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Witnesses: Sue E. Garcia
Adam H. Levin
Charles D. Ladd
Tracy M. Dalu

PUBLIC VERSION

PREPARED DIRECT TESTIMONY

ON BEHALF OF

SAN DIEGO GAS & ELECTRIC COMPANY

(2017 SONGS 1 and SONGS 2&3 DCE)

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

March 15, 2018

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PREPARED DIRECT TESTIMONY
ON BEHALF OF SDG&E

I. INTRODUCTION (S. GARCIA)

The purpose of this testimony is to demonstrate the reasonableness of the 2017 San Onofre Nuclear Generating Station ("SONGS") Unit 1 ("SONGS 1") Decommissioning Cost Estimate ("DCE") and 2017 SONGS Units 2&3 ("SONGS 2&3") DCE (collectively, the "SONGS DCEs" or "DCEs") and San Diego Gas & Electric Company's ("SDG&E") forecast of its SDG&E-only costs for SONGS 1 and SONGS 2&3. This testimony provides support for the California Public Utilities Commission ("CPUC" or "Commission") to:

(1) Approve the joint request by Southern California Edison Company ("SCE") and SDG&E to find the 2017 SONGS 1 DCE to be reasonable;[1]

(2) Approve the joint request by SCE and SDG&E to find the 2017 SONGS 2&3 DCE to be reasonable;[2] and

(3) Approve the request by SDG&E that its forecast for future SDG&E-only costs is reasonable.

This volume of testimony is organized as follows: Chapter II discusses SDG&E's efforts to review the 2017 SONGS 1 and SONGS 2&3 DCEs. Chapter III discusses Mr. Joseph Carignan and Mr. Thomas LaGuardia's report on SDG&E's review of the DCEs. Chapter IV discusses decommissioning industry expert Mr. Adam Levin's review of the DCEs. Chapter V

[1] The updated 2017 SONGS 1 DCE, using methodologies consistent with the 2016 SONGS 1 DCE, identifies a $209.0 million (100% share, 2014$) total cost for the activities to be undertaken by the decommissioning agent and general contractor. If the 2017 SONGS 1 DCE is adopted by the Commission, SDG&E's twenty-percent (20%) ratable share of decommissioning costs for SONGS 1 would be $41.8 million (SDG&E share, 2014$). This excludes future SDG&E-only costs.

[2] The updated 2017 SONGS 2&3 DCE, using methodologies consistent with the 2014 SONGS 2&3 DCE, identifies a $4,478.6 million (100% share, 2014$) total cost for the activities to be undertaken by the decommissioning agent and general contractor. If the 2017 SONGS 2&3 DCE is adopted by the Commission, SDG&E's twenty-percent (20%) ratable share of decommissioning costs for SONGS 2&3 would be $895.7 million (SDG&E share, 2014$). This excludes future SDG&E-only costs.

discusses the 2017 SONGS 1 DCE. Chapter VI discusses the 2017 SONGS 2&3 DCE. Chapter VII describes SDG&E's estimate for its future "SDG&E-only" costs.

II. SDG&E'S REVIEW OF THE 2017 SONGS 1 AND 2017 SONG 2&3 DCE (S. GARCIA)

As a 20% minority owner in SONGS, SDG&E recognizes the need to perform its due diligence in reviewing for reasonableness the SONGS 1 DCE and SONGS 2&3 DCEs. As a part of this due diligence effort, SDG&E retained the services of Carignan and Associates LLC ("C&A") to provide decommissioning technical support in the review and oversight of the DCEs. C&A's Consultant Report[3] for SDG&E's Review of DCE is described further in Section III and is included in Attachment B of this testimony.

For each category of cost in the DCEs, SDG&E obtained supporting documentation from The Kenrich Group, LLC ("Kenrich") and performed a detailed review to determine whether the cost estimate was reasonable. SDG&E developed review packets for each distributed project and undistributed activity. The review included a comparison and variance explanation between the current DCE and the previous DCE. In addition, the review focused on the basis for the estimate. After each review packet was completed, SDG&E had C&A review the packet. The purpose of C&A's review was to identify any areas needing clarification, provide guidance to SDG&E in its review and its feedback to Kenrich and SCE, and to determine the reasonableness of the DCEs. Questions, concerns and feedback were documented for SDG&E and C&A's review and followed up with Kenrich and SCE. All questions, concerns and feedback were adequately addressed by Kenrich and SCE.

[3] *Review of San Onofre Nuclear Generating Station Decommissioning Cost Estimates and Supporting Documentation* (March 11, 2018), prepared by Carignan & Associates LLC and LaGuardia & Associates LLC.

III. CONSULTANT REPORT FOR SDG&E'S REVIEW OF DCE (J. CARIGNAN AND T. LAGUARDIA)

As part of SDG&E's due diligence effort, SDG&E retained the services of C&A to provide decommissioning technical support in the review and oversight of the 2017 SONGS 1 DCE and 2017 SONGS 2&3 DCE. Mr. Joseph Carignan, along with decommissioning expert, Mr. Thomas LaGuardia, provided this support. Included as Attachment B to this testimony is C&A's report related to the review of the 2017 DCEs.

IV. DECOMMISSIONING INDUSTRY EXPERT'S REVIEW OF THE 2017 SONGS 1 AND SONGS 2&3 DCE (A. LEVIN)

The purpose of my testimony is to provide my expert opinion of the 2017 SONGS 1 and 2017 SONGS 2&3 DCEs. At SDG&E's request, I conducted a critical review of the approach to estimating decommissioning costs and the assumptions included in the DCEs. In my opinion, the 2017 SONGS 1 and 2017 SONGS 2&3 DCEs provide a realistic approach to the decommissioning process, and reasonable estimates of the costs expected to be incurred during decommissioning of these facilities.

During my nearly 41-year career in the commercial nuclear industry, I have had the opportunity to develop and review decommissioning cost estimates for more than 40 commercial nuclear units. I find that the SONGS DCEs have used industry-accepted methods for cost estimating, appropriate site-specific inputs, and reasonable, conservative assumptions regarding the disposition of radiological, hazardous and municipal waste from the site. Additionally, the DCEs generally conform to the guidance on preparing decommissioning cost estimates provided by the NRC.[4]

[4] U.S. Nuclear Regulatory Commission, Regulatory Guide 1.202, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," February 2005. http://pbadupws.nrc.gov/docs/ML0502/ML050230008.pdf.

A. The SONGS 1 and SONGS 2&3 DCE Reflects a Realistic Decommissioning Approach

SCE has chosen to immediately decommission SONGS. The 2017 SONGS 1 and 2017 SONGS 2&3 DCEs describe the immediate decontamination and dismantlement of the entire SONGS site. This approach to decommissioning is known as "DECON." In DECON,[5] the major decommissioning activities at SONGS begin with (1) completing the transfer of spent nuclear fuel ("SNF") into dry cask storage, followed by (2) major equipment removal (e.g., the reactor vessel, reactor internals, steam generators, primary loop piping and valves), (3) removal of the balance of the plant systems, structures and components, and (4) restoration of the site.

The 2017 SONGS 1 and 2017 SONGS 2&3 DCEs have been prepared by Kenrich.[6] Kenrich performed updates to the 2014 SONGS 2&3 DCE and the 2016 SONGS 1 DCE, for filing as the 2017 DCEs. The three most significant differences between the current Kenrich-prepared estimates and the prior estimates are (1) the reporting format has been changed to more clearly align decommissioning costs into distributed costs (for major projects) and undistributed costs (collateral costs incurred not assignable to specific activities), (2) the revision of certain major cost elements based upon competitively bid contracts, and (3) a downward adjustment of contingency, warranted in some areas, by contracting status (certain major activities now under fixed price contracts), and a clearer understanding of decommissioning costs based upon lessons learned during the decommissioning process to date.

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[5] The DECON decommissioning scenario is defined by the NRC as "[t]he equipment, structures, and portions of the facility and site that contain radioactive contaminants are promptly removed or decontaminated to a level that permits termination of the license after cessation of operations. (Decontamination is initiated within a couple of years after shutdown and continues until completed, usually within 7 to 10 years)." *Id*. at I.202-3.

[6] The Kenrich Group, LLC 2017 SONGS 1 DCE dated March 5, 2018, provided as Appendix B to Exhibit ("Ex.") SCE-02 to the Application; The Kenrich Group, LLC 2017 SONGS 2&3 DCE, dated January 26, 2018 (revised March 8, 2018), provided as Appendix B to Ex. SCE-03 to the Application.

Many of the major decommissioning activities have already been performed for SONGS 1, and some major decommissioning work has already been performed at SONGS 2&3. The 2017 SONGS 1 and 2017 SONGS 2&3 DCEs accurately reflect the status and configuration of all three units, and appropriately integrate the activities between the DCEs and across the entire site, to enable the future completion site decommissioning in the most cost-effective manner. The decommissioning of SONGS 1 and SONGS 2&3 will be coordinated as one decommissioning project with SONGS Decommissioning*Solutions* ("SDS"), the Decommissioning General Contractor ("DGC"), performing major decommissioning activities.

Radioactively-contaminated components will be disposed of at NRC-licensed low-level radioactive waste ("LLRW") disposal facilities at Envirocare of Utah ("Envirocare") and Waste Control Specialists ("WCS") in Texas. Other non-hazardous, non-radioactive waste generated during decommissioning will be disposed of at an out-of-state municipal landfill. These activities and disposal plans are reasonably reflected in the DCEs.

When the site has been cleared of LLRW and municipal waste, SCE as the NRC licensee will: (1) submit a license termination plan to NRC for its approval, and (2) the site will be restored to a state acceptable to the State of California and the Department of the Navy ("Navy"). SNF and greater-than-Class C ("GTCC") waste will remain on site at the SONGS Independent Spent Fuel Storage Installation ("ISFSI") until accepted and removed by the Department of Energy ("DOE") for offsite storage or disposal. These events have been properly reflected in the 2017 SONGS 1 and 2017 SONGS 2&3 DCEs.

B. Major Assumptions of the SONGS 1 and SONGS 2&3 DCEs are Reasonable

As noted earlier, the 2017 SONGS 1 and 2017 SONGS 2&3 DCEs are highly integrated and use the same major assumptions to form the estimate bases. There are a definable number of major drivers impacting decommissioning cost and schedule specifically applicable to SONGS

decommissioning. Site specific material quantities, labor costs, energy costs, insurance, property taxes and other costs recognized in NRC regulatory guidance and industry decommissioning experience must be presented in a comprehensive SONGS DCE. To develop a logical decommissioning schedule and a realistic estimate of decommissioning costs, the SONGS DCEs must also address the following site-specific critical assumptions in reasonable detail:

1) The date assumed by which the DOE will begin accepting SNF and GTCC waste from the nuclear industry, and the date by which DOE will complete its obligation to remove SNF and GTCC waste from SONGS, for storage off site or disposal;
2) Site end state conditions required by the Navy, the California State Lands Commission ("CSLC"), and the California Coastal Commission ("CCC");
3) The continuing availability of LLRW and municipal disposal facilities accepting waste from SONGS; and
4) Site security and emergency response requirements.

1. The DOE Start and Completion Date Assumptions in the SONGS 1 and SONGS 2&3 DCEs are Reasonable

The 2017 SONGS 1 and 2017 SONGS 2&3 DCEs assume the same date for DOE performance under the Standard Contract,[7] to begin accepting SNF and GTCC waste for disposal (the "DOE Start Date"). The DCEs assume a DOE Start Date of 2028.[8] Using this DOE Start Date, the DCEs report that all SNF and GTCC waste will be removed from SONGS 1 by 2034, and from SONGS 2&3 by 2049.

SCE and SDG&E have continued to pursue a better understanding of the rapidly changing factors impacting the DOE Start Date. They have concluded, and I agree for the

[7] 10 CFR Part 961, *Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste*. https://www.gpo.gov/fdsys/pkg/CFR-2011-title10-vol4/pdf/CFR-2011-title10-vol4-part961.pdf.

[8] Ex. SCE-02, Appendix B (SONGS 1 DCE) at 13; Ex. SCE-03, Appendix B (SONGS 2&3 DCE) at 17.

reasons explained below, that a 2028 DOE Start Date should be used going forward. The DOE Start Date will be reviewed and updated as required, in future NDCTPs.

The DOE Start Date and the rate at which the DOE will remove SNF and GTCC waste, once they begin performance, have been the subject of much public speculation. SDG&E has independently reviewed this assumption to assess the reliability of the assumed 2028 DOE Start Date and finds it to be a reasonable assumption based upon known facts.

On July 18, 2006, DOE proposed that pending full Congressional funding, geologic repository operations would begin in approximately 11 years (i.e., on March 31, 2017).[9] Given a delay of 11 years from the 2006 announcement without any action, it is arguable that a "one-for-one" delay since 2006 would place DOE repository operations and the DOE Start Date to 2029 (i.e., 2018 plus 11 years).

Based upon work performed in 2008 and published in January 2009, the DOE revised the estimated start date based upon updated transportation plans, and pushed the DOE Start Date to no earlier than 2020.[10] This revision implies that the DOE believes approximately 12 years would be required to implement transportation of SNF and GTCC waste to a geologic repository. Again, arguing a "one-for-one" delay since 2008 would place DOE repository operations and the DOE Start Date to 2030 (i.e., 2008 plus 12 years).

Since these announcements, much has transpired, including the termination of the licensing process at Yucca Mountain and the commissioning and completion of a federal

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[9] *DOE's Revised Schedule for Yucca Mountain*, Hearing Before the Subcommittee on Energy and Air Quality of the Committee on Energy and Commerce, House of Representatives, One Hundred Ninth Congress, Second Session, July 19, 2006. https://www.gpo.gov/fdsys/pkg/CHRG-109hhrg30416/pdf/CHRG-109hhrg30416.pdf.

[10] *Notice of Availability: Office of Civilian Radioactive Waste Management; National Transportation Plan, Revision 0*, Fed. Reg., Vol.74, No. 11, January 16, 2009. https://www.gpo.gov/fdsys/pkg/FR-2009-01-16/pdf/E9-894.pdf.

administration study on the future of managing spent nuclear fuel and high-level radioactive waste. The Blue Ribbon Commission report[11] recommended, among other matters, that a program to site consolidated interim storage facilities ("ISF") – with the goal of first accepting spent nuclear fuel from shutdown plants – should be pursued ("the Pilot ISF"). This DOE-sponsored ISF approach would have begun removing spent nuclear fuel from shutdown plants followed by others in industry by 2021.[12] The DOE-assumed start date for Pilot ISF operations was predicated on work beginning on the Pilot ISF by January 2014. Thus, DOE concluded that 7 years from implementation to acceptance of the first assembly for storage at the ISF, would be required.

The Pilot ISF program has yet to be launched; Congress has not allocated the funding required. DOE has stated that federal legislation will be required to implement the Blue Ribbon Commission recommendations, and federal legislation needed in order for the DOE to move forward has yet to be enacted. However, there is some movement forward.

The White House has issued the Fiscal Year 2019 proposed budget, which states "The Budget also *continues support for a robust interim storage program* and the licensing of the Yucca Mountain geologic repository, demonstrating the Administration's commitment to nuclear

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[11] *Report to the Secretary of Energy, Blue Ribbon Commission on America's Nuclear Future*, January 2012. https://energy.gov/sites/prod/files/2013/04/f0/brc_finalreport_jan2012.pdf.

[12] *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, U.S. Department of Energy, January 2013, p. 2. https://www.energy.gov/sites/prod/files/Strategy%20for%20the%20Management%20and%20Disposal%20of%20Used%20Nuclear%20Fuel%20and%20High%20Level%20Radioactive%20Waste.pdf.

waste management."[13] DOE has earmarked $120 million for these efforts.[14] Legislation has been introduced which would allow DOE to proceed with development of an ISF.[15,16] Additionally, significant progress has been made on the technical side of the program on one of the long-lead items; the development and deployment of a rail car capable of transporting 125 ton SNF and GTCC waste transportation casks.[17]

For either a geologic repository or a Pilot ISF, the startup of operations will be strongly driven by the development of a national rail transportation program, the National Environmental Policy Act ("NEPA") process, and the NRC licensing process. At this juncture, a license for a geologic repository at Yucca Mountain has been received by NRC for review. The Pilot ISF licensing would have to be initiated, submitted and reviewed, which may take somewhat longer. I expect the transportation program and the NEPA process to be similar for whichever path is pursued, with the NEPA process for a geologic repository somewhat more protracted. It is my opinion that approximately the same amount of time overall would be required to begin operations at a geologic repository or a Pilot ISF. Assuming Congressional authority to proceed and the proper funding authorizations established by late 2018 or early 2019 and using either my

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[13] *Fiscal Year 2019, Efficient, Effective, Accountable, An American Budget,* Budget of the U.S. Government, Office of Management and Budget, pg. 45 (emphasis added to original). https://www.whitehouse.gov/wp-content/uploads/2018/02/budget-fy2019.pdf.

[14] *Department of Energy FY 2019 Budget Request Fact Sheet*, February 12, 2018. https://energy.gov/sites/prod/files/2018/02/f48/Energy%20Department%20FY%202019%20Budget%20Fact%20Sheet.pdf.

[15] *Nuclear Waste Administration Act of 2015,* S.854, 114th Congress, 1st Session, March 24, 2015. https://www.congress.gov/114/bills/s854/BILLS-114s854is.pdf.

[16] *Nuclear Waste Policy Amendments Act of 2017,* H.R. 3053, 115th Congress, 1st Session, June 26, 2017. https://www.congress.gov/115/bills/hr3053/BILLS-115hr3053rh.pdf.

[17] Schwab, Patrick "DOE's Atlas Railcar Design Project," https://curie.ornl.gov/system/files/documents/1323/Schwab%20Spent%20Fuel%20Railcar%2013Jan2017%20rev2.pdf .

estimate of 8 to 10 years or DOE's estimate of 7 to 12 years from authorization to repository operation, a 2028 DOE Start Date is a reasonable assumption.

Regarding the date by which SNF and GTCC waste will be removed from the SONGS site, SCE has assumed 2034 and 2049 for SONGS 1 and SONGS 2&3, respectively. These dates result from the assumption that once DOE begins performance, they will accept the material for storage or disposal at a rate ramping up to 3,000 metric tonnes uranium ("MTUs") per year (across the commercial nuclear industry). It is my opinion that this rate of acceptance is reasonably achievable, and I therefore concur with the SCE-assumed all SNF and GTCC waste off site dates.

2. Site End-State Condition Requirements

SONGS resides on government-owned land leased to SCE and SDG&E by the Navy. The current easement allows the Navy to require all improvements to the property (including all subsurface structures) to be removed and the site restored before the lease may be terminated. While there has been speculation that the Navy would not require removal of all subsurface structures before the land is returned, there has been no change to the lease agreement between the parties – and SCE and SDG&E retain the liability to remove all improvements below grade and restore the site to the satisfaction of the federal government. The estimated costs for doing so have been properly captured by the DCEs.

SCE and SDG&E also maintain a lease with the CSLC, which provides an easement for SONGS cooling water intake and discharge conduits extending into the Pacific Ocean. The current lease agreement with the CSLC has allowed these structures to remain in place for SONGS 1 (although the vertical portions of the intake and discharge conduits that protrude above the seabed have been removed and the resulting openings blocked to prevent the intrusion of large mammals). Upon termination of the lease, SCE and SDG&E will be required to enter

into a lease termination agreement that will include a requirement to provide sufficient financial assurance to fund removal of all or part of the remaining conduits to the extent that they become a public safety hazard at any time in the future. There is no change in the lease agreement for SONGS 2&3.

Although the CSLC has allowed the SONGS 1 intake and discharge conduit to remain in place for the time being, the current lease agreement does not release SCE and SDG&E from the liability of removing these structures at some time in the future. The costs for removing the balance of the SONGS 1 intake and discharge conduits, and the costs for removing all SONGS 2&3 intake and discharge conduits have been properly included in the DCEs.

a. Availability of LLRW and Municipal Landfill Disposal Facilities

Decommissioning nuclear power plants generates large volumes of LLRW and clean demolition debris. Additionally, relatively small volumes of hazardous waste may be generated. LLRW and hazardous waste disposal facilities at Envirocare of Utah and WCS remain available for SONGS material. Based upon current State of California requirements, unless otherwise deemed to be acceptable for onsite backfill, all clean demolition debris must be disposed of out of state. The DCEs assume that Class III landfill facilities out of state will be available for the clean demolition debris and have estimated this cost based upon an Arizona facility disposal rates. The costs for dispositioning these waste streams are properly reflected in the SONGS 1 and SONGS 2&3 DCEs.

b. Site Security and Emergency Response Requirements

SNF residing in the SONGS 2&3 spent fuel pools is being placed into dry cask storage at an onsite ISFSI, which has been constructed for that purpose. Once that milestone has been reached, the NRC typically allows licensees to reduce the number of security personnel required

(since SNF will now be located only at the ISFSI and no longer at both the ISFSI and the spent fuel pools). The SONGS DCEs properly reflect the reduction in onsite security staffing.

