existing spent fuel pool buildings within the SONGS protected area (**Exhibit 1**). The chillers and shipping containers would be placed immediately behind the spent fuel buildings, as shown in **Exhibit 3**. Diagrams, specifications and photos of key system components are provided in **Exhibit 4**.

Under normal operations, four chillers (two chillers for each spent fuel pool) would serve the SFPI system. However, the current combined heat load of the spent fuel pools requires that only three chillers be operational at any given time, decreasing to two chillers in approximately a year as the heat load from the spent fuel continues to decline. The four installed chillers would be cross-tied to take advantage of this extra capacity, allowing for operational flexibility and back-up capability in the event that one chiller (and later, two chillers) needs to be taken offline for repairs. The chillers would be secured on reinforced concrete pads, the installation of which may require a minor amount of excavation in order to create a stable foundation. Excavated material would be repurposed onsite or disposed of at an offsite location.

Water used in the spent fuel pools and primary cooling loops would continue to be supplied from the plant's existing demineralized water system. Evaporation from the spent fuel pools currently requires the addition of approximately 900 gallons of water per week to the primary loop. The new secondary cooling loops would recirculate fresh water (treated with a corrosion inhibitor) provided by the local municipal water system. The secondary loops would require initial system fills of approximately 1000 gallons each, and would be replenished only if needed during maintenance.

The SFPI system is proposed to be installed beginning in late August, 2015, and would be operated until all remaining spent fuel has been transferred to dry cask storage. Under SCE's current decommissioning schedule, summarized in the *SONGS Units 2 and 3 Post-Shutdown Decommissioning Report* (PSDAR) submitted to the Nuclear Regulatory Commission, the transfer of spent fuel to dry storage is to be completed by June 1, 2019. However, in order to allow for contingencies, the SFPI system is proposed to be operated through December 31, 2020. If future circumstances, such as changes in the fuel transfer schedule, require that the SFPI system be retained and operated beyond this date, SCE would seek further authorization from the Commission. Once the SFPI is no longer in operation the equipment would be removed as part of plant decommissioning.

Federal pre-emption

The construction and operation of new facilities at SONGS are subject to the approval and oversight of the federal Nuclear Regulatory Commission (NRC) pursuant to NRC regulations. The NRC has exclusive jurisdiction over radiological aspects of the proposed project. The state is preempted from imposing upon operators of nuclear facilities any regulatory requirements concerning radiation hazards and nuclear safety. The state may, however, impose requirements related to other issues. The U.S. Supreme Court, in *Pacific Gas and Electric Company v. State Energy Commission, 461 U.S. 190, 103 S.Ct. 1713 (1983)*, held that the federal government has preempted the entire field of "radiological safety aspects involved in the construction and operation of a nuclear plant, but that the states retain their traditional responsibility in the field of regulating electrical utilities for determining questions of need, reliability, costs, and other related state concerns." The Coastal Commission findings herein address only those state

concerns related to conformity to applicable policies of the Coastal Act, and do not evaluate or condition the proposed project with respect to nuclear safety or radiological issues.

B. OTHER AGENCY APPROVALS

U. S. Nuclear Regulatory Commission

The proposed SFPI project is subject to oversight and review by the U. S. Nuclear Regulatory Commission (NRC) under Title 10 of the Code of Federal Regulation, Part 50, Section 50.59 (10 CFR 50.59), applying to design changes, tests and experiments carried out licensed nuclear facilities. NRC staff has communicated to Coastal Commission staff that the project is being reviewed under Section 50.59 screening criteria, and that the NRC would conduct an inspection of the facility after project completion.

C. MARINE RESOURCES & WATER QUALITY

Section 30230 of the Coastal Act states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 of the Coastal Act states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Section 30232 of the Coastal Act states:

> *Protection against the spillage of crude oil, gas, petroleum products or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

These Coastal Act policies generally require that development protect coastal waters and not result in adverse effects to those waters and their associated biological resources. They also require protection against spills of hazardous substances and effective management of spills should they occur. Normal operation of the SFPI system would not result in the discharge of pollutants to coastal waters or otherwise affect marine resources. . However, because the SONGS site is immediately adjacent to the Pacific Ocean, leaks, spills or other incidents associated with the proposed project have the potential to affect water quality and marine

organisms in nearby coastal waters, even when excluding the potential leaks or spills of radiological materials, which are not within the Commission's jurisdiction. In addition, grading and ground disturbance during the construction of concrete foundations for the four chillers could mobilize soil and sediment which, if washed into the ocean, could adversely impact marine resources.

Operational Discharges

All waste discharges to the ocean from SONGS occur through existing offshore conduits serving Units 2 and 3. Discharges are governed by existing National Pollutant Discharge Elimination System (NPDES) Permits, issued by the San Diego Regional Water Quality Control Board, which set discharge limitations for a variety of pollutants and chemical constituents. Because no waste discharges are necessary in order to operate the proposed SFPI cooling system, the proposed project would not result in new operational discharges of pollutants to the ocean, nor require revisions to the existing NPDES permits. However, there is some potential for unintentional discharges from the SFPI system as a result of spills or system leaks.

Accidental leaks or spills from the SFPI system, other than leaks and spills of substances exclusively regulated by the NRC, could occur as follows: (1) Leakage of fresh water treated with rust inhibitors from secondary loop components connecting the heat exchangers with the chillers, either within or outside the Fuel Handling Buildings; and (2) spills during the handling of chemicals used to treat either of the SFPI loops. Runoff from the SONGS complex does not enter the ocean directly, but is captured in either interior or exterior drain systems prior to active dilution and discharged through the offshore conduits. Nevertheless, these materials would eventually end up in the ocean, just diluted with other discharges from the SONGS facility.

SCE has indicated that it would continuously monitor SFPI system parameters (e.g., temperature, pressure, flow rates) and conduct daily inspections of critical system components. If a damaged or malfunctioning component were identified, or if a leak were detected, the affected components or systems would be removed from service and repaired or replaced. SCE has further stated that it is developing an inspection and maintenance procedure for the SFPI system based on manufacturer recommendations.

