Application No.:
Exhibit No.: SCE-02, Vol. 02
Witnesses: J. Huson

SOUTHERN CALIFORNIA EDISON®

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(U 338-E)

2015 General Rate Case

Generation
Volume 2 – SONGS Capital

Before the

Public Utilities Commission of the State of California

Rosemead, California
November 2013

SUMMARY

- Test Year 2015 capital expenditures are $15.196 million (nominal dollars, SCE Share).
- Post Test Year capital is $11.620 million and $18.677 million (nominal dollars, SCE Share) for 2016 and 2017, respectively.
- SCE must continue to comply with all Nuclear Regulatory Commission requirements.
- Major projects include the Large Organism Exclusion Device, Used Fuel Dry Cask Storage, and Post Fukushima Response.

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I.

SONGS CAPITAL

On June 7, 2013, SCE announced its decision to permanently retire San Onofre Nuclear Generating Station (SONGS) Units 2 & 3. In accordance with this decision, SCE will transition the units into a safe storage (SAFSTOR)[1] configuration preparatory to decommissioning. SCE has not yet determined the timing for commencing decommissioning. Regardless of the timing, however, SCE must continue to comply with all of the requirements of its Nuclear Regulatory Commission (NRC)[2] operating licenses and technical specifications until the licenses are transitioned to non-operating licenses. SCE also must continue to comply with other state and federal conditions and commitments until those are similarly discharged.

Accordingly, until SCE formally commences the decommissioning of SONGS Units 2 & 3, and SCE and the SONGS co-owners are authorized to begin using their accumulated decommissioning trust funds to pay for decommissioning costs, SCE will be required to make capital expenditures: (1) to ensure that nuclear material (primarily spent nuclear fuel) is maintained safely and securely, and to ensure the radiological safety and security of SONGS in accordance with NRC and other regulations; (2) for dry cask storage of spent nuclear fuel; and (3) to meet other state and federal regulatory requirements, as explained in this testimony.

Chapter II categorizes capital investments, describes the capital budgeting and approval process, and provides the capital expenditure forecast for 2013-2017. The capital expenditures for 2013 are subject to refund and may be reviewed in Investigation (I.) 12-10-013 ("SONGS OII").

Chapter III provides a detailed forecast for each of the four major SONGS capital work categories: (1) Special Projects, (2) Plant Modifications, (3) Balance of Plant Modifications, and (4) Department Annual Program.[3] Each project or work category forecast is reasonable because it is necessary to meet NRC or other regulatory requirements or necessary for the safe and compliant storage

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1 In a SAFSTOR configuration, all plant systems that are not required to directly or indirectly support the safe storage of the fuel assemblies in the units' spent fuel pools are drained, de-energized, and abandoned in place until they are decommissioned.

2 "The U.S. Nuclear Regulatory Commission (NRC) is an independent agency created by Congress. The mission of the NRC is to license and regulate the Nation's civilian use of byproduct, source, and special nuclear materials in order to protect public health and safety, promote the common defense and security, and protect the environment." NUREG-1350.

of nuclear fuel. Chapter III provides information on both the level of capital expenditures and the in-service date for each capital project.

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[3] The Department Annual Program summarizes all of an organization's continuing capital infrastructure, replacement, and spare part expenditures. It groups them into a single package for ease of budget management.

II.

SONGS CAPITAL SCOPING AND APPROVAL

A. Capital Budget and Approval

Notwithstanding the decision to permanently retire SONGS, SCE must make capital investments at SONGS that are necessary to maintain safe onsite nuclear fuel storage and meet NRC and other regulatory requirements. SCE cannot rigidly establish the detailed specific scope of certain regulatory-required capital work to be implemented in future years because NRC or other regulatory requirements are subject to change. SCE requires flexibility to optimally respond to changing NRC, or other, regulatory requirements, equipment condition, refinement of conceptual or preliminary engineering work scope, industry developments, and other evolving factors.

The Budget Review Committee (BRC)[4] reviews all requests for Special Projects, Plant Modifications, Balance of Plant Modifications, and the Department Annual Program. Using a standard format for assessment and approval (including justification, timing, and cost estimate), SCE personnel first identify items meeting the capitalization criteria for all capital projects. The BRC then approves projects for the SONGS capital budget and recommends capital projects up to $10 million to the Vice President & Station Manager (VP&SM) for approval.

SCE reviews the capital budget frequently to incorporate emergent projects and changes to existing projects. As a result of these reviews, SCE defers certain planned projects in order to provide funding for emergent projects. Projects selected for deferral are those that can reasonably be postponed without resulting in detrimental effects to SONGS safety or regulatory compliance.

The VP&SM reviews and approves all capital work plans in accordance with the capital budget, followed by review and approval by the Chief Nuclear Officer (CNO) and the Capital Review Team (CRT).[5] The budget development, review, and approval process are explained in greater detail below.

B. Work Categorization

Capital Expenditures are organized into four categories:

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[4] The current members of the BRC are the SONGS Plant Manager, and the Directors and Managers from Maintenance, Operations, Engineering and Technical Services, Design Engineering, Maintenance/System Engineering, Projects, Work Control, Site Support Services, and Nuclear Finance.

[5] The CRT includes SCE officers who provide financial oversight and governance for SCE's capital investment program. SONGS projects with estimated budgets of more than $10 million must be reviewed and approved by the CRT. Periodically, SCE's Board of Director's Finance, Operations and Safety Oversight Committee reviews the capital budget, followed by full Board of Directors' review and approval.

- Special Projects: This category includes projects that will require significant effort to engineer and construct or implement. Chapter III.B describes the Special Projects in detail.
- Plant Modifications: This category includes projects that will change the plant design. These projects require engineering, procurement, construction, and testing. Plant Modifications are projects with a cost of $1 million or more. Chapter III.C describes the Plant Modifications projects in detail.
- Balance of Plant Modifications are plant modifications under $1 million. Chapter III.D describes the Balance of Plant Modifications projects in detail.
- The Department Annual Program (DAP): This category supports the daily operations of SONGS. SCE focuses the capital requirements in this category on the near-term to meet the operational and safety requirements of the plant and personnel. Chapter III.E describes the DAP projects in detail.

Chapter III provides an additional breakdown and description of the three categories together with detailed cost information and item descriptions for projects over $1 million being placed in service during 2013-2017.

C. Work Approval Process

SCE reviews and evaluates all proposed SONGS capital expenditures to determine necessary or beneficial capital investment and appropriate timing. The BRC evaluates proposed projects to determine their feasibility, necessity and benefits, and appropriate timing for implementation. The BRC reviews new projects proposed for implementation in the current year as well as future years.

The BRC manages projects within established budgets or approved budget revisions. The BRC authorizes projects needed to meet licensing and regulatory requirements and maintain plant reliability, and evaluates and approves plant betterment projects on a cost-effectiveness basis. The BRC assesses capital projects within its multi-year listing of work scopes and integrates all projects (capital and O&M) from a resource and timing perspective. Adherence to budget is a priority, but it is second to complying with regulatory and safety requirements, which are of the utmost importance.

Table II-1
SONGS Units 2 & 3 Summary Cash Flow

	Prior Years	2013	2014	2015	2016	2017	Total 2013-2017
Special Projects	259,843	63,021	21,907	13,217	9,925	11,360	119,430
Plant Modifications	24,166	15,704	452	1,909	779	8,235	27,079
Balance of Plant Modifications	1,200	2,443	55	0	9	77	2,584
Department Annual Program	70,106	8,832	4,812	4,823	4,546	4,667	27,680
Projects Closing to Plant in 2013 - 2017	**355,315**	**90,000**	**27,226**	**19,949**	**15,259**	**24,339**	**176,773**
Total Cash Flow - 100% Level	**355,315**	**90,000**	**27,226**	**19,949**	**15,259**	**24,339**	**176,773**
SCE Share	**223,062**	**69,863**	**20,917**	**15,196**	**11,620**	**18,677**	**136,273**

1. Special Projects

SCE identifies Special Projects at SONGS to resolve emerging problems, improve or maintain overall plant performance, or upgrade site equipment or facilities. Special Projects are typically major projects involving significant resources that merit special attention through the design and implementation phases. These projects may involve new or emergent work, and may result in a plant design change or addition. Special Projects generally are necessary in response to NRC or state regulations, or to the condition of plant equipment. The BRC individually analyzes, reviews, and approves each Special Project.

