Application No.:
Exhibit No.: SCE-02, Vol. 03
Witnesses: T. Champ

SOUTHERN CALIFORNIA EDISON®

An *EDISON INTERNATIONAL*® Company

(U 338-E)

2015 General Rate Case

Generation
Volume 3 - Palo Verde

Before the

Public Utilities Commission of the State of California

Rosemead, California
November 2013

SUMMARY

Palo Verde O&M

- SCE requests Test Year 2015 Operation & Maintenance (O&M) expenses of $73.8 million (Constant 2012 $, SCE share)
    - Includes SCE oversight costs
- SCE's Test Year 2015 O&M forecast estimates no increase above 2012 recorded expenses

Palo Verde Capital

- SCE requests capital expenditures of $31.6 million in Test Year 2015
    - Post Test Year capital expenditures are $30.8 million and $30.0 million (nominal $, SCE share) in 2016 and 2017, respectively.
- Major projects include the Security Access Control System Replacement project, Digital Upgrade GENERREX project, Nuclear Administrative and Technical Manual Replacement project, Spray Pond Concrete Replacement project, Evaporation Pond #1 Liner Replacement project, the Addition of the Seventh Clarifier Train, and the Learning Center: In-Processing Facility project.

SCE-02: Generation
Volume 03 - Palo Verde

Table Of Contents

SCE-02: Generation
Volume 03 - Palo Verde

Table Of Contents (Continued)

SCE-02: Generation
Volume 03 - Palo Verde

Table Of Contents (Continued)

SCE-02: Generation
Volume 03 - Palo Verde

Table Of Contents (Continued)

SCE-02: Generation
Volume 03 - Palo Verde

List Of Figures

SCE-02: Generation
Volume 03 - Palo Verde

List Of Tables

I.

INTRODUCTION – PALO VERDE O&M

This volume presents Southern California Edison Company's (SCE) Test Year 2015 Palo Verde Nuclear Generating Station Units 1, 2, and 3 (Palo Verde) Operations and Maintenance (O&M) expense request. SCE forecasts Test Year 2015 Palo Verde O&M expense at $73.8 million (SCE's 15.8 percent share, Constant 2012 Dollars). This forecast represents no increase from last recorded year 2012.

Chapter I provides background information on Palo Verde Operations, and an expense estimate summary for SCE's Test Year O&M. Chapter II provides an overview of the Palo Verde budget and cost control process. It also describes the annual budget development cycle and methods for identifying and assessing funding needs. SCE is not the operator of Palo Verde; therefore it must rely on Arizona Public Service's (APS) understanding of Palo Verde requirements. Chapter II discusses ways in which SCE exercises oversight. Chapter III describes the methodologies used to develop SCE's forecast of Palo Verde O&M expenses in constant 2012 dollars. Chapter IV discusses Palo Verde's Refueling and Maintenance Outage (RFO) expenses, which are a substantial part of total O&M expenses, and provides the Palo Verde RFO schedule for Test Year 2015. Chapter V provides detail on SCE's Test Year 2015 Palo Verde O&M expense requirements.

A. Background Information On Palo Verde Operations

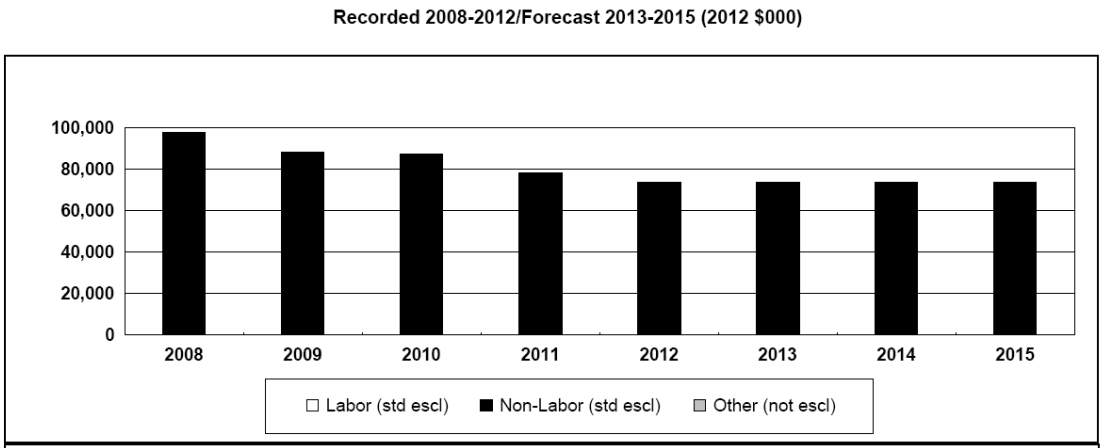
Palo Verde consists of three nuclear Units with a total rated output of about 3,937 megawatts electric (MWe) net. SCE owns 15.8 percent of Palo Verde. There are six other participants of the plant.