In the event of a leak or spill from the SFPI system, SCE would seek to shut off the leak and implement spill response measures (including damming and diverting strategies and the use of spill clean-up kits kept near each Fuel Handling Building) designed to contain the spill and prevent fluids from entering the drain systems. SCE has prepared a draft *Spent Fuel Pool Off-Normal Actions* procedure outlining the immediate actions to be taken in the event of a leak, spill or other emergency affecting the SFPI system, while the existing SONGS *Spill Prevention, Control and Countermeasures* (SPCC) plan describes the procedures and equipment availability needed to prevent and control spills of hazardous materials on site, and prevent such spills from reaching the drain systems. Both plans have been provided to and reviewed by Commission staff. Implementation of these plans will minimize the potential that a leak or spill of fluids or hazardous materials during operation of the SFPI system would reach coastal waters.

In the worst case, a leak or spill from the secondary loop (containing fresh water treated with anti-corrosion agents) could enter the SONGS drain system and be discharged to the ocean

through the offshore outfalls. While the environmental effects of such a discharge have the potential to be adverse, they would not be significant, for several reasons. First, the only potential non-radiological contaminant in the SFPI system will be the anti-corrosion agents, and the volume of rust inhibitor additive used in the secondary loop water would be small (approximately 1 gallon of rust inhibitor per 1000 gallons of water). Second, the combined volume of water (2000 gallons) circulating through the two secondary loops is very small relative to both the current and future volumes of water being discharged through the outfalls, with which any fluid leaked from the SFPI systems would be mixed prior to reaching the ocean. As a result, even the largest potential leak or spill would be massively diluted prior to discharge to the ocean.[2] Further, a large spill of this sort would be an isolated event rather than a chronic discharge, and thus any measurable effects on the marine environment would be temporary. In summary, a leak or spill from the secondary loop which reached the SONGS drain system and was discharged to the ocean would not significantly degrade nearshore water quality or populations of marine organisms.

Construction-related discharges

Construction activities and grading during the installation of the SFPI cooling system would comply with existing water quality, storm water management, and spill prevention plans and their associated best management practices (BMPs). Because the project construction activities – minor excavation, pouring of concrete, use of heavy equipment, etc. – are similar to those already occurring at SONGS, the existing plans and BMPs provide appropriate controls to avoid and minimize potential adverse water quality effects. The facility's Storm Water Management Plan (SWMP) includes procedures regarding dust control and debris cleanup that apply to the types of equipment to be used and activities to be conducted during the project, and use of this procedure during construction will control dust and loose soil, minimize storm water runoff, and prevent soil and sediment from entering the ocean. Similarly, the risk of spills of oil or fuel from construction equipment would be minimized by implementation of the existing SPCC Plan. SCE will stage all project-related construction machinery and heavy equipment in paved, developed areas inside the SONGS perimeter where the necessary spill prevention controls are already in place, and will refuel vehicles within already authorized areas.

Reduced Seawater Intake

At present, the daily intake of ocean water at SONGS is approximately 98 MGD, or about 4% of the full operational flow when the plant was operational. Even at this reduced level of intake, the plant remains a major user of once-through cooling water, and results in the mortality of large numbers of marine organisms, both through entrainment in the intake stream and through impingement against the intake screens. Installation of the SFPI system, along with a previously-approved retrofit of the plant HVAC system and installation of smaller intake pumps (CDP waiver 9-15-0417-W), would eliminate the need for once-through cooling water and halve

[2] At present, SONGS takes in and discharges approximately 98 million gallons per day (MGD) of ocean water through the offshore conduits, primarily for the purpose of cooling various plant systems, including the spent fuel pools, but this water also serves to dilute plant waste streams prior to discharge. In the worst case, the complete leakage of both secondary loops, with a spill volume of 2000 gallons, would represent a tiny fraction (0.002%) of the current daily discharge from the plant. With the anticipated completion of the SFPI system and a previously-approved project to downsize the Units 2 and 3 intake pumps and replace the plant HVAC system (CDP# 9-15-0417-W), the intake of ocean cooling water would be eliminated. However, the plant would still take in and discharge approximately 48 MGD of seawater for the purpose of diluting SONGS waste streams. Thus, in the future, the maximum combined spill volume from the secondary loops would still only amount to 0.004% of the daily discharge volume.

the plant's rate of ocean water intake, to approximately 48 MGD.[3] This reduction in ocean water intake would result in commensurate reductions in entrainment and impingement impacts on marine organisms, and will thus improve biological productivity and enhance marine resources in nearby coastal waters, compared to existing conditions.

Conclusion

For the reasons described above, the Commission finds that the proposed project will be carried out in a manner that maintains and enhances marine resources, sustains the biological productivity and quality of coastal waters and will prevent or respond to potential spills, and is therefore consistent with Coastal Act Sections 30230, 30231 and 30232.

D. GEOLOGIC HAZARDS

Section 30253 of the Coastal Act states, in relevant part:

> *New development shall do all of the following:*
>
> *(a) Minimize risk to life and property in areas of high geologic, flood, and fire hazard.*
>
> *(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

The SONGS site lies in the Peninsular Ranges geomorphic province of southern California. Bedrock at the site is the San Mateo Formation, a dense, well-lithified sandstone of Pliocene to Pleistocene age, and, south of the Cristianitos Fault, the Monterey Formation, consisting of shale susceptible to landslides. These bedrock units are overlain by a series of marine and non-marine terrace deposits, approximately 50 feet thick, of late Pleistocene age. Units 2 and 3, including the site of the proposed SFPI project, were constructed on San Mateo Formation bedrock after the removal of overlying terrace deposits. The following geologic issues must be considered to determine whether the proposed development will minimize risk to life and property, and to assure stability and structural integrity at the site: Seismic safety (including ground shaking, fault rupture, and liquefaction), and coastal hazards (including tsunami inundation and bluff erosion).