NRC typically allows licensees to reduce offsite emergency response requirements after SNF has been discharged from the reactor core for more than approximately 14-18 months. By that time there are no credible events that could result in a radiation dose to any member of the public exceeding 1 Rem. Since no credible radiological events would result in an offsite dose to the public exceeding 1 Rem, no radiological offsite emergency response capability is required by the Environmental Protection Agency.

The SONGS SNF is well beyond this milestone. However, SCE has agreed to continue certain funding for local jurisdictions for offsite radiological emergency preparedness, including planning, response and recovery activities until such time all SNF has been removed from the site.

These changes in security and emergency response have a marked impact upon the operations and maintenance costs for the site throughout the balance of the decommissioning project, and the long-term storage of SNF and GTCC waste until accepted by DOE for storage or disposal. The changes in security staffing and emergency response, and the estimated costs associated with them are properly reflected in the 2017 SONGS 1 and 2017 SONGS 2&3 DCEs.

V. ESTIMATE OF 2017 SONGS 1 DCE (S. GARCIA)

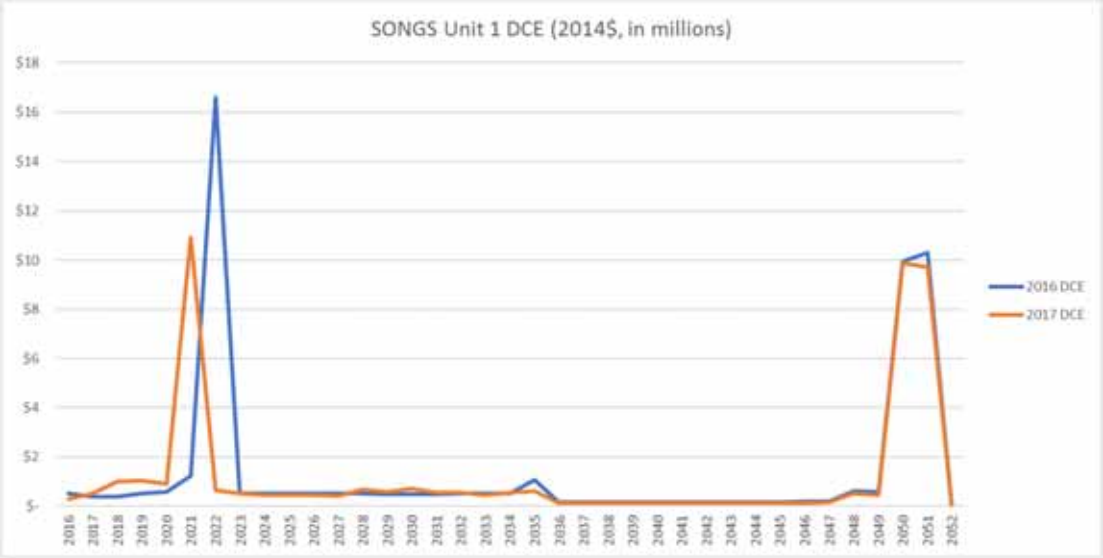
The 2017 SONGS 1 DCE estimates that the total cost to complete the remaining decommissioning of SONGS 1 will be $209.0 million (100% share, 2014$).[18] The 2016 SONGS 1 DCE was $239.4 million (100% share, 2014$) for the time period 2016-2051 and $237.1

[18] The 2017 SONGS 1 DCE includes estimated costs of $207.1 million (100% share, 2014$) to be incurred after January 1, 2018, plus $1.9 million (100% share, 2014$) in recorded costs during 2016-2017, totaling $209.0 million (100% share, 2014$). Ex. SCE-02 at 1.

million (100% share, 2014$) for the time period 2018-2051. The 2017 SONGS 1 DCE has decreased $28.1 million (100% share, 2014$) for the time period 2018-2051.[19]

The change in cash flows for SDG&E's share, including SDG&E only costs, between the previous 2016 DCE and the current 2017 DCE is shown below in Chart 1.

Chart 1
2016 SONGS 1 DCE and 2017 SONGS 1 DCE Cash Flow Comparison
SDG&E Share, 2014$ in Millions



As discussed in SCE witness Mr. Perez's testimony, the decrease between the 2016 SONG 1 DCE and the 2017 SONGS 1 DCE is primarily due to a decrease in the estimate for SONGS 1 reactor vessel package disposal. This decrease is offset by newly identified scope for ISFSI Aging Management, GTCC Canister Licensing, GTCC Disposal and ISFSI CDP Settlement which were not included in the 2016 SONGS 1 DCE.[20] Below in Table 1 is a comparison of the 2017 SONGS 1 DCE[21] to the 2016 SONGS 1 DCE.

[19] Ex. SCE-02 at 1.

[20] Ex. SCE-02 at 7.

[21] The Kenrich Group, LLC 2017 SONGS 1 DCE dated March 5, 2018, provided as Appendix B to Ex. SCE-02 to the Application.

Table 1
2017 SONGS 1 DCE
100% Share, 2014$ in Millions

Line No.	Description	2017 DCE Total (2014$)	2016 DCE Total (2014$)	Variance (2014$)
1	**Distributed Projects**			
2	Transportation and Disposal of Reactor Vessel	$50.2	$83.7	($33.5)
3	Substructure Removal & Final Site Restoration	$34.4	$43.5	($9.1)
4	Offshore Conduit Removal	$34.0	$35.6	($1.6)
5	License Termination During Final Site Restoration	$6.9	$7.2	($0.3)
6	ISFSI Demolition	$3.3	$3.7	($0.4)
7	Other Projects	$12.6	$4.6	($8.0)
8	**Distributed Subtotal**	**$141.4**	**$178.3**	**($36.9)**
9				
10	**Undistributed Activities**			
11	Service Level Agreements/A&G	$9.0	$0.0	$9.0
12	Non-Labor	$30.6	$27.0	$3.6
13	Labor-Staffing	$18.4	$21.7	($3.3)
14	DGC Staffing	$9.6	$10.1	(0.5)
15	**Undistributed Subtotal**	**$67.6**	**$58.8**	**$8.8**
16				
17	**Total**	**$209.0**	**$237.1**	**($28.1)**

A. DISTRIBUTED PROJECTS (C. LADD)

The 2017 SONGS 1 DCE estimates remaining costs on distributed projects to be $141.4 million (100% share, 2014$). The major projects are described below.

1. Transportation and Disposal of Reactor Vessel

The project is for transportation and disposal of the SONGS 1 reactor pressure vessel ("RPV") that was removed during the initial phase of SONGS 1 decommissioning. The SONGS 1 RPV is currently packaged and stored adjacent to the ISFSI pad in the North Industrial Area ("NIA") at SONGS. The fixed price contract negotiated between SCE and SDS includes

provisions for characterization, repackaging and removal of the SONGS 1 RPV. The DCE estimate for the RPV disposal is based on a specific contract milestone for completion of this scope of work. This estimate also includes a disposal fee based on the known volume of Class B and C waste and the associated cost per cubic foot. Also included is the transportation cost and the applicable pass through taxes.

The 2017 SONGS 1 DCE estimate for this project is $50.2 million (100% share, 2014$) and is based on the SDS negotiated contract. The 2016 SONGS 1 DCE estimate was $83.7 million (100% share, 2014$). The decrease in the estimate is primarily due to having a negotiated contract now in place for this scope of work. SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 1 DCE amount to be reasonable and appropriate.

2. Substructure Removal & Final Site Restoration

This work will be done for SONGS 1 in Period 7 in conjunction with ISFSI removal. In 2050, the physical work to remove the substructures will begin. The structures that remain in 2050 will need to be removed as required by the Navy and include the containment foundation, circulating water structures, sewage treatment plant, as well as the slurry backfill. The NIA seawall will also be removed during this period. Finally, the site will be graded and re-vegetated.

The 2017 SONGS 1 DCE forecast for substructure removal and final site restoration is $34.4 million (100% share, 2014$). The previous DCE had a value of $43.5 million (100% share, 2014$). The decrease is due to lower unit cost factors from the updated High Bridge[22]

[22] High Bridge Associates is an engineering company that provides project management and project controls staffing for medium to large sized construction projects. They have expertise in the field of project cost estimation.

estimate (to be consistent with SONGS 2&3 DCE). The lower unit cost factors include lower assumed disposal rates for non-radiological decommissioning waste in the 2017 DCE than in the 2014 DCE. SDG&E reviewed the supporting documentation for the forecast and considers the DCE amount to be reasonable and appropriate.

3. Offshore Conduit Removal

The scope of work of this project is to remove the SONGS 1 offshore conduits. The CSLC has allowed the conduits to remain in place provided that the SONGS 1 Participants retain the liability to remove them should the CSLC determine that removal is required at some future date. Until such time that a final decision is made to eliminate liability from the Participants for conduit removal, it is appropriate to include costs for full removal in the DCE.

The 2017 SONGS 1 DCE amount is $34.0 million (100% share, 2014$). The 2016 SONGS 1 DCE estimate was $35.6 million (100% share, 2014$). This decrease from the 2016 SONGS 1 DCE amount is due to removal of the 5% Administrative and General ("A&G") overhead loader[23] from this line item in the 2017 SONGS 1 DCE. SDG&E reviewed the supporting documentation for the forecast and considers the DCE amount to be reasonable and appropriate.

4. License Termination During Final Site Restoration

Upon removal of all SONGS 1 fuel and GTCC waste, SONGS 1 will apply for final license termination from the NRC. SCE will prepare the License Termination Plan, which will be submitted to the NRC for approval. In addition, final status surveys will be performed and

[23] In the 2017 SONGS 1 DCE the A&G overhead loader is no longer included in specific line items in the DCE but is instead included as a separate DCE category called "Service Level Agreements/A&G."

reviewed by Oak Ridge Institute for Science and Education and the NRC for approval by December 2051.

The 2017 SONGS 1 DCE amount is currently $6.9 million (100% share, 2014$). The 2016 SONGS 1 DCE estimate was $7.2 million (100% share, 2014$). This decrease from the 2016 SONGS 1 DCE amount is due to removal of the 5% A&G overhead loader from this line item in the 2017 SONGS 1 DCE. SDG&E reviewed the supporting documentation for the forecast and considers the DCE amount to be reasonable and appropriate.

5. Independent Spent Fuel Storage Installation Demolition

SCE will demolish and remove the ISFSI and perform a final status survey of the ISFSI after the removal of all spent fuel and GTCC waste by the Department of Energy ("DOE"). There are three ISFSI pads; pads 1 and 2 are the Areva Trans Nuclear ("TN") horizontal storage system and pad 3 is the Holtec vertical UMAX system. The costs covered in this project are to decontaminate and demolish the two Areva TN ISFSI pads. The costs are prorated between SONGS 1, 2, and 3 based on the portion of each unit's spent fuel stored in the Areva TN ISFSI system.

The 2017 SONGS 1 DCE total estimate at completion for ISFSI demolition is $3.3 million (100% share, 2014$). The 2016 SONGS 1 DCE had a value $3.7 million (100% share, 2014$). The decrease is primarily due to removal of the 5% A&G overhead loader and lower non-radiological waste disposal rates. SDG&E reviewed the supporting documentation for the forecast and considers the DCE amount to be reasonable and appropriate.

6. Other Distributed Projects

SCE needs to perform other projects to comply with federal and state regulations and the terms of SCE's real estate authorizations with the Navy. These other projects are discussed in more detail below.

The 2017 SONGS 1 DCE value for all Other Distributed Projects is $12.6 million (100% share, 2014$). The 2016 SONGS 1 DCE value for all of these projects was $4.6 million (100% share, 2014$). The increase in amount is primarily due to the addition of distributed projects to the 2017 SONGS 1 DCE that were not included in the previous estimate.

Independent Spent Fuel Storage Installation Aging Management

The Aging Management project was established to develop inspection and maintenance programs for the dry storage systems to confirm the continuing integrity of dry cask storage canisters. This cost is specific to the Areva TN advanced horizontal storage module ("AHSM") system. Initial cask testing, inspection equipment and licensing costs for dry cask NRC Certificate of Compliance renewals, and Safety Analysis Report updates are included in the scope. Annual maintenance and inspections of the AHSMs are included in the undistributed non-labor Aging Management category. The Aging Management costs are allocated to SONGS 1 based on the proportion of SONGS 1 fuel assemblies stored in the Areva ISFSI system. The 2017 SONGS 1 DCE forecast for ISFSI Aging Management is $6.8 million (100% share, 2014$). The 2016 SONGS 1 DCE did not include this project. This cost element is the largest part of the cost increase for Other Distributed Projects.

Greater Than Class C Waste Disposal

There are no disposal facilities licensed to accept GTCC waste in operation in the United States. The Radioactive Waste Policy Amendments Act specifies that the federal government is responsible for the disposal of GTCC low-level radioactive waste.

For purposes of the 2017 SONGS 1 DCE, the cost of shipping and disposing of a GTCC canister was assumed to equal the cost associated with a canister of SONGS 1 spent fuel. The one-mill fee per kilowatt-hour of generation under the Standard Contract was used to estimate this cost. The 2017 SONGS 1 DCE forecast for GTCC Waste Disposal is $2.0 million (100%

share, 2014$). The 2016 SONGS 1 DCE cost was $4.3 million (100% share, 2014$). The estimate decreased due to using a calculation methodology for disposal cost based on $1 per megawatt–hour for each fuel assembly.

SDG&E reviewed the supporting documentation for the other projects and considers the DCE forecast amount to be reasonable and appropriate.

GTCC Licensing

SCE must obtain the necessary license in order to transport the existing Areva canister containing SONGS 1 GTCC waste that is currently on the ISFSI. The 2017 SONGS 1 DCE estimate for GTCC Licensing is $2.4 million (100% share, 2014$). The estimate covers the cost to prepare the license submission and costs for NRC review and support. The 2016 SONGS 1 DCE did not include this project.

DCE Update

As part of the NDCTP, SCE is required to submit an updated DCE every three years for approval by the CPUC. The 2017 SONGS 1 DCE forecast for DCE update is $0.7 million (100% share, 2014$). The 2016 SONGS 1 DCE estimate was $0.5 million (100% share, 2014$). The estimate is based on an average cost per DCE update of $69,000 and 10 remaining DCE updates.

ISFSI Coastal Development Permit ("CDP") Settlement

In August 2017, SCE reached a settlement agreement with parties opposed to the storage of spent fuel at SONGS. As part of that settlement, the SONGS Participants agreed to incur up to $4 million on commercially reasonable efforts to identify an alternative location for SONGS spent fuel storage. The 2017 SONGS 1 DCE cost for ISFSI CDP Settlement is $0.4 million (100% share, 2014$). The 2016 SONGS 1 DCE did not include this project.

Removal of ISFSI Interferences

In 2016, Holtec removed a portion of the Unit 1 containment foundation and grout for purposes of expanding the ISFSI. The waste associated with this work is still on site and will need to be removed and disposed of. The 2017 SONGS 1 DCE cost for removal of ISFSI interferences is $0.3 million (100% share, 2014$). The 2016 SONGS 1 DCE did not include this project.

SDG&E reviewed the supporting documentation for the forecasts of these Other Distributed Projects and considers the 2017 SONGS 1 DCE amount to be reasonable and appropriate.

B. Undistributed Activities (S. Garcia)

The 2017 SONGS 1 DCE estimates remaining undistributed activities to be $67.6 million (100% share, 2014$). The undistributed activities major categories are described below.

1. Service Level Agreements/Administrative & General Expenses

The 2017 SONGS 1 DCE applies the 5% A&G overhead loader to all remaining decommissioning costs to account for SCE's A&G expenses supporting the SONGS decommissioning project. This is consistent with the 2016 SONGS 1 DCE except that in that DCE the 5% overhead loader was included in each DCE line item and now in the current DCE it is included as a separate DCE category.

The 2017 SONGS 1 DCE estimate for A&G expenses is $9.0 million (100% share, 2014$). SDG&E reviewed the supporting documentation for the forecast of the Service Level Agreements/A&G expenses and considers the 2017 SONGS 1 DCE amount to be reasonable and appropriate.

2. Non-Labor

Non-labor costs include a wide range of decommissioning activities and obligations including the following:

Aging Management – The Aging Management program covers the Areva dry storage systems. This represents only the undistributed portion of the program which includes annual facility maintenance and inspection as well as in-service canister inspections every five years.

Association Fees and Expenses – This category of costs includes Nuclear Energy Institute membership fees.

Contracted Services – Contracted services generally consists of shorter-term supplemental resources, specialty contractors and consultants, third-party services, materials, equipment, and supplies. In addition, SONGS 1 seawall maintenance is included in this category.

Dry Active Waste Disposal – Dry active waste includes contaminated clothes, tools and personal protective equipment (e.g., masks, face shields, gloves).

DGC Health Physics Supplies – During substructure removal and ISFSI demolition, a DGC will require health physics supplies, such as personal radiological monitoring and protection equipment.

Emergency Preparedness Fees – SCE provides funding to local jurisdictional authorities for their radiological emergency preparedness and will continue to do so until all spent fuel has been removed from SONGS.

Energy – SCE purchases electrical energy to power the SONGS site.

Ground Water Monitoring – SCE is required to periodically sample, analyze, and monitor the ground water beneath the SONGS site.

Information Technology – SCE will incur software and network license costs, pay network service providers, and provide internal technical support to site personnel at levels commensurate with site staffing until decommissioning is completed.

Insurance – NRC regulations require SCE to maintain minimum levels of nuclear liability and property insurance until the spent fuel is removed from the SONGS site. SCE also maintains general liability insurance and excess workers' compensation insurance.

Loading Spent Fuel & GTCC Waste to DOE – Under the DOE Standard Contract, SCE is responsible for the cost to transfer spent fuel canisters from the ISFSI and loading them into DOE shipping containers onsite, and then onto the DOE's transportation device.

NRC Fees – As holder of the NRC licenses for SONGS, SCE will be required to pay 10 C.F.R. Part 171 annual license fees and 10 C.F.R. Part 170 inspection fees until the NRC licenses are terminated.

Security Related Expenses – As long as spent fuel remains onsite, the SONGS security force will continue to require uniforms, weapons, ammunition, other supplies and equipment, as well as background investigations, training, and vendor support.

Site Lease and Easement Expenses – SCE is required to make annual easement and lease payments to CSLC for the SONGS 1 offshore conduits.

Water – SCE is required to purchase potable and service water for the SONGS Site.

Utility Staff Health Physics Supplies – After SDS completes the major D&D work, SCE will re-assume responsibility for providing health physics supplies as required to support the ISFSI-only staff.

The estimated costs for all other non-labor are shown in Table 2 below:

Table 2
Undistributed Non-Labor Cost Estimates
2017 SONGS 1 DCE
100% Share, 2014$ in Millions

Line No.	Description	2017 DCE Total (2014$)	2016 DCE Total (2014$)	Variance (2014$)
1	**Undistributed Non-Labor**			
2	Aging Management	$1.1	$0.0	$1.1
3	Association Fees and Expenses	$0.1	$0.0	$0.1
4	Contracted Services	$5.3	$0.5	$4.8
5	DAW Disposal	$0.0	$0.0	$0.0
6	DGC HP Supplies	$0.0	$0.0	$0.0
7	Emergency Preparedness Fees	$2.2	$0.0	$2.2
8	Energy	$0.4	$0.3	$0.1
9	Ground Water Monitoring	$0.5	$7.6	($7.1)
10	Information Technology	$0.2	$0.0	$0.2
11	Insurance	$3.0	$5.8	($2.8)
12	Loading Spent Fuel & GTCC Waste to DOE	$4.7	$0.0	$4.7
13	NRC Fees	$11.1	$11.1	$0.0
14	Security Related Expenses	$0.4	$0.8	($0.4)
15	Site Lease and Easement Expenses	$1.3	$0.1	$1.2
16	Water	$0.3	$0.2	$0.1
17	Utility Staff HP Supplies	$0.0	$0.3	($0.3)
18	Spent Fuel Maintenance	$0.0	$0.3	($0.3)
19	Craft Worker Training	$0.0	$0.0	$0.0
20				
21	**Total**	**$30.6**	**$27.0**	**$3.6**

The 2017 SONGS 1 DCE estimate for Non-Labor is $30.6 million (100% share, 2014$). The 2016 SONGS 1 DCE for Non-Labor was $27.0 million (100% share, 2014$). The increase of $3.6 million between the 2016 SONGS 1 DCE and SONGS 1 2017 DCE is primarily due to increases in contracted services and load spent fuel and GTCC waste to DOE costs offset by a reduction in ground water monitoring.