Each nuclear plant site is unique. Palo Verde is one of the largest nuclear installations in the United States, located on a site of more than 4,000 acres, approximately 50 miles west of Phoenix, Arizona. Its operation benefits from both the economies of scale and its large site. The plant also has an innovative feature; it uses reclaimed treated sewage water from the City of Phoenix, and other local cities, as cooling water because it is not located near a large body of water.

Figure I-1 reflects SCE's 15.8 percent[1] ownership share of Palo Verde adjusted/recorded O&M costs for 2008 – 2012 and the forecast O&M costs for Test Year 2015.

[1] Participants in Palo Verde are: APS (29.1 percent); Salt River Project (17.5 percent); El Paso Electric (15.8 percent); Southern California Edison (15.8 percent); Public Service New Mexico (10.2 percent); Los Angeles Department of Water & Power (5.7 percent) and Southern California Public Power Authority (SCPPA) (5.9 percent).

Figure I-1
Palo Verde 1, 2, and 3 Adjusted O&M Expense – FERC Account 524
2008-2012 Recorded and 2015 Forecast
(Constant 2012 $000, SCE Share)



	2008	2009	2010	2011	2012	2013	2014	2015
Labor	212	86	116	182	173	173	173	173
Non-Labor	97,426	88,243	87,103	78,123	73,645	73,645	73,645	73,645
Other	0	0	0	0	0	0	0	0
Total	**97,638**	**88,329**	**87,219**	**78,305**	**73,818**	**73,818**	**73,818**	**73,818**

Forecast

In addition to O&M costs, SCE also reimburses APS for its overheads, which are part of operating Palo Verde. These overheads include: payroll taxes, pensions and benefits, insurance costs, and administrative costs associated with the plant. SCE records such costs as overheads paid to others. SCE-08, Volume 1, Chapter III, provides information regarding this part of the total operating costs for SCE's share of Palo Verde.

B. SCE Test Year O&M Expense Estimate Summary

SCE's 15.8 percent share of Palo Verde's O&M expenses for Test Year 2015 is $73.8 million (Constant 2012 Dollars). The first responsibility of a nuclear facility operator is to implement and maintain all necessary measures to protect both public and worker health and safety. SCE and APS take this responsibility seriously and insist that compliance with regulatory safety requirements is of the utmost importance. The Test Year 2015 O&M forecast for Palo Verde is consistent with the objective of excellent safety performance, regulatory compliance, and cost effective performance.

II.

SCE'S OVERSIGHT RESPONSIBILITIES FOR PALO VERDE

SCE participates in various committees at Palo Verde as described below.

The Palo Verde Administrative Committee is chaired by an APS Officer/Chief Nuclear Officer, currently the Executive Vice President, Nuclear. The Administrative Committee also consists of other members as appointed by the Owner companies (SCE's member of the Palo Verde Administrative Committee is SCE's Senior Vice President & Chief Nuclear Officer). The Palo Verde Administrative Committee meets quarterly to focus on the strategy and planning for the station.

The Palo Verde Engineering and Operations (E&O) Committee is responsible for final review and approval of the annual O&M budget as prepared by APS, review of O&M budget status and variance reports, review of recommended corrective actions to budget variances, approval of those actions, as necessary, and outage schedule review and approval. SCE's Palo Verde Project Manager represents SCE on the E&O Committee. The Project Manager actively participates in E&O Committee meetings discussing and approving significant cost, schedule, and resource issues, and confirms that development, approval, monitoring and control of the O&M budget is acceptable to SCE. The Palo Verde E&O Committee typically meets eight times per year.