Seismic Hazards

Like most of coastal California, the SONGS site lies in an area subject to earthquakes. SONGS is approximately 8 km from the Newport-Inglewood-Rose Canyon fault system, 38 km from the Elsinore Fault, 73 km from the San Jacinto Fault, and 93 km from the San Andreas Fault, all of which have been designated "active" (evidence of movement in the past 11,700 years) by the California Geological Survey (Jennings and Bryant 2010). Several relatively nearby offshore faults, including the Coronado Bank Fault Zone, the San Diego Trough Fault Zone, the Thirty-Mile Bank Fault, and the Oceanside Thrust also may have been active during Quaternary time. Nevertheless, seismicity here has historically been relatively quiet compared to much of the rest

[3] Continued ocean water intake through the end of decommissioning is needed to provide a means of diluting on-going plant waste streams and complying with state and federal discharge requirements (i.e., NPDES permits, ODCM limits).

of southern California, probably because of the relatively great distance from the San Andreas Fault, which accommodates most of the plate motion in the area, and the relatively low slip rates of the nearer faults (Peterson et al., 1996). A magnitude (M_L) 5.4 earthquake, associated with an unusually large swarm of aftershocks, occurred near the offshore San Diego Trough Fault Zone in 1986, but no other moderate or large (>M 5.0) earthquake has occurred within 50 km in historic time.

SONGS Units 2 and 3 are located on firm San Mateo Formation bedrock, which is not prone to liquefaction. Although the Cristianitos Fault crosses a portion of the SONGS site, this fault is not considered active, with no evidence for displacement during Quaternary time (within the last 1.6 million years) (Jennings and Bryant 2010). Thus, the primary seismic hazard at the project site is presented by ground shaking during a large earthquake centered off-site.[4]

The California Geological Survey's (CGS) Earthquake Shaking Potential for California (Branum et al., 2008) portrays the San Onofre area as a region of relatively low seismic shaking potential, with the Big Sur coast being the only other part of coastal California having a comparably low ground shaking potential according to this assessment. A comparable, quantitative assessment is provided by the U.S. Geological Survey's (USGS) Seismic-Hazard Map for the Coterminous United States, 2014 (Peterson et al. 2015), which characterizes the ground-shaking risk in firm bedrock areas along the San Onofre coast as a 10% chance of exceeding a peak ground acceleration (PGA) of approximately 0.25 g in 50 years. Probabilistic peak ground accelerations and spectral accelerations for the San Onofre area, assuming firm bedrock conditions, can also be estimated using on-line tools provided by both the USGS and CGS:

	10% in 50 yr (475-yr return period) (USGS)[5]	**10% in 50 yr** (475-yr return period) **(CGS)**[6]	**2% in 50 yr** (2475-yr return period) **(USGS)**[4]	**2% in 50 yr** (2475-yr return period) **(CGS)**[5]
PGA	0.20 – 0.25 g	0.245 g	0.40 – 0.50 g	0.505 g
0.2 sec SA	0.50 – 0.60 g	0.564 g	1.0 – 1.2 g	1.113 g
1.0 sec SA	0.15 – 0.20 g	0.200 g	0.30 – 0.40 g	0.377 g

These assessments, however, are based only on current understanding of the likelihood of earthquakes of varying intensities on nearby faults.

Studies undertaken at the time of the licensing permit application for SONGS Units 2 and 3 (U.S. Nuclear Regulatory Commission, 1981) identified an earthquake on the Newport-Inglewood-Rose

[4] Seismic hazards are often discussed in terms of the strength or intensity of ground shaking rather than earthquake magnitude. Measures of ground-shaking account for the attenuation of seismic waves due to distance from a rupture and amplification or damping due to substrate types (e.g., soft sediments vs. hard rock) and thus provide a better estimate of the amount of damage that may occur at a given site. Ground shaking is often expressed as the *acceleration* experienced by an object during an earthquake. The *spectral acceleration* occurs at different oscillation frequencies, which can be plotted to form a ground shaking *response spectrum*. The *peak ground acceleration* (PGA) is a measure of is the maximum force (expressed as a % of the acceleration of gravity, *g*) experienced by a small mass located at the surface of the ground during an earthquake. PGA is often used in seismic design as a hazard index for short, stiff structures.

[5] U. S. Geological Survey, Seismic Hazards Science Center, Custom Hazard Maps tool, http://geohazards.usgs.gov/hazards/apps/cmaps/, and/or Peterson et al. (2015).

[6] California Geological Survey, Probabilistic Seismic Hazards Ground Motion Interpolator (2008), http://www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html.

Canyon fault system, centered on the portion of the fault nearest to SONGS, to be the seismic event with the greatest potential ground shaking for the SONGS site. Modeling of this "design basis earthquake" (M_S = 7.0, at 8 km from the site), yielded response spectra with a peak ground acceleration of 0.31 g. After comparison with empirical models, and in order to build in conservatism for inaccuracies in the model, the NRC approved the calculated spectra multiplied by a factor of about 2, resulting in a design basis peak ground acceleration of 0.67 g. In 2010, as an update to the older studies, SCE commissioned a new study (*Probabilistic Seismic Hazard Analysis Report*, GeoPentech, 2010) to assess the seismic hazard presented by both previously-recognized strike-slip faulting near SONGS and several more recently postulated – and still scientifically controversial -- offshore blind thrust faults (e.g., Oceanside and Thirty-Mile Bank thrust faults), which several studies suggest could generate significant earthquakes (M 7.1 – 7.6) (e.g., Rivero et al. 2000; Rivero and Shaw 2011).[7] Probabilistic peak ground accelerations and spectral accelerations for the SONGS site as determined in the 2010 PSHA study were similar to the USGS and CGS estimates:

	10% in 50 yr (475-yr return period) (GeoPentech 2010)	**2% in 50 yr** (2475-yr return period) (GeoPentech 2010)
PGA	0.227 g	0.477 g
0.2 sec SA	0.530 g	1.111 g
1.0 sec SA	0.261 g	0.501 g

The analyses summarized above indicate that the proposed project could experience strong ground shaking during a large earthquake, potentially causing damage to the new SFPI system components which could result in the disruption or complete shutdown of the spent fuel pool cooling system. The consequences of such a shutdown, in terms of radiological safety, are outside the jurisdiction of the Commission, and are not considered here. However, the Coastal Act imposes an independent requirement that all new development assure stability and structural integrity, and minimize risks to life and property, in areas of high geologic hazards. The proposed SFPI system must conform to these policies irrespective of its role in cooling the spent fuel pools.