SDG&E reviewed the supporting documentation for the forecasts for and considers the 2017 SONGS 1 DCE amount to be reasonable and appropriate.

3. Labor-Staffing

The undistributed labor category generally includes the required staffing to provide the oversight, management and other activities necessary to support the decommissioning project and the security force over the spent fuel. This Labor-Staffing category also includes the short-term incentive compensation costs. The estimate is based on the estimate prepared for the SONGS 2&3 DCE with ten percent of the costs being allocated to SONGS 1 during certain time periods. From third quarter 2019 through 2034, 10% of the labor costs for plant management and security force is allocated to SONGS 1. During 2029-2034, 10% of the labor costs for site management and administration is allocated to SONGS 1. During the ISFSI Demolition and Final Site Restoration period (2050-2051), 10% of site management and administration, plant management, decommissioning oversight and security force.

The 2017 SONGS 1 DCE forecast for Labor-Staffing is $18.4 million (100% share, 2014$). The 2016 SONGS 1 DCE estimate was $21.7 million (100% share, 2014$). The estimate decreased because of a change in contingency rate from 25% to 10%, the removal of A&G overhead loader from this cost category and a decrease in security force. This change in contingency rate is appropriate because a more detailed labor staffing estimate was prepared by Kenrich with SONGS executive managers. SDG&E reviewed the supporting documentation for the Labor-Staffing forecast and considers the DCE forecast amount to be reasonable and appropriate.

4. DGC Staffing

The DGC staffing undistributed labor category generally includes the undistributed staffing portion for the contractor that will do the Civil Works Project (2046 -2049) and ISFSI

Demolition (2050-2051). The estimate developed during the 2016 SONGS 1 DCE is being used for the 2017 SONGS 1 DCE. The contingency rate applied to this estimate is 25%, which is a reasonable rate for this high-level estimate that will occur in the future.

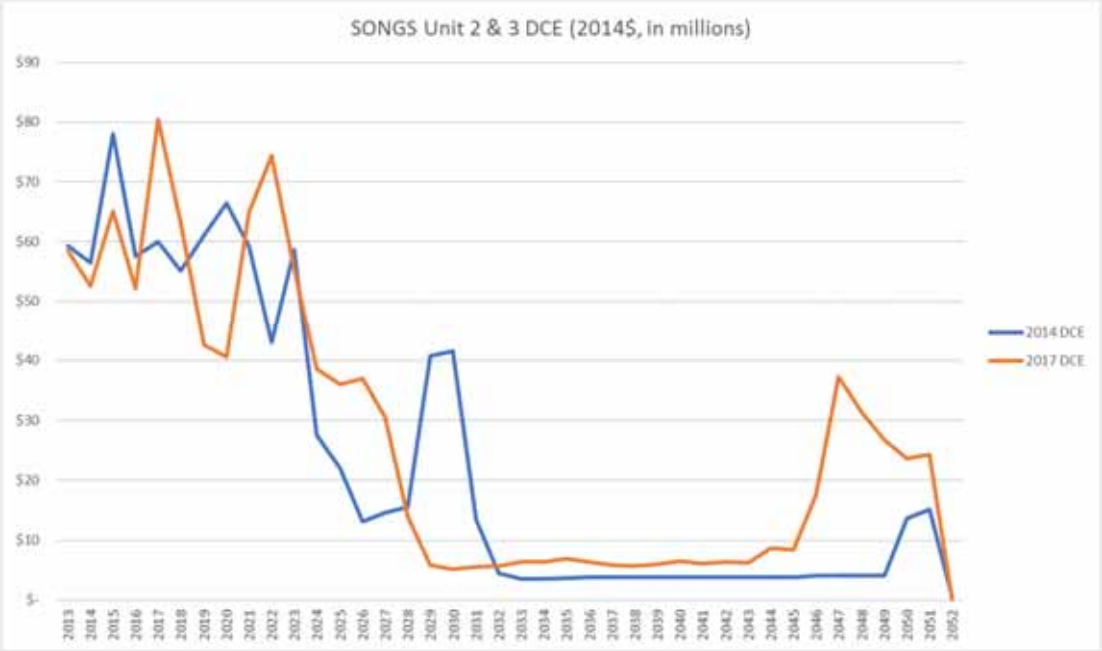
The 2017 SONGS 1 DCE forecast for DGC Staffing is $9.6 million (100% share, 2014$). The 2016 SONGS 1 DCE cost was $10.1 million (100% share, 2014$). The estimate decreased because the removal of the 5% A&G overhead loader from this cost category. SDG&E reviewed the supporting documentation for the DGC Staffing forecast and considers the DCE forecast amount to be reasonable and appropriate.

VI. ESTIMATE OF 2017 SONGS 2&3 DCE (S. GARCIA)

The 2017 SONGS 2&3 DCE includes the total estimated project cost including recorded costs through September 2017 and estimated cost to 2051. The 2017 SONGS 2&3 DCE estimates that the total cost to decommission SONGS 2&3 will be $4,478 million (100% share, 2014$). The 2014 SONGS 2&3 DCE was $4,411 million (100% share, 2014$).

The change in cash flows for SDG&E's share, including SDG&E only costs, between the 2014 SONGS 2&3 DCE and the 2017 SONGS 2&3 DCE is shown below in Chart 2.

Chart 2
2014 SONGS 2&3 DCE and 2017 SONGS 2&3 DCE Cash Flow Comparison
SDG&E Share, 2014$ in Millions



The 2017 SONGS 2&3 DCE has increased $68 million (100% share, 2014$), an increase of approximately 1.5% over the 2014 SONGS 2&3.[24] Below in Table 3 is a comparison of the 2017 SONGS 2&3 DCE[25] to the 2016 SONGS 2&3 DCE.

[24] Ex. SCE-03C at 1.

[25] The Kenrich Group, LLC 2017 SONGS 2&3 DCE, dated January 26, 2018 (revised March 8, 2018), provided as Appendix B to Ex. SCE-03 to the Application.

Table 3
2017 SONGS 2&3 DCE
100% Share, 2014$ in Millions

Line No.	Description	2017 DCE Total (2014$)	2014 DCE Total (2014$)	Variance (2014$)
1	**Distributed Projects**			
2	ISFSI & Fuel Transfer Operations	$270.2	$405.1	($134.9)
3	Final Site Restoration	$6.9	$57.5	($50.5)
4	ISFSI Aging Management	$36.5	$0.0	$36.5
5	Decontamination, Demolition & Disposal	[redacted]	$1,208.2	[redacted]
6	Substructure Removal	$273.0	$303.8	($30.7)
7	Other Distributed Projects	$99.6	$72.9	$26.7
8	GTCC Waste Storage	$26.6	$0.0	$26.6
9	Plant Easement/Lease Renewals	$27.1	$1.4	$25.6
10	Offshore Conduit Removal	$91.6	$96.0	($4.4)
11	ISFSI Demolition	$19.2	$21.1	$1.9
12	Completed Projects	$123.3	$98.1	$25.3
13	**Distributed Subtotal**	[redacted]	**$2,264.0**	[redacted]
14				
15	**Undistributed Activities**			
16	Contracted Services	$225.2	$34.6	$190.6
17	Service Level Agreements	$168.2	$0.0	$168.2
18	DGC Staffing	[redacted]	$423.6	[redacted]
19	Labor Staffing	$986.2	$1,029.4	($43.2)
20	All Other Non-Labor	$623.6	659.6	($36.0)
21	**Undistributed Subtotal**	[redacted]	**$2,147.2**	[redacted]
22				
23	**Total**	**$4,478.6**	**$4,411.2**	**$67.4**

A. Distributed Projects (C. Ladd)

The major distributed projects included in the 2017 SONGS 2&3 DCE are described below.

1. Independent Spent Fuel Storage Installation and Fuel Transfer Operations ("FTO")

The ISFSI and FTO projects facilitate the storage of spent nuclear fuel on site until such time that the Department of Energy takes custody of the spent nuclear fuel and greater than GTCC waste. By transferring spent nuclear fuel to the ISFSI, the spent fuel pools and their associated cooling systems can be drained and demolished.

The ISFSI pad was completed in October of 2017 and the security building was completed in January of 2018. FTO commenced in January of 2018 and are on track to complete by June 2019. SDG&E representatives have been monitoring this work by attending status and schedule meetings and through direct observations of work performed in the field.

The 2017 SONGS 2&3 DCE amount is currently $270.2 million (100% share, 2014$). This is lower than the 2014 SONGS 2&3 DCE amount of $405.1 million (100% share, 2014$). The decrease is the result of a contract in place with Holtec International for the UMAX vertical storage system. Following a competitive bidding process, SCE awarded a contract to Holtec International to license, design, and construct an expanded on-site ISFSI; and to supply, load, and transfer the multipurpose canisters containing fuel assemblies, from the SONGS 2&3 spent fuel pools to the expanded ISFSI. SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

2. Final Site Restoration

Final site restoration scope of work includes the removal of the gunite slope protection, remaining railroad tracks, access roads and parking lots. It is expected that the final site end state is determined by the Navy through the National Environmental Policy Act ("NEPA") process will require grading and re-vegetation of the SONGS site.

The 2017 SONGS 2&3 DCE amount for final site restoration is $6.9 million (100% share, 2014$). The 2014 SONGS 2&3 DCE had a value of $57.5 million (100% share, 2014$). The original plan in the previous DCE made use of two different dewatering evolutions, one for the ISFSI and SONGS 1 remnants and one for the SONGS 2 & 3 demolition work. The revised plan will now employ a single dewatering evolution that will be performed near the end of the decommissioning schedule. This has resulted in reduced cost. SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

3. ISFSI Aging Management

The Aging Management project was established to develop inspection and maintenance programs for the Areva and Holtec spent fuel dry storage systems. This included initial cask testing, inspection equipment and licensing costs for dry cask NRC Certificate of Compliance renewals and Safety Analysis Reports updates.

The 2017 SONGS 2&3 DCE amount is $36.5 million (100% share, 2014$). The 2014 SONGS 2&3 DCE did not include a specific line item for ISFSI Aging Management. However, this activity is required in order to renew and maintain NRC Certificates of Compliance. SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

4. Decontamination, Demolition, and Disposal to Achieve Partial Site Release

The scope of work is to remove all SONGS 2&3 structures systems and components to three feet below grade so the property can be released for unrestricted use. The major components of this work are the characterizing, packaging, transporting and disposal of waste created by decontaminating and demolishing the facility.

The 2017 SONGS 2&3 DCE estimate on Table 3 line 5 is based on the contract for the DGC with SDS. In the 2014 SONGS 2&3 DCE, the estimated cost for Decontamination, Demolition, & Disposal activities was $1,208.2 million (100% share, 2014$). The primary reason for the increased cost is the addition of activities expected to be performed that are currently outside the scope of the SDS contract.

The DGC contract has three cost elements. The fixed price portion assigns costs for known identified scope. This includes removal of large components, demolition of building and disposal of waste. The contract contains a very detailed scope description. The second cost element is for pass-through costs. This is a known scope and includes such things as taxes, tolls and waste disposal fees. The third element of cost is for change orders that may occur if there is new scope identified or different conditions discovered during demolition. There is an approved change order process detailed in the DGC contract.

The work is performed in two phases. Phase 1 is transition and site mobilization.

Phase 2 is decontamination, dismantlement, demolition and waste disposal activities that will allow partial site release to reduce the SONGS Part 50 footprint to the ISFSI area only.

The DCE assumes that the California Environmental Quality Act ("CEQA") review process completed by the CSLC will conclude with the issuance of an Environmental Impact Report that will be utilized by the CCC in connection with its issuance of a CDP in the last quarter of 2018. The CDP will allow physical decommissioning work to commence at SONGS. Accordingly, SDS is expected to begin Phase II work in January 2019. SDS's Phase II work is estimated to be completed by December 2028, following the submission of Final Site Survey to the NRC and the approval of a partial site release, reducing the SONGS 2&3 NRC Part 50 license footprint to the ISFSI area only. Following the decontamination and demolition work, the

SONGS plant site will be backfilled to current grade levels. Clean material available on the SONGS plant site could be acceptable for purposes of backfill at the site; any additional required backfill material would then be imported from offsite.

SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

5. Substructure Removal to 3 Feet Below Grade

The substructure removal work will include the activities necessary to achieve the final "end state" requirements determined by the Navy. Substructure removal activities include removing substructure systems and components, backfilling excavations with approved material and leveling the SONGS site, characterizing, packaging, transporting, processing, and disposing of SONGS waste and removing the existing seawall and intake and outfall box culvert.

The 2017 SONGS 2&3 DCE estimate for substructure removal is $273.0 million (100% share, 2014$). The 2014 SONGS 2&3 DCE had a value $303.8 million (100% share, 2014$). The decrease is the result of lower assumed disposal rates for non-radiological decommissioning waste.

SCE will seek a Navy determination of the substructure removal requirements. The Navy is expected to make its determination after completing a NEPA process and to include the requirements within a new or amended real estate authorization. This will define the final site release criteria for turnover of the SONGS property back to the Navy.

The cost estimate for substructure removal, developed by High Bridge Associates, reflects the costs to install sheet piling and shoring, install dewatering and effluent treatment systems, and demolish and backfill all buildings and structures 3 feet below grade (elev. 27') and lower. The estimate includes the cost to remove dewatering and effluent treatment systems after dewatering. Labor and equipment cost estimates were based on unit rates and material

quantities. For purposes of the 2017 SONGS 2&3 DCE, it is assumed that all SONGS 2&3 substructures will be removed during 2046-2049 (Period 6) (excluding the ISFSI which will be removed in a subsequent period).

SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

6. Other Distributed Projects

SCE needs to perform other projects to comply with federal and state regulations and the terms of SCE's real estate authorizations with the Navy. These other projects are discussed in more detail below.

The 2017 SONGS 2&3 DCE value for Other Distributed Projects is $99.6 million (100% share, 2014$). The 2016 SONGS 2&3 DCE value was $72.9 million (100% share, 2014$). The Other Distributed Projects cost category includes many activities that were either not included in the 2014 SONGS 2&3 DCE or for which the work scopes were determined to have changed substantially between the 2014 SONGS 2&3DCE and the 2017 SONGS 2&3DCE. The 2017 SONGS 2&3 DCE is higher due to many of the projects not being included in the 2014 SONGS 2&3 DCE and increased costs for other projects. The 2017 SONGS 2&3 DCE estimate is provided below for each project.

Cyber Security Modifications - NRC regulations require a Cyber Security Plan at SONGS to ensure certain digital assets, such as computer and communication systems and networks, are secure and protected. The NRC granted approval for a license amendment to remove the cyber security license condition. This allowed waiving the requirement to complete implementation the final cyber security milestone. The 2017 SONGS 2&3 DCE amount is $9.4 million (100% share, 2014$).

GTCC Disposal - Presently, a disposal facility licensed to accept GTCC waste does not exist in the United States. Courts have determined that the DOE is obligated to accept and dispose of GTCC waste; however, issues regarding costs remain unsettled. For purposes of the 2017 SONGS 2&3 DCE, the cost of shipping and disposing of a GTCC waste canister was assumed to equal the cost associated with a canister of SONGS spent fuel. The one-mill fee per kilowatt-hour of generation under the Standard Contract was used to estimate this cost. The 2017 SONGS 2&3 DCE amount is $40.7 million (100% share, 2014$).

CEQA Permitting - Under CEQA, the CSLC, as lead agency, is required to evaluate the SONGS decommissioning project and prepare an Environmental Impact Report ("EIR") in response to SCE's application to modify and extend the existing CSLC lease regarding the offshore conduits. Following the receipt of the CDP, the physical decommissioning of the plant can proceed. The 2017 SONGS 2&3 DCE amount is $7.9 million (100% share, 2014$).

Mesa Site Turnover - SCE's Mesa site consists of five parcels leased from the Navy. SCE currently estimates that Parcels 5, 6, and 7 will be returned to the Navy in 2021, and Parcels 8 & 9 will be retained until the end of decommissioning. As part of the process to return the parcels to the Navy, SCE must first remediate any contamination. The estimated cost associated with the project is based on currently anticipated remediation requirements. The 2017 SONGS 2&3 DCE amount is $20.3 million (100% share, 2014$).

Substructure Removal Contractor Procurement - In 2044, SCE will begin efforts to procure a contractor for the removal of SONGS substructures and placement of permanent backfill. The 2017 SONGS 2&3 DCE therefore includes costs to cover a competitive bidding process, including the development of a Request for Proposal, proposal evaluation, and contract award. For purposes of this DCE, the effort was assumed to be approximately one-half the

expended cost to procure a DGC for the major decontamination and demolition work. SDG&E considers this to be a reasonable estimate for this future activity and acknowledges that it can be updated as better information to estimate is available. The 2017 SONGS 2&3 DCE amount is $7.0 million (100% share, 2014$).

Coastal Development Permit Extension - SCE holds a CDP for the storage of SONGS 2&3 spent fuel in the Areva ISFSI system until November 2022, and a separate CDP to store SONGS 2&3 spent fuel in the Holtec ISFSI system until 2035. SCE will need to obtain CDP extensions from the CCC for the Areva and Holtec ISFSI systems prior to the expiration of the permits. The 2017 SONGS 2&3 DCE amount is $5.3 million (100% share, 2014$).

ISFSI CDP Settlement - SCE reached a settlement agreement with parties opposed to the storage of spent fuel at SONGS and agreed to incur up to $4 million on commercially reasonable efforts to identify an alternative location for SONGS spent fuel storage. SCE also incurred third-party legal costs to reach the settlement. Given the ongoing analysis and current uncertainty relating to the potential location and requirements of an acceptable alternative spent fuel storage site, the associated costs with moving to an alternative site have not been included in the DCE. The 2017 SONGS 2&3 DCE amount is $4.3 million (100% share, 2014$).

DCE Update - As part of the NDCTP, SCE is required to submit future updated DCEs for approval by the CPUC. The 2017 SONGS 2&3 DCE total estimate for future submissions is $3.7 million (100% share, 2014$).

North Industrial Area Sump Modifications - The NIA sump currently discharges to the SONGS 2&3 dilution water system. The dilution water system will be retired by SDS, and therefore the discharge pathway for the NIA sump will need to be modified. Kenrich utilized the

current budget estimate provided by the SCE Project Manager. The 2017 SONGS 2&3 DCE amount is $1.1 million is (100% share, 2014$).

SDG&E reviewed the supporting documentation for the forecasts of these Other Distributed Projects and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

7. GTCC Waste Storage

SDS is responsible for preparing, characterizing, and packaging the GTCC waste into canisters. Holtec will supply the GTCC canisters and transfer the loaded GTCC waste canisters to the ISFSI pad. The estimated costs are for the purchase and licensing of GTCC canisters, as well as their transfer from the containment buildings to the ISFSI pad. The 2017 SONGS 2&3 DCE amount is $26.6 million (100% share, 2014$). The 2014 SONGS 2&3 DCE did not include any costs for GTCC waste storage because at that time it was assumed that SCE would use the ten Areva canisters originally fabricated for storing and disposing spent fuel from SONGS 2&3 would be used. However, those canisters are not licensed for storing and transporting GTCC waste. Rather than going through the re-licensing process for the Areva canisters, SCE determined that it would be prudent to avoid such schedule uncertainties by obtaining ten new canisters that would already be licensed to store and transport GTCC waste.[26]

SDG&E reviewed the supporting documentation for the forecasts and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

8. Plant Easement/Lease Renewals

The current SONGS Plant Easement with the Navy expires in 2024. SCE will seek an extension (i.e., new real estate authorization) covering the time to complete major

[26] Ex. SCE-03C at 28-29.

decommissioning activities. The Navy must undertake a NEPA environmental review prior to issuing a new real estate authorization. The limited scope NEPA process is expected to be completed prior to the easement expiration in 2024, which will allow SCE to continue using the property until 2035. During the 2030 – 2035 timeframe, SCE intends to negotiate another ten-year renewal with the Navy. In 2040, the Navy is expected to undertake another NEPA review to determine the final site restoration conditions, including the substructure removal requirements prior to beginning the civil works project in 2046.