Subsequent to the permanent closure of SONGS, SCE re-evaluated the need for each Special Project, and cancelled all such projects that are not required to directly or indirectly support the safe onsite storage of spent nuclear fuel and the maintenance of the units in a SAFSTOR configuration.

2. Plant Modifications

Plant Modifications often involve a plant design change or addition, but are typically smaller in scope than Special Projects and generally are not emergent. Plant Modifications include the modification or replacement of components necessary to maintain plant reliability or operability. As opposed to Special Projects, they also include the replacement of systems or equipment that have

become obsolete or are reaching the end of their design-life. The BRC analyzes, reviews, and approves each Plant Modification on an individual basis.

Subsequent to the permanent closure of SONGS, SCE re-evaluated the need for each Plant Modification and cancelled all such projects that are not required to directly or indirectly support the safe onsite storage of spent nuclear fuel and the maintenance of the units in a SAFSTOR configuration.

3. Balance of Plant Modifications

Balance of Plant Modifications are plant modifications that are each less than $1.0 million. The scope and timing for each of these projects has been selected to optimize overall cost-effective plant operation and to maintain continued safe and reliable plant operation. The BRC analyzes, reviews, and approves each Plant Modification on an individual basis.

Subsequent to the permanent closure of SONGS, SCE re-evaluated the need for each Balance of Plant Modification and cancelled all such projects that are not required to directly or indirectly support the safe onsite storage of spent nuclear fuel and the maintenance of the units in a SAFSTOR configuration.

4. Department Annual Program (DAP)

SCE identifies items under DAP blanket orders during preparation of the annual capital budget. SCE updates the budget, as needed, to accommodate emergent items and other changes as appropriate. SCE places all DAP requests into appropriate blanket categories, and summarizes and compares them with historical levels of expenditures. Then, SONGS Directors review all requests, determine priorities, and finalize budgets for specific and blanket work orders.

Subsequent to the permanent closure of SONGS, SCE re-evaluated the need for each DAP blanket order and adjusted the associated forecasted costs to align with expected needs while the units are in a SAFSTOR configuration.

III.

SONGS CAPITAL EXPENDITURE FORECAST

A. Summary of Capital Expenditures

SONGS requires capital funding to maintain the plant's condition at a level supporting the long-term safe and compliant storage of nuclear fuel, and to meet other state and federal requirements. This Chapter provides the capital expenditure forecast for 2013-2017 and the basis for the forecast, arranged by the four major capital work categories: (1) Special Projects, (2) Plant Modifications, (3) Balance of Plant Modifications, and (4) Department Annual Programs. Prior to the June 7, 2013 announcement to permanently shutdown SONGS, capital project expenditures supported safe, compliant, and reliable operations. Since the shutdown announcement, all projects, except for those required for safe and compliant nuclear fuel storage or required by regulation, have been terminated. SCE provides a specific description and justification for each remaining project with an estimated cost of $1 million or greater (nominal, 100 percent level).

SCE developed total future capital investment needs for 2013-2017 by combining known specific projects, the necessary timing for such expenditures, and where appropriate, past expenditures and trends. Table II-1 shows the summary of capital expenditures or cash flow for 2013-2017. For plant-in-service information, see Exhibit SCE-10, Volume 2.

SCE determined the plant in-service forecasts by utilizing one of the following methodologies:

- Costs are placed in service on the Commercial Operation Date (COD)
- Costs are placed in service as items and components are fabricated, or received and are ready for use (annual)

The first methodology uses the COD as the basis for in-service dates. SCE uses this methodology for projects that are not used and useful until complete and placed in service. Examples are Special Projects such as the Large Organism Exclusion Device (LOED), and Plant Modification projects to replace worn out or broken systems and components that will continue to be required for safe onsite storage of nuclear fuel. SCE utilizes the second methodology for capital items that become used and useful as items or components are fabricated or received. This includes items such as dry storage canisters, capital replacements, and computers.

B. Special Projects

The Special Projects category identifies projects that require significant effort to engineer and construct or implement. Table III-2 contains a summary of planned Special Projects and their associated cash flows by year.

Table III-2
SONGS Special Projects Forecasted Expenditures

Project Description	Unit	Prior Years	2013	2014	2015	2016	2017	Total 2013-2017
Control Room Upgrade	Common	10,730	1,486	0	0	0	0	1,486
Cyber Security	Common	8,731	4,249	0	0	0	0	4,249
HPT Retrofit Project - Material	Unit 3	24,475	3,500	0	0	0	0	3,500
ISFSI - Canisters Total	Common	79,720	13,113	6,936	4,732	6,794	6,792	38,367
ISFSI - Dry Cask Spent Fuel Storage	Common	17,199	3,515	4,969	3,768	3,131	2,262	17,645
ISFSI - Spent Fuel Movement	Common	10,190	31	0	4,352	0	2,306	6,689
Large Organism Exclusion Device (LOED)	Units 2 & 3	2,651	16,997	7,152	0	0	0	24,149
Post Fukushima Response - SPF	Units 2 & 3	138	1,170	2,850	365	0	0	4,385
Replacement Reactor Vessel Head (RRVH)	Unit 3	41,380	2,723	0	0	0	0	2,723
Rapid Refueling	Units 2 & 3	37,906	6,756	0	0	0	0	6,756
Security Future Force Initiative	Common	2,149	7,745	0	0	0	0	7,745
Security Rule	Common	19,465	693	0	0	0	0	693
Technical Specifications Project	Common	5,109	1,043	0	0	0	0	1,043
Total		**259,843**	**63,021**	**21,907**	**13,217**	**9,925**	**11,360**	**119,430**
SCE Share		**203,223**	**48,762**	**16,757**	**9,931**	**7,449**	**8,526**	**91,425**

1. Special Projects Required For Shutdown Conditions and Transitioning to Decommissioning

a) Control Room Upgrade

The SONGS technical specifications (TS) mandate that the Control Room Supervisor shall be responsible for the Control Room command function. In addition, industry guidance recommends that Operations programs, processes, and activities should be implemented in a manner that promotes sustained high levels of safe and reliable operation. During on-site inspections, NRC personnel recommended that the SONGS Control Room Supervisors could more effectively perform their command and control function, and better implement plant operating activities to promote sustained high levels of safety, if their computer consoles were re-oriented such that they could monitor both their computers and their control boards at the same time. To resolve these issues, SCE implemented the Control Room Upgrade project to redesign the console configuration inside the SONGS Control Room during early 2013, before SCE made the decision to retire the units. This project was subdivided into three sections to facilitate implementation. Section 1 was the Unit 2 side of the Control Room, which consisted of upgrading two consoles; Section 2 was the Unit 3 side of the Control

Room, which consisted of upgrading two consoles; and Section 3 was the Common area of the Control Room, which consisted of upgrading one console and elevating the seating for the Control Room Supervisors to facilitate more effective monitoring of the other Control Room Operators. In addition, these modifications were made in the Control Room Simulator to ensure compatibility. The Control Room project was necessary at the time it was implemented in 2013, given that the Control Room is utilized to monitor the condition of the plant, fuel in the core, and to control any operations during shutdown conditions as SCE prepared for the restart of Unit 2.

Now that SONGS has been permanently shutdown, the project will assist Control Room Operators with the safe transition of the units into a safe storage configuration prior to decommissioning and to monitor the fuel in the spent fuel pools and Independent Spent Fuel Storage Installation.

(1) Cost

SCE estimates the remaining cost of this project during 2013 to be $1.5 million (nominal, 100% level). SCE essentially completed this entire project before the June 7, 2013 decision to close the plant, and cancelled the small amount of remaining work following that decision. See Table III-2. The 2013 expenditures for this project are subject to review in the SONGS OII.

b) Independent Spent Fuel Storage Installation

At the beginning of each SONGS refueling outage, SCE was required to transfer all 217 fuel assemblies from the reactor vessel to the spent fuel pool storage racks located within the power block of the generating station. SCE stored the spent nuclear fuel in these underwater racks temporarily, to provide radiation shielding and thermal cooling, while SCE performed inspections of the reactor vessel internal structures and other maintenance and testing on the reactor systems. Of these 217 fuel assemblies, approximately one-half were permanently discharged and were never again used in the reactor.

