CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

JAN 23 2013

Mr. Elmo Collins
Region IV Administrator
U.S. Nuclear Regulatory Commission
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Dear Mr. Collins:

APPLICABILITY OF THE LARGE ORGANISM EXCLUSION DEVICE PROVISION IN THE POLICY ON THE USE OF COASTAL AND ESTUARINE WATERS FOR POWER PLANT COOLING TO THE SAN ONOFRE NUCLEAR GENERATION STATION'S SAFETY-RELATED AUXILIARY INTAKES

The California State Water Resources Control Board (State Water Board) seeks input on requirements affecting the San Onofre Nuclear Generating Station (SONGS). The State Water Board has adopted a Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (Policy) for regulating cooling water intakes used by coastal power plants, including SONGS, pursuant to the Federal Water Pollution Control Act (Clean Water Act) section 316, subdivision (b). That provision requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

Pursuant to the Policy, SONGS is required to install on any offshore intake(s) a large organism exclusion device (LOED) having a distance between exclusion bars of not greater than nine inches, or install other exclusion devices, deemed equivalent by the State Water Board.

The Southern California Edison Company (SCE), owner and operator of SONGS, has submitted the attached letter, dated April 20, 2012, to provide substantiation for the position that the LOED requirement should not apply to SONGS' auxiliary intake structures. SCE contends that the auxiliary intake structures are safety-related systems, and as such, cannot be altered to accommodate the required LOED without compromising safety requirements. SCE has cited safety analysis reports and Nuclear

Regulatory Commission (NRC) regulations to support its contention that NRC safety requirements preclude installation of a LOED.

The State Water Board asks that the NRC review SCE's submission and share its expertise in determining whether the auxiliary intake(s) at SONGS are in fact safety-related systems that could be compromised by installation of a LOED. If the NRC concurs in SCE's summary of the requirements and safety issues, that information would be invaluable in assisting the State Water Board to determine whether and to what extent the Policy requirements should apply to the auxiliary intakes at SONGS.

We would appreciate any assistance you can provide. If you should have any questions, please contact Jonathan Bishop, Chief Deputy Director at (916) 341-5820 (Jonathan.Bishop@waterboards.ca.gov), or Dominic Gregorio, Manager of our Watersheds, Ocean and Wetlands Section at (916) 341-5488 (Dominic.Gregorio@waterboards.ca.gov).

Sincerely,

Thomas Howard

Thomas Howard
Executive Director

Enclosure

cc: Ms. Mary J. Woollen
Director for External Engagement
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Mr. Bill Maier
Regional State Liaison Officer
U.S. Nuclear Regulatory Commission, Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Mr. David Asti
Corporate Environmental Policy Senior Manager
Southern California Edison
2244 Walnut Grove Avenue
Rosemead, CA 91770
David.Asti@sce.com

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Michael M. Hertel, PhD
Director, Corporate Environmental Policy
michael.hertel@sce.com

April 20, 2012

VIA E-MAIL & U.S. MAIL

Thomas Howard, Executive Director
State Water Resources Control Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812-2815
thoward@waterboards.ca.gov

RE: APPLICABILITY OF THE ONCE-THROUGH COOLING (OTC) POLICY'S LARGE ORGANISM EXCLUSION DEVICE (LOED) PROVISION TO THE SAN ONOFRE NUCLEAR GENERATION STATION'S (SONGS) SAFETY-RELATED AUXILIARY INTAKES

Dear Mr. Howard,

In response to the compliance schedule detailed in your January 5, 2012 letter, and in accordance with the Southern California Edison Company (SCE) letter submitted to the State Water Resources Control Board (SWRCB) on February 27, 2012, SCE respectfully submits this letter to provide further substantiation for SCE's position that Section 2.C.(1) of the OTC Policy regarding the large organism exclusion device (LOED) requirement should not apply to SONGS' auxiliary offshore intake structures (AOIS), which are essential for providing safety-related cooling to the SONGS reactor, fuel, and other safety components.