The 2017 SONGS 2&3 DCE estimate is $27.1 million (100% share, 2014$). The 2014 SONGS 2&3 DCE estimate was $1.4 million (100% share, 2014$). The increase is due to the scope not being fully developed. As explained in SCE's testimony, at the time the 2014 SONGS 2&3 DCE was developed, discussions between SCE and the Navy had not yet progressed to that point that the need for three such updates to the Navy easement and three NEPA reviews was identified.[27] SDG&E reviewed the supporting documentation for the forecasts and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

9. Offshore Conduit Removal

This project is to fully remove the offshore intake and outfall conduits located below the sea floor for SONGS 2&3. There is still some uncertainty in the required end state of the conduits. The required end state will not be known until the Navy completes its NEPA evaluations, currently estimated in 2045. As was the case for the 2014 SONGS 2&3 DCE, uncertainty remains regarding the required scope of the offshore subsea intake and outfall conduits removal.

[27] Ex. SCE-03C at 30.

The 2017 SONGS 2&3 DCE estimate for offshore conduit removal is $91.6 million (100% share, 2014$). The previous estimate from the 2014 SONGS 2&3 DCE was $96.0 million (100% share, 2014$). The decrease occurred because the estimated value in the 2014 DCE included a 5% adder for A&G, whereas the A&G overhead loader is excluded in this line item and included in the Service Level Agreements line item in the 2017 SONGS 2&3 DCE. SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

10. Independent Spent Fuel Storage Facility Demolition

After all the spent nuclear fuel and GTCC waste has been removed by the DOE, SCE will demolish and remove the ISFSI and perform activities necessary for the final restoration of the SONGS site.

The ISFSI demolition estimate is for full removal of ISFSI, which includes ISFSI pads 1, 2 and 3. The 2014 SONGS 2&3 DCE assumed that the ISFSI expansion using the TN system, which uses advanced horizontal storage modules and are used for ISFSI pads 1 and 2. For ISFSI pad 3, SCE decided to use the Holtec International dry fuel storage system using vertical fuel storage in a monolithic block of concrete. ISFSI pads 1 and 2 use the Areva TN system and ISFSI pad 3 uses the Holtec system.

As a result of this design change, Kenrich contracted High Bridge to perform a cost estimate for demolition and disposal of the ISFSI pads. High Bridge had Northwest Demolition and Dismantling assist in the development of the DCE revision. They used detailed material quantity lists, production rates, equipment costs, labor estimates and disposal costs to develop an estimate.

The 2017 SONGS 2&3 DCE estimate for ISFSI demolition is $19.2 million (100% share, 2014$). The 2014 SONGS 2&3 DCE, ISFSI demolition costs were estimated at $21.1 million

(100% share, 2014$). The decrease was due to the new estimate performed by High Bridge resulting in a lower estimate. SDG&E reviewed the supporting documentation for the forecast and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

11. Completed Projects

Following the transition to decommissioning in June 2013, SCE began efforts to prepare the site for decommissioning and obtain necessary approvals of NRC license amendments. During the period from June 7, 2013 to September 30, 2017, SCE began and completed several Distributed Projects. The projects below are the projects already submitted to the Commission for reasonableness review:

Distributed Projects completed and included in 2014 reasonableness review:

- Development of the Certified Fuel Handler Program
- Post-Fukushima Modifications
- ISFSI Pad Study
- Spent Fuel Pool Analyses

Distributed Projects completed and included in 2015 reasonableness review:

- Nuclear Fuel Contracts Cancellations
- Legacy Radioactive Waste Disposal
- Security Programs – Security Shutdown Strategy
- Regulatory Submittals
- Historical Site Assessments and Site Characterization
- Special Purpose Vehicle Feasibility Study

Distributed Projects completed and included in 2018 reasonableness review:

- Spent Fuel Islanding Project
- Selection of Decommissioning General Contractor
- Transition Project Modifications, including the Large Organism Exclusion Device Modification, Records Backlog project, the Simplification and Streamlining project and Special Purpose Vehicle Support.

The Defueled Safety Analysis Report project costs will be submitted for reasonableness review in the 2021 NDCTP.

The actual recorded costs for the above completed projects were incorporated into the 2017 SONGS 2&3 DCE. The total recorded cost for completed projects is $123.3 million (100% share, 2014$). Because the basis of the estimate is recorded costs, SDG&E considers including these costs in the 2017 SONGS 2&3 DCE to be reasonable.

B. Undistributed Activities (S. Garcia)

The undistributed activities major categories included in the 2017 SONGS 2&3 DCE are described below.

1. Contracted Services

The undistributed contracted services category includes the shorter-term supplemental resources, specialty contractors and consultants, third-party services, materials, equipment, and supplies. The 2017 SONGS 2&3 DCE forecast for contracted services is $225.2 million (100% share, 2014$). The 2014 SONGS 2&3 DCE estimate was $34.6 million (100% share, 2014$). The 2014 DCE assumed contracted services would involve only office supplies, computers, and related equipment for utility staff use, based upon an assumed cost of $10,500 per year per employee. In the 2017, SCE used this category more broadly for services and activities to meet its regulatory requirements related to the safe storage of spent fuel on-site; and to provide services required to maintain the plant and general facility.[28] SDG&E reviewed the supporting documentation for contracted services forecast and considers the DCE forecast amount to be reasonable and appropriate.

[28] Ex. SCE-03C at 35.

2. Service Level Agreements

Beginning in 2016, SONGS implemented annual intra-company Service Level Agreements ("SLAs") with SCE corporate service providers. Each SLA describes the specific A&G functions and services SCE provides to SONGS. The 2017 SONGS 2&3 DCE incorporates the SLA costs during the 2016-2028 period and replaces the A&G overhead loader that was used in the 2014 SONGS 2&3 DCE. Beginning in 2029, the 2017 DCE resumes applying the 5% A&G overhead loader to all remaining decommissioning costs until project completion in 2051.

The 2017 SONGS 2&3 DCE estimate for Service Level Agreements/A&G expenses is $168.2 million (100% share, 2014$). The number SCE calculated for the corresponding 5% A&G overhead loader for the 2014 DCE for the period 2016-2051 is $160.8 million (100% share, 2014$). SDG&E reviewed the supporting documentation for the forecast of the Service Level Agreements/A&G expenses and considers the 2017 SONGS 2&3 DCE amount to be reasonable and appropriate.

3. DGC Staffing

The DGC staffing undistributed labor category includes the undistributed staffing portion for SDS and for the contractor that will do the Civil Works Project (2046 -2049) and ISFSI Demolition (2050-2051). The estimate for the DGC staff for SDS is based on the contract. The estimate for the contractor during the Civil Works Project and ISFSI Demolition developed during the 2014 SONGS 2&3 DCE is being used for the 2017 SONGS 2&3 DCE.

The 2017 SONGS 2&3 DCE forecast for DGC Staffing is on Table 3 line 18. The 2014 SONGS 2&3 DCE estimate was $423.6 million (100% share, 2014$). The estimate decreased primarily as the result of the competitive procurement process that resulted in the selection of

SDS. SDG&E reviewed the supporting documentation for the DGC Staffing forecast and considers the DCE forecast amount to be reasonable and appropriate.

4. Labor Staffing

The undistributed labor category generally includes the required staffing to provide the oversight, management and other activities necessary to support the decommissioning project and the security force over the spent fuel pool. This category also includes the short-term incentive compensation costs.

The 2017 SONGS 2&3 DCE forecast for labor staffing is $986.2 million (100% share, 2014$). The 2014 SONGS 2&3 DCE cost was $1,029.4 million (100% share, 2014$). The estimate decreased primarily because of a change in contingency rate from 25% to 10%. This decrease in contingency is appropriate because this time a more detailed labor-staffing estimate was prepared by Kenrich with SONGS executive managers.

SDG&E reviewed the supporting documentation for the Labor-Staffing forecast and considers the 2017 SONGS 2&3 DCE forecast amount to be reasonable and appropriate.

5. All Other Non-Labor

Non-labor costs include a wide range of decommissioning activities and obligations, including the following:

Aging Management – Aging Management programs cover both the Areva and Holtec dry storage systems. This represents only the undistributed portion of the program which includes annual facility maintenance and inspection as well as in-service canister inspections every five years.

Association Fees and Expenses – This category of costs includes Nuclear Energy Institute membership fees, and costs related to an external Nuclear Oversight Board.

Community Engagement Panel – The SONGS Community Engagement Panel holds periodic meetings with the public to provide information on various issues, including decommissioning plans, spent fuel management, emergency planning, security and environmental review process.

Dry Active Waste ("DAW") Disposal – DAW includes contaminated clothes, tools, and personal protective equipment (e.g., masks, face shields, gloves).

Decommissioning Advisor – This category includes outside consultants who provide subject matter expertise regarding decommissioning regulatory issues, spent fuel storage, and project management.

DGC Executive Oversight Committee – The SDS contract requires a five-person committee that provides oversight and resolves contractual issues. The committee includes one person each from SCE and SDS, and three independent third-party members. SCE and SDS share the costs of the third-party positions.

Emergency Preparedness Fees – SCE provides funding to local jurisdictional authorities for their radiological emergency preparedness and will continue to do so until all spent fuel has been removed from SONGS.

Energy – SCE purchases electrical energy to power the SONGS site.

Environmental Permits and Fees – SONGS must comply with a variety of environmental regulations and maintain several environmental permits that will require periodic payments of fees.

Ground Water Monitoring – SCE is required to periodically sample, analyze, and monitor the ground water beneath the SONGS site.

Information Technology – SCE will incur software and network licenses, pay network service providers, and provide internal technical support to site personnel at levels commensurate with site staffing until decommissioning is completed.

Insurance – NRC regulations require SCE to maintain minimum levels of nuclear liability and property insurance until the spent fuel is removed from the SONGS site. SCE also maintains general liability insurance and excess workers' compensation insurance.

Legal-Third Party – SCE retains outside counsel as necessary to handle legal matters that require specific expertise or additional resources.

NRC Fees – As holder of the NRC licenses for SONGS, SCE will be required to pay 10 C.F.R. Part 171 annual license fees and 10 C.F.R. Part 170 inspection fees until the NRC licenses are terminated.

Office Space – During major decontamination and demolition activities, SDS will demolish all existing office space on the SONGS site and provide temporary office space as necessary. After major decontamination and demolition is completed, SCE will provide office space for the remaining employees.

Security Related Expenses – As long as spent fuel remains onsite, the SONGS security force will continue to require uniforms, weapons, ammunition, other supplies and equipment, as well as background investigations, training, and vendor support.

Severance – Under the California Nuclear Facilities Decommissioning Act of 1985,[29] SCE is required to provide severance benefits to SCE employees at SONGS whose jobs are eliminated as a result of the permanent retirement of SONGS.

[29] California Public Utilities Code Section 8322(g).

Site Lease and Easement Expenses – SCE is required to make annual easement and lease payments to the Navy for the onshore plant site and SONGS Mesa facility and to the CSLC for the SONGS 2&3 offshore conduits until the easement and lease agreements are terminated.

Water – SCE is required to purchase potable and service water for the SONGS Site.

Utility Staff Health Physics Supplies – After SDS completes the major D&D work, SCE will re-assume responsibility for providing health physics supplies as required to support the ISFSI-only staff.

Loading Spent Fuel & GTCC Waste to DOE – Under the DOE Standard Contract, SCE is responsible for the cost to transfer spent fuel canisters from the ISFSI and loading them into DOE shipping containers onsite, and then onto the DOE's transportation device.

The estimated costs for all other non-labor are shown in Table 4 below:

Table 4
Undistributed All Other Non-Labor
2017 SONGS 2&3 DCE
100% Share, 2014$ in Millions

Line No.	Description	2017 DCE Total (2014$)	2014 DCE Total (2014$)	Variance (2014$)
1	**Undistributed Non-Labor**			
2	Aging Management	$15.3	$0.0	$15.3
3	Association Fees and Expenses	$8.6	$11.0	($2.4)
4	Community Engagement Panel	$12.5	$34.0	($21.5)
5	DAW Disposal	$0.0	$3.9	($3.8)
6	Decommissioning Advisor	$9.9	$11.4	($1.5)
7	DGC Executive Oversight Committee	$3.7	$0.0	($3.7)
8	DGC Non-Labor	$0.0	$35.9	($35.9)
9	Emergency Preparedness Fees	$48.3	$25.8	$22.6
10	Energy	$84.7	$50.2	$34.5
11	Environmental Permits and Fees	$6.7	$27.1	($20.4)
12	Ground Water Monitoring	$0.5	$0.0	$0.5
13	Information Technology	$31.9	$6.6	$25.3
14	Insurance	$63.7	$67.3	($3.7)
15	Third Party Legal	$23.8	$0.0	$23.8
16	NRC Fees	$31.2	$53.6	($22.4)
17	Office Space	$1.7	$0.0	$1.7
18	Property Tax	$0.0	$74.7	($74.7)
19	Security Related Expenses	$11.8	$18.8	($7.0)
20	Severance	$121.0	$170.8	$49.8
21	Site Lease and Easement Expenses	$97.5	$19.5	$78.0
22	Spent Fuel Maintenance	$0.0	$7.4	($7.4)
23	Tools and Equipment	$0.0	$1.3	($1.3)
24	Water	$16.5	$14.5	$2.0
25	Utility Staff Health Physics Supplies	$3.7	$25.7	($22.1)
26	Loading Spent Fuel & GTCC Waste to DOE	$30.6	$0.0	$30.6
27	**Total**	**$623.6**	**$659.6**	**($36.0)**

In the 2017 SONGS 2&3 DCE, other Non-Labor costs are estimated at $623.6 million (100% share, 2014$). The 2014 SONGS 2&3 DCE had an estimate of $659.6 million (100% share, 2014$), resulting in a decrease of $36.0 million (100% share, 2014$). This net decrease

reflects numerous offsetting increases and decreases and is documented in SCE's testimony.[30] SDG&E reviewed the variance explanations provided by SCE and the supporting documentation for the other Non-Labor forecast and considers the 2017 SONGS 2&3 DCE forecast amount to be reasonable and appropriate.

VII. ESTIMATE OF FUTURE SDG&E-ONLY COSTS IS REASONABLE (T. DALU)

The purpose of my testimony is to demonstrate that the estimate of future SDG&E-only costs are reasonable.

In addition to SDG&E's 20% share of SONGS costs invoiced by SCE, SDG&E anticipates incurring SDG&E-only (100%) costs throughout the SONGS decommissioning process. These costs are for SDG&E's internal activities related to decommissioning and oversight activities. SDG&E is responsible for and will incur 100% of these costs; the costs will not be billed or shared by SCE.

These costs are organized into two high-level categories: labor and non-labor. Labor refers to SDG&E internal labor. Non-labor has several components including consulting, outside legal, property taxes, trust administration, and other miscellaneous expenses.

A detailed estimate of SDG&E-only costs is provided in the Labor, Consulting and Legal, and Non-Labor forecast tables in Attachment A. As summarized in Table 5, SDG&E estimates its future total internal costs over the decommissioning period of 2018 through 2051 to be $45.9 million (2014$).

[30] Ex. SCE-03C at 42-46.

Table 5
SDG&E-Only SONGS Decommissioning Costs
100% Share, 2014$ in Millions

	SDG&E Labor	Other/Non-Labor	Total Costs
Total	$19.4	$26.5	$45.9

As discussed in the testimony of Mr. Woodruff, SDG&E adds these SDG&E-only costs to its 20% share of the 2017 SONGS 1 and SONGS 2&3 DCEs to demonstrate that SDG&E's Nuclear Decommissioning Trust is adequately funded.[31]

SDG&E has provided previous estimates of its internal costs associated with decommissioning in prior DCE reviews.[32] In the 2014 SONGS 2&3 DCE, the SDG&E-only cost estimate for 2018 through 2051 to be $10.7 million (2014$). In the 2016 SONGS 1 DCE, the SDG&E-only cost estimate for 2018 through 2052 was $45.5 million (2014$). The current forecast is higher than the 2014 estimate primarily due to an increase in labor costs, and the inclusion of trust administration fees and property taxes in the estimate. The current forecast is higher than the 2016 estimate due to higher labor, legal, and consultant costs, offset by lower contingency. Consistent with the nature of DCEs, SDG&E expects that the cost and resource estimates will be refined as the decommissioning effort moves forward and updated information on actual costs becomes available.

[31] *See* Ex. SDGE-04 at 6-8.

[32] Ex. SDGE-01-R-E-A (De Marco) at 13-16, submitted in A.14-12-007, *Joint Application of [SCE and SDG&E] to Find the 2014 SONGS Units 2 & 3 Decommissioning Cost Estimate Reasonable* (August 20, 2015). Ex. SDGE-04 (Moftakhar) at 7-12, submitted in A.16-03-004, *Joint Application of SCE and SDG&E for the 2015 Nuclear Decommissioning Cost Triennial Proceeding* (February 17, 2017).

A. Allocations of Estimated SDG&E-Only Costs Between SONGS 1 and SONGS 2&3

The total SDG&E-only internal costs for SONGS 1 and SONGS 2&3 are $45.9 million (2014$). SONGS 1 is allocated 6.10% of these costs ($2.8 million, 2014$), and Units 2&3 are allocated 93.9% of these costs ($43.1 million, 2014$). The allocations of future decommissioning costs (6.10% for SONGS 1 and 93.9% for SONGS 2&3) are calculated based on the proportion of remaining decommissioning estimates in the 2017 SONGS 1 DCE and the 2017 SONGS 2&3 DCE.[33] SDG&E allocates the costs of its SDG&E-only costs among the units the same way.

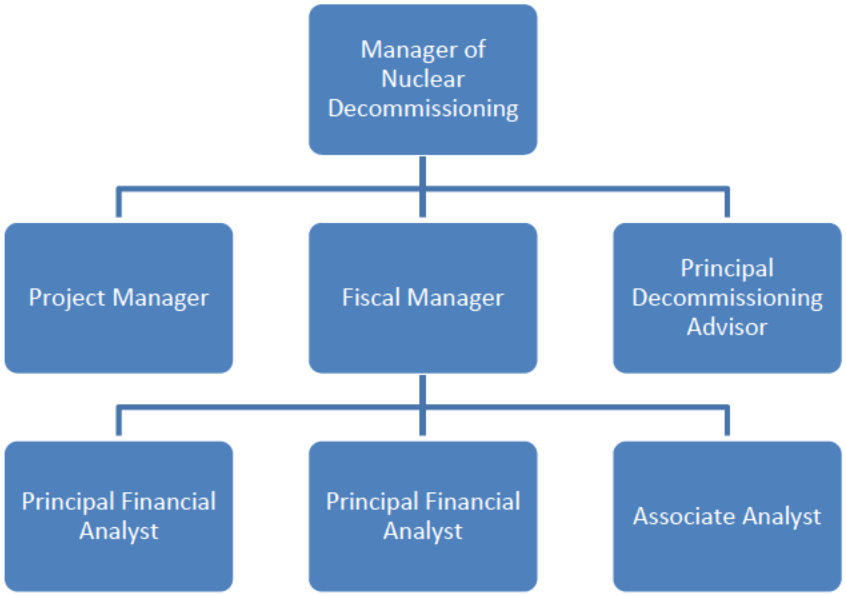
B. SDG&E Labor

The first category in Table 3 - "SDG&E Labor" - is for SDG&E staff who provide oversight of SONGS decommissioning costs and activities. Since the SONGS closure announcement in 2013, SDG&E has worked to develop a dedicated and focused core SONGS Team to oversee SONGS decommissioning activities. The goal of the SONGS Team is to manage SDG&E's oversight of decommissioning activities in an efficient and effective manner from a technical, regulatory and financial perspective. SDG&E expects internal staffing levels to correlate with the periods of decommissioning activities. SDG&E will provide the appropriate level of resources for its SONGS Team, as needed. SDG&E's labor cost forecast for 2018 through 2051 is $19.4 million (100% share, 2014$).

As of March 2018, SDG&E's SONGS Team is organized according to the structure set forth below.

[33] To perform this calculation, the 2017 DCE for SONGS 1 is $207.1 M (100% share, 2014$) and the 2017 DCE for SONGS 2&3 is $3,187.6 M (100% share, 2014$) for 2018 through 2051 forecasted costs.

SDG&E SONGS Team



SDG&E expects to supplement this focused core team with outside industry experts, consultants and legal counsel, as needed, detailed in Section C below.

C. Other/Non-Labor

The second type of SDG&E-only costs identified in Table 3 is "Other/Non-Labor." The "Other/Non-Labor" category consists of three specific types of costs: decommissioning consultants, external to SDG&E, decommissioning counsel external to SDG&E, and direct costs related to oversight activities.