The SONGS spent fuel pools have limited storage capacity. Late in the past decade, the SONGS spent fuel pools approached their full capacity. Without a means to remove some of the fuel from the pools, it would have been impossible for SCE to continue operating the units. As a result, SCE constructed the Independent Spent Fuel Storage Installation (ISFSI), an on-site dry spent fuel storage facility. With the ISFSI available, SCE conducted a fuel transfer campaign after each refueling outage to remove a sufficient number of fuel assemblies from the spent fuel pool such that the pool would have a sufficient number of storage racks available to perform the next refueling outage. In

each such campaign, SCE loaded fuel assemblies that had thermally cooled sufficiently into specially licensed and constructed dry shielded canisters (DSCs) that had been placed in the corresponding pool. After SCE sealed each DSC, dried it internally, and filled it with an inert gas to prevent corrosion, SCE removed the DSC from the pool, transported it to the ISFSI inside a shielded transfer cask, and then placed it in a specially designed Advanced Horizontal Storage Module (AHSM) that rests on a seismically qualified reinforced concrete pad. The DSCs provide shielding and criticality control during transfer to and during storage at the ISFSI.

The fabrication or purchase of AHSMs and DSCs required for each fuel transfer campaign requires a lead time of at least two to three years. This project includes the costs associated with the purchase, delivery, and installation of the AHSMs, and the purchase, delivery, loading, and transportation costs associated with the DSCs that will be used during each fuel transfer campaign that is scheduled during the 2013-2017 period. Fuel transfer campaigns will continue through this period to support the eventual emptying of the spent fuel pool.

If SCE commences decommissioning Units 2 & 3 at any time during the 2013-2017 period, SCE will terminate the ISFSI capital project and will pay for all subsequent ISFSI-related costs with decommissioning funds.

(1) ISFSI – AHSMs

AHSMs are purchased and installed on the ISFSI pad for each fuel transfer campaign with reinforced concrete structures designed to support and shield the dry shielded canisters while providing passive heat removal. The AHSMs protect the canisters from potential extreme weather conditions and seismic activity and provide radiation protection to the public and site personnel.

(2) ISFSI - DSC (24PTH System)

SCE has used 24PTH canisters fabricated on-site for all fuel transfer campaigns conducted to-date, and plans to continue using these canisters through the 2014 campaign. The 24PTH canisters hold up to 24 fuel assemblies. SCE, therefore, will fabricate a sufficient number of 24PTH canisters for planned transfers of DSCs to support the spent fuel transfer scheduled in 2014.

(3) ISFSI - DSC (32PTH2 System)

Spent fuel transfer to the ISFSI after 2014 will utilize upgraded dry fuel storage technology described as the 32 PTH2-DSC and HSM-H system. The 32PTH2 DSCs are larger than the 24PTH DSCs because each 32PTH2 canister can hold 32 fuel assemblies instead of 24 fuel assemblies. This upgrade required the purchase of a new larger diameter OS-200 Transfer Cask, an

Automatic Welding System, a new Canister Vacuum Dryer, a new Transfer Trailer Skid Positioning System, which will be mounted on the existing Fuel Transfer Trailer, and a new Prime Mover and Yoke. The Transfer Cask is placed under water in the spent fuel pool with its open end facing the top of the pool at the beginning of the loading process for each canister. Each new canister is lowered into the Transfer Cask in the pool, and then loaded with fuel assemblies. After fuel loading is completed, the Automatic Welding System is used to weld the closure/shielding plates over the open side of each canister, and the Vacuum Dryer evacuates the water from and dries the inside of each canister after it has been welded shut while still in the pool. The Transfer Cask and loaded canister are then lifted out of the spent fuel pool and loaded onto the Fuel Transfer Trailer. The Transfer Cask provides additional radiation shielding as the Trailer is towed from the spent fuel building to the ISFSI by the Prime Mover and Yoke. Upon arrival at the AHSM, that will store the canister, the Transfer Trailer Skid Positioning System is used to align the Trailer so the canister can be safely inserted into the AHSM.

(a) Cost

SCE estimates the cost of ISFSI projects to be $62.7 million (nominal, 100% level), for the period of 2013-2017. See Table III-2.

2. Special Projects Required To Meet Existing State and Federal Regulatory Requirements

a) Large Organism Exclusion Device

The California Once Through Cooling (OTC) Policy adopted by the State Water Resources Control Board (SWRCB) includes a requirement for the installation of a physical barrier, referred to as a Large Organism Exclusion Device (LOED), over each of the Units 2 & 3 offshore intake structures. The purpose of the LOED is to prevent large marine organisms from being drawn into the cooling water system of the plant. The LOED installation was required within one year of the Policy's effective date (October 1, 2011). SCE agreed to install LOEDs over the primary intakes for each unit.[6] SCE requested a time extension for this deadline to October 1, 2013 in a letter to the SWRCB dated August 24, 2011. SWCRB's response included a compliance schedule requiring installation of the LOEDs by December 31, 2012.

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[6] The Units 2 & 3 intake structures also include much smaller auxiliary intakes. The auxiliary intakes do not have sufficient capacity to support plant power generating operations, but do have sufficient capacity to support other essential plant functions such as spent fuel pool cooling.

SCE was unable to meet this compliance deadline due to a variety of factors primarily due to challenges associated with design, engineering, and material procurement lead times, which required additional time. Therefore, by letter dated December 7, 2012, SCE requested additional time to fulfill its obligations under the compliance schedule. SCE indicated that installation of the LOEDs would not be completed until April 2014. By letter dated December 27, 2012, the SWRCB approved SCE's request and allowed an extension until April 30, 2014.

The OTC Policy requires installation of the LOEDs any time cooling water is drawn into the plant. Because the units require cooling water even when they are not generating electricity, SCE must install the LOEDs to be compliant with OTC policies.

(1) Cost

SCE estimates the cost to complete this project during the 2013-14 period will be $24.1 million (nominal, 100% level). SCE plans to complete this project in 2014. See Table III-2.

b) Post-Fukushima Response

As a result of the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011 Great Tohoku Earthquake and subsequent tsunami, the NRC established the Near Term Task Force (NTTF), consisting of a team of NRC managers and staffers with significant nuclear safety experience. The NTTF conducted a systematic and methodical review of NRC processes and regulations, and identified additional improvements to its regulatory system that were needed. Through this review, a comprehensive set of recommendations was developed and provided to the NRC using a decision rationale built around the defense-in-depth concept in which each level of defense-in-depth (namely prevention, mitigation, and emergency preparedness) was critically evaluated for its completeness and effectiveness in performing its safety function.

Although the NTTF and NRC concluded that an accident with consequences similar to the Fukushima accident is unlikely to occur in the United States, the NTTF, as directed by the NRC staff, determined which of its recommendations could and should be implemented without unnecessary delay. Following that, the NTTF prioritized the recommendations into three tiers. This ultimately resulted in the issuance of orders and a request for information pursuant to 10 C.F.R. § 50.54(f) on March 12, 2012. The capital impacts of these regulations are discussed below.

(1) Capital Impacts: NRC Orders Modifying License

On March 12, 2012, the NRC issued two immediately-effective orders: "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events."[7] and "Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation"[8] These orders required submission of overall integrated plans (including a description of how compliance with the requirements will be achieved) to the NRC for review in early 2013. Full implementation (*e.g.*, design work, modifications, training, procedures) was required to be completed within two refueling cycles of that date or by December 31, 2016, whichever was earlier.

(2) SFP Level Instruments

This Order required that commercial nuclear power plant licensees equip each spent fuel pool with two separate trains of level instrumentation that send readouts to remote locations that are promptly accessible to Station Operators in the event of a beyond-design-basis accident. By having a reliable means to monitor the SFP level, the confusion and misapplication of resources that occurred at Fukushima could be avoided.