This letter provides written support and reference documentation supplementing the oral presentation made during the February 14, 2012 meeting between SCE and the SWRCB staff and management.

Description of SONGS' Saltwater Cooling System (SWCS) and the Function of the AOIS

For nuclear power plants, the need to remove residual heat from the fuel, whether the fuel is located in the reactor core or safely managed in the spent fuel pool, is fundamental to safe operation and protection of public health and safety. NRC regulations require that nuclear power plants have safety-related systems, the design of which has been approved by the NRC, to operate in all conditions to remove this heat. The SONGS SWCS, a safety- related system, provides saltwater from the Pacific Ocean to the component cooling water (CCW) heat exchangers for cooling during normal power generation and emergency shutdown and cooling of the nuclear fuel. The SWCS for each unit consists of two saltwater cooling pumps that are capable of providing the cooling water needed to supply the minimum required flow of water to the CCW heat exchangers in the event of an accident. These pumps are located in the intake structures of Unit 2 and Unit 3. Located near the end of the intake conduits are the AOIS, which

are specifically designed to ensure the required flow of cooling water needed to remove heat and maintain safe shutdown conditions in the event of an accident. Because of its function in protecting nuclear safety, each AOIS is classified as a safety-related structure under the NRC-approved design for SONGS.[1] Each AOIS is also classified as a Seismic Category I structure, which means that the structure is important to safety and must be designed to withstand earthquakes without loss of the ability to perform its safety function.[2]

The AOIS is located shoreward of the Primary Offshore Intake Structure (POIS). More specifically, the AOIS is located approximately 3,100 feet offshore, directly on the alignment of the intake conduit, and 92 feet shoreward of the POIS as depicted in Figure 1.

The AOIS are submerged at a depth of approximately 20 feet below mean lower low water (MLLW). The auxiliary intake riser has a 4-foot inside diameter and is a reinforced concrete cylinder with 9-inch walls. It is 11-1/2 feet tall and is topped by a 9-1/2 foot diameter concrete velocity cap. The opening between the top of the AOIS riser and the bottom of the velocity cap is 17 inches. The distance between the four concrete support posts for the AOIS velocity cap is approximately 30 inches. Therefore, the dimensions of the AOIS openings are 17 inches high by 30 inches wide. Under normal plant operation, the POIS provide approximately 830,000 gal/min.[3] By comparison, the AOIS flow under normal plant operations is 23,800 gal/min, or approximately 3 percent of the POIS flow. If the POIS are not available, however, the AOIS are designed to each provide 34,000 gallons per minute (gal/min) of cooling water to the SWCS for extended shutdown time.[4] This ensures that sufficient cooling water is available to remove residual heat from the nuclear fuel in both the reactor vessel and the spent fuel pool.

The AOIS Serves As the Ultimate Heat Sink to Cool the Reactor In the Event of An Emergency and Is an Essential Safety Structure under NRC Regulations

In order to understand why the OTC Policy should not be applied to the AOIS, it is critical to summarize the portions of the NRC's regulations that govern the design and function of the AOIS.

The NRC's authority is set forth in Atomic Energy Act of 1954, as amended,[5] and is described in its regulations, which appear in Title 10 of the U.S. Code of Federal Regulations (CFR). The NRC's authority includes the licensing and regulation of production and utilization facilities, including nuclear power plants. Specifically, the NRC is responsible for "licensing and regulating nuclear facilities and materials....These responsibilities include protecting public health and safety, protecting the environment, [and] protecting and safeguarding nuclear materials and nuclear power plants...."[6]