As SDG&E proceeds through the decommissioning process, specific decommissioning expertise in decommissioning projects learned at other nuclear sites can provide significant benefits for ratepayers and independently assure SDG&E that the efforts at SONGS are consistent with industry practice. SDG&E currently retains external decommissioning consultants. One such expert has been Mr. Adam Levin, whose specific industry knowledge and decommissioning experience has been valuable to SDG&E in determining that SONGS

decommissioning processes and proposed activities are consistent with similar nuclear stations undergoing decommissioning. In addition, SDG&E has enlisted the expertise of Mr. Joseph Carignan and Mr. Thomas LaGuardia to help review the 2017 DCEs for SONGS 1, and SONGS 2&3. SDG&E's use of decommissioning consultants and experts is expected to follow the decommissioning activities in terms of use and intensity. For example, SDG&E expects to utilize experts and consultants to supplement its on-site oversight staff during critical periods in the decontamination and demolition phase. SDG&E expects the need for such expertise to taper off following the completion of the dismantling work when SONGS will have only spent fuel on site while awaiting DOE pickup and final license termination. SDG&E forecasts use of experts and consultants again from 2046 through 2051 during the Civil Works Projects and ISFSI Demolition & Final Site Restoration phases.

SDG&E also has retained outside legal counsel with expertise in nuclear decommissioning issues to advise and counsel SDG&E on numerous decommissioning topics. The costs associated with this area are difficult to anticipate or estimate, but SDG&E has endeavored to include a reasonable estimate of outside legal costs based on anticipated future activities. SDG&E's outside consultant and legal counsel cost forecast, including overheads and contingency for 2018 through 2051 is $4.3 million (100% share, 2014$).

Finally, SDG&E incurs direct costs related to its oversight activities at SONGS, including a lease/easement paid directly to the Department of the Navy, travel and travel related expenses, and employee training. SDG&E's miscellaneous non-labor cost forecast, including overheads and contingency for 2018 through 2051 is $1.1 million (100% share, 2014$).

D. Property Taxes

SDG&E pays property taxes to the California State Board of Equalization based on the sum of its property located in the State of California. Property taxes are then allocated to the various counties where SDG&E property is located.

As a result of the Commission approval of a settlement agreement ("2014 Settlement Agreement") in a separate proceeding,[34] SDG&E has a SONGS Regulatory Asset.[35] The 2014 Settlement Agreement amortizes the SDG&E SONGS Regulatory Asset until February 1, 2022. Due to the fact that SDG&E does not own the land at SONGS and in accordance with the 2014 Settlement Agreement, SDG&E calculates the amount of property tax to be paid for SONGS by the present value of future cash flows expected from the SONGS Regulatory Asset. This calculation is the basis for property taxes forecasted (2018 – 2023) in this 2017 DCE. This calculation includes SDG&E recovering the balance of its investment in SONGS, as well as return on its investment.

SDG&E has estimated declining property taxes through 2023 and no property taxes from 2024 on, as shown in Attachment A in the Non-Labor table. SDG&E's property tax cost forecast, including overheads and contingency, for 2018 through 2023 is $4.9 million (100% share, 2014$). SDG&E will no longer incur property taxes for SONGS nuclear assets once the investment in the SONGS Regulatory Asset is fully recovered.

[34] D.14-11-040, issued in I.12-10-013.

[35] The SONGS Regulatory Asset is calculated based on the terms of the SONGS OII Settlement Agreement, approved by D.14-11-040. The amortization period ends February 2022.

E. Trust Administration

Nuclear Decommission Trust ("NDTs") Administration costs are also included in the "Non-Labor-Direct Costs" category.[36] SDG&E incurs several types of trust administration costs including trustee fees, audit costs, tax and legal services for the NDTs, investment consulting, and NDT committee member fees.[37]

Trustee Fees are paid to BNY Mellon to serve as the trustee of the NDT. These amounts are forecasted at a fixed fee annually. Audit, tax, and legal service fees are expenses incurred for auditing NDT financial statements, providing tax advice including tax opinions and verification of tax treatment, and counseling on legal issues associated with the NDT. Investment consulting fees are paid for NDT performance and investment analysis done by consultants. Committee member fees are expenses paid to the three non-SDG&E members of the NDT Committee for their service.

SDG&E has included a forecast of trustee, audit, tax, and legal service, investment consulting, and committee member fees based historical costs from 2015-2016.[38] These costs are detailed in Attachment A in the Non-Labor Table. SDG&E's trust administration cost forecast, including overheads and contingency, for 2018 through 2051 is $16.1 million (100% share, 2014$).

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[36] SDG&E is required by Article 3.05 of its NDT Master Trust Agreements to submit an annual report that includes an accounting of these NDT administration costs to the Commission.

[37] SDG&E also incurs investment management fees for the NDTs. These fees are allocated to the investment manager for managing the investments in the NDTs and are paid out as a percentage of the overall capital that is managed. To calculate the liquidation value of the NDTs, taxes and fees (specifically investment management fees) are netted out. *See* Ex. SDGE-04 at 2. Therefore, this type of cost has been excluded from our forecast.

[38] Trust Administrative costs are reported in the Annual Nuclear Decommissioning Report to the CPUC in compliance with Article 3.05 of SDG&E's Nuclear Facilities Qualified and Non-Qualified Master Trust Agreement for SONGS.

F. Contingency

SDG&E applies a contingency of 15% for its estimated SDG&E-only costs for future years. The contingency amount will help SDG&E manage risk associated with currently unknown events as SDG&E proceeds through the decommissioning process and learns more about its needs and incurs actual costs.

A contingency of 15% is lower than previously Commission-approved SONGS 2&3 DCE that used a contingency rate of 25% for SDG&E-only costs. However, SDG&E believes 15% more accurately represents the unknown risks associated with its internal costs and is better suited to the particular types of costs at issue (i.e., labor and trust administrative costs). In addition, SDG&E's forecast of internal costs is more detailed and refined than previous estimates, due in part to lessons learned from four years of decommissioning history. Therefore, SDG&E asserts that applying a 15% contingency factor to its SDG&E-only DCE forecast is reasonable and appropriate.

G. Escalation

The costs provided in Table 3 above are shown in 2014$. Any potential escalated costs would use the same escalation projections that SCE utilizes from the IHS Global Insight economic forecasting service.[39] This service has been used in past escalation projections by both utilities.

This concludes our prepared direct testimony.

[39] Ex. SCE-06 at 7-8.

ATTACHMENT A

SDG&E-Only Cost Estimate

SDG&E Internal Labor Forecast
(2014 Dollars in Millions)

	SDG&E Labor Costs				
Year	Oversight	Fiscal	Overhead	Contingency	Total
2018	0.3	0.3	0.6	0.2	1.5
2019	0.2	0.3	0.5	0.2	1.2
2020	0.2	0.3	0.5	0.2	1.2
2021	0.2	0.3	0.5	0.2	1.2
2022	0.2	0.3	0.5	0.2	1.2
2023	0.2	0.3	0.5	0.2	1.2
2024	0.2	0.3	0.5	0.2	1.2
2025	0.2	0.3	0.5	0.2	1.2
2026	0.2	0.3	0.5	0.2	1.2
2027	0.2	0.3	0.5	0.2	1.2
2028	0.2	0.3	0.5	0.2	1.2
2029	0.0	0.1	0.1	0.0	0.2
2030	0.0	0.1	0.1	0.0	0.2
2031	0.0	0.1	0.1	0.0	0.2
2032	0.0	0.1	0.1	0.0	0.2
2033	0.0	0.1	0.1	0.0	0.2
2034	0.0	0.1	0.1	0.0	0.2
2035	0.0	0.1	0.1	0.0	0.2
2036	0.0	0.1	0.1	0.0	0.2
2037	0.0	0.1	0.1	0.0	0.2
2038	0.0	0.1	0.1	0.0	0.2
2039	0.0	0.1	0.1	0.0	0.2
2040	0.0	0.1	0.1	0.0	0.2
2041	0.0	0.1	0.1	0.0	0.2
2042	0.0	0.1	0.1	0.0	0.2
2043	0.0	0.1	0.1	0.0	0.2
2044	0.0	0.1	0.1	0.0	0.2
2045	0.0	0.1	0.1	0.0	0.2
2046	0.1	0.1	0.2	0.1	0.4
2047	0.1	0.1	0.2	0.1	0.4
2048	0.1	0.1	0.2	0.1	0.4
2049	0.1	0.1	0.2	0.1	0.4
2050	0.1	0.1	0.2	0.1	0.4
2051	0.1	0.1	0.2	0.1	0.4
	3.2	5.9	7.8	2.5	19.4

SDG&E Legal & Consulting Forecast
(2014 Dollars in Millions)

	SDG&E Legal & Consulting				
Year	Legal	Consulting	Overheads	Contingency	Total
2018	0.2	0.0	0.0	0.0	0.3
2019	0.1	0.1	0.0	0.0	0.3
2020	0.1	0.1	0.0	0.0	0.2
2021	0.1	0.1	0.0	0.0	0.2
2022	0.1	0.1	0.0	0.0	0.2
2023	0.0	0.1	0.0	0.0	0.2
2024	0.0	0.1	0.0	0.0	0.2
2025	0.0	0.1	0.0	0.0	0.2
2026	0.0	0.1	0.0	0.0	0.2
2027	0.0	0.1	0.0	0.0	0.2
2028	0.0	0.1	0.0	0.0	0.2
2029	0.0	0.0	0.0	0.0	0.1
2030	0.0	0.0	0.0	0.0	0.1
2031	0.0	0.0	0.0	0.0	0.1
2032	0.0	0.0	0.0	0.0	0.1
2033	0.0	0.0	0.0	0.0	0.1
2034	0.0	0.0	0.0	0.0	0.1
2035	0.0	0.0	0.0	0.0	0.1
2036	0.0	0.0	0.0	0.0	0.1
2037	0.0	0.0	0.0	0.0	0.1
2038	0.0	0.0	0.0	0.0	0.1
2039	0.0	0.0	0.0	0.0	0.1
2040	0.0	0.0	0.0	0.0	0.1
2041	0.0	0.0	0.0	0.0	0.1
2042	0.0	0.0	0.0	0.0	0.1
2043	0.0	0.0	0.0	0.0	0.1
2044	0.0	0.0	0.0	0.0	0.1
2045	0.0	0.0	0.0	0.0	0.1
2046	0.0	0.1	0.0	0.0	0.1
2047	0.0	0.1	0.0	0.0	0.1
2048	0.0	0.1	0.0	0.0	0.1
2049	0.1	0.1	0.0	0.0	0.2
2050	0.1	0.1	0.0	0.0	0.2
2051	0.1	0.1	0.0	0.0	0.2
	2.2	1.6	0.0	0.6	4.3

SDG&E Non-Labor Forecast
(2014 Dollars in Millions)

	SDG&E Non Labor Costs					
Year	Non Labor	Trustee Fees	Property Tax	Overhead	Contingency	Total
2018	0.0	0.4	1.4	0.0	0.3	2.1
2019	0.0	0.4	1.1	0.0	0.2	1.8
2020	0.0	0.4	0.9	0.0	0.2	1.5
2021	0.0	0.4	0.6	0.0	0.2	1.2
2022	0.0	0.4	0.2	0.0	0.1	0.8
2023	0.0	0.4	0.0	0.0	0.1	0.5
2024	0.0	0.4	0.0	0.0	0.1	0.5
2025	0.0	0.4	0.0	0.0	0.1	0.5
2026	0.0	0.4	0.0	0.0	0.1	0.5
2027	0.0	0.4	0.0	0.0	0.1	0.5
2028	0.0	0.4	0.0	0.0	0.1	0.5
2029	0.0	0.4	0.0	0.0	0.1	0.5
2030	0.0	0.4	0.0	0.0	0.1	0.5
2031	0.0	0.4	0.0	0.0	0.1	0.5
2032	0.0	0.4	0.0	0.0	0.1	0.5
2033	0.0	0.4	0.0	0.0	0.1	0.5
2034	0.0	0.4	0.0	0.0	0.1	0.5
2035	0.0	0.4	0.0	0.0	0.1	0.5
2036	0.0	0.4	0.0	0.0	0.1	0.5
2037	0.0	0.4	0.0	0.0	0.1	0.5
2038	0.0	0.4	0.0	0.0	0.1	0.5
2039	0.0	0.4	0.0	0.0	0.1	0.5
2040	0.0	0.4	0.0	0.0	0.1	0.5
2041	0.0	0.4	0.0	0.0	0.1	0.5
2042	0.0	0.4	0.0	0.0	0.1	0.5
2043	0.0	0.4	0.0	0.0	0.1	0.5
2044	0.0	0.4	0.0	0.0	0.1	0.5
2045	0.0	0.4	0.0	0.0	0.1	0.5
2046	0.0	0.4	0.0	0.0	0.1	0.5
2047	0.0	0.4	0.0	0.0	0.1	0.5
2048	0.0	0.4	0.0	0.0	0.1	0.5
2049	0.0	0.4	0.0	0.0	0.1	0.5
2050	0.0	0.4	0.0	0.0	0.1	0.5
2051	0.0	0.4	0.0	0.0	0.1	0.5
	1.0	14.0	4.2	0.1	2.9	22.1

SDG&E Forecast Totals
(2014 Dollars in Millions)

	SDG&E Labor Costs	SDG&E Legal & Consulting Costs	SDG&E Non-Labor Costs	SDG&E Total
Year	Total	Total	Total	Total
2018	1.5	0.3	2.1	3.9
2019	1.2	0.3	1.8	3.3
2020	1.2	0.2	1.5	3.0
2021	1.2	0.2	1.2	2.6
2022	1.2	0.2	0.8	2.2
2023	1.2	0.2	0.5	1.9
2024	1.2	0.2	0.5	1.9
2025	1.2	0.2	0.5	1.9
2026	1.2	0.2	0.5	1.9
2027	1.2	0.2	0.5	1.9
2028	1.2	0.2	0.5	1.9
2029	0.2	0.1	0.5	0.8
2030	0.2	0.1	0.5	0.8
2031	0.2	0.1	0.5	0.8
2032	0.2	0.1	0.5	0.8
2033	0.2	0.1	0.5	0.8
2034	0.2	0.1	0.5	0.8
2035	0.2	0.1	0.5	0.8
2036	0.2	0.1	0.5	0.8
2037	0.2	0.1	0.5	0.8
2038	0.2	0.1	0.5	0.8
2039	0.2	0.1	0.5	0.8
2040	0.2	0.1	0.5	0.8
2041	0.2	0.1	0.5	0.8
2042	0.2	0.1	0.5	0.8
2043	0.2	0.1	0.5	0.8
2044	0.2	0.1	0.5	0.8
2045	0.2	0.1	0.5	0.8
2046	0.4	0.1	0.5	1.1
2047	0.4	0.1	0.5	1.1
2048	0.4	0.1	0.5	1.1
2049	0.4	0.2	0.5	1.1
2050	0.4	0.2	0.5	1.1
2051	0.4	0.2	0.5	1.1
	19.4	4.3	22.1	45.9

ATTACHMENT B

CONSULTANT REPORT FOR SDG&E'S REVIEW OF DCE

Review of San Onofre Nuclear Generating Station Decommissioning Cost Estimates and Supporting Documentation (March 11, 2018)

Prepared by:

Joseph E. Carignan - Carignan & Associates LLC

Thomas S. LaGuardia, PE, CCP - LaGuardia & Associates LLC

Review of San Onofre Nuclear Generating Station Decommissioning Cost Estimates and Supporting Documentation

Prepared by:

Joseph E. Carignan - Carignan & Associates LLC

Thomas S. LaGuardia, PE, CCP - LaGuardia & Associates LLC

For

SDGE

A Sempra Energy utility®

March 11, 2018

1. BACKGROUND

The San Onofre Nuclear Generating Station (SONGS) has permanently ceased operations and is undergoing prompt decommissioning. As a minority owner of SONGS, San Diego Gas & Electric Company (SDG&E) recognized the need to oversee their interest in ensuring the project is performed in a safe and cost-effective manner. As part of this due diligence effort, SDG&E retained the services of Carignan and Associates LLC (C&A) to provide decommissioning technical support in the review and oversight of the decommissioning cost estimates (DCEs), schedule, and supporting documentation provided by Southern California Edison Company (SCE).[1] Mr. Joseph Carignan, along with decommissioning expert, Mr. Thomas LaGuardia, provided this support. Between the two consultants, they have over 70 years of decommissioning experience (see Appendix D for additional information).

2. INTRODUCTION

As part of SDG&E due diligence and oversight of the SONGS decommissioning, SDG&E selected C&A to provide DCE consulting support and guidance. This support included training and reviewing numerous decommissioning documents, including assumptions and decommissioning cost estimates prepared by others. The reviews included on-site meetings with SDG&E and SCE personnel at both the SDG&E offices and at SONGS. This support was an ongoing process throughout 2017 and first quarter of 2018 with SDG&E and C&A working closely together to ensure a comprehensive "due diligence" was accomplished.

The support to date has been provided in two phases; phase one began in early 2017 and included a one-day decommissioning course presented by C&A to a select group of SDG&E personnel. C&A also worked with SDG&E in conducting a preliminary review of draft SCE assumptions being developed in support of the SONGS 1 and SONGS 2&3 DCEs. Phase two began in late November 2017 and involved C&A providing a detailed review of the SONGS 1 and SONGS 2&3 DCEs and supporting documentation as part of SDG&E's due diligence effort. These DCEs were prepared by The Kenrich Group, LLC (Kenrich) for SCE. The purpose of C&A's review was to identify any areas needing clarification, provide guidance to SDG&E in its review and feedback to SCE and Kenrich, and to determine the "reasonableness" of the DCEs. A complete list of all documents used for this review are provided in Appendix A.

[1] Purchase Order Agreement 5660047837 among SDG&E and Carignan and Associates LLC.

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3. Approach:

Phase one:

- A one-day decommissioning training course was conducted by C&A for select SDG&E personnel in January 2017. The training focused on introductions to the challenges of decommissioning, industry lessons learned, and the methods and approaches for providing decommissioning oversight. C&A emphasized the initial phase of the decommissioning project and the basis of a DCE. Topics C&A covered included:
  1. Planning and Management of a Decommissioning Project
  2. Decommissioning Cost Estimating
  3. Decommissioning Uncertainties
  4. Decommissioning Lessons Learned
  5. Decommissioning Cost Estimates: What can go wrong
  6. Oversight and Use of the DCE Checklists
  7. Contracting Oversight: Advantages/Disadvantages

- In addition to this training, C&A recommended SDG&E send personnel to the Argonne National Laboratories 4-day decommissioning training course. This course provides a general overview of all aspects of decommissioning and has trained over 2500 personnel from 75 countries since the late 1987. In November 2016, SDG&E's Manager of Nuclear Decommissioning attended the training course and SDG&E's Principal Nuclear Decommissioning Advisor attended in March 2017.

- In the June and July 2017 timeframe, SDG&E requested C&A review and provide comments on fourteen draft assumptions documents SCE was preparing for use in developing the DCEs. C&A provided the results of their review, including specific comments and recommendations, to SDG&E in a meeting at SDG&E's office on July 5 and 6, 2017. C&A also recommended SDG&E establish administrative controls to properly document SDG&E's DCE review and review results. SDG&E implemented this recommendation, which was verified by C&A.

  The documents involving SCE's assumptions that C&A reviewed included the following:

  1. Fuel Transfer Operations Schedule
  2. Transition and Mobilization Schedule
  3. Mesa Site Turnover
  4. SONGS Unit 2 and 3 2017 Decommissioning Cost Estimate - Undistributed Non-Labor Assumptions Matrix
  5. SONGS Unit 2 and 3 2017 Decommissioning Cost Estimate - Distributed Projects (Excluding DGC, Phase II, and ISFSI D&D) Assumptions Matrix
  6. DOE Acceptance of SONGS Spent Nuclear Fuel

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7. DCE Greater Than Class C Waste Basic Assumption
8. Phase III full removal of all improvements
9. DGC Fixed Price Work Scope (Phases I and II) and Phase III Work Scope
10. Backfill and Final Grading Material
11. Radiological criteria for end state for license termination
12. Assumed Navy Required End-State Radiological Criteria
13. Vegetation Monitoring After Site Restoration

Phase two:

- During November and December 2017, in preparation for finalizing the SONGS 2&3 DCE and in preparation for its submittal to the California Public Utility Commission (CPUC), C&A supported SDG&E in its review. Specifically, C&A reviewed the SONGS 2&3 DCE including 34 Decommissioning Packets prepared by SDG&E as part of their review process. The Packets for distributed projects and undistributed activities used a standardized format, which included a review checklist to ensure key elements of the estimate were addressed, such as assumptions, basis, financial information and other applicable DCE data. C&A's review included two work weeks at the SDG&E's office and at SONGS to discuss the results of SDG&E and C&A review with site personnel.

  During February 2018, in preparation for finalizing the SONGS 1 DCE and in preparation for its submittal to the CPUC, C&A supported SDG&E in the same review process used for Units 2&3. C&A reviewed the SONGS 1 DCE and twelve Decommissioning Packets prepared by SDG&E for distributed projects and undistributed activities.