On February 27, 2013, SCE submitted its overall integrated plan to install two permanent SFP Level Instruments per pool. The selected instrument technology uses time domain reflectometry, also called guided wave radar, to take measurements using pulse trains that travel along a cable to a matched probe. This technology is highly reliable and robust in a multitude of different environmental and radiological conditions and will be used by a majority of the industry. To ensure the equipment is available, SCE plans to have the instrument channels connected to different buses so that no single failure will interrupt power to both channels. Additionally, each channel will have backup battery power as well as a reliable alternate source of power provided by portable diesel generators.

Because SCE will continue to store fuel in the Units 2 & 3 spent fuel pools for several years while the units are in SAFSTOR or in decommissioning, the installation of these instruments is still required notwithstanding the permanent closure of the units. SCE plans to complete the implementation on an accelerated schedule. The engineering and installation of the SFP Level Instruments is expected to occur in 2013 and 2014, along with corresponding training and procedures. SCE plans to complete full implementation of the SFP Level Instruments project in 2015.

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7 *See* workpapers for NRC Order EA-12-049.

8 *See* workpapers for NRC Order EA-12-051.

(a) Cost

SCE estimates the cost to complete this project during 2013-2015 will be $4.4 million (nominal, 100% level). SCE plans to complete this project in 2015. See Table III-2.

c) Security Future Force Initiative

Under 10 C.F.R. § 73, each licensed nuclear power facility is required to implement and maintain a comprehensive security program to protect the public health and safety from external and internal security threats. These comprehensive security programs include qualified armed security forces and physical security features. Failure to meet these federal requirements may result in penalties up to forfeiture of the facility's NRC license.

In 2012, the NRC updated some of the regulations that pertain to the nuclear facility comprehensive security programs. The updated regulations mandate the installation of additional physical security features on the plant site to improve the ability of the security program to protect the public health and safety against security threats. In response to these NRC rulemaking changes, SCE was required to modify and improve the installed security features for the SONGS facility.

Although the specifics of this project are considered Safeguards Information, and therefore, cannot be divulged to anyone not appropriately qualified per NRC regulation, the general scope of work associated with this project involves additions or modifications to physical barriers, vehicular access, surveillance, observation, and monitoring. SCE originally planned to install a larger scope for this project in 2015. Due to the announced shutdown of SONGS, however, SCE adapted this project to meet the needs of SONGS in a shutdown or decommissioning configuration. SCE plans to complete the adapted version of this project in 2013.

(1) Cost

SCE estimates the costs incurred for this project during 2013 will be $7.7 million (nominal, 100% level). See Table III-2.

d) Security Rule Implementation

This project consists of several security improvements required to meet a new NRC rule (Federal Register Volume 74, No. 58, 13926-13993). Although the specifics of this initiative are considered Safeguards Information, and therefore, cannot be divulged to anyone not appropriately qualified per NRC regulation, the general scope of work includes improvements to aircraft attack

response, access authorization, training, and qualification for security and physical security (alarm stations).

(1) Cost

SCE estimates the cost of this project during the 2013-2017 period to be $0.7 million (nominal, 100% level). SCE plans to complete this project in 2013. See Table III-2. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

e) Technical Specifications Project

Each United States nuclear generating facility is required by the NRC's 10 C.F.R. § 50.36[9] to maintain Technical Specifications (TS), including information regarding the facility's characteristics, operating limits, design features, and administrative controls.

In September 1992, the NRC approved the "Improved Standard Technical Specifications (ISTS)" as Revision 0 of NUREGs 1430-1434. The Technical Specification Task Force (TSTF) is made up of nuclear industry leaders who review and approve proposed changes submitted by the ISTS working groups. After approval, the TSTF then submits the proposed changes to the NRC for review. To date, more than 500 changes have been submitted since Revision 0 of the NUREGs, resulting in the current Revision 4 to the NUREGs, dated April 2012.

SONGS was one of the first plants to convert to the ISTS in 1996, using Revision 0 of NUREG 1432. Given the time span since the SONGS conversion to ISTS and the improvements that have been made to the NUREGs since the conversion, SONGS will conduct a comprehensive review of the plant's TS. This review would identify the applicable TSTF changes that have not been incorporated into the TS and incorporate those changes, where required. This project will bring SONGS in line with nuclear industry standards. SCE planned to complete this project in 2013, however, due to the announced shutdown of SONGS, SCE is evaluating a potential reduction in scope or project termination.

(1) Cost

SCE estimates the incurred and termination cost of this project to be $1.0 million (nominal, 100% level). See Table III-2. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

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[9] *See* workpapers for 10 C.F.R. § 50.36.

3. Other Special Projects In Progress In 2013 That SCE Has Cancelled

a) Replacement Reactor Vessel Head

The Reactor Vessel Head (RVH) is the top of the reactor pressure vessel (RPV). During reactor operations, the RVH is secured to the RPV, which contains the nuclear fuel. Thus, the RVH is an integral component of the reactor coolant system pressure boundary for each unit.

The original RVHs were made from carbon steel, with interior liners made from stainless steel and nozzle penetrations made from an iron-nickel-chrome alloy known as Inconel 600. Industry experience revealed that this alloy is susceptible to primary water stress corrosion cracking in the high temperature environment of the Reactor Coolant System (RCS). This cracking can lead to pressure boundary leaks, and if allowed to continue, is capable of causing failure of RCS pressure boundary components, jeopardizing adequate protection of public health and safety. In Order EA-03-009, "Order Modifying Licenses," which establishes interim requirements for Reactor Pressure Vessel Heads at pressurized water reactors," the NRC mandated ongoing retest requirements and repairs of Inconel 600 nozzle cracking in commercial nuclear power plant reactor heads as the plants age.

SONGS conducted these inspections on the existing RVH during its periodic refueling outages. As a result, based on the findings from these tests, the RVHs were determined to require replacement. The replacement RVH has nozzle penetrations manufactured from Inconel 690, a material less susceptible to stress corrosion cracking. SCE replaced the Unit 2 RVH during the Unit 2 Cycle 17 refueling outage (RFO) in 2012, prior to when the extent of the tube wear in the Unit 2 steam generators was fully known. The 2012 costs are being reviewed in the SONGS OII. SCE had planned to replace the Unit 3 RVH during the Unit 3 Cycle 17 RFO, which was originally scheduled for 2012. As such, all materials were procured and installation contracts in place when the announcement to permanently shutdown SONGS occurred. This project has been cancelled, but will incur charges for materials and contract cancellation.

(1) Cost

SCE estimates the cancellation cost of this project during 2013 to be $2.7 million (nominal, 100% level). See Table III-2. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

b) Cyber Security Phases 2 & 3

Under 10 C.F.R § 73.54, all United States nuclear power plants are required to implement a cyber security defense strategy to protect data and controls for each plant component or

piece of equipment identified as critical to the safe operation of the facility. To comply with this new regulation, SONGS submitted a schedule to the NRC comprised of three phases spanning a timeframe of 60 months.

The first phase is the Analysis Phase and includes: (1) identifying the NRC critical cyber security systems; (2) complying with the North American Electric Reliability Corporation (NERC) continuity of power systems and components standards; (3) identifying nuclear cyber security critical digital assets; (4) performing a program self-assessment and gap analysis to the NRC-endorsed Nuclear Energy Institute (NEI) 08-09 program; and (5) identifying a cyber security defensive strategy which includes operating system hardening, cyber incident handling, identifying required training, drills and audits, regulatory reporting, and organizational change management.

The second phase is the Engineering Phase, which consists of developing the cyber security design and construction of a data warehouse of the design bases and controls for each plant component or piece of equipment identified as an NRC or NERC cyber critical digital asset.

The third phase is the Construction Phase, which implements the plant physical modifications or software modifications identified by the design bases. The number of engineering change packages and software modifications are to be refined as the Engineering Phase is completed.

This work is mandated by NRC and NERC regulations (including 10 C.F.R § 73.54). SONGS Cyber Security Plan and implementation schedule were submitted to the NRC under proposed license amendment change number, NPF-10/15-595, Cyber Security Plan San Onofre Nuclear Generating Station, Units 2 and 3.