SCE has stated that all new SFPI equipment, piping and support infrastructure have been designed to meet the seismic requirements of the California Building Code (CBC), and that a supply of replacement parts would be kept on site to facilitate any needed repairs if the system were damaged in a major earthquake. In addition, in the event that one of the chillers was damaged, the cross-tied configuration of the SFPI system would allow the remaining three chillers to serve both spent fuel pools while the damaged chiller was offline.

The 2013 CBC requires that non-structural components (including architectural, mechanical, electrical and plumbing equipment) and their supports and attachments that are permanently attached to a structure be designed and constructed to resist the effects of earthquake motions in accordance with design loads and other requirements contained in the American Society of Civil

[7] Other studies dispute the existence of blind thrust faults offshore of Orange and San Diego counties, and suggest that the observational data (seismic reflection profiling, earthquake clustering patterns, etc.) used by Rivero et al. to infer thrust faulting can be interpreted within a framework of step-overs and trend changes along known north-to-northwest oriented strike-slip fault systems (Ryan et al. 2012; Malloney et al., *in press*).

Engineers *Minimum Design Loads and Requirements for Buildings and other Structures* (ASCE 7-10, 2013). CBC Section 1613 and ASCE 7 lay out specific procedures for determining seismic design criteria for different site classes (determined by soil properties) and structure/component risk categories based on probabilistic analysis of seismic loading (i.e., ground acceleration) for a specific location. The CBC mandates the use of USGS Maximum Considered Earthquake Ground Motion Response Acceleration maps for seismic design analysis. The USGS also provides an on-line, georeferenced Risk Targeted Ground Motion Calculator[8] for the purposes of calculating ground motion parameter values in accordance with ASCE 7 standards for building and non-structural design.

SCE has conducted seismic design analysis for the SFPI system following the procedures and requirements of ASCE 7, generating a set of horizontal and vertical ground-shaking intensities (spectral accelerations) defining the design seismic loads for the proposed system. The design seismic response spectrum encompasses ground-shaking intensities of 0.820 g at a 0.2 second period (0.2 sec SA) and 0.471 g at a 1.0 second period (1.0 sec SA), corresponding to a PGA of approximately 0.35 g – 0.45 g. These ground-shaking intensities correspond to an average return period of approximately 1,500 – 2,000 years, or a 2.5 – 5% chance of exceedance in 50 years. The SFPI system, including mechanical, electrical, piping and support components, will be designed and installed to withstand this level of ground-shaking, without collapsing or resulting in damage to adjacent equipment.

The ability of the proposed system to perform according to its design basis during an earthquake will depend at least in part on the appropriate maintenance of system components. In order to assure that the proposed system will continue meet its initial seismic safety design throughout the project life, the Commission finds that **Special Condition 1** is necessary; this condition would require that SCE submit an Inspection and Maintenance Plan detailing the type and frequency of system inspections and the procedures that will be followed to maintain the SFPI system in good working condition.

In summary, the SFPI system would be designed and constructed in accordance with applicable state (the CBC) and national (ASCE 7) standards for seismic safety, and, with the adoption of **Special Condition 1**, would be inspected and maintained to assure the integrity of system components. The Commission finds that compliance with these standards and this condition would minimize geologic hazards and assure structural stability.

Coastal Hazards

The new equipment proposed as part of the SFPI system would be located approximately 475 feet inland of the existing SONGS Units 2 and 3 seawall, at an elevation of 31 feet above mean lower low water (MLLW), and as a result is not expected to be exposed to coastal hazards, including tsunami flooding and bluff erosion, during the life of the project.

Several previous studies have estimated the potential run-up and inundation that would occur on the SONGS Site during a tsunami event. The most recent site-specific analysis was conducted as part of SCE's 2013 *Calculations for a Probable Maximum Tsunami* report (Kirby 2013), which considered both local- and distant-sourced tsunami events. Models of far field tsunami sources

[8] U.S. Geological Survey Risk Targeted Ground Motion Calculator, http://earthquake.usgs.gov/hazards/designmaps/rtgm.php

associated with large subduction-zone earthquakes (M 9.0 – 9.5) from around the Pacific Rim (e.g., Aleutians, Kuril Islands, Japan Islands, Chile) yielded tsunami wave run-up elevations ranging from 8.5 to 22 feet MLLW, with the largest tsunamis produced by earthquakes in the eastern Aleutian Islands.[9] Models of locally-sourced tsunamis, including those resulting from a M7.5 earthquake along a theorized offshore blind thrust fault and from submarine landslides, yielded maximum run-up elevations ranging from 10 to 21.5 feet MLLW. A recent, independent evaluation of potential tsunami inundation at the SONGS site is provided by the *Tsunami Inundation Map for Emergency Planning* (San Onofre Bluff quadrangle), prepared by the State of California in 2009. The purpose of this series of maps was to identify a "credible upper bound" of potential inundation at any location along the coast, based on a combination of potential tsunami source events, including both local and fair field sources. At SONGS, the map suggests a credible upper bound to potential inundation of 20 to 23 feet MLLW, similar to the projections contained in the SCE study.

Short-duration high water levels, such as those occurring during extreme high tides ("king tides") and/or winter storms, could be expected to increase tsunami inundation levels by up to several feet. Sea level rise associated with global warming, which can be expected to exacerbate tsunami inundation at SONGS in future decades, would make only a slight contribution (if any), to increased water levels during the life of the project (through December 2020).[10] Even taking into account these additional factors, the elevation of the project site at 31 feet MLLW would remain above the maximum credible tsunami run-up expected for this location during the project life.[11]

Similarly, the project site would not be threatened by shoreline erosion during the project life. In their natural state, coastal bluffs at the SONGS Units 2 and 3 site are composed of highly-erodible terrace deposits underlain by the more resistant San Mateo Formation sandstone. During plant construction, the bluff was extensively graded, the terrace deposits were largely removed, and the plant foundations were set in San Mateo Formation bedrock. SCE also installed a shoreline protection system, consisting of a rock revetment and a concrete seawall/bulkhead rising to an elevation of approximately 30 feet MLLW, in front of Units 2 and 3 at the time of construction. As a result, there has been no measurable bluff retreat at Units 2 and 3 over the past 35 years, and future erosion is expected to be negligible so long as the shoreline protection remains in place. Previous studies of coastal bluffs to the north and south of SONGS have estimated long-term bluff retreat rates in the range of 6 – 20 inches per year at the base of unprotected slopes within the San Mateo Formation (Hapke and Reed 2007; Hapke et al. 2007).[12] Discounting the presence of shoreline armoring, a maximum bluff retreat rates of 20

[9] For comparison, actual tsunami run-up heights observed along the Southern California coast following large historical earthquakes on the Pacific Rim, including the M9.5 1960 Chilean earthquake, M9.2 1964 Alaskan earthquake, and M8.8 2010 Chilean earthquake, ranged from 4.9 to 12.5 feet above MLLW. (California Geologic Survey, *Historic Tsunamis in California*, http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Pages/About_Tsunamis.aspx#historic)

[10] Based on sea level rise curves derived from projections contained in the National Research Council's *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) report, sea level along the Southern California Shoreline could rise 1-7 inches by 2021.