  C&A's review did not attempt to verify specific dollars by line item, or to reconcile differences in costs, if any. C&A worked with SDG&E at its office in San Diego to provide guidance on the reasonableness of the estimates, and to assure SDG&E was providing a review of the specific dollars by line item. C&A primarily focused its decommissioning experience and expertise in two areas:

  - Independently reviewing each document provided to determine the "reasonableness" of the estimates and identify potential areas of cost savings, areas needing clarification and specific questions for SDG&E to consider as part of its due diligence; and
  - Reviewing SDG&E's internal assessment/review results, questions asked, and answers provided by Kenrich and SCE in response to SDG&E's assessment.

4. RESULTS

The review by C&A and SDG&E identified a number of suggestions, comments, questions, and requested clarifications of the documents used in support of the SONGS Unit 1 and Units 2&3 DCEs. The results of the C&A assessment have been summarized in Appendix B of this report. The results of the SDG&E assessment will be summarized and provided in testimony in the 2018 Nuclear Decommissioning Cost Triennial Proceeding by SDG&E's witness Ms. Sue Garcia.

- In July 2017, C&A provided specific comments on the SONGS 2&3 DCE's draft assumptions and recommended SDG&E establish administrative controls to properly document SDG&E's DCE review and review results. C&A confirmed that these comments and recommendations were adequately implemented in SDG&E's review of the DCE.

- In November and December 2017 and February 2018, C&A's review of the DCEs and SDG&E's Decommissioning Packets, identified areas where the basis and assumptions used to support the DCEs were lacking in clarity or did not provide sufficient information to determine the adequacy of the estimate for a specific DCE cost category. C&A's identified comments and SDG&E's response to those comments are included in Attachment B. C&A found the Decommissioning Packets completed by SDG&E to be thorough, detailed, and correct. SDG&E reviewed and questioned all areas of the SONGS 1 and SONGS 2&3 DCEs including the assumptions, basis, and financial information used in preparation of the SONGS DCEs.

  Based on C&A's review of the DCEs, SDG&E worked with Kenrich and SCE to obtain additional information to support and better understand specific DCE cost categories. The issues identified by the C&A review did not adversely or negatively impact SDG&E's determination that the DCEs were reasonable.

- C&A identified key areas where SDG&E should continue to closely monitor as the decommissioning progresses, specifically the RPV internals segmentation, oversight staffing, and project contingency and risk.

  - <u>Contingency and Costs for Reactor Vessel Internals and Segmentation</u>: Reactor Vessel and Internals segmentation, packaging, transportation and disposal estimate includes contingency. This contingency is in addition to the SDS fixed-price contract for Reactor Vessel and Internals segmentation, which is considered reasonable. While segmentation may incur higher costs than the contingency allocated, packaging, transportation and disposal activities are well understood and developed, so the overall contingency should be sufficient. The DCE also includes schedule contingency to cover any schedule slippage during this historically difficult

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activity. Nevertheless, Reactor Vessel and Internals segmentation should be closely monitored.

- Oversight Staffing Levels: Oversight staffing levels are constant throughout the specific decommissioning periods and do not appear to correlate to the level or repetitive nature of work. The levels of staffing during the ISFSI period at SONGS when work activity is repetitive and minimal appear to be unnecessarily high. Examples such as the three Yankee plant ISFSI monitoring activities (Yankee Rowe, Maine Yankee and Connecticut Yankee) experience should be examined for applicability to the SONGS 1, 2 and 3 ISFSI costs for oversight with its associated oversight costs. The three Yankee plants are implementing a combined staff to oversee all three ISFSIs with minimal duplicative staffing functions to accomplish essentially the same oversight activities as would be required for SONGS 1, 2 and 3. Oversight staffing is an area of costs that warrants additional detailed review in the next DCE update.

- Project contingency and risk: These are key factors in DCE and should be continually monitored throughout the project and the DCE updates. Contingency and risk are further described in Appendix C.

The list of documents used by C&A in the course of its current review are provided in Appendix A.

Appendix B provides the results of the review and actions taken by SDG&E to address the C&A comments.

5. Recommendations:

Appendix B contains the documented issues raised by C&A and SDG&E and how Kenrich/SCE has addressed each issue. C&A recommended SDG&E use this information in future DCE updates and in its continuing oversight and participation in the SONGS decommissioning effort. There were three key areas noted above in the results section that C&A recommended that SDG&E continue to monitor and revisit as the project progresses: RPV contingency, oversight staffing as well as overall contingency and project risk.

C&A encourages SDG&E to work with SCE to address contingency and risks in subsequent DCE updates based on the principles presented in Appendix C. The 2017 DCEs for SONGS 1, 2 and 3 appear to use these terms interchangeably when determining the overall costs for various project tasks, which is misleading. Contingency estimates are funds that are certain to be spent and are factored into the overall costs. Risks estimate funds may or may not be spent and are typically estimated by probabilistic methods. How the funds are identified and used in the project is typically an executive management decision. For example, the DCE includes a contingency of 15% for the estimated cost increases for site and Mesa land leases from the US Navy. As the US Navy has not decided what needs they have for these properties, nor how much they will charge for the lease, it is probabilistic and should be treated as risks and not contingency.

APPENDIX A

Documents Included in the Review Process

Listed below are the documents provided by SDG&E and used by C&A in the course of the review.

SONGS 1 DCE Documents

- 2016 Decommissioning Cost Analysis EnergySolutions 2/23/16
- Appendix A Spent Fuel Shipping Schedule - 2017 Unit 1 DCE
- Distributed - Unit 1 Substructure Removal and Final Site Restoration
- Distributed Unit 1 - Other Projects
- Distributed Unit 1 - Reactor Vessel Disposal
- Distributed Unit 1 ISFSI Demolition
- Distributed Unit 1 License Termination During Final Site Restoration
- Distributed Unit 1 Off Shore Conduit Removal
- SONGS Unit 1 2017 Decommissioning Cost Estimate March 5, 2018
- Undistributed Non-Labor - NRC Fees
- Undistributed Non-Labor - Spent Fuel Loading and GTCC waste to DOE
- Undistributed Non-Labor Contracted Services
- Undistributed Service Level Agreements for Administrative and General Expenses
- Undistributed DGC Staffing
- Undistributed Labor Staffing

SONGS 2&3 DCE Documents

- 2017 DCE DRAFT Appendices – 12/1/2017
- 4000 Series General Arrangement Drawings (4001 – 4010)
- Aging Management – Undistributed Non-Labor
- Association Fees and Expenses: Undistributed Non-Labor
- Assumed Navy Required End-State Radiological Criteria
- Backfill and Final Grading Material
- Changes to December 1st Draft – Word Document
- Community Engagement Panel – Undistributed Non-Labor
- Comparison Of 2017 DCE Update to July Draft
- Completed Projects – Distributed
- Contracted Services - Undistributed Non-Labor
- Contracted Services and Contracted Services Additional Support (Q&A Document)
- Contracted Services Annual Costs - Plant Management – 11/27/2017
- DCE Greater Than Class C Waste Basic Assumption
- Decontamination, Demolition and Disposal – Distributed Costs

- Decommissioning Advisor – Undistributed Non-Labor
- DGC Executive Oversight Committee – Undistributed Non-Labor
- DGC Fixed Price Work Scope (Phases I and II) and Phase III Work Scope
- DGC Staffing – Undistributed Non- Labor
- DOE Acceptance of SONGS Spent Nuclear Fuel
- Dry Active Waste (DAW) Disposal Costs – Undistributed Non-Labor
- Emergency Preparedness Fees – UD Non-Labor
- Energy – Undistributed Non-Labor
- Environmental Fees and Permits
- Estimated ISFSI Settlement Cost Summary – 11/30/2017
- Estimated Spent Fuel Loading Costs
- Final Site Restoration – Distributed
- Fuel Transfer Operations Schedule
- Groundwater Monitoring – Undistributed Non-Labor
- Health Physics Supplies – Undistributed Non-Labor
- Information Technology – Undistributed Non-Labor
- Initial Real Estate Authorization Renewal and Plant Easements Cost Estimate
- Insurance -Undistributed Non-Labor
- ISFSI and Fuel Transfer Operations
- ISFSI Demolition
- Labor Staffing – Undistributed
- Legal – Undistributed Non-Labor
- Mesa Site Turnover Detailed Cost Summary Estimate
- NRC Fees – Undistributed Non-Labor
- Off Shore Conduit Removal - Distributed
- Office Space Lease – Undistributed Non-Labor
- Other Projects – Distributed
- Phase III full removal of all improvements
- Plant Lease Amendment for Final Site Restoration Cost Estimate
- Plant Lease Extension Cost Estimate – No Date
- Radiological criteria for end state for license termination
- Security Related Expenses – Undistributed Costs
- Service Level Agreements – Undistributed
- Severance – Undistributed Non-Labor
- Site Lease and Easement Expenses– Undistributed Non-Labor
- SONGS Unit 2 and 3 2017 Decommissioning Cost Estimate - Distributed Projects (Excluding DGC, Phase II, and ISFSI D&D) Assumptions Matrix
- SONGS Unit 2 and 3 2017 Decommissioning Cost Estimate - Undistributed Non-Labor Assumptions Matrix

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- SONGS Units 2 & 3 2017 Decommissioning Cost Estimate ("DCE") January 26, 2018 (Revised March 8, 2018)
- Spent Fuel Loading – Undistributed Non-Labor
- Subgrade Structure Removal Below -3 feet and Demolition of ISFSI Area (Change to HOLTEC System) - July 07, 2017
- Substructure Removal - Distributed
- Substructure Removal Contractor Procurement Summary by Cost Element
- Summary of CEQA Permitting & Approvals Cost Estimate
- Summary of GTCC Waste Storage Estimate 2017.12.04
- Tools and Equipment Cost– Undistributed Non-Labor
- Transition and Mobilization Schedule
- Utilities – Water – Undistributed Non-Labor
- Vegetation Monitoring After Site Restoration

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APPENDIX B

Results of Review of Distributed & Undistributed Costs

For all three SONGS units, C&A reviewed the Decommissioning Packets prepared by SDG&E. Each Packet for distributed projects and undistributed activities was developed using a standardized format, which included a review checklist to ensure key elements of the estimate were addressed, such as assumptions, basis, financial information and other applicable DCE data. The C&A review addressed the reasonableness of the estimate relative to previous industry decommissioning experience. C&A worked with SDG&E personnel and, using C&A's decommissioning experience and expertise, focused on:

- Independently reviewing each document provided to determine the "reasonableness" of the estimates and identify potential areas of cost savings, areas needing clarification and specific questions for SDG&E to consider as part of their due diligence
- Reviewing SDG&Es internal assessment/review results, questions asked, and answers provided by SCE in response to C&A's assessment

C&A found the reviews by SDG&E of each of the DCE cost categories to be thorough and detailed with prudent identification of issues on the assumptions and financial information used in preparation for decommissioning SONGS.

The tables listed below summarize the results of the C&A review along with the actions and responses from SDG&E.

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Unit 1 - Distributed Projects

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
Reactor Vessel Disposal	a. General comment. While C&A doesn't disagree with the waste disposal tax rate used, the number provided should be based on an historical data review (and referenced). b. C&A would have expected SDS to contact WCS to get an up-to-date disposal cost and Waste Disposal Tax Rate, instead of relying on the Radiological Shipping Oversight Specialist.	a. Kenrich provided additional information that the historical range data referenced in the workpapers was provided verbally and Kenrich does not have the documentation to support the range. Instead of using a range, Kenrich opted to use the 2016 tax rate in SDS contract. b. Kenrich responded that they did not contact SDS but instead relied on the 2016 tax rate in SDS contract. SDG&E agrees with the use of the 2016 tax rate in SDS contract in this forecast but notes this for use in future DCE reviews.
Other Projects	General Comment – GTCC Licensing estimate references discussions with SONGS Aging engineer and project manager is the basis for the costs. The basis of a cost should be documented with more than someone the estimator talked to – Is it history, benchmarked or other means? Even if the estimator relies on an "expert opinion", it should be documented with the basis for the opinion.	SDG&E notes this general comment for use in future DCE reviews.
License Termination (LT) During Final Site Restoration	Comment – The estimate for LT for Unit 1 is approximately $7.2 Million. In the DCE for U2/3 it is approximately $4.7M for License Termination, SF Management and Site restoration. Why such a variance and why so high for U1 when the other estimate is for two units?	Kenrich responded that in the closest equivalent is the partial site release that occurs in 2027-2028. This includes final status surveys and submittal of the license termination plan. The estimate (including contingency) is $42.2 M. SDG&E reviewed this additional information and agrees that $42.2 M is the appropriate comparison not $4.7M.

ISFSI Demolition	No comments	No response required.
Offshore Conduit Removal	a. Comment: Will the COWI study in 2017 prepared for U2/3 Conduit be factored into this DCE or will COWI perform a similar analysis for U1? b. General comment: $35.6 M is similar to the U2/3 estimate of $96M	a. Kenrich responded that the 2017 SONGS 2&3 DCE did not revise the conduit estimate to reflect the estimate in the COWI study, and instead was kept equal to the 2014 DCE value. Consistent with the SONGS 2&3 DCE, the SONGS 1 DCE is kept equal to the 2016 DCE value. b. No response required.
Substructure Removal & Final Site Restoration	a. General Comment: Almost $5 Million dollars to procure equipment, however, no credit is provided at end of 2051 (minor cost) b. General Question High Bridge stated they did not prepare updated UCFs but used ones from the 2016 DCE. Did High Bridge review them and concur or just assumed they were accurate? I believe this conflicts with note in ISFSI Demo where they state they did revise them.	a. No response required. b. Kenrich clarified that updated UCFs were used.

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Unit 1 – Undistributed Activities

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
Labor Staffing	No Comments	No response required.
Non-Labor – Contracted Services (only line items over $4 M)	Comment: The % allocated to U1 seems reasonable.	No response required.
Non-Labor – Loading Spent Fuel & GTCC Waste to DOE (only line items over $4 M)	General Comment: In preparing this estimate C&A would have expected the estimator to ask Energy Solutions how much it cost to Load Fuel Canisters and Fuel Transfer Operations from their Zion 1, 2 experience.	SDG&E notes this general comment for use in future DCE reviews.
Non-Labor – NRC Fees (only line items over $4 M)	No Comments – estimate is reasonable	No response required.
Service Level Agreements	No Comments	No response required.
DGC Staffing	No Comments	No response required.

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Unit 2&3 Distributed Projects

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
Completed Projects	No comments	No response required.
ISFSI & Fuel Transfer Operations	Why is contingency added to the fixed price contract?	SDG&E has reviewed the contingency rate included in this distributed project and determined that it is a reasonable percentage to apply to the remaining costs, including the fixed price contract, based on where they are in the project.
Decontamination, Demolition, & Disposal	a. Is SCE adding contingency to the SDS fixed price contract? b. General comment – it is C&A's understanding the "contingency" is part of the fixed price contract and is not under the control of SCE. c. Reviewing the line items for RPVI, C&A is unable to identify the milestone payments that match the DCE estimate.	a. Yes, there is a contingency rate applied to the remaining costs, SDG&E thinks it is reasonable rate at this point in the project as there will be change orders to the fixed price contract and/or other issue come up during the D&D phase of the project. b. For SDS, we assume that SDS's contingency has been priced into the contract. c. SDG&E walked C&A through example on how to tie the numbers.
Other Projects	SDG&E has requested additional back up information for most of these projects.	SDG&E received additional backup to confirm costs and note that these costs have 15-25% contingency rate which appears to be reasonable.
Substructure Removal	a. Unable to follow the costs that were extracted from the original High Bridge estimate. b. Why are costs in 2047 to install DW system and 2049 to remove DW System? c. A contingency rate is not included in the High Bridge estimate. Suggest asking High Bridge to identify based on their experience, what the appropriate contingency rate should be for their estimate.	a. SDG&E discussed with SCE/Kenrich and understands how the costs were extracted from the report. b. 2027-2049 is the timing on the dewatering project. c. Contingency of 25% is included. Kenrich received a contingency range from High Bridge and 25% is near the high end of the range.
Offshore Conduit Removal	No comments.	No response required.

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DCE Cost Category	Carignan & Associates Comments	SDG&E Response
ISFSI Demolition	a. This is a class 4 estimate. If they are following AACEI, a Class 4 is for conceptual or feasibility studies, at this stage of the project with fixed price contracts in place for building the ISFSI, this estimate for demolition should be a more accurate class 2 or 3 estimate (budgetary level). b. The cost of separating the "concrete" and "steel" for removal seems very high for a conventional demolition. However, the work is so far out in the future, C&A expects the cost will be revised again in the future during cost updates.	a. SDG&E will address this issue with SCE in the next DCE. b. SDG&E will address this issue with SCE in the next DCE.
Final Site Restoration	There is no credit for equipment sold once work is completed.	Kenrich provided response that no credit is taken for equipment sold or scrap metal, consistent with the 2014 DCE. SDG&E further inquired and received a response that most of the equipment would be leased and there would be very little, if any, equipment to sell.

Undistributed Costs

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
Labor Staffing	a. General Comment: During the SDS project, it is fixed price and from our understanding, SDS is overall responsible for all site decommissioning activities including decontamination, dismantling and removal of radioactive material as well as supporting SONGS in addressing licensing and other regulatory issues. In this capacity, SDS is responsible for virtually all site activities from operating and maintenance of equipment to training and radiological controls. If this is the case, SCE/SONGS role and focus should be to provide monitoring and oversight of project activities as well as responsible for the overall NRC site license. If this is the case, it seems SCE/SONGS primary oversight focus should be in four areas below ensuring SDS meets: • safety and radiological requirements (nuclear, personnel & equipment); • licensing and other regulatory requirements; • contractual requirements; and • ensuring SDS and its subcontractors do not adversely impact the public image of SCE and minority owners by poor performance or other acts. Ideally, the oversight and support staffing levels should correlate to SDS and other work activities (i.e. work crews in field and other physical activity requiring SONGS Oversight). b. Comment: Suggest obtaining additional justification for staffing levels for the following organizations: Site Management (Communications and Strategic Planning and Stakeholder Engagement), Plant Management (Maintenance, Work Control and PI/CAP and Engineering), Decommissioning Oversight (Project Controls, Construction Oversight, Engineering Oversight, Radiological Oversight),	a. No response required. b. In preparation of the testimony on undistributed costs, SDG&E met with SCE to obtain an understanding on how the estimate of Undistributed – Labor Staffing was developed. These questions were discussed during those meetings.

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
	and Finance (Project Controls and Decommissioning Finance).	
Non-Labor – Aging Management	No comments.	No response required.
Non-Labor – Association Fees and Expenses	a. The documentation in one area says the Nuclear Oversight Board (NOB) costs are forecast to 2032 but in another place, it shows it ends in 2028. b. Why do we need any NOB reviewers during ISFSI phase? **c.** Why pay NEI 103K per year once the SDS completes their work? d. NEI invoice (page 20 of 33) shows a 10K charitable contribution. It is C&A's opinion the NRC would not allow this as a valid decommissioning expense.	a. SDG&E has corrected the documentation to show that it ends in 2028 b. Correct time period is through 2028. There are no NOB reviewers during the ISFSI phase. c. SDG&E will add this to the list of items to recommend to SCE to consider in next DCE d. SDG&E requested that this be removed from the estimate and Kenrich has removed in the final DCE.
Non-Labor – Community Engagement Panel	Why are the Community Engagement Panel meetings not disbanded after all fuel is in the ISFSI?	The meetings will be significantly scaled down after D&D, but the community will still be interested in when the spent fuel will be moved and also on-going aging management activities.
Non-Labor – Contracted Services	a. Why are these considered "Non-Labor" when they are clearly labor-related activities? Do they mean non-SDS or SCE Labor? If it is contract labor only, is this above or in addition to SCE staff? b. Why are they continuing to spend $3.15 million per year during Dry storage from 2029 to 2045?	a. Contracted services category is for non-SDS, non-SCE labor or non-long-term contract employees. Contracted services generally consist of shorter-term supplemental resources, specialty contractors and consultants, third-party services, material, equipment and supplies. b. Costs are for ISFSI only (plant management/maintenance), nuclear oversight and site management. SDG&E will note this for monitoring and review during the next DCE update.
Non-Labor – DAW Disposal	No comments	No response required.