(1) Cost

SCE ceased work on this project after the announcement that SONGS would be retired. However, SCE is currently evaluating the cyber security regulatory requirements as they pertain to spent fuel storage, which would require continuation of this project with a reduced scope. SCE estimates the cost of this project during 2013 to be $4.2 million (nominal, 100% level). See Table III-2. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

c) High Pressure Turbine Retrofit

The steam turbine generators for each unit include a High Pressure Turbine (HPT), two reheaters and moisture separators, three Low Pressure Turbines (LPTs), and one electrical generator. The steam turbines utilize high pressure, high temperature steam from the steam generators to turn the electrical generator to, ultimately, produce electrical power with nuclear energy. First, the

steam entered the steam generator, pushing against the HPT blades causing the steam turbine to rotate. Steam then left the HPT and entered the reheaters and moisture separators where additional heat was added to the steam and moisture was removed. The steam then entered the LPTs and pushed against the LPTs blades before exiting the steam turbine. The turbine directly connected to the electrical generator, which also rotated. As the generator rotated, electrical power was produced and transmitted to the electrical grid for use by SCE's customers.

In February 2012, SCE installed the Unit 2 replacement HPT with a modern steam path consisting of a new rotor, moving blades, diaphragms, diaphragm carriers, and miscellaneous parts. The 2012 costs are being reviewed in the SONGS OII.

The Unit 3 HPT was manufactured and delivered to the site in anticipation of the Unit 3 Cycle 17 RFO. Due to SCE's decision to permanently shutdown the plant, the Unit 3 HPT will not be installed. SCE, nevertheless, was required to pay the balances owed to the manufacturer and shipping contractor in 2013.

(1) Cost

The cost incurred for this project during 2013 is $3.5 million (nominal, 100% level). See Table III-2. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

d) Rapid Refueling Head Modifications

The original SONGS RVHs required substantial time and polar crane usage to disassemble and reassemble during RFOs.

The rapid refueling project is comprised of three separate activities:

(1) Simplified Head Assembly

This modification configures the mechanical assemblies that are installed on top of the RVH, integrating the cable support structures and the missile shields. This results in fewer crane lifts being required to disassemble and reassemble the reactor upper support structures. It also provides enhanced radiation shielding by incorporating steel doors over the in-core instrumentation access windows. The plan also included the modification of the cable support structure to allow for storage on the reactor coolant pump housings.

(2) Hydra-Nut System

The original design required torque to be applied to each reactor head tensioning bolt individually. In Unit 2, SCE installed a new Hydra-Nut system that would allow

simultaneous tensioning and/or de-tensioning of multiple head bolts thereby reducing the personnel time spent within containment.

(3) Quicklocs System

In Unit 2, SCE installed quicklocs adapters to eliminate the assembly and need for torqueing of the original seal connections.

Completion of the Rapid Refueling Head Modifications on both Units 2 & 3 would have brought SONGS into conformity with current industry practices and would have facilitated more expeditious disassembly and reassembly of the RVHs, resulting in labor and equipment savings, reduced worker personnel time within containment, and decreased personnel radiation dosage. The RVH modifications were performed on Unit 2 during its February 2012 RFO, prior to when the extent of the tube wear in the Unit 2 steam generators was fully known. These 2012 costs will be reviewed in the SONGS OII. These modifications were planned to be performed in Unit 3 in the Unit 3 Cycle 17 RFO, but the Unit 3 project was terminated after the decision to retire the SONGS units was announced.

(a) Cost

SCE estimates the remaining cost that will be incurred for this project during 2013 to be $6.8 million (nominal, 100% level). This remaining cost includes residual costs from the Unit 2 project, and costs paid to the supplier of the Unit 3 project for work performed prior to the plant shutdown announcement. See Table III-2. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

C. Plant Modifications

SONGS conducts plant modifications to improve equipment reliability and significantly extend the lifespan of required equipment and components. There are several types of modifications conducted at the site, these range from modifications based on requirements for licensing and compliance, equipment operability, component end of life/obsolescence, plant betterments, and/or facility upgrades. After SCE announced the shutdown of SONGS, SCE cancelled all Plant Modifications except those required to maintain the units in SAFSTOR, those required to safely store nuclear fuel onsite, and those for which royalty payments were owed. Table III-3 below, depicts the modifications that SCE plans to implement at SONGS from 2013 through 2017.

Table III-3
SONGS Plant Modifications Forecasted Expenditures

Project Description	Unit	Prior Years	2013	2014	2015	2016	2017	Total 2013-2017
CCW Heat Exchanger Replacements	Unit 3	3,847	710	0	0	0	0	710
NFPA Fire Protection	Common	13,177	3,959	0	0	0	0	3,959
Nitrogen (N16) Monitor	Unit 2	693	898	0	0	0	0	898
Paragon Implementation	Common	1,073	154	0	0	0	0	154
Reactor Coolant System Zinc Injection	Unit 2	817	92	86	95	55	0	328
Security Vault Reconfiguration	Common	1,851	800	0	0	0	0	800
SOER 10-1, Transformer Protection	Units 2 & 3	64	3,934	0	0	0	0	3,934
Traveling Screens Enhancements	Unit 2	70	1,980	0	0	0	0	1,980
Vibration & Loose Parts Monitoring	Unit 2	2,395	319	0	0	0	0	319
Y012 Inverter Room Enclosure	Unit 2	179	1,646	0	0	0	0	1,646
Emergent Work Allowance	Common	0	1,212	366	1,814	724	8,235	12,351
Total Cash Flow								
100% Level		**24,166**	**15,704**	**452**	**1,909**	**779**	**8,235**	**27,079**
SCE Share		**18,900**	**12,282**	**354**	**1,493**	**609**	**6,441**	**21,178**

1. Plant Modifications Required For Shutdown Conditions and Transitioning to Decommissioning

a) New Zero Carryover Traveling Screen Design

The SONGS intake structures take in sea water to cool plant components, including the spent fuel pools. The Traveling Screens at the SONGS intake structures[10] minimize debris entering into the Salt Water Cooling (SWC) System by catching kelp, seashells, and other materials and moving the materials toward a waste receptacle for removal. On multiple occasions, debris has carried over a traveling screen and caused significant problems with operation of the SWC System. Shells and/or grass carried over a traveling screen can partially block the SWC pump suction strainer affecting pump performance. Smaller debris can pass through the strainer and plug tubes in the Component Cooling Water Heat Exchanger.

[10] At SONGS, the current cooling water intake system for each unit consists of an 18-foot diameter buried offshore pipeline system withdrawing seawater via a velocity cap intake located 3,200 feet offshore. The 18-foot pipe delivers water to the onshore pump intake structure by using gravity. The cooling water withdrawn from the intake system passes through the condenser and various heat exchangers and then is combined with low-volume wastes generated at the plant before being discharged back to the Pacific Ocean via an 18-foot diameter pipeline. The discharge is released to the sea through a series of diffusers designed to dissipate the discharge heat.

Notwithstanding SCE's decision to permanently retire Units 2 & 3, SCE will replace the traveling water screens with screens that are designed for zero carry over because the intake structure functions will continue to be required to safely store fuel in the spent fuel pools.

(1) Cost

SCE estimates the cost of this project for 2013 to be $2.0 million (nominal, 100% level). See Table III-3.

b) Reactor Coolant System Zinc Injection

In December 2006, the Electric Power Research Institute (EPRI) published the "Pressurized Water Reactor (PWR) Primary Water Zinc Application Guidelines." In this document, EPRI endorsed zinc injection into the Reactor Coolant System (RCS) as "good practice" when implemented with an acceptable specific plant evaluation.

This project injected zinc into the SONGS RCS since its installation a few years ago. Under SCE's contract with EPRI, SCE was required to pay royalties for the use of this system design. SCE is currently obligated to continue to pay such royalties throughout the 2013-2017 period, however, SCE is investigating whether the payment of royalties may be discontinued subsequent to the permanent shutdown of the units.