Palo Verde has a comprehensive budget development, approval, cost-control process. SCE and the other owners' participation in the E&O and Administrative Committees provides assurance that, based on the best available information, APS properly plans and controls Palo Verde O&M expenses in a way that is consistent with the objective of excellent safety performance, regulatory compliance, and cost effective maximization of generation.

In addition to oversight of Palo Verde O&M costs, the above committees also provide for oversight of engineering, plant operations, nuclear fuels, audits, and switchyard issues. They receive routine reports from Palo Verde and review relevant plant information at routine meetings, usually at Palo Verde or APS headquarters. This section of the Test Year 2015 funding request includes costs for the oversight functions described above.

A. Palo Verde Budget Process

APS's staff of cost professionals develops, monitors, and administers budgets at Palo Verde. This staff considers the operational needs and cost experiences at Palo Verde, as well as, the experiences of others in the industry concerning achievement of high levels of electrical production, consistent with safe, compliant, and reliable long-term operation. The cost professionals, who are part of a centralized

cost organization, provide effective and efficient budget and cost control services and support for the entire Palo Verde organization.

Palo Verde currently develops its budget using a methodology and process consistent with industry practices. Palo Verde develops annual O&M work requirements and manpower requirements in detail by line management and supervision. The goal is to define a scope of work that maintains safe, reliable and efficient plant operations while generating electricity at the lowest possible cost.

The line managers identify specific needs of their organization for the upcoming year. They also evaluate the impact of the next year's anticipated work activities to identify needs for resources other than manpower. They consider such things as: (1) RFO schedules, (2) operating and support requirements, (3) future staffing development needs, (4) efficiency improvements in their particular work areas, and (5) the use of information technologies to further improve work processes.

The cost staff considers all inputs available from the line managers and determines the resource needs. From this information, they forecast costs for each group at Palo Verde. They organize these costs into an overall budget for the plant that reflects the total resource requirements and costs for the upcoming budget year. All organizations systematically review budget performance throughout the year to identify budget adjustments (*i.e.*, increases or decreases) that may be achieved without compromising the safety and reliability of operations.

B. Cost Control Process

To monitor costs, Palo Verde produces monthly reports that identify the variance between budgeted and recorded costs. Palo Verde management holds routine meetings with the E&O Committee (which includes representatives from each co-owner) to formally review the current cost status compared to the approved budget and to discuss any unbudgeted or emergent work. Line managers address potential changes to their budgets that have arisen during the month that may affect costs. A key function of these meetings is for the E&O Committee to agree on budget plans and set priorities, so that all work performed is not only necessary, but justified in relation to other emergent work requirements.

III.

METHODOLOGY FOR ESTIMATING 2012 TEST YEAR O&M EXPENSES

SCE applied adjustments to historical recorded data (2008-2012) and future adjustments to the estimating methodologies chosen for Test Year 2015 forecast to account for one-time events and/or new requirements or emerging issues. Both historical and future adjustments are included in SCE's work papers.[2] This Chapter describes estimating methodologies considered in forecasting Palo Verde O&M expenses.

A. Methodologies Considered

SCE evaluated a number of different methods or variations of methods in developing a basis for the Palo Verde Test Year 2015 O&M forecast. These methods include:

- 5 year (2008-2012) average of O&M expense data
- 4 year (2009-2012) average of O&M expense data
- 3 year (2010-2012) average of O&M expense data
- 2-year (2011-2012) average of O&M expense data
- 5 year (2008-2012) linear trending of O&M expense data
- 4 year (2009-2012) linear trending of O&M expense data
- 3 year (2010-2012) linear trending of O&M expense data
- Last recorded year (2012) O&M expense data
- Adjusted methodology for a specific forecast of future costs where SCE uses one estimating method in conjunction with future year adjustment(s)
- Itemized Forecast methodology where SCE develops a specific forecast of future costs without using any of the estimating methods discussed above

Once SCE selected an estimating methodology, the total forecast of Test Year 2015 O&M expenses included the amount in 2012 dollars. The Test Year O&M forecast includes RFO expenses based on two RFOs annually. Chapter V discusses the results of the forecasting method selected by SCE.

---

[2] *See* Chapter V for cost details.

IV.