---

[1] SONGS Units 2&3 Updated Final Safety Analysis Report Section 3.2, App. 3.2A lists the AOIS as a structure required to mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public.
[2] SONGS Units 2&3 Updated Final Safety Analysis Report Sections 3.2, App. 3.2A
[3] SONGS Units 2&3 Updated Final Safety Analysis Report Sections 9.2.5.2.2 and 10.4.5.2.2.1
[4] SONGS Units 2&3 Updated Final Safety Analysis Report Section 3.8.4.1.10, Auxiliary Intake Structure
[5] See Atomic Energy Act, Sections 101 and 103, 42 U.S.C. Sections 2131 and 2133
[6] 10 CFR Part 1, Section 1.11(b)

Applicants for a nuclear power plant construction and operating license must demonstrate that the facilities will meet the NRC's safety requirements before they are granted a license to construct and to operate a nuclear power plant. Accordingly, the NRC performs a detailed evaluation of the licensee's application, including the design of the plant systems that ensure nuclear safety. The NRC then makes a decision to grant a license that is based, in part, upon a Safety Evaluation Report (SER) that evaluates whether the construction and operation of the nuclear facilities under the specific site design can be accomplished consistent with the criteria and requirements for safe operations set forth in the NRC's regulations. The licensee must continue to meet those regulatory requirements throughout the duration of the operating license.

NRC Regulations Regarding Safety Related Structures

Structures, systems, and components are categorized based on their importance to safety. "Safety related" structures, systems, and components refers to features that must remain functional to maintain the safety of the reactor and prevent the release of radioactive materials to the environment.[7] "Non-safety related" structures, systems, and components refer to features whose capability to perform has no effect on the safe shutdown of the reactor or on the potential for an off-site release of radioactive material. For example, SONGS' POIS is a non-safety related structure. As such, the failure of the POIS cannot impact the ability to deliver cooling water to the safety components through the AOIS. By contrast, since it performs the essential safety function of ensuring a supply of cooling water for the removal of residual heat from the reactor and nuclear fuel, the AOIS is a safety-related structure.[8]

The NRC has established general design criteria (GDC) for nuclear power plants that are the minimum design requirements that the licensee must meet. The GDC are "[t]he principal design criteria [that] establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety; that is, structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public."[9]

The GDC include requirements, which must be met without exception, to ensure the removal of residual heat in any event. Two of the GDC are directly relevant to the AOIS at SONGS: Criterion 2 -- "Design Bases for Protection Against Natural Phenomena;" and Criterion 44 -- "Cooling Water."

GDC 2 states that: "Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions."[10]

---

[7] 10 CFR Part 50, Section 50.2, Definitions

[8] SONGS Units 2&3 Updated Final Safety Analysis Report Section 3.2, App.3.2A lists the AOIS as a structure required to mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public.

[9] 10 CFR Part 50, Appendix A, General Design Criteria

[10] 10 CFR Part 50, Appendix A, General Design Criterion 2

GDC 44 states that: "A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions."[11]

The SONGS 2&3 Updated Final Safety Analysis Report (UFSAR) is SONGS' analysis of the major structures, systems and components which bear significantly on the acceptability of the plant site and design for the operation of a nuclear facility that is required by the NRC under its licensing regulations. As described in the SONGS UFSAR, the ultimate heat sink consists of the Pacific Ocean; one AOIS per unit; one intake conduit per unit; one outfall conduit per unit; an emergency discharge line common to both units; and the portion of the intake structure where the saltwater cooling pumps are located.[12]

To further define the requirements of the ultimate heat sink, the NRC issues regulatory guidance documents in the form of Regulatory Guides. The Regulatory Guide series provides guidance to licensees and applicants on implementing specific parts of the NRC's regulations, techniques used by the NRC staff in evaluating specific issues or postulated accidents, and data needed by the staff in its review of applications for permits or licenses.

Regulatory Guide 1.27, titled "Ultimate Heat Sink for Nuclear Power Plants," describes the basis acceptable to the NRC staff that may be used to implement General Design Criteria 2 and 44 with regard to a particular feature of the cooling water system, namely the ultimate heat sink (of which the AOIS for each SONGS unit is a part). This guide applies to all nuclear power plants that use water primarily as the ultimate heat sink.