(1) Cost

SCE estimates the cost of this project during the 2013-2017 period will be $0.33 million (nominal, 100% level). See Table III-3.

c) Y012 Inverter Room Enclosure

The 120 VAC Non-Class 1E Uninterruptable Power Supply System was designed to convert 250 VDC into 120/208 VAC power for Instrument & Control Buses during a loss of on-site power. Integral to this system are inverters that charge batteries under normal operating conditions and subsequently swap to batteries as an alternate source of power when necessary. Y012 is one of these inverters.

In 2011, a negative trend developed on the Non-Class 1E Uninterruptable Power Supply (UPS) Y012 Inverters indicating numerous internal bus grounds resulting in voltage perturbations and an automatic transfer to an alternate source with a momentary loss to critical components.

The Y012 Inverters are located in the southeast and northeast corners of the Turbine Building on the 7' Elevation. Although these inverters are tucked into the lowest corners of the

building, the rooms are surrounded by security fencing to maintain vital areas. Even with Turbine Building fans circulating air and HVAC units directing airflow, a marine environment is ever-present on the 7' Elevation.

Upon further background research, at least seven ground faults occurred during high humidity (greater than 90% humidity) conditions. Additionally, there were also trends of poor air flow on the nearby HVAC units. Water pooling from excessive rainfall and dust, dirt, and other contaminants are also suspected contributors to the status of the Y012 Inverters.

The SONGS Y012 Inverter HVAC Modifications & Room Enclosures are expected to remove, or greatly minimize, the environmental conditions present at the inverters. Improving the conditions around the inverters will have prevent future ground faults and inadvertent source transfers.

This project is continuing due to power provided to site security electrical systems.

(1) Cost

SCE estimates the cost incurred for this project during 2013 will be $1.6 million (nominal, 100% level). See Table III-3.

2. Plant Modifications Required To Meet Existing State and Federal Regulatory Requirements

a) Security Vault Reconfiguration

Safeguards Information (SGI) at SONGS is a regulated process which involves robust controls for handling and storing sensitive information related to Plant Security and Operations. SONGS is committed to maintaining such controls under 10 C.F.R § 73.21 and 10 C.F.R § 73.22.

During the NRC's Baseline Inspection in March 2012, SGI handling errors were identified resulting in a Greater-than-Green[11] Finding against the SONGS SGI Program. As a result of the NRC Inspection, several actions were identified to improve sensitive information handling controls and to better align the SONGS SGI program with NRC Regulatory Guide 5.79, "Protection of Safeguards Information."

[11] Green inspection findings allow for commercial nuclear power plants to correct performance issues before increased regulatory involvement is warranted. Greater-than-Green inspection findings represent a greater degree of safety significance and therefore trigger increased regulatory attention.

One of the primary actions from the recovery plan was to consolidate and modify the SGI storage and handling areas. Each room will have a Security System installed that will monitor the room when unoccupied and alarm when necessary. Details regarding the room layout and modifications have been removed to protect SCE's assets.

The SGI Vault Modifications commenced in 2012 and will be completed in 2013. This project is necessary notwithstanding the announced shutdown of Units 2 & 3 because SONGS will continue to utilize and store SGI as long as SONGS stores nuclear fuel onsite and is required to maintain a Physical Securities Plan.

(1) Cost

SCE estimates the cost of this project during 2013 to be $0.80 million (nominal, 100% level). See Table III-3.

3. Plant Modifications In Progress In 2013 That SCE Has Cancelled or Is Revising

a) Components Cooling Water Heat Exchangers

The SONGS Component Cooling Water (CCW) System was designed to cool heat loads present in the Primary System and its associated safety components during normal, outage, and emergency operations. The CCW Heat Exchangers are the single point where heat loads from the CCW System are exchanged with the Salt Water Cooling (SWC) System, which ultimately transfers the heat to ocean water. The units could not operate or cool the spent fuel pools without these exchangers.

Because the saltwater systems are not filtered, contaminants (*e.g.*, sand, salt, organic material) present in the systems accelerate the internal erosion of heat exchanger tubes (relative to the rates of erosion of heat exchanger tubes in pure/clean water systems). This is normal and expected during the life of a heat exchanger. As tubes leaked or were damaged, they were plugged and removed from service. After a certain percentage of the tubes in a heat exchanger were plugged, that heat exchanger was no longer able to transfer the heat loads sufficiently to perform its design function. Such a heat exchanger would need to be replaced, have its tubed replaced, or have sleeves installed inside its damaged tubes.

The original SONGS CCW Heat Exchangers operated since the early 1980s. These heat exchangers experienced emergent leaks, some of which occurred just prior to or after regularly-scheduled preventative maintenance activities. The CCW Heat Exchangers would have required extensive monitoring to assess operability and water chemistry, action by Operations to control water levels in the CCW System, and implementation of emergent work packages. After approximately

three decades of wear, the number of tubes in these heat exchangers that have been plugged render them incapable of performing their design function sufficiently to support ongoing plant operations. As a result, the original SONGS CCW Heat Exchangers required replacement.

SCE replaced the Unit 2 CCW Heat Exchangers during the February 2012 outage with replacement units built with larger diameter tubes and greater surface area that provided improved heat transfer margin. These upgrades improved operability characteristics during periods of rapid macro-fouling. The Unit 3 CCW Heat Exchangers were scheduled for replacement in 2015, however, SCE cancelled this project after the decision to retire Units 2 & 3 was announced. Since the replacement Unit 3 CCW Heat Exchangers have been fabricated and delivered to SONGS, SCE must pay for the work performed and project de-mobilization costs.

(1) Cost

SCE estimates the cost of this project during 2013 to be $0.7 million (nominal, 100% level) for the 2013-2017 period. See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

b) NFPA-805 Fire Protection Project

10 C.F.R § 50.48(c) and National Fire Protection Association (NFPA) 805 specify the fire protection requirements for existing light water nuclear power plants during all phases of plant operation, including shutdown, degraded conditions, and decommissioning. NFPA 805 replaces the previously used 10 C.F.R. § 50 Appendix R Fire Protection Standard. Under NFPA 805, SCE committed to develop a Probabilistic Risk Assessment[12] (PRA) approach to assessing risk factors in design and fire strategies for a nuclear unit, and converting results to the commonly used PRA parameters of Core Damage Frequency and Large Early Release.

The original scope for this effort would have required a multi-year and multi-disciplined team to develop a fire risk-based PRA model, which did not exist in a suitable methodology before the regulation. The team would then evaluate fire induced Multiple Spurious Operations that could occur for the plant specific design. Fire induced circuit failure, non-power operational fire analysis, nuclear safety capability assessments, and evaluation of post fire operator manual actions were

[12] Probabilistic risk assessment (PRA) is a systematic evaluation of how the pieces of a complex system work together to ensure safety. PRA allows analysts to quantify risk and identify what could have the most impact on safety.

also to be analyzed and risk evaluations of the more than 200 SONGS fire areas in 32 probability-based assessements were to be performed. These analyses were then to be quantified in the PRA model.

In light of the announced shutdown of Units 2 & 3, the future scope of this project is under review. The project costs incurred during 2013 were for expenses related to the engineering studies and analyses required to develop responses to NRC Requests for Additional Information (RAIs) that arose from SCE's License Amendment Request (LAR) for Units 2 & 3.

(1) Cost

SCE estimates the 2013 cost of this project to be $4.0 million (nominal, 100% level). See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

c) Paragon Implementation

The Shutdown Nuclear Safety Defense-In-Depth Program was a manual process that involved an individual reviewing more than 20,000 operational and maintenance activities that were planned to be completed during a typical refueling outage, and assessing whether or not each activity could negatively impact any safety function in the plant. This individual was then required to manually ensure that these activities were scheduled into the correct work windows and the correct plant operating configuration in the outage so that the risk of performing the activity was minimized. This process did not differentiate between relative level of risk but rather had a simple "OK-Not OK" result that did not effectively match risk management actions with the relative risk.

The Paragon Implementation Project would have replaced that manual process with a computerized shutdown nuclear risk assessment model. The computer model would have facilitated a more effective performance of these functions.

The project was cancelled upon SCE's announcement to permanently retire Units 2 & 3, however, SCE incurred some costs associated with this project during 2013.