RFO EXPENSE

This chapter describes how refueling outages (RFOs) are included in Palo Verde O&M costs. These costs are part of the total O&M funding request consistent with the plan for two RFOs every year. A primary goal at Palo Verde is to avoid summer outages since all participants are Southwestern U.S. utilities that typically experience their peak load periods in the summer months (June-September). For this reason, Palo Verde plans its fuel cycles so that one Unit refuels in the spring each year and another refuels in the fall. These RFOs rotate among the three Units in an approximately 18-month period for each individual Unit. Palo Verde has used this rotation for a number of years, which has resulted in two RFOs per year. Therefore, SCE reasonably expects that the plant will experience two RFOs per year. RFOs for Palo Verde Unit 3 (spring) and Unit 2 (fall) are currently forecast for Test Year 2015.

A. Development of an RFO Plan

APS, the Operating Agent for Palo Verde, plans RFOs with three major parameters in mind: scope, duration, and cost. APS bases its initial planning on the prevailing work processes and procedures in effect at Palo Verde, the demonstrated organizational capabilities, and the required work scope. The foundation of an RFO is the work scope or activities to be performed. In addition to refueling activities, a typical RFO at Palo Verde has over 3,000 maintenance orders and over 10,000 individually identified activities in the work scope.

Every RFO has work activities that are similar in scope and outage time requirements, such as: (1) shut down and cool down of the reactor, (2) removal of the reactor vessel head and fuel replacement, (3) reassembly of the reactor vessel, and (4) heat up and start-up of the reactor. Other activities in an RFO are one-time projects or follow a periodic cycle. Each RFO has a work scope consisting of generic work activities and cycle-specific activities (i.e., plant modifications, surveillances, and corrective maintenance). Before detailed planning of an RFO can begin, Palo Verde determines cycle-specific activities to be performed in conjunction with the generic activities; therefore, each RFO scope is unique.

Within the framework of the generic work activities, Palo Verde creates a specific RFO plan, based upon the particular work scope. This plan begins with the generic refueling activities and

standard work windows,[3] which allow access to specific plant systems. Palo Verde adds cycle-specific activities to this plan, including, required surveillance, preventive maintenance, plant modifications, corrective maintenance, and fuel cycle-specific activities. Palo Verde then establishes the planned duration for each RFO based on the work necessary to ensure safe, compliant and reliable operations are met. Prior to each outage, the planned scope, duration and cost are reviewed with the participants.

B. RFO Expenses

The RFO plan identifies the scope of work and schedule. Palo Verde establishes a cost forecast using historical RFO costs as a basis. Palo Verde removes the costs for cycle-specific activities from the historical costs for past years, and averages the historical costs. Palo Verde then adds costs for the planned cycle-specific activities for the planned RFO to the average-historical costs to determine the total RFO cost.

[3] "Work Windows" are periods of time when work can be performed on specific systems. During the work window, the system is usually removed from service and placed in a condition safe for work activities (*i.e.*, cooled down, depressurized and deenergized). This process allows the aggregation of work activities with similar plant status requirements.

V.

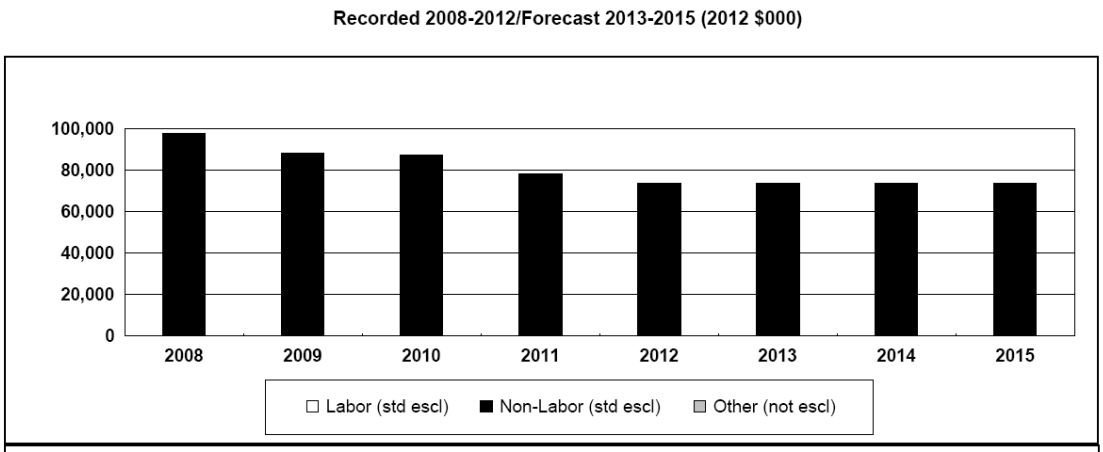
SCE'S O&M EXPENSE REQUEST FOR PALO VERDE