Regulatory Guide 1.27 states that the ultimate heat sink "constitutes the source of service or 'house' water necessary to safely operate, shut down, and cool down a plant." The NRC further notes that the ultimate heat sink "performs two principal safety functions: (1) dissipation of residual heat after reactor shutdown and (2) dissipation of residual heat after an accident."[13] Regulatory Guide 1.27 establishes that "sufficient conservatism should be provided to ensure that a 30-day supply of water is available and that design basis temperatures of safety-related equipment are not exceeded."[14] Furthermore, it is required that "because of the importance of the ultimate heat sink to safety, these functions should be ensured during and following the most severe natural phenomena postulated for the site...in addition, the sink safety functions should be ensured during other applicable site-related events that may be caused by natural phenomena such as river blockage."[15] In the case of SONGS, a blockage situation could be caused by kelp, sea grasses, or other marine debris or by other natural phenomena.

---

[11] 10 CFR Part 50, Appendix A, General Design Criterion 44
[12] SONGS Units 2&3 Updated Final Safety Analysis Report Section 9.2.5.2.1
[13] U.S. Nuclear Regulatory Commission Regulatory Guide 1.27
[14] U.S. Nuclear Regulatory Commission Regulatory Guide 1.27
[15] U.S. Nuclear Regulatory Commission Regulatory Guide 1.27

NRC Regulations Regarding Design Changes

In granting a license to construct and operate a nuclear power plant, the NRC approves a design that is specific for the site licensed. Any changes to an approved design must comply with the requirements of 10 CFR Part 50 Section 50.59, "Changes, Tests, and Experiments." This section of the CFR prohibits license holders from changing the design of a safety structure without NRC approval if that change would impact the design assumptions for that structure in the SER. In particular, the NRC license holder may not make such a change if it would "[c]reate a possibility for an accident of a different type than previously analyzed in the UFSAR;" or if it would "[r]esult in more than a minimal increase in the likelihood of a malfunction of a structure, system, or component (SSC) important to safety....".[16] As described below, in the case of the AOIS, the addition of an LOED to the AOIS would create the possibility of a new type of accident due to blockage of the LOED, and would increase the likelihood that the AOIS would malfunction due to blockage.

Installing An LOED on the AOIS Would Be Inconsistent with the Approved Safety Design of SONGS

The AOIS is an NRC-approved design that meets current safety requirements and is described in the UFSAR. The SONGS 2&3 USFAR Chapter 9 describes how compliance with the NRC's requirements for cooling and the ultimate heat sink is achieved and maintained. The UFSAR is the overall technical document upon which the NRC has based its approval for licensing and operation of SONGS. The NRC noted in its SER that as designed, "we conclude that the salt water cooling system design is in conformance with the requirements of General Design Criterion 44 regarding the ability to transfer heat from safety-related components to the ultimate heat sink."[17] The AOIS design evaluated by SCE and approved by the NRC in the SER did not include an evaluation of the potential for debris blockage of the AOIS, since it was not considered a credible event with the current design (*i.e.*, absent a LOED). By its nature, the installation of an LOED would create a potential for flow blockage that does not currently exist, and would not be permitted under the safety design approved by the NRC for SONGS. Such blockage could cause an inability to remove heat from the reactor and fuel and consequently pose a risk to the public health and safety.