[11] This analysis does not take into account the existing seawall in front of Units 2 and 3, which provides additional protection against a tsunami and is expected to remain in place during the life of the project.

[12] Shoreline erosion processes are highly episodic, and bluff retreat rates can vary greatly over time and over short distances in response to wave action, storm events, and differences in bluff substrate.

inches per year over the 5-year life of the project would equate to a total bluff retreat of just 8 feet, far short of the approximately 475-foot setback of the SFPI system. Thus, even in the absence of the existing shoreline protection, the proposed project would not be at risk from coastal erosion.

Conclusion

For the reasons described above, the Commission finds that the proposed project, as modified by **Special Condition 1**, would minimize risks to life and property from seismic, flooding, and erosion hazards and assure stability and structural integrity without requiring shoreline protection, and is therefore consistent with Coastal Act Sections 30253(a) and (b).

E. VISUAL RESOURCES

Section 30251 of the Coastal Act states:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.*

The proposed project involves the installation of new structures and equipment inside or adjacent to larger existing buildings on the heavily industrialized SONGS site. The largest new structures, the two shipping containers and four chillers (each approximately 20 ft L x 8 ft W x 8.5 ft H), would be placed at ground level behind the 110-ft tall Auxiliary Building, between the two 120-ft tall Units 2 and 3 Fuel Handling Buildings (*see* **Exhibit 3**), and would not be visible from the public walkway seaward of SONGS or other publically-accessible shoreline areas. The project site is situated at an elevation (31 feet above MLLW) well below that of the public roads inland of SONGS (i.e., Old Pacific Coast Highway, Interstate 5), and would not be visible to drivers along these corridors. Thus, the project would not block views to or along the coast or alter the predominantly industrial visual character of the SONGS site. Although a minor amount of excavation will be necessary in order to construct foundations for the four chillers, the entire SONGS site was heavily graded during plant construction, and the present project would not alter natural landforms.

For these reasons, the Commission finds that the proposed project will not result in substantial visual effects and is consistent with Section 30251 of the Coastal Act.

F. ATTORNEYS' FEES AND COSTS

Coastal Act section 30620(c)(1) authorizes the Commission to require applicants to reimburse the Commission for expenses incurred in processing CDP applications. *See also* 14 C.C.R. § 13055(e). Thus, the Commission is authorized to require reimbursement for expenses incurred in defending its action on the pending CDP application. Therefore, consistent with Section 30620(c), the Commission imposes **Special Condition 2**, requiring reimbursement of any costs

and attorneys fees the Commission incurs "in connection with the defense of any action brought by a party other than the Applicant/Permittee … challenging the approval or issuance of this permit."

G. CALIFORNIA ENVIRONMENTAL QUALITY ACT

Section 13096 of the Commission's administrative regulations requires Commission approval of coastal development permit applications to be supported by a finding showing the application, as modified by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act ("CEQA"). Section 21080.5(d)(2)(A) of CEQA prohibits approval of a proposed development if there are feasible alternatives or feasible mitigation measures available that would substantially lessen any significant impacts that the activity may have on the environment. The project as proposed is not expected to have any significant adverse impacts to the environment. The project has been conditioned to ensure that it is consistent with all applicable Coastal Act policies. Therefore, the proposed project is consistent with CEQA.

Appendix A – Substantive File Documents

Branum, D., S. Harmsen, E. Kalkan, M. Petersen and C. Wills (2008). *Earthquake Shaking Potential for California,* Map Sheet 48 (Revised), California Geological Survey, Sacramento, California, 2008.

California Coastal Commission, *Coastal Development Permit Application #9-15-0228*, submitted by Southern California Edision for the construction of an independent spent fuel storage installation (ISFSI) in the SONGS North Industrial Area, February 20, 2015.

California Coastal Commission, *Coastal Development Permit #E-00-014*, issued to Southern California Edison for construction of an ISFSI, consisting of up to 104 steel-reinforced concrete fuel storage modules, to provide temporary dry storage for SONGS 2&3 spent fuel, July 11, 2001.

California Coastal Commission, *Coastal Development Permit De Minimis Waiver #9-14-1550-W*, issued to Southern California Edison for the removal of existing switchyard controls and installation of a new 12kV power source and back-up diesel generators at SONGS, September 10, 2014.

California Coastal Commission, *Coastal Development Permit De Minimis Waiver #9-14-0265-W*, issued to Southern California Edison for the on-site relocation of a back-up diesel generator at SONGS, April 17, 2015.

California Coastal Commission, *Coastal Development Permit De Minimis Waiver #9-14-0417-W*, issued to Southern California Edison for the replacement of the SONGS Units 2 and 3 cooling water pumps with smaller dilution pumps, and retrofitting of plant HVAC system, May 14, 2015.