SCE records costs to FERC accounts based on billing information provided by APS. SCE does not participate in determining the appropriate accounting assignments made by APS. For that reason, this testimony does not describe in detail trends or averages in any particular account. Palo Verde's overall O&M costs decreased from 2009 through 2012 as improvements were made in refueling outage performance and productivity improvements were implemented. Palo Verde costs have now stabilized into a normal pattern. As discussed below, the Test Year 2015 O&M forecast does not increase above 2012 recorded expenses.

A. Palo Verde FERC Account Forecast

As shown in Figure V-2 below, SCE will require $73.8 million in Test Year 2015 for Palo Verde O&M costs including $0.2 million for Labor and $73.6 for Non-Labor. This forecast represents no increase from last recorded year 2012 recorded expenses.

Figure V-2
Palo Verde 1, 2, and 3 Adjusted O&M Expense– FERC Account 524
2008-2012 Recorded and 2015 Forecast
(Constant 2012 $000, SCE Share)



	2008	2009	2010	2011	2012	2013	2014	2015
Labor	212	86	116	182	173	173	173	173
Non-Labor	97,426	88,243	87,103	78,123	73,645	73,645	73,645	73,645
Other	0	0	0	0	0	0	0	0
Total	**97,638**	**88,329**	**87,219**	**78,305**	**73,818**	**73,818**	**73,818**	**73,818**

As seen in Figure V-2 above, labor costs in 2009 and 2010 were lower than average as employees assigned to Palo Verde oversight activities were temporarily re-assigned to SONGS projects.

More recent costs, in 2011 and 2012, represent labor associated with a normal level of oversight activity since SCE had representatives specifically assigned to Palo Verde activities during those years. Therefore, we have chosen a last recorded year forecast method for labor.

Non-labor costs have steadily decreased each year from 2008 through 2012 as improvements were made in refueling outage performance and productivity improvements were implemented. In D.89-12-057, the CPUC stated that if recorded expenses in an account have shown a trend in a certain direction over three or more years, the last recorded year is an appropriate base estimate. Since non-labor costs have shown a decreasing trend for the last five years, we have chosen the last recorded year forecast method. Selecting any other forecast method would simply provide in excess of the O&M expenses we expect to incur, and therefore, would not be appropriate.

VI.

INTRODUCTION - PALO VERDE CAPITAL

SCE owns 15.8 percent of Palo Verde Nuclear Generating Station Units 1, 2 & 3 (Palo Verde). As the operating agent for Palo Verde, Arizona Public Service (APS) develops and manages capital expenditures. APS identifies and implements capital projects as necessary to support safe operation of the plant to meet regulatory requirements, optimize overall cost-effective plant operation, or to continue to increase reliable plant operation. APS has developed and utilized a budgeting and cost-control program to implement an optimum level of capital expenditures. This volume identifies the categorization of capital investments, describes the capital budgeting and approval process, and provides the capital expenditure forecast for years 2013 through 2017.

Table IX-1 shows the 2013-2017 capital expenditures planned by major category. Table IX-2 shows any capital projects for which SCE's share of the cost exceeds $1 million over the period 2013-2017 separately within their major category. Chapter IX provides a brief description of each large project (SCE's share over $1 million), and explains the need for the project, and its financial justification.

VII.
PALO VERDE CAPITAL BUDGET

A. Overview

SCE reviews and approves the APS-prepared Palo Verde capital budget and individual capital projects (Work Authorizations) through participation in the Engineering & Operating (E&O) and Administrative Committees. The Palo Verde Participation Agreement established these committees to provide effective forums for participant oversight of Palo Verde's management.

APS expends capital funds as needed for the safe operation of the plant within regulatory requirements, plant reliability, operability, or when otherwise required to effectively and efficiently operate and maintain the plant. APS does not rigidly "fix" the specific scope of capital work to be implemented in future years. APS plans capital expenditures in response to changing regulatory requirements, emergent work, plant reliability or operability changes, results of studies and conceptual or preliminary engineering, industry developments, replacement energy costs, and other evolving factors. Thus, prudent management of capital expenditures includes flexibility in deferring or substituting projects as needed to respond to emergent work, changing priorities, and other factors. SCE and the other participants approve necessary individual capital improvement projects and necessary revisions to the capital budget to respond to changing conditions.