Debris Loading at SONGS

Three kelp forests are located in proximity to the SONGS offshore intakes. These include the San Onofre Kelp Bed, the San Mateo Point Kelp Bed, and the Wheeler North Artificial Reef. There have been eight events since 1986 that have resulted in either a plant automatic shutdown (one or both units go offline) or a reduction in power due to debris loading on the intake water traveling screens. During these events, the onshore, self-cleaning travelling screens began to be overwhelmed by the influx of kelp and sea grass. These events have resulted in SONGS personnel having to take immediate action to manually remove debris from the traveling screen panels with rakes and shovels to ensure that the system did not become completely

[16] 10 CFR Part 50, Section 50.59
[17] U.S. Nuclear Regulatory Commission Safety Evaluation Report for SONGS 2&3, Section 9.2.1

overwhelmed. In two instances, this additional manual removal technique was still unable to prevent plant trips. On March 16, 1986 and June 4, 2004 Unit 3 at SONGS went offline due to debris loading. Furthermore, since 2009 alone, SONGS has experienced three instances where it has had to reduce plant output by stopping a circulating water pump due to the influx of both sea grass and kelp. These events demonstrate the potential for kelp clogging of exclusion devices, a condition not acceptable for the safety related AOIS system.

The AOIS Function Could Be Compromised as a Result of Kelp Loading on a LOED

Placing a physical barrier on the AOIS could compromise the ability of the AOIS to meet GDC 2 and 44. A LOED on the POIS would increase the possibility of debris loading that could cause a trip or a reduction in power without ultimately compromising the safety of plant operations or the public. In contrast, debris blockage on a LOED on the AOIS would create risks to the public health and safety due to the inability to remove heat from the SONGS reactors and nuclear fuel.

SCE requested MBC Applied Environmental Services to evaluate the potential for blockage of an LOED. MBC's conclusions on this topic are as follows:

> "Any LOED installed on the SONGS intakes will suffer kelp loading. This conclusion is based on long-term surveys of both the SOK and SMP kelp canopies, the experiences of MBC biologists in the area around SONGS, MBC biologists' impingement monitoring experience, and known kelp forest physics. Kelp snowballs are likely to occur whenever a kelp plant is forcibly dislodged by wave energy. Wave energy will continue to strike and kelp forests will continue to occur along the southern California coastline into the foreseeable future. Therefore, drift kelp will be generated in proportion to the biomass of kelp present and any submerged structure, including an LOED, will continually be subjected to the influence of large snowballs of kelp following suitable wave events."[18]

SONGS currently has the ability to mitigate a debris loading event from an onshore location (the traveling screens in the screenwell of the plant), where plant personnel can safely and readily access the accumulating debris and physically remove it. In contrast, a debris loading event on the AOIS with an LOED would occur on a submerged offshore location where access and mobility are clearly limited. This not only reduces or eliminates the ability to *rapidly* mitigate loading but also would require divers and a boat/barge to complete a debris removal effort at a depth of 20 feet. Based on SONGS' experience, the only option for prompt removal of such a debris load from an offshore location would be physical removal by divers. However, during storm conditions, physical removal by divers would not be available as an option due to the industrial safety hazard, and in any event could take more time than would be available if a plant safety event were to occur.

[18] Technical Memorandum Regarding Potential Kelp Loading on Proposed Large Organism Exclusion Device, MBC Applied Environmental Sciences, April 18, 2012

CONCLUSIONS

The AOIS at SONGS differs significantly from the plant's POIS. As we have discussed, the functions of the two systems are different: the AOIS perform a required nuclear safety-related function that the POIS do not share. Compromising that function would create risks for the public health and safety by potentially preventing reactor and fuel cooling, and would not be permitted under the NRC-approved safety design for SONGS. Consequently, SCE does not believe that installation of such a device is an appropriate action.

As a result, SCE respectfully requests that the SWRCB and SCE begin a process for obtaining either a waiver of the LOED requirement as applied to the AOIS based upon the safety provision found in Section 2.D *Nuclear Fueled Power Plants* of the OTC Policy or, alternatively, pursue a policy amendment for the AOIS. SCE also respectfully requests that the SWRCB suspend enforcement of the LOED provision for the AOIS until the SWRCB makes a final determination regarding this issue.

If you have any questions regarding this letter, please do not hesitate to contact me at (626) 302-9408 or David Asti at (626) 302-9732.