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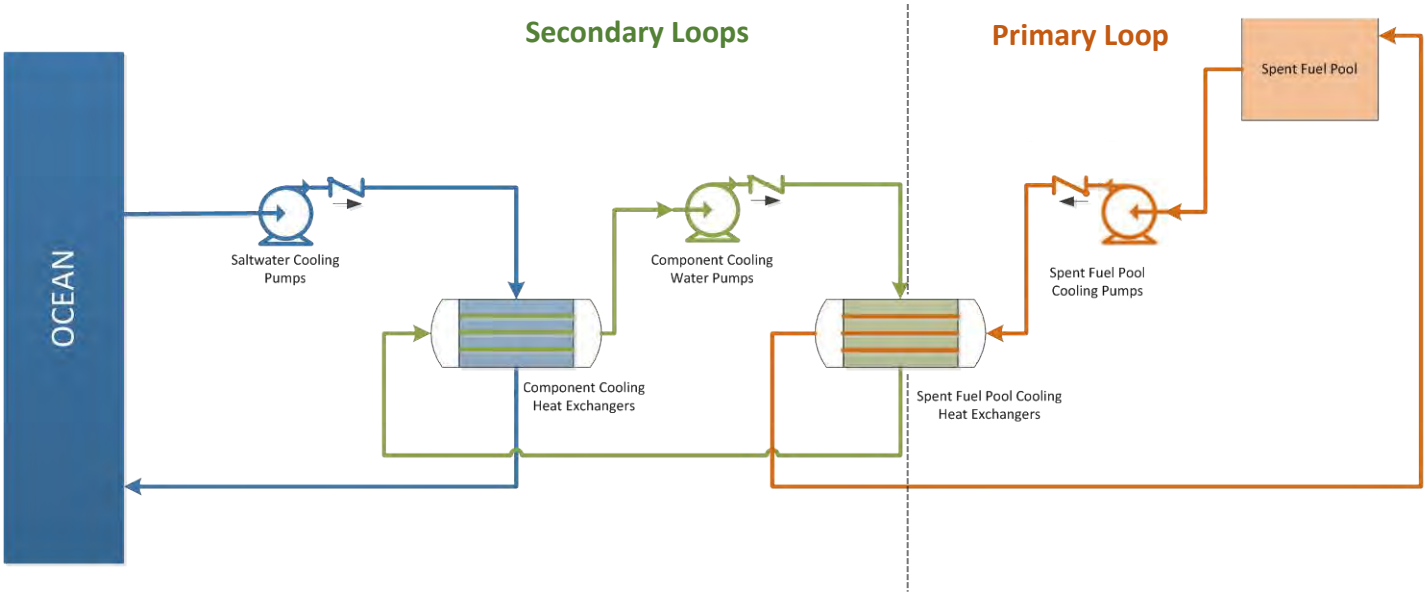
(a) Regional map of Southern California with San Onofre Nuclear Generating Station (SONGS) designated as a red star

(b) Project Location: Aerial photograph of SONGS identifying Units 2 and 3 (yellow box) and the general location of the SFPI project (red box)

Exhibit 1
Application No. 9-15-0162
Southern California Edison
Project Location

(A) Schematic of Existing Ocean Water Once-Through Cooling System



(B) Schematic of Proposed Spent Fuel Pool Island Cooling System

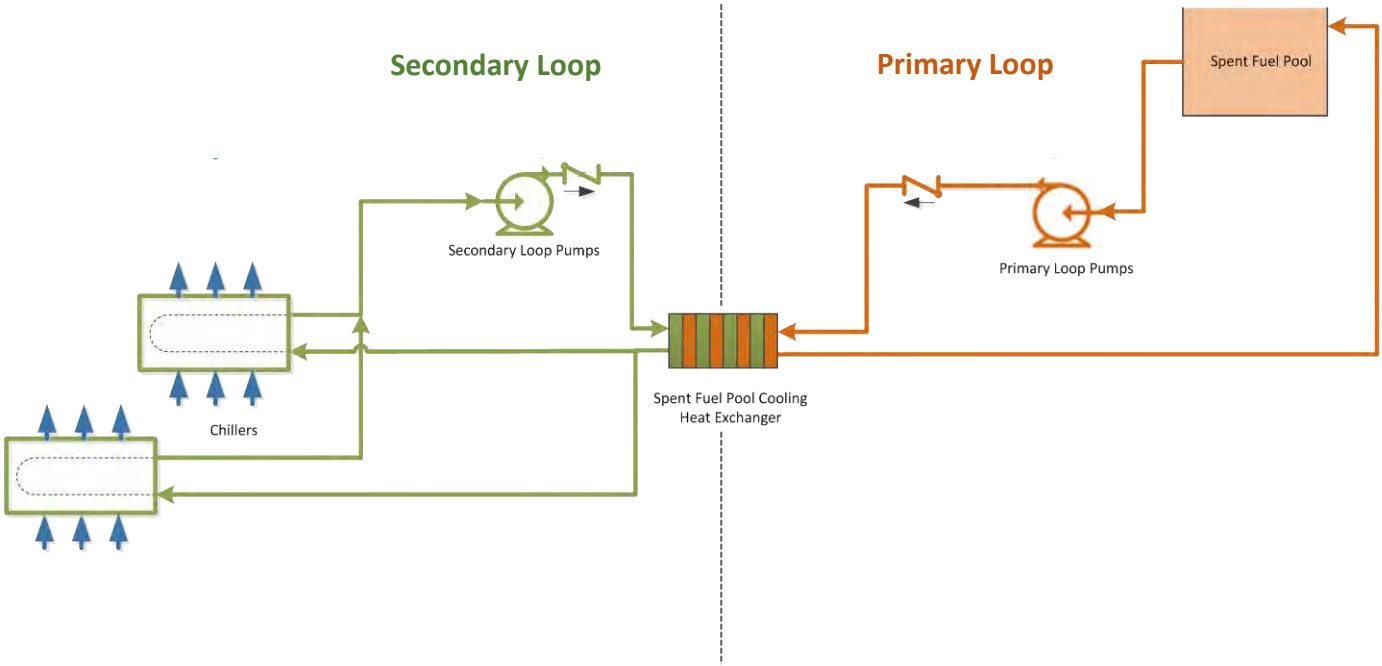
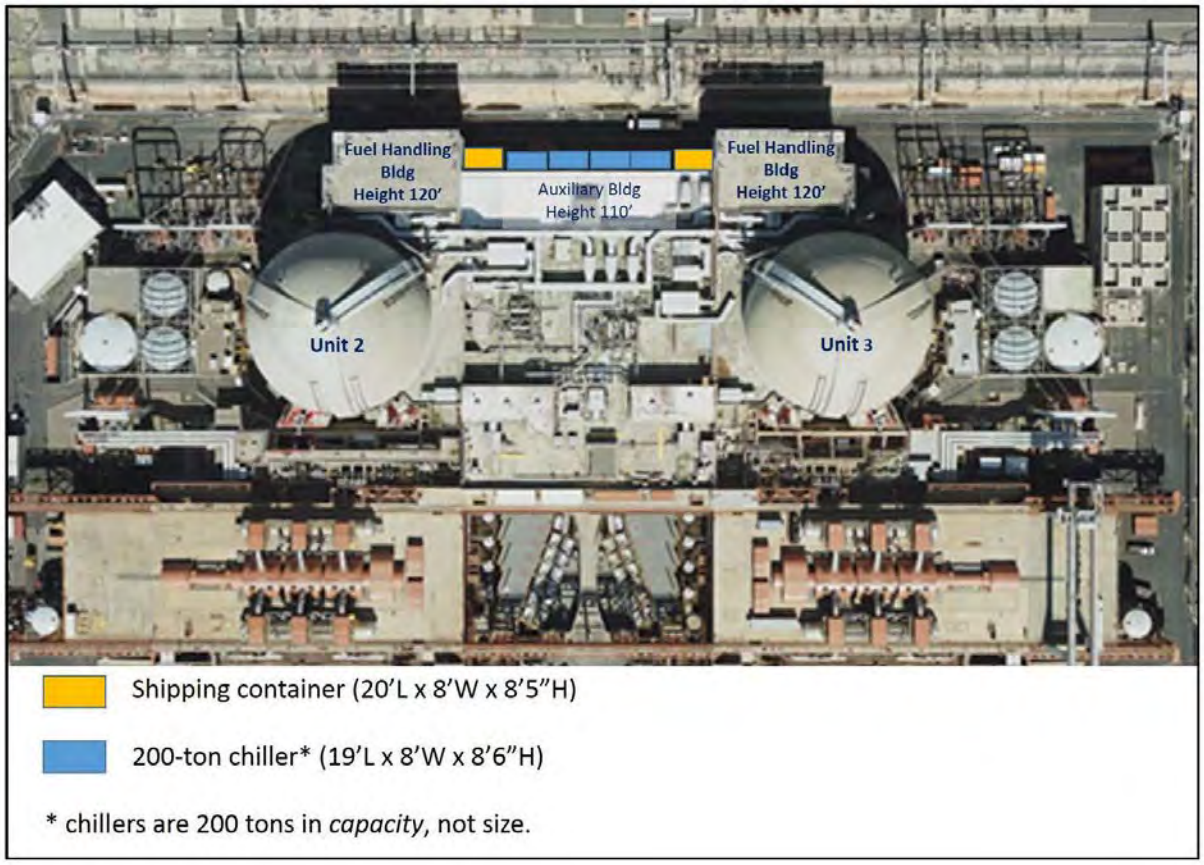