(1) Cost

SCE estimates the cost for this project to be $0.15 million (nominal, 100% level) during 2013. See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

d) Permanent Nitrogen (N-16) Radiation Monitors Installation

The SONGS Radiation Monitoring System assists plant operators in evaluating the performance of plant systems, specifically, the detection of radioactive leakage into non-radioactive

systems. Detection generally monitors Primary-to-Secondary Leakage, Primary-to-Atmosphere Leakage, and Process System Leakage.[13]

SCE conducted an investigation and found that the SONGS Radiation Monitoring System currently in use is not up to industry standards as recommended by EPRI regarding Primary-to-Secondary Leakage. In EPRI's Pressurized Water Reactor (PWR) Primary-to-Secondary Leak Guidelines, Main Steam Line (MSL) Monitoring, specifically N-16 Monitors, were identified as key components in the assessment of plant conditions. EPRI recommends N-16 Radiation Monitors and MSL Monitors because N-16 has a very high and unique energy peak while it decays and is always present during power operations. This made it an ideal indicator of a Primary-to-Secondary Leak.

The Permanent N-16 Radiation Monitors are specialized pieces of equipment that were to be installed at predetermined locations along the MSLs to optimize N-16 detection. The monitors would have communicated with a local data processing unit, and eventually, the Control Room. Operators would have been informed immediately when a potential leak was detected as well as the estimated location of the leak. This project was cancelled upon notification of SCE's decision to permanently shutdown Units 2 & 3, however, SCE incurred project costs during 2013.

(1) Cost

SCE estimates the cost of this project to be $0.9 million (nominal, 100% level) during 2013. See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

e) SOER 10-1, Transformer Protection

The Institute of Nuclear Power Operations' (INPO) Significant Operating Experience Report (SOER) 10-1, Large Transformer Reliability, was issued due to the high number of large transformer failures over the past decade throughout the industry. Per INPO, "[t]ransformer failures challenge operators by causing electrical power system transients, equipment unavailability, scrams, fires, and emergency plan entries."

SOER 10-1 is an industry-wide commitment. Recommendation 8 of the document requires each nuclear facility to "[e]valuate and take practical measures to reduce risks from personnel safety hazards, collateral damage, and fire hazards to adjacent buildings and plant equipment

[13] Primary system refers to the Reactor Coolant System while Secondary refers to nonradioactive systems including the Main Steam, Condensate, and Main Feed Water Systems.

that could result from large transformer failures." The primary factors affecting personnel safety are transformer bushings and oil inside the transformers.

SONGS Fire Protection Engineering evaluated areas surrounding each large transformer on site and identified a number of buildings and components that need to be protected from a transformer failure. From this assessment, it was determined that:

- Large Blast / Fire Barriers would be installed around the Reserve Auxiliary Transformers.
- Smaller Removable Plate Barriers would be installed around critical plant equipment and potential safety hazards, including Electrical Tunnel Deluge Valves and Welding Gas Platforms.
- Blast Mitigation Window Film would be installed on every window within a specific radius of a transformer's bushing.

In light of SCE's decision to permanently retire Units 2 & 3, the remaining work on this project was cancelled. SCE, however, incurred costs associated with this project in 2013 prior to its cancellation.

(1) Cost

SCE estimates the cost of this project will be $3.9 million (nominal, 100% level) during 2013. See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

f) Vibration & Loose Parts Monitoring Systems

The SONGS Vibration & Loose Parts Monitoring Systems (VLPMS) identifies loose parts in each unit's Reactor Coolant System. The original systems experienced spurious alarms and drive problems, resulting in operator distractions during startup and shutdown of the units. SCE planned to replace the existing systems with a standalone Digital Metal Impact Monitoring System (DMIMS-DX).

The new digital systems would each have had 16 vibration sensors (six on each steam generator, two on the new reactor head, and two on the bottom of the reactor vessel). Sensors within the system would have converted mechanical vibrations into pulse signals. These signals would have been sent through soft wire cables to a pre-amplifier where the signals would have been amplified and sent to the monitoring and recording cabinet in the Control Room. This project would also have upgraded the Control Room cabinet where the signals were displayed in a Richter-like image. If the

signals reached a pre-determined set point, an alarm would have been triggered and the Operations group would have taken appropriate actions.

The DMIMS-DX is in use at other nuclear facilities and has been found to be faster and more reliable than the existing type of VLPMS. In-place vibration monitoring systems were required by the SONGS Updated Final Safety Analysis Report (UFSAR) and were designed to fulfill the requirements of NRC Regulatory Guide 1.133. The monitoring functions of the DMIMS-DX would have also constituted an important safety improvement to steam generator monitoring.

Due to the permanent shutdown of Units 2 & 3, this project was cancelled. SCE, however, remains liable for project costs incurred before project cancellation and associated demobilization costs.

(1) Cost

SCE estimates the cost of this project to be $0.32 million (nominal, 100% level) during 2013. See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

g) Emergent Work Allowance

The Emergent Work Allowance is a blanket work authorization for unplanned capital investments at the plant to address: (1) issues raised by the NRC and other regulatory agencies, or (2) issues supporting spent fuel pool cooling. The Emergent Work Allowance appears as a line item in the five-year capital forecast for 2013-2017. Any capital work item funded from the Emergent Work Allowance requires a detailed, specific Capital Project approved by the Budget Review Committee.

(1) Cost

SCE estimates the amount of this allowance to be $12.4 million for the period of 2013 – 2017. See Table III-3. The 2013 costs will be reviewed in the SONGS OII, and should not be reviewed in the GRC.

D. Balance of Plant Modifications

The Balance of Plant Modifications shown in Table III-4 are Plant Modifications that have not previously been discussed. Each of these projects is required notwithstanding the permanent shutdown of Units 2 & 3, is estimated to cost less than $1.0 million, and will be completed during 2013, except the royalty payments for the Unit 3 Reactor Coolant System Zinc Injections, which will continue through 2017. See Table III-4.

Table III-4
SONGS Balance of Plant Modifications Forecasted Expenditures

Project Description	Unit	Prior Years	2013	2014	2015	2016	2017	Total 2013-2017
12KV Improvements	Common	0	409	0	0	0	0	409
Domestic/Service Water Backflow Preventers	Common	0	398	0	0	0	0	398
Emergency Planning	Common	0	200	0	0	0	0	200
Full Flow Condensate Polisher Demin	Unit 2	71	201	0	0	0	0	201
HPT Retrofit Project - Shipping	Unit 2	0	60	0	0	0	0	60
HVAC Unit Replacements	Unit 2	354	153	0	0	0	0	153
K-Bldgs 12K Switchgear Replacement	Common	0	20	0	0	0	0	20
Portal Monitor Replacement	Common	101	16	0	0	0	0	16
Post Fukushima Response - Flex	Common	157	820	0	0	0	0	820
Reactor Coolant System Zinc Injection	Unit 3	517	86	55	0	9	77	227
Simulator Upgrade	Common	0	80	0	0	0	0	80
Total Cash Flow								
100% Level		1,200	2,443	55	0	9	77	**2,584**
SCE Share		939	1911	43	0	7	60	**2,021**

E. Department Annual Program

The Department Annual Program (DAP) provides blanket funding of capital items in support of plant operation and personnel. Due to the permanent shutdown of SONGS, SCE has reduced the DAP blanket funding to a level required to support maintaining the units in SAFSTOR and storing spent fuel onsite until decommissioning commences.

Table III-5 provides a summary of cash flow of DAP expenditures, with cash flows for each blanket category.