Very truly yours,

Michael M. Hertel

Dr. Michael Hertel
Director, Corporate Environmental Policy

cc: Charlie Hoppin, SWRCB Chair
Frances Spivy-Weber, SWRCB Vice Chair
Tam Doduc, SWRCB Member
Michael A.M. Lauffer, SWRCB Chief Counsel
Jonathan Bishop, SWRCB Chief Deputy Director
Dominic Gregorio, SWRCB Supervisor
Colin Lennard, SCE Senior Attorney

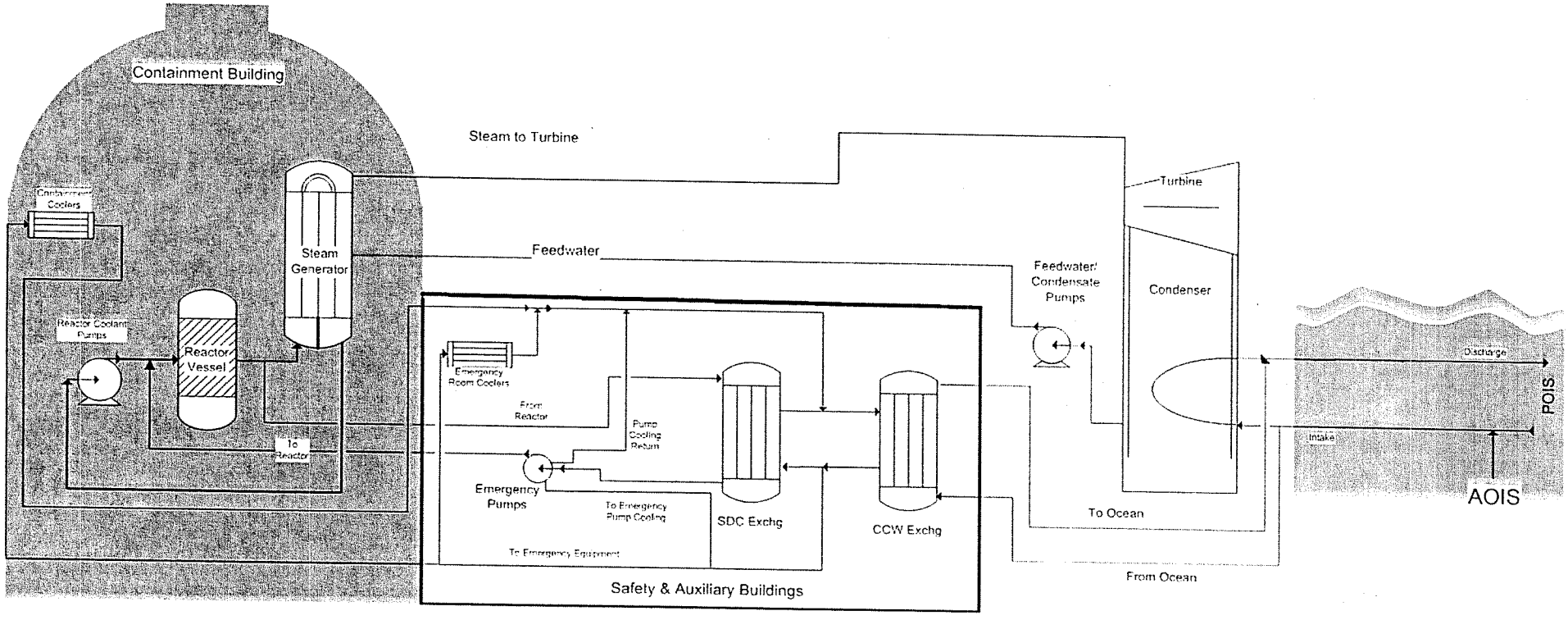

Figure 1 - Simplified Picture of SONGS Cooling Systems