Exhibit 2
Application No. 9-15-0162
Southern California Edison
Cooling System Schematic Diagrams



Above: Configuration of the shipping containers and chillers between the Units 2 and 3 fuel handling buildings (Note: shipping container and chiller representations not to scale; the area that will be occupied is less than half the space shown in this figure)

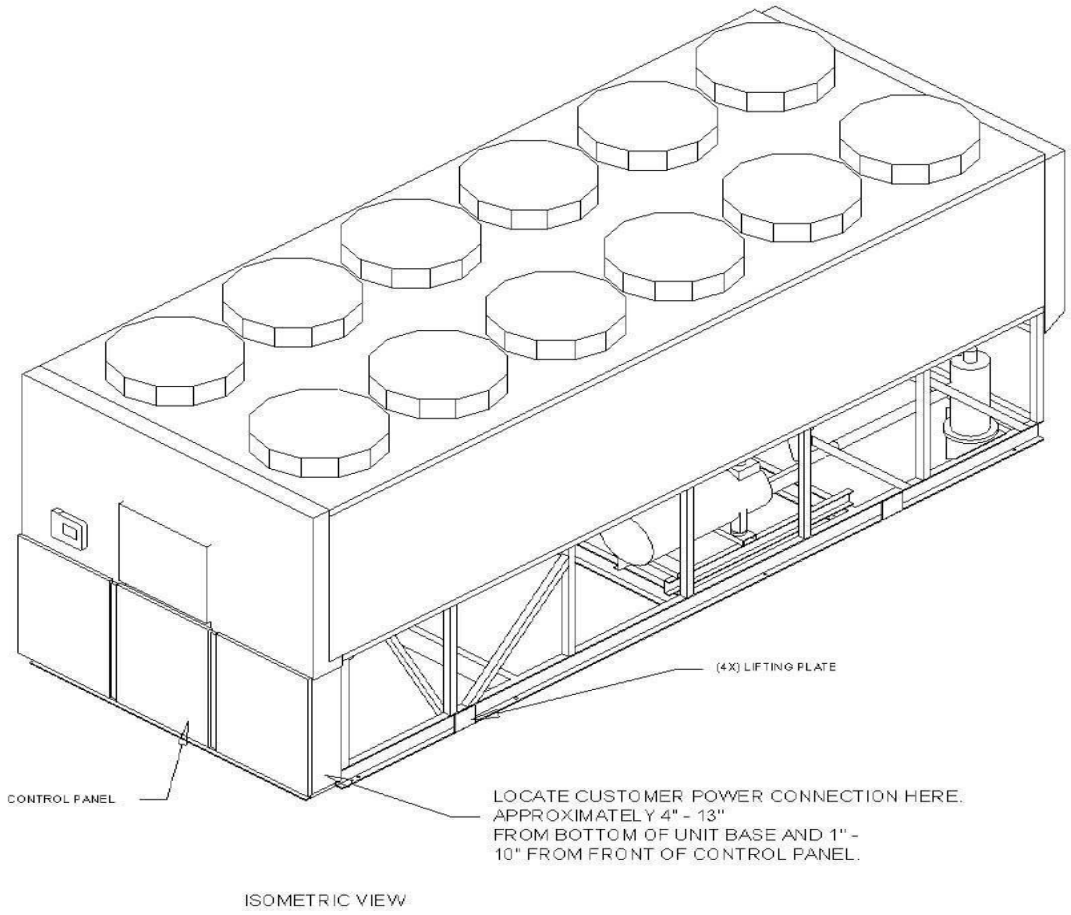
Below: Oblique view of project site with simulated placement of chillers and containers