Table III-5
SONGS Department Annual Program Forecasted Expenditures

Project Description		2013	2014	2015	2016	2017	Total
Computer Blankets							
	Non-Process Computer Blanket	1,317	240	30	30	30	1,647
	Personal Computers Blanket	1,210	240	240	240	240	2,170
Facilities Blankets							
	Facilities Retirement Unit Replacement	549	657	517	515	516	2,754
	Office Furniture & Equipment Blanket	14	0	0	0	0	14
	Telecom Systems Refresh Blanket	758	300	210	210	210	1,688
Capitalized Replacements							
	Capitalized Replacements	1,019	922	1,360	1,094	1,190	5,585
	Spare Parts Blanket	521	552	555	553	572	2,753
	Traveling Screens	2,650	1,349	1,356	1,351	1,355	8,061
Tools, Lab, Test, & Training Equipment (TERT)		794	552	555	553	554	3,008
	Total Cash Flow						
	100% Level	**8,832**	**4,812**	**4,823**	**4,546**	**4,667**	**27,680**
	SCE Share	**6,908**	**3,763**	**3,772**	**3,555**	**3,650**	**21,649**

1. Computer Blankets

SCE established two blankets to capture expenditures for Personal Computers (PC) and other computer hardware used in the daily operation of SONGS. The Non-Process Computer Network Hardware Blanket includes non-PC workstation computer equipment. Items included in this category are network-connected printers, plotters, scanners, servers, network switches, and storage. These items are replaced based on a cyclical equipment refresh schedule, typically every four to five years. The Personal Computers Blanket includes personal computers and associated workstation components for site personnel. All items purchased through this blanket have a unit cost greater than $800 but less than $100,000. Typical items include desktop computers, laptop computers, and monitors. The typical replacement schedule is three to four years based on the requirements of the individual's job function as well as technology requirements. See Table III-5. This equipment will continue to be required when Units 2 & 3 are in SAFSTOR.

2. Facilities Blankets

The Facilities Blanket funds minor facility projects, not exceeding $100,000. These projects include capitalized maintenance of support facilities and minor facilities additions outside the

power block area, and will also be required as SCE prepares to commence decommissioning of Units 2 & 3. SCE established the following blankets to capture expenditures for facilities related projects at SONGS. See Table III-5.

a) Telecommunications Replacements

The telecommunications replacements blanket provides funding for capital replacements or additional telecommunications items.

The telecommunications system at SONGS includes, but is not limited to, the following:

- Site-Wide Public Address System – 110 audio amplifiers located in 80 locations driving approximately 2,000 speakers.
- Fiber Optic Based Voice and Data Transport – 28 nodes (located in 10 buildings) that link different facilities within SONGS and also link SONGS to the rest of SCE.
- Digital Microwave – Two terminals linking SONGS to the rest of SCE.
- Two-Way Radio System and Handheld Radios – In-plant simulcast system for radio coverage requirements.
- Site Telephone System – Nearly 4,600 extensions and about 4,400 phones, including phone services such as voice mail, conference calling, and transfer/forward/call waiting.
- DC Power System – Protected power to the telecommunications systems at all times.
- Emergency Communications System – The control and monitoring of the alert and notification siren system, the interagency communications system (Yellow Phone), and on-site emergency phone links for control rooms, technical support center, operational support center, and emergency operations facility.
- Video conferencing systems.
- Transport of Local Area Network data between buildings and between the local communications closets and the workstations and links to the SCE corporate network.

SONGS is a 24-hour-a-day operation. It has continuous requirements for the availability of telecommunications systems. SCE delivers these telecommunication services across a 220-acre area separated by I-5 and containing over 50 buildings. These communication systems will be required while Units 2 & 3 are in SAFSTOR.

b) Facilities Retirement Unit Replacement

The Facilities Retirement Unit Replacement blanket provides funding for capitalized maintenance of support facilities and minor facilities additions outside the power block area. SCE determines the scope of this work order by infrastructure needs and facility or component life cycles.[14]

SONGS will continue to support a reduced site population. Conformance with environmental requirements and employee safety standards require that SCE maintain its facilities in a serviceable condition.

c) Office Furniture & Equipment Blanket

This blanket provides funding for the purchase of free standing (non-modular) office furniture and office equipment at the site. All items purchased have a unit cost greater than $2,500, but less than $100,000. Representative furniture items purchased are large conference tables, copy boards, audiovisual equipment (non-training related), and various types of information storage equipment. With the announcement to permanently shutdown Units 2 & 3, SCE will be reducing expenditures in this area to only costs incurred in 2013.

d) Spare Parts Blanket

SONGS retains an inventory of spare parts[15] necessary to ensure a high level of plant performance and reliability. This inventory is housed at the Mesa warehouse facility on the east side of the Interstate 5 freeway. A spare part is one that meets the following criteria:

- SCE requires the item for continuity of service;
- The acquisition of the item requires long lead times and/or extensive manufacturing requirements;

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[14] There are several factors that identify life cycle durations: manufacturers' recommendations, industry standards, and site-specific historical data.

[15] Capital spare parts are separate from the Material & Supplies inventory.

- The item is not available to be shipped to SONGS on a dependable and timely basis;
- The item is manufactured for a specific piece of equipment;
- The item is not a scheduled routine replacement; and
- The item is not used more than once a year historically.

Unlike other blanket work orders, this work order is impacted by: (1) planned new purchases, (2) replenishment of inventory (including the cost differential) or return of inventory to stock, and (3) inventory issues for plant use. The Inventory Management group determines: (1) the need for a spare part, (2) an appropriate stocking level for the item, and (3) the priority for purchase of any new items.

Due to the permanent closure of SONGS, SCE is evaluating which items in the spare parts inventory will be required to support the units in a SAFSTOR configuration. SCE has reduced the spare parts blanket work order to reflect a spare parts inventory level appropriate to support SAFSTOR and spent fuel storage requirements.

3. Capitalized Replacements

Capitalized Replacements provide for the replacement of in-kind capital equipment; that is, no major engineering is required. SCE determines funding requirements for capitalized replacements through analysis of historical expenditures and the identification of future projects impacting the specific capital retirement units. SCE conducts capitalized replacements in accordance with Federal Energy Regulatory Commission (FERC) regulations and following SCE's capitalization policy. With SONGS permanently shutdown, SCE is evaluating which plant equipment may require capitalized replacements with the units in a SAFSTOR configuration and to support the operation of the spent fuel pools. SCE reduced the capital replacements work order to reflect a level appropriate to support SAFSTOR and spent fuel storage requirements. See Table III-5.

4. Tool & Equipment Review Team (TERT)

SCE uses blanket work orders to fund tools, lab, test, and training equipment, as authorized by the SONGS Tool & Equipment Review Team (TERT). Maintaining an adequate inventory of these items is essential to support equipment repairs. Tools, lab, test, and training equipment are routinely replaced as necessary throughout the year due to deterioration, obsolescence, or

breakage. SONGS Directors review, approve, and monitor the TERT work orders.[16] See Table III-5. A reduced level of tools, lab, test, and training equipment will be required while Units 2 & 3 are in a SAFSTOR configuration.

[16] The current method of review for Tool & Equipment Review Team work orders will most likely change because of the permanent shutdown of SONGS.

Appendix A

Witness Qualifications

SOUTHERN CALIFORNIA EDISON COMPANY
QUALIFICATIONS AND PREPARED TESTIMONY
OF S. JACK HUSON

Q. Please state your name and business address for the record.

A. My name is S. Jack Huson, and my business address is 5000 S. Pacific Coast Highway, San Clemente, CA 92674.

Q. Briefly describe your present responsibilities at the Southern California Edison Company (SCE).

A. I am the Director of Generation Finance of Southern California Edison Company. In that capacity, I have the responsibility of managing the financial services for all of SCE's electric power generation assets, including the San Onofre Nuclear Generating Station (SONGS).

Q. Briefly describe your educational and professional background.

A. I received a Bachelor of Arts degree in Business Administration from California State University, San Bernardino in 1988 and a Master of Business Administration from the University of La Verne in 1995. I joined SCE in 1980 as an Apprentice Plant Equipment Operator in the Steam Generation Division and progressed through levels of management in Steam Generation, Hydro Generation, Power Production Department Staff, Supply Chain Management, IT, and Planning and Performance Reporting. I was also the Treasurer of Edison O&M Services, an affiliate of SCE.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to sponsor the portions of Exhibit SCE-02, Volumes 1 and 2, entitled *Generation – SONGS O&M* and *Generation – SONGS Capital*, as identified in the Table of Contents thereto.

Q. Was this material prepared by you or under your supervision?

A. Yes, it was.

Q. Insofar as this material is factual in nature, do you believe it to be correct?

A. Yes, I do.

Q. Insofar as this material is in the nature of opinion or judgment, does it represent your best judgment?

A. Yes, it does.

Q. Does this conclude your qualifications and prepared testimony?

A. Yes, it does.