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
Non-Labor – Decommissioning Advisor	No comments	No response required.
Non-Labor – DGC Executive Oversight Committee	General Comment: two risks were identified that could drive costs upward in the future but were not included in the estimate: (1) the oversight committee may be required during DGC Phase III; and (2) Delays in DGC Phase II schedule. However, there are additional risks. If the project experiences an event resulting in regulatory or safety violation or injury or death, or SDS does not perform as required, this cost as well as community involvement and NRC involvement and cost could increase significantly. No action needed but just an observation.	SDG&E agrees and will note this for monitoring and review during next DCE update.
Non-Labor – Emergency Preparedness Fees	No comments	No response required.
Non-Labor - Energy	The reference number appears to be in error for 2014 DCE Value in 2017$.	SDG&E will make the change to the review packet.
Non-Labor – Environmental Permits and Fees	General comment – thorough review with good back up. Are there any permitting fees or costs during the dry storage period for the security structure and support personnel? If so is it captured?	SDG&E asked this question and Kenrich responded that the National Pollutant Discharge Elimination System (NPDES) permit will not be required during the dry fuel storage period and therefore no NPDES permit costs are assumed in the estimate during this period.
Non-Labor – Ground Water Monitoring	Does the fact there are two units (U2 & 3) versus one unit used in the estimate impact the ground watering monitoring costs and if so is it factored into the cost estimate? Since the majority of Nuclear plants in the US have had tritium issues (https://www.cbsnews.com/news/radioactive-leaks-found-at-75-of-us-nuke-sites/) if is found on the U2&3 footprint, will it impact the overall GW monitoring costs?	SDG&E asked this question and Kenrich responded that groundwater monitoring costs are included beginning in 2029, once SDS transitions the responsibility back to SCE after Phase II is completed. After D&D, the level of monitoring required is expected to be similar to what SCE incurs today for Unit 2&3 and also Unit 1. The estimate is based on average Unit 1 recorded costs, which we believe is a reasonable proxy, and we also confirmed it is consistent with 2017 U2&3 recorded costs. No tritium

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
		issues are expected during this period, and any remediation required during Phase II would be SDS's responsibility. In addition, Units 2&3 have fewer wells than Unit 1, and the number of Units is not expected to impact the estimate.
Non-Labor – Information Technology	a. Does this network include SDS? If so why are they not shouldering some of these costs? b. If not, has SCE bid this work out assuming the network will be separate from SCE's corporate network?	a. SDG&E asked this question and Kenrich responded that no SDS IT costs are included in the estimate. b. SDG&E confirmed that this network will be separate from SCE's corporate network (covered under Service Level Agreements) and most of the costs in the estimate are in the contract category.
Non-Labor - Insurance	Will the NEIL and ANI insurance premiums decrease as the "radioactivity" on the site decreases annually? Once fuel is removed to the ISFSI, it will contain all the fuel related radioactive inventory that was originally in the pools, so that amount won't change. However, as the RPVI and RPV are segmented and removed from both units, it is our understanding the NEIL and ANI insurance premiums should be reduced.	SDG&E asked Kenrich about insurance. Kenrich responded: SCE submitted the requests to the NRC in the fall of 2015 and the NRC approved the requests in December 2017. The DCE will not be revised due to the timing of the approval, the unknown information regarding the impact to insurance premiums, and the timing of when SCE would reduce coverage.
Non-Labor – Third Party Legal	SDG&E review is thorough. Contingency appears to be between 11-15%. Based on the California regulations and regulators, community involvement and intervenors, the contingency may be low.	Contingency is 15%. SDG&E will note this for review during the next DCE update.
Non-Labor – NRC Fees	No Comments	No response required.
Non-Labor – Office Space	While the basis for the cost is documented, it should specify where the costs came from (i.e. previous set up at SONGS or Vendor bids).	SDG&E will add to the review package the source of the estimate.
Non-Labor – Security Related Expenses	Basis of Estimate writeup incorrectly states ISFSI Demolition (2046-2049). This should be corrected to state that this period is for the transfer of Spent Fuel to DOE.	SDG&E will correct the review package.

DCE Cost Category	Carignan & Associates Comments	SDG&E Response
Non-Labor - Severance	a. 15% contingency seems reasonable. b. The basis is well documented and SDG&E's review is thorough. The only comment here is at this point in the project, SCE should know almost to the person, when they will be separated, their salary, and their severance package. Using an average is OK but it is C&A's opinion SCE should be using actual data. The "contingency" would then be used to address variances in the headcount plan (i.e. Need to keep someone longer than anticipated).	a. No response required. b. SDG&E has requested that SCE consider in the next DCE using a more detailed and accurate estimate for each employee.
Non-Labor – Site Lease and Easement Expenses	a. Why is the contingency only 15% for this estimate when there are so many unknowns? While the increase is unknown it is certain the increase will be significantly more than the 1964 amount. b. Parcels 8 & 9 also appear to be a higher risk based on the assumptions provided. Contingency could be much higher.	a. SDG&E does not recommend that the contingency rate be changed in this DCE but will continue to monitor and review in the next DCE. b. SDG&E does not recommend that the contingency rate be changed in this DCE but will continue to monitor and review in the next DCE.
Non-Labor – Loading Spent Fuel & GTCC Waste to DOE	Good follow up questions and checking by SDG&E. No additional comments or concerns.	No response required.
Non-Labor – Tools and Equipment	No comment since it states: "Tool and equipment costs will be absorbed by the DGC and by other fixed-price contracts going forward."	No response required.
Non-Labor - Water	a. SDG&E questions are good and while Kenrich addressed SDG&E's question regarding the high-water costs, the agreement from 2000 should be renegotiated since the nuclear power plant is no longer operating and the site is undergoing decommissioning. b. Does this cost address electric and sewer?	a. SDG&E will continue to monitor and review in the next DCE. b. Electricity is addressed in Energy. Sewer is addressed in this line item.

Non-Labor – Utility Staff Health Physics Supplies	If dosimeters and TLDs are covered elsewhere, not sure why they are addressed in this section (At least during SDS period). In addition, it is C&A's understanding SDS is responsible for all Decommissioning (radiological) and as such will be responsible for HP supplies. It is doubtful SCE personnel will be setting up separate control points for entry and will be following SDS HP processes and procedures for rad areas. While this is not a large cost during SDS period, it could be questioned.	SDG&E asked Kenrich about this and Kenrich responded that the radiation protection program transition to SDS, however there are still needs for HP supplies by SCE ISFSI-only personnel that are not covered by the SDS contract.
Service Level Agreements	a. Changing contingency from 25% to 10% is reasonable and expected. However, in most of the SLAs costs are constant year to year and don't seem to take into account reduction in activities as the project progresses from 2018 to 2028. It is expected the SLA support in some areas would decrease as work is completed by SDS. b. There appears to be overlap between the oversight staff identified in the "Labor Staff" document and SLA's. c. How many Controller staff do they need?	a. SDG&E will continue to monitor and review in the next DCE. b. SDG&E will discuss this with SCE/Kenrich in conjunction with the Undistributed Labor Staffing. c. SDG&E will discuss this with SCE/Kenrich in conjunction with the Undistributed Labor Staffing.
DGC Staffing (Civil Works Phase)	Not clear why this was not developed as a separate DCE and it is assumed this work will be competitively bid.	SDG&E has recommended to SCE that in the next DCE consider moving the Undistributed DGC Staffing to the distributed project estimate for the Civil Works Phase.

Appendix C

Contingency and Risk

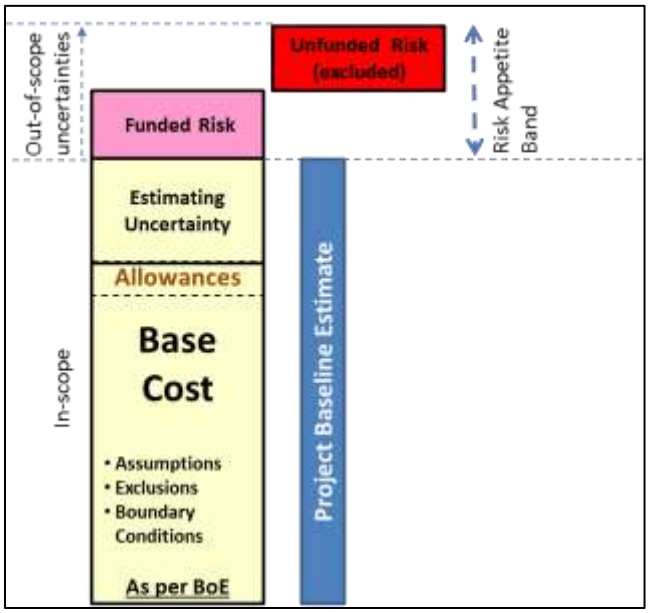
Key Terms and Basic Elements of a Cost Estimate

There are many different terms used when discussing uncertainties in cost estimation and there is variation in their use and meaning depending on preferences and traditions developed over time in a variety of different contexts and countries. Depending on the specific application, the language used, and approach taken, the terms risk and uncertainty are often interchangeably used.

This Appendix serves to define the use of the terms 'uncertainty' (as the cause) and 'financial provision' (as the outcome) as umbrella terms under which it defines certain key terms that are used in a more precise way. To clearly delineate 'in project scope' uncertainties from 'out of project scope' uncertainties, the term Estimating Uncertainty (in the U.S. commonly called Contingency) is attributed to the former and the term Risk is attributed to the latter.

Figure 1 illustrates the basic elements of a cost estimate. The figure is intended to facilitate understanding of how the main terms of uncertainty are used in decommissioning (or any) cost estimates.

Figure 1: Basic Elements of a Cost Estimate



As shown above, Estimating Uncertainty (i.e. Contingency) is part of the Decommissioning cost estimate along with the base cost, allowances and is expected to be spent. Out of Scope Uncertainties (i.e. Risk) are normally managed outside the project based on the companies "risk appetite". Risk may or may not be funded based on the company or management's decision on how much risk they are willing to include in the estimate.

Definition of Key Terms

Listed below are common terms and their definitions, which are often used in the development and discussion of decommissioning cost estimates.

Term	Definition
Allowances	Allowances are provisions for known activities that must be included in the Base Cost, but whose exact values are not presently known. Allowances will be fully spent.
Assumptions	Postulated activities and conditions that are expected to happen or occur. These are necessary to define boundaries of the scope and describe the basis by which the project is planned.
Basis of Estimate (BoE)	A detailed description of the assumptions and exclusions, constraints, Boundary Conditions, sources of data and methodology to be used in the cost estimate (including how estimating uncertainty and risk analysis will be addressed).
Base Cost	This is the estimated cost of the base scope of the project as defined by the BoE, without any contingencies. Allowances are usually included in the Base Cost.
Boundary Conditions	Legal and technical limitations and regulations under which the decommissioning work is expected to be performed.
Estimating Uncertainty	This is a provision for uncertainties that are associated with events that occur in the field within the defined project scope, as identified by the Basis of Estimate (BoE) and are part of the Project Baseline Estimate. In the U.S. and other countries, this is often referred to as the "contingency" and it is assumed to be fully spent during execution of the project.
Exclusions	Specific assumptions which are not to be considered in the project. Risks associated with exclusions are defined as being out-of-scope.
Funded Risk	An additional funding provision calculated for identified risks above the Project Baseline Estimate. This is a provision which may or may not be spent during execution of the project.
In-scope	These are activities and costs that comprise the Project Baseline Estimate and are described in the BoE.

Out-of-scope uncertainties	These are uncertainties which lie above the Project Baseline Estimate as they are considered out of scope. Out-of-scope uncertainties can be funded or remain unfunded (see Risk Appetite).
Project Baseline Estimate	This is the estimated cost of the base scope of the project as defined by the Basis of Estimate (BoE), including provision for the Estimating Uncertainty (Contingency). It excludes provision for any risks considered beyond the defined project scope.
Risk Appetite	This is the amount of risk above the Project Baseline Estimate that an individual, group or organization is prepared or required to fund to complete the project objectives.
Unfunded Risk	This is the identified risk above the Project Baseline Estimate for which funding is not provided within the project.

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Appendix D

Resumes Thomas L. LaGuardia and Joseph E. Carignan

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JOSEPH E. CARIGNAN

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QUALIFICATION SUMMARY

Over thirty-seven years of progressive nuclear experience performing and managing a wide variety of tasks from plant operations and training to decommissioning projects and business development. Over 25 years of diverse decommissioning experience beginning as the Operations Manager on the first large scale reactor decommissioning ***(Shippingport Station Decommissioning Project***). Involved in numerous large and small-scale decommissioning projects; both domestically and internationally. Routinely (4-5 times a year) provide ***decommissioning training and support for Argonne National Laboratories and the International Atomic Energy Agency (IAEA) at various locations***.

- 10+ Years of Managing/Conducting Self Assessments & INPO Readiness Assessments
- 25+ Years Decommissioning Experience
- Performance Based Assessments/QA
- Contract Management/Proposal Development
- Decommissioning- Fossil & Nuclear
- IAEA and ANL Support (Decommissioning)
- Business Development/Sales/Marketing
- Decommissioning Cost Estimating
- Training-Decommissioning & Operations
- Nuclear Plant Operations
- Procedure Development
- Root Cause Analysis/Total Quality
- SRO Senior Instructor (GE)

EXPERIENCE

CARIGNAN & ASSOCIATES LLC (Present)

Consultant

Provide consulting services in the areas of decommissioning cost estimating, operational readiness reviews, training, project management and general decommissioning support.

- Providing decommissioning oversight training and consulting services San Diego Gas and Electric, a minority utility owner of the San Onofre Nuclear Plant. Subject Matter Expert providing independent assessment of a third party DCE for accuracy and completeness in preparation for physical decommissioning.
- Conducted assessments of nuclear power plant decommissioning cost estimates (DCE) for two confidential clients to identify areas for potential cost savings, risks and accuracy; a private company and major utility.
- Conducted an independent assessment of the Nuclear Ship Savannah's DCE and associated plans
- Supported the development of the risk register to be used to support integration into the cost and schedule for the San Onofre Nuclear Plant Decommissioning
- Developed/conducted Decommissioning Cost Estimating Workshop for Canadian Nuclear Laboratories (Previously AECL) including both Whiteshell and Chalk River Laboratories for over 100 personnel
- Routinely provide decommissioning training on Project Management and Planning, Cost Estimating, Risk Management and Environmental Health and Safety, and other select decommissioning topical areas for Argonne National Laboratory and IAEA (over 2000 participants over 15 years)
- In 2016, conducted Risk Management and cost estimating training and support for Ignalina nuclear plant and an International Atomic Energy Agency (IAEA) sponsored company in Slovakia. Also, provided Project Management, Cost Estimating, Transition planning and Risk Management training for companies in the Republic of Korea

TENNESSEE VALLEY AUTHORITY (12/2009 – 12/2014)

Senior Manager, Performance Analysis and Assessments/Decommissioning Planning

Developed an assessment program for a newly formed department responsible for governance and oversight of TVA's nuclear plant performance; focusing on performance-based assessments. This includes staffing the organization with key personnel and developing an innovative process for assessing, monitoring, and measuring plant performance. Many of the assessments focus on training accreditation performance and Institute of Nuclear Power Operations (INPO) follow-up assessments for all six TVA nuclear units. Provide Decommissioning consulting as the subject matter expert to TVA including the development of the decommissioning cost estimates for their seven nuclear power plants. As a Decommissioning Subject Matter Expert, supported the decommissioning cost estimates for the TVA Nuclear Fleet.

- Decommissioning expert for an ***IAEA workshop in Vienna, Austria on decommissioning cost estimating/project management***. ***Subject Matter Expert for TVA decommissioning studies.***
- Established the first industry working group to address standardizing **Self-Assessment Programs.**
- ***Developed processes and procedures*** for the effective implementation of an assessment and analysis program to pro-actively address key issues relating to TVA's nuclear plant performance.
- Provided management direction and oversight for all TVA integrated performance assessments in preparation for the Institute for **Nuclear Power Operations (INPO)** evaluations and accreditations. This included over 20 major assessments in the areas of Technical and Maintenance, Training, and Conduct of Operations. Assessment teams consisted of 10 -30 personnel.)
- Developed guidance for transitioning TVA's nuclear plants from operations to decommissioning and **decommissioning cost estimates**.
- Numerous accolades from INPO and TVA Executive Management on the overall improvement in the assessment process, results, and reports provided to TVA for action.

PROJECT SERVICES GROUP, LLC (2007 – 2009)

Vice President, New Business Development

Responsible for obtaining new business; with a focus on decommissioning as well as ***managing and overseeing various contracts and projects.*** Business development focused on nuclear decommissioning cost estimating, project management and project controls for both commercial and government entities; in less than two years, *contributed to the company being awarded 3 major contracts*.

- Instrumental in winning the support services contract for the ***Humboldt Bay Decommissioning Project***. Managed PSG contract and personnel for the ***Humboldt Bay Decommissioning Project*** providing consulting support, including ***development of the Site Area Closure Plan.***
- Project Manager for medium construction contract for the Department of Energy (DOE).
- **Develop proposals and negotiated contracts** for various project and business opportunities including field construction, decommissioning and cost and financial planning.
- Team Expert for ***IAEA Missions - China & Romania*** to evaluate decommissioning plans, prepared material and conducted week long training on how to prepare decommissioning cost estimates.

TLG SERVICES, INC. (An Entergy Company) (1996- 2007)

Senior Manager, Business Development/Senior Account Manager/Project Manager

Management support, decommissioning technical expertise, cost estimating, oversight, business development and sales/marketing to various TLG projects with a focus on supporting clients in the field as well as obtaining new clients; both domestically and internationally.

- Provided on-site support for various nuclear facility projects including:
  - Team Expert for ***IAEA China mission*** to evaluate the decommissioning plan for their Heavy Water Research Reactor and provide decommissioning guidance on cost estimating.
  - ***Plumbrook Decommissioning Project*** oversight support and project assessment.
  - Assessed Bechtel's multi-million-dollar decontamination/cleanup process for ***Connecticut Yankee's Decommissioning*** Fuel pool using remote heavy equipment.
  - Supported the ***Saxton Concrete Removal Project*** providing QA oversight/audits, as well as procedure and process development for the removal of 2700 tons of contaminated concrete from the containment building.
  - **Conducted DOE critical assessment and independent reviews** of the ***Hanford Tank Waste Farm*** Remediation program focusing on operations, maintenance, and surveillance resulting in process improvements and cost savings.
  - Prepared a ***decommissioning strategy & report*** used for public information for a major utility.
  - On site consulting support and project manager for the on-site area portion of the decommissioning cost estimate and plan for ***Big Rock Point Nuclear Plant.*** Provided site area walk-downs and decommissioning approach used to prepare the site-specific cost estimate.
  - Conducted analysis/assessments of the ***B plant transition project*** at the ***DOE Hanford Facility.***
- Instrumental in obtaining ***dismantling/cost study contracts for fossil power plants***. Provided management oversight for TLG's contract for COMAL and City of Austin ***fossil plant dismantling***.
- ***Auditor and Lead Auditor*** for TLG's Corporate and site QA audits over a 5-year period.
- Instrumental in landing the ***Decommissioning cost estimating*** contract for the Canadian utility power plants ***(Ontario Power Generation, Hydro Quebec and New Brunswick Power)*** resulting in over 6 million in initial sales with ongoing contracts on a routine basis.
- Routinely conduct decommissioning training (Project Management, Cost Estimating, and Case Studies) for ***Argonne National Laboratory's decommissioning training course*** (4-5/Year).
- Instrumental in obtaining new business in the fossil dismantling and remediation area including on-site management of a fossil plant remediation and oversight support for a second independent unit.
- Routinely prepare or support proposals for decommissioning and engineering related projects.
- ***Developed strategy*** for Entergy/TLG to determine viability of future decommissioning opportunities.

MAC TECHNICAL SERVICES CO. (1993- 1996)

Project Manager, RMI Decommissioning Project & Consultant

Managed the Department of Energy (DOE) support staff for the ***50+ million-dollar RMI decommissioning project:*** an NRC licensed site funded by DOE. Provided administrative/technical support including project controls, safety oversight, training, operations, environmental monitoring, and performance assessment activities. Management of the RMI decommissioning project required a working knowledge of contractual requirements, DOE Orders, as well as Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA) regulations.

- Evaluated contractor and company performance identifying numerous improvement areas resulting in lowering the overall project cost estimate by approximately 50 million dollars.
- ***Managed/Performed numerous baseline cost studies/estimates*** for project completion.
- Developed and implemented *a* ***formalized surveillance program*** resulting in significant project improvements and cost savings/avoidance. This included integrating ***DOE, NRC, and EPA requirements*** such that no regulatory requirements were violated.
- Managed formal site audits and performance-based assessments of all site activities and presented site status for budget and progress to senior staff at the DOE Corporate Offices.
- Reviewed/approved all project technical specifications, procedures, work authorization, and plans.