Exhibit 3
Application No. 9-15-0162
Southern California Edison
Project Configuration

Trane 200 Ton Chiller Unit

Equipment Description:

Two 200-ton capacity air cooled chillers will be used within a closed loop cooling system utilizing potable water on the secondary side of the temporary fuel pool cooling system for SONGS Unit 2 and SONGS Unit 3. The designed criterion is based on information provided by SONGS of a heat load calculation of three million BTU/hr per fuel pool. Each chiller will be a 200-ton unit designed to remove 2.4 MBTU/hr and have the ability to be cross connected so the entire heat load of Units 2 and 3 spent fuel pools can be removed by three chillers. Chillers require 460 VAC power. The chillers will be limited to a return temperature of 100°F due to relief valves on the refrigerant side of the unit, which will lift at 108°F and release Freon into the atmosphere.



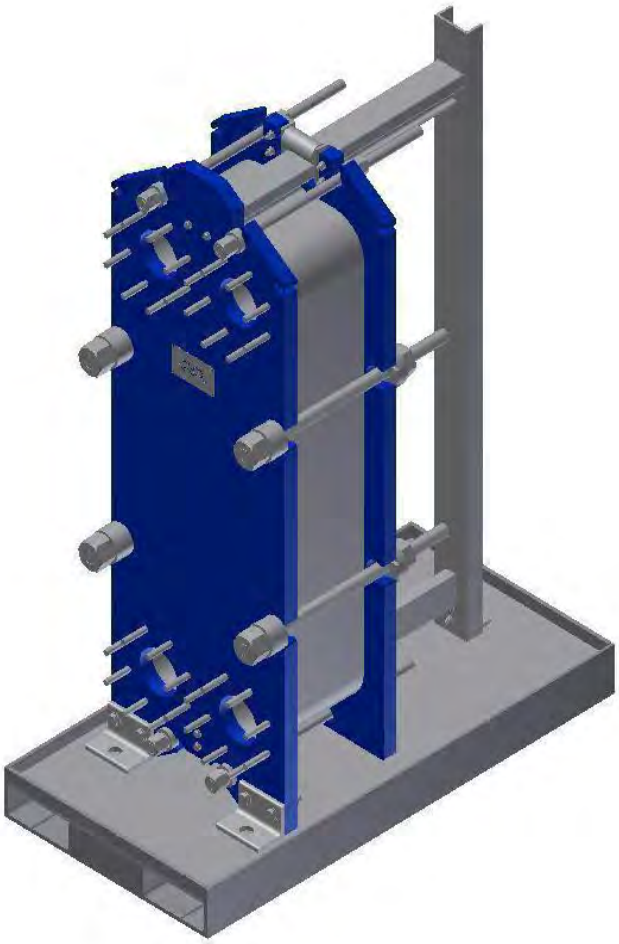
ISOMETRIC VIEW

Manufacturer Performance Data:

Rated capacity (AHRI)	198.90 tons	Rated efficiency (AHRI)	9.7 EER Evap application Std temp
ASHRAE 90.1/CSA compliance All versions IPLV	13.6 EER		
Refrig (HFC-134a) - ckt 1	215.0 lb.	Refrig (HFC-134a) - ckt 2	215.0 lb
Evap fluid type	Water		
Evap entering temp	54.00 F Evap	Evap leaving temp	44.00 F
Evap fluid concentration	0.00 %	Fluid freeze point	32.00 F
Evap flow rate	475.50 gpm		
Max Evap flow rate	883.00 gpm	Min Evap flow rate	241.00 gpm
H2O Evap fouling factor	0.00010 hr-sq ft-deg F/Btu	Press drop max Evap flow	36.80 ft. H2O
Evap configuration	2 pass		
Saturated Evap temp – ckt 1	40.10 F	Saturated Evap temp - ckt 2	40.90 F

Equipment Description Plate Frame Heat Exchanger (HEX)

Equipment Description:
The Plate Frame Heat Exchanger has a 3 million btu/hr. capacity based on the inlet temperature of 100 degrees F on the primary loop side with a secondary side cold water temperature of 76 degrees F. The primary loop will take suction from the fuel pool, discharge heat to the heat exchanger, and return back to the fuel pool. The secondary loop will accept heat from the heat exchanger and return back to the electric chiller units, removing the heat load generated from the primary loop. The picture below is a conceptual drawing not to be used from dimensional information.



HEX Manufacturer Performance Data

		Hot side	Cold side
Fluid		Water	Water
Density	lb/ft³	61.99	62.14
Specific heat capacity	Btu/lb, °F	1.00	1.00
Thermal conductivity	Btu/ft, h, °F	0.360	0.354
Viscosity – inlet	cP	0.683	0.906
Viscosity – outlet	cP	0.783	0.814
Volume flow rate	GPM	500.0	700.0
Inlet temperature	°F	100.0	76.0
Outlet temperature	°F	87.9	84.6
Pressure drop	psi	4.00	7.18
Heat Exchanged	kbtu/h	3000	
L.M.T.D.	°F	13.6	
O.H.T.C clean conditions	Btu/ft²,h,°F	954.4	
O.H.T.C service	Btu/ft²,h,°F	752.2	
Heat transfer area	ft²	293.6	
Duty margin	%	26.9	
Relative directions of fluids		Countercurrent	
Number of plates		46	
Effective plates		44	
Number of passes		1	1
Extension capacity			19
Plate material / thickness		ALLOY 316 / 0.50 mm	
Sealing material		EPDMP CLIP-ON	EPDMP CLIP-ON
Connection material		Stainless steel	Stainless steel
Connection diameter		See drawing	See drawing
Nozzle orientation		S4 -> S3	S1 <- S2
Pressure vessel code		ASME	ASME
Flange rating		150#	150#
Design pressure	psi	150.0	150.0
Test pressure	psi	195.0	195.0
Design temperature	°F	200.0	200.0
Overall length x width x height	in	45 x 26 x 74	
Liquid volume	ft³	2.00	2.08

Example of a standard shipping container

Example of a 200-ton heat capacity chiller