APS categorizes capital work by project type, and the participants approve the work in accordance with Palo Verde (E&O) Committee procedures applicable to the project category. The Palo Verde E&O Committee is responsible for final review and approval of the annual capital and O&M budgets prepared by APS, and periodic review of the status of those budgets and any variances with actual costs.

Chapter VIII.A identifies and discusses the established capital categories. APS provides documented justification for capital work and, where appropriate, develops an engineering cost evaluation of alternatives. The Palo Verde capital program contains the following elements to ensure appropriate project and expenditure prioritization: (1) System Engineering, Plant Health Committee Sub-Committee (PHCSC), Plant Health Committee (PHC), Management Review Committee (MRC), and Long Range Plan (LRP); (2) the Work Authorization (WA) process; and (3) the Annual Capital Budget.

APS has an effective budgeting and cost control system in place. SCE uses its review of the APS monthly variance reports, review and approval of the annual capital budget, and review and

approval of individual projects (WAs) to oversee the capital expenditures at Palo Verde and to verify that APS is effectively administering budget and cost control processes.

B. System Engineering, Plant Health Committee Sub-Committee (PHCSC), Plant Health Committee (PHC), Management Review Committee (MRC), and Long Range Plan (LRP)

This testimony demonstrates that the participants control Palo Verde capital costs and implement only necessary and justifiable projects. SCE oversees these capital expenditures through its role in the E&O and Administrative Committees.

The Palo Verde System Engineering Team, PHCSC, PHC and MRC must approve plant modifications. The System Engineering Team identifies proposed plant modifications and a package/presentation is provided to the PHCSC for review and ranking. The PHCSC reviews each plant modification project and assigns an implementation priority and schedule based on the following criteria:

* A ranking between two and seven is established based on Safety (Nuclear and Personnel), Reliability Improvements or Production (Short Term).
* A multiplier is applied to the ranking as follows:

  5 - Short-term implication or limited option needed to correct existing or imminent condition. The failure to implement may impact the health or safety of public/plant personnel; result in plant shutdowns, or delay start-up or plant return to service.

  4 - Aggressive completion is necessary to prevent future significant or adverse conditions, or hinders response to design basis or critical plant transients.

  3 - Items that improve/maintain equipment reliability, plant operation or worker condition that is economically justified but not urgent to resolve.

  2 - Plant improvement/betterment item that provides short term benefit. May include intangible benefits such as improvement in employee morale and plant appearance.

  1 - Item could potentially add value, but shows little short-term benefit.

Following initial PHCSC ranking and approval of modifications, the proposed modification then proceeds to the PHC for implementation approval and finally goes to the MRC for funding approval. Once the MRC has approved funding for a project, Palo Verde assigns WA numbers to the capital project and processes the project for approval via the WA process.

The LRP schedules and tracks current and future capital projects and requirements, including PHCSC / PHC approved plant modifications. The LRP incorporates a cost estimate for capital work and

is periodically updated as necessary. The LRP documents deferral of scheduled projects and identifies and/or substitutes new projects in response to changing regulatory requirements, and other evolving factors. The LRP database cross-references projects to the NRC and other regulatory agency commitments.

C. Work Authorization Process

Palo Verde develops individual WA packages for new or revised capital projects and routes them internally for review and approval. These packages include the description, justification, and cost estimate for the individual projects or work activity. Palo Verde-approved WA packages are then submitted to the E&O Committee (participants) for review and approval. WA packages include descriptive documents and appropriate justification for review and approval. A capital project is justified if it is: (1) required for personnel, public or plant health and safety, (2) necessary to meet regulatory requirements, (3) necessary for continuing reliable plant operation, or (4) cost-effective plant betterment. The E&O Committee reviews WA packages on an ongoing basis and approves them, as appropriate, on a monthly basis. If a project is estimated to cost in excess of $500,000 (100 percent share), it goes to the Administrative Committee[4] for approval.

D. Annual Capital Budget

Palo Verde prepares an Annual Capital Budget each year for the next budget year and processes it for APS and E&O Committee approval. The budget is