TENNESSEE VALLEY AUTHORITY (1987-1993) – Various management positions

Chemistry Program Manager (1993)
Manager, Quality Assessments (1992 - 1993)
Manager, Nuclear Performance Reviews (1989 - 1992)

As Department Manager, Nuclear Managers Review Group, responsible for performance-based assessments of TVA nuclear programs as well as supporting the Nuclear Safety Review Board (NSRB). The Nuclear Manager's Review Group was established to assist in improving TVA's overall nuclear performance after all the TVA nuclear plants were shut down due to management issues. Approximately 6 months prior to leaving TVA, performed the duties as the Corporate Chemistry Program Manager.

- Managed or conducted over **fifteen major evaluations** including ***Operational Readiness*** and Institute of Nuclear Power Operations follow-up assessments, which contributed to the successful restart of the Sequoyah, Browns Ferry, and Watts Bar nuclear plants.
- Received **TVA "Award of Excellence"** for working on shift to improve Sequoyah plant operations.
- Managed numerous assessments, which determined the effectiveness of TVA's reorganization and consolidation efforts. These included commitments as part of the recovery plan for TVA.
- ***Developed a corrective actions/problem solving training course*** for Sequoyah Nuclear Plant.
- Management representative/coordinator for the CFC charity exceeding contribution goal by 114%.

Senior Nuclear Evaluator (1987 - 1989)

Senior Nuclear Evaluator and team leader responsible for providing support to the teams which evaluated TVA's nuclear programs. Rapidly promoted to department manager overall performance-based reviews for TVA's 3 nuclear stations and developed processes for conducting these reviews.

- As team leader, conducted a three-month onsite, 14-person performance-based assessment of Browns Ferry Nuclear plant operations and training programs to baseline their performance in preparation for restart. The assessment resulted in improvements in plant operations and training contributing to a successful restart of the units.
- Assisted Sequoyah Nuclear Plant in preparing for the Institute of Nuclear Power Operations evaluation by reviewing their corrective action plans and developing the necessary materials and actions to correct previously identified problems. These included chemistry, operations,

radiological controls, and regulatory compliance.

GENERAL ELECTRIC COMPANY (1981 - 1987)

Manager, Operations Support - ***Shippingport Station Decommissioning Project*** (1984-1987)

Shift supervisor responsible for system operations, site maintenance, configuration control, and work release. Within six months, promoted to **Operations Manager** and assumed responsibility for planning, scheduling, system deactivations, operations, maintenance and plant modifications, as well as daily work release to support a constantly changing site configuration during decommissioning.

- Successfully recovered a failing operations de-activation and decommissioning schedule by streamlining work processes, establishing goals, and increasing personal accountability.
- Met all milestones necessary to support decommissioning activities resulting in no contractor change orders or cost add-ons due to work delays.
- Responsible for system deactivation and installation of temporary power (now referred to “cold and dark” and is the process used on most commercial decommissioning projects to date).
- Management award for developing a site configuration and communications program.
- Chaired the daily work and weekly site decommissioning planning and scheduling meetings.
- Emergency Operations Coordinator/Emergency Response Leader for the overall project.
- Coordinated work activities between contractors and General Electric including the development and approval of daily work schedules and site Technical Bid Specifications/procedures.
- Involved in all aspects of preparing and approving procedures for system deactivation.
- Project and Operations met all safety, radiological and budgetary goals for the project.

Lead Engineer/On-Shift Advisor - E.I. Hatch Nuclear Plant (1983-1984)

Integral member in the development of their Emergency Operations Procedure project and held the position as an on-shift advisor for operations. The purpose of the on-shift support was to improve the overall professionalism and conduct of plant operations.

- As **on-shift operations advisor**, assisted operators with solving operational and equipment problems, conducted management audits of surveillance tests, upgraded procedures, and coached junior operators in proper operational watch standing practices.
- **Developed the training program** and material to support implementing one of the first flow chart approaches to symptom-based emergency procedures.
- **Developed an emergency procedure** for plant shut down from outside of the control room. This included walking down plant systems/components and identifying specific actions necessary to operate plant equipment locally. Required extensive knowledge of plant systems.

Senior Instructor - Operating Training Services (1981-1983)

- As a **certified Senior Reactor Operator**, conducted Operator Training (simulator and classroom for BWR 4&6). Developed lesson plans, system descriptions and procedures. Received an award for developing and training 36 foreign and domestic operators on the Graphics Display System and Symptom Based Emergency Operations Procedures as part of a research project. The results of this effort were the basis for the development of the Safety Parameter Display System is still in use today.

UNITED STATES NAVY (1972 - 1978)

USS Nathan Hale - SSBN 623, USS Orion AS 18 and USS Sperry AS 12

- Maintained primary and secondary chemistry. Performed submarine repair and maintenance.
- Supervised work groups for radiological controls compliance and performed tests, decontamination and system line-ups of submarines under shipyard overhaul. Responsible for waste processing including compaction, packaging, and decontamination.

EDUCATION

B.S. Chemistry (1981) Lander College/University (minor in mathematics/computer science)

TRAINING/CERTIFICATION

Participated in various management and training courses including courses in the U.S. Navy nuclear program and commercial nuclear power, technical, environmental, management and total quality including:

Obtained a DOE "Q" clearance (September 2009).
Certified Senior Reactor Operator and Senior Instructor (BWR 4 & 6)
MORT and KT Training (Decision Analysis and problem-solving training) & Total Quality Management
Applying Environmental Regulations & RCRA Compliance & Hazardous Waste Operations Training
50.59 safety evaluation training and certification (BWR)
US Navy Nuclear Power - numerous including Diesel Mechanic and Engineering Laboratory Technical Training

AWARDS AND RECOGNITION

Letter of Appreciation (Ontario Power Generation), TVA Power of Excellence Award, General Electric Management Award, GE Productivity Award, College Science Department Excellence Award, Alpha Chi Honor Society, Military Commendation, two Captain Letters of appreciation and Battle E Efficiency/Good conduct medals. Active 3rd Degree in Taekwondo

PUBLICATIONS/PRESENTATIONS

Routinely present papers at ANS and decommissioning conferences as well as conduct decommissioning classes on project management, cost estimating and case studies three to five times a year (since 1999). Technical chair for the TLG Decommissioning Conferences (1998-2004). 2005/2006 Chair for Decommissioning, Decontamination & Reutilization Division (DD&R - American Nuclear Society). Established and chair the Industry Self-Assessment User's Group (Established 2012).

Examples of workshops/papers/presentations include:

"Transitioning from Operations to Decommissioning": EPRI 2015 and WM16
"Cost Estimating, Decommissioning Funding & Case Studies": *"Decommissioning Planning"* and various decommissioning project case studies including Saxton and Cintichem decommissioning - ANL Decommissioning Training Program (routinely present four to five times a year since 2000).
"How to Prepare a Decommissioning Cost Estimate": IAEA - *1 week - Vienna*
"Decommissioning Nuclear Facilities": IAEA 2 Week Workshop - *Expert Mission - Annually*
"Workshop on Decommissioning Cost Estimating": IAEA 5 day *- Expert Mission - Austria 2010*
"Decommissioning Training Course": IAEA 4 day - *Expert Mission - China 2008*
"Managing Risk" *– ANS Meeting 2007 Project Management Continuing Education*

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Thomas S. LaGuardia, PE, CCP

Senior Decommissioning and Waste Management Consultant, and Cost Estimator

Summary

Mr. LaGuardia has more than 47 years of experience planning and managing decommissioning plans, decontamination and decommissioning programmes; waste management programs, preparing and reviewing cost estimates for major domestic and international government decommissioning projects; preparing cost estimates and cost control programs for decommissioning; reviewing plans and costs of low-level waste disposal facilities; and developing, implementing, and auditing quality assurance programmes. Mr. LaGuardia has written three Decommissioning Handbooks in the US, and contributed to other handbooks internationally. He authored the first definitive text on preparing cost estimates for decommissioning nuclear power plants. He has previously served as an expert witness testifying at over 160 hearings on decontamination, decommissioning, and waste management, and has made decommissioning presentations at more than 50 conferences in the US and abroad.

Education

MS, Mechanical Engineering University of Connecticut, BS, Mechanical Engineering Polytechnic Institute of Brooklyn

Certifications

Professional Engineer (PE) – Connecticut, New York, New Jersey, Virginia

AACEI Certified Cost Professional (CCP)

Professional Affiliations

AACE International, American Nuclear Society, American Society of Mechanical Engineers

Honours and Awards

Lifetime Achievement Award from the American Nuclear Society Decontamination, Decommissioning, and Reutilization Division

Wendell D Weart Lifetime Achievement Award presented at the Waste Management Symposium, March 2017

Selected Relevant Experience

As Managing Member of LaGuardia & Associates, LLC (2006 to present)

- Consultant to Excel Services, Inc., for the review and evaluation of decommissioning costs estimates and risk analyses for the acquisition of a nuclear power plant.
- Consultant to NextEra Energy (Florida Power & Light) for the review of decommissioning cost estimates to reduce decommissioning costs, and preparation of associated risk analyses.
- Consultant to Carignan & Associates, LLC for the review of SONGS 2,3 decommissioning cost estimates for San Diego Gas & Electric.
- Consultant to Carignan & Associates, LLC for the decommissioning cost and funding analysis for Crystal River.

- Consultant to Project Time & Cost for the review of decommissioning cost estimates and risk analyses for the Swiss Gosgen KKG NPP Optimism Bias Analysis

- Consultant to IAEA and OECD/NEA on Uncertainty in Cost Estimation for Decommissioning, including Allowances, Contingency and Risks (Report published in 2017)

- Consultant to Holtec, International for the Proposal to Southern California Edison for the SONGS 2,3 Decommissioning

- Prepared and presented (with Carignan & Associates, LLC) a one-day Workshop on Decommissioning Cost estimating for San Diego Gas & Electric (Sempra)

- Consultant to Chesapeake Nuclear for the review of the Decommissioning Plan of the United Arab Emirates Barakah NPP submittal to the Federal Authority for Nuclear Regulation

- Prepared and presented (with Carignan & Associates, LLC) a two-day Workshop on Decommissioning Cost estimating for Canadian Nuclear Laboratories (formerly AECL) at Whiteshell Laboratory and Chalk River Laboratory (twice) to over 75 attendees.

Prepared a Decommissioning Cost Survey of US completed projects versus estimated costs for The Institute for Applied Energy, Tokyo, Japan.

Prepared decommissioning cost estimates for the Vermont Yankee Nuclear Power Plant specifically addressing three scenarios for segmentation of the reactor vessel and internals including an innovative technology for cutting and advising the Bechtel/RSCS/GE-H team on decommissioning methodologies and costs.

Prepared two guides for the OECD/NEA on cost estimation, “The Practice of Cost Estimation,” and “Peer Review of Decommissioning Cost Estimates.”

Prepared a Decommissioning Cost Estimate Review Guide for the Swedish Radiation Safety Authority (regulator for all the Swedish nuclear power plants), including detailed checklists for review of estimates.

Participated in a joint OECD/NEA and IAEA program to identify and define decommissioning cost uncertainties including estimating uncertainty, allowances, and risks.

Provided technical and cost estimating support for three utilities regarding the reasonableness of disposal costs and licensing issues for the Waste Control Specialists Disposal Facility in Texas.

Prepared a Decommissioning Cost Control Guide and Training Modules for the Earned Value Management System (EVMS) for the Organization for Economic Cooperation and Development/Nuclear Energy Agency (OECD/NEA.

Evaluated the decommissioning cost estimate for the Zion Nuclear Power Plant, including a Risk Analysis using Monte Carlo analysis techniques for the probability of costs not to exceed estimated values.

Prepared cost estimation testimony for Exelon Nuclear used in litigation against the US Internal Revenue Service.

Reviewed and provided decommissioning cost/planning guidance for the Steam Generating Heavy Water Reactor (SGHWR) and DRAGON Reactor at Winfrith Laboratory, UK.

Prepared a report for the UK NDA on the US decommissioning experience in large component removal and disposal of reactor vessels, steam generators and pressurizers.

Authored two chapters for cost estimation and decommissioning experience for the Nuclear Decommissioning Handbook for Woodhead Publishing (UK).

Authored a Chapter on US Decommissioning Experience for a book entitled, “Infrastructure and methodologies for the justification of nuclear power programmes,” Edited by: Prof Agustín Alonso of the Madrid Polytechnic University, Spain, published by Woodhead Publishing (UK).

Provided consulting services to Natural Resources Canada (NRCan) for the Evaluation of the Chalk River Laboratory and Whiteshell Laboratory Decommissioning, and the Port Hope/Port Granby Uranium Mill Tailings Remediation Program.

Provided decommissioning cost estimating and planning services for the AECL Chalk River Laboratory and Whiteshell Laboratory.

Provided consulting and cost estimating services to Project Time & Cost, UK (PT&CUK) to develop a cost estimating model for decommissioning the UK Magnox reactors.

Provided consulting services to the International Atomic Energy Agency (IAEA) on an expert mission to the Russian Federation at Rosenergoatom to assist and review the development of a cost estimating computer program for Russian reactors.

Provided consulting services to the European Bank for Reconstruction and Development (EBRD) in a review of the decommissioning plan for decommissioning the Ignalina NPP.

Assisted the UK National Audit Office (NAO) by developing an audit plan for the NAO in an audit of the NDA contracting practices for first and second tier decommissioning contractors.

Assisted the NAO in the development of an Audit Plan to be used by NAO in an audit of the NDA contracting practices for operation of the UK Drigg Low Level Waste Repository.

Provided an independent review of five contractor multi-billion-dollar proposals for the US Department of Energy for decommissioning the Portsmouth Gaseous Diffusion plant in Ohio, and reviewed four contractor proposals for decommissioning the Lawrence Berkeley Bevatron Facility in California.

Prepared a report on US experience in the dismantling of nuclear power plant reactor vessels and internals for the ENBW Company KWO Obrigheim.

As President of TLG Services, Inc:

As a contractor to the US DOE, directed the decommissioning activities for piping and component removal from the Shippingport Atomic Power Station. Provided planning and cost estimating support for the decommissioning of the Gentilly Unit 1 reactor in Canada. Directed the preparation of the Pathfinder reactor decommissioning plan, and the structural analysis of the Pathfinder reactor vessel to secure a US Nuclear Regulatory commission (NRC) license for transport of the vessel as its own container. Supervised the demolition of the Mallinkrodt cyclotron facility near San Francisco. Supervised the evaluation of decommissioning alternatives and costs for decommissioning the Rancho Seco Nuclear Power Plant. Supervised the cost estimate for decommissioning the Shoreham Nuclear Power Station, and the preparation of draft decommissioning plan. Participated in the Long Island Lighting Co., Nuclear D&D Safeguards Committee. Directed the preparation of the Cintichem Research Reactor decommissioning plan and cost estimate. Participated in the Cintichem Nuclear Safeguards Committee. Prepared a verification review of the Fort St. Vrain decommissioning cost estimate to support a letter of credit for decommissioning funding.

Supervised the preparation of decommissioning cost estimates for the US DOE's Gaseous Diffusion Plants located in Oak Ridge, TN; Paducah, KY; and Portsmouth, Oh.

Directed the development of cost estimates for the Garigliano Nuclear Power Plant in Italy, the Tokai Unit 1 Nuclear Power Plant in Japan, the Koberg Nuclear Power Plant in South Africa, and the Barsebeck Unit 1 Nuclear Power Plant in Sweden. Prepared a decommissioning planning review and cost estimate evaluation of British Nuclear Group's program for decommissioning Magnox reactors. Performed a review of cost estimating methodology for the Russian Federation Rosenergoatom's nuclear power plants.

Relevant Work History

2006-Present: LaGuardia & Associates, LLC - Managing Member

2000-2006: Vice President Entergy Nuclear, Inc. and President of TLG Services, Inc.

1982-2000: TLG Services, Inc. – President/Owner

1974-1982: Nuclear Energy Services, Inc. - General Manager - Decommissioning, Group Manager, Quality Assurance Manager, Manager of Plant Systems Engineering

1968-1973: Gulf United Nuclear - Senior Mechanical Engineer, Power Plant Engineering

1962-1986: Combustion Engineering, Inc. - Thermal Performance Group Leader, Marine Department

Publications

Authored/edited three Decommissioning Handbooks, Cost Estimate Guides, and over 200 papers

Testimony

Testified at more than 165 public hearings on nuclear and fossil fuelled plants on decommissioning rate cases for clients.

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ATTACHMENT C

DECLARATION OF BRUCE A. FOKMANN REGARDING CONFIDENTIALITY OF CERTAIN DATA/DOCUMENTS PURSUANT TO D.17-09-023

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

DECLARATION OF BRUCE A. FOLKMANN REGARDING CONFIDENTIALITY OF CERTAIN DATA/DOCUMENTS PURSUANT TO D.17-09-023

I, Bruce Folkmann, do declare as follows:

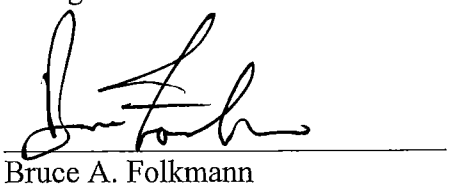
1. I am the Vice President – Controller & Chief Financial Officer for San Diego Gas & Electric Company ("SDG&E"). I have reviewed the confidential information included within Exhibit SDGE-03/03C, prepared direct testimony addressing 2017 SONGS 1 and SONGS 2&3 DCE ("Exhibit SDGE-03/03C"), submitted concurrently herewith. I am personally familiar with the facts in this Declaration and, if called upon to testify, I could and would testify to the following based upon my personal knowledge and/or information and belief.

2. I hereby provide this Declaration in accordance with Decision ("D.") 17-09-023 and General Order ("GO") 66-D to demonstrate that the confidential information ("Protected Information") provided in Exhibit SDGE-03/03C is within the scope of data protected as confidential under applicable law.

3. In accordance with the narrative justification described in Exhibit 1, the Protected Information should be protected from public disclosure.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct to the best of my knowledge.

Executed this 14th day of March, 2018, at San Diego.



Bruce A. Folkmann
Vice President – Controller & Chief Financial Officer

EXHIBIT 1

SDG&E Request for Confidentiality
on the following information in Exhibit SDGE-03/03C

Location of Protected Information	Legal Citations	Narrative Justification
Gray shaded portions in lines 5, 13, 18 and 21 of Table 3 in Exhibit SDGE-03/03C, page 27.	California Gov. Code § 6255 (the public interest served by not disclosing the information is clearly outweighed by the public interest served by disclosure of the record).	The Protected Information includes confidential contract terms, including decommissioning plans and pricing terms, in two agreements: 1) an agreement between Southern California Edison ("SCE") and Energy*Solutions* Services, Inc. (Energy*Solutions*), and AECOM Energy & Construction, Inc. ("AECOM"), dated December 20, 2016 ("DGC Agreement"). EnergySolutions and AECOM formed a joint venture known as SONGS Decommissioning*Solutions* ("SDS"); and 2) an agreement between SCE and Holtec International (ISFSI Agreement), dated December 5, 2015. While not a party to these Agreements, as a minority owner of SONGS, and under the terms of its Decommissioning Agreement with SCE, SDG&E is bound by the same confidentiality constraints as SCE. Both the DGC Agreement and ISFSI Agreement require SCE, and by extension SDG&E, to make reasonable efforts to protect the confidentiality of the terms and conditions in the agreements. The agreements require confidentiality because they contain commercially sensitive pricing terms and proprietary information, such as work sequencing and scope. If this information was publicly disclosed without protection, competitors, including potential vendors for decommissioning sub-contract work and other activities, could mis-use the information to the detriment of SCE's and SDG&E's customers. For example, if a vendor seeking to bid on a subcontract or

		another activity knew the DGC Agreement or ISFSI Agreement pricing terms, the vendor would have an opportunity to adjust its bid prices (e.g., the vendor could bid higher than it otherwise may have bid). Public release of this information could also hinder SCE's ability to obtain favorable contract terms for related decommissioning work not covered under the DGC Agreement and ISFSI Agreement. For example, if a vendor (who SCE has not yet contracted with for SONGS decommissioning) was aware of various terms in the DGC Agreement and ISFSI Agreement, the vendor could mis-use this information during contract negotiations to extract terms favorable to the vendor that the vendor may not have otherwise sought. Finally, it is also in the best interest of the long-term success of the SONGS decommissioning project that SDS and Holtec remain commercially competitive throughout the terms of the DGC Agreement and ISFSI Agreement, respectively. Both agreements are long-term agreements that will require SDS' and Holtec's continued performance for the next decade and beyond. If information regarding the agreements was disclosed without protection, their competitors could mis-use the information against them during the bidding process for other decommissioning projects across the world and potentially threaten the financial health of both companies, to the detriment of the companies' financial health to complete contractually required services for SONGS in the future without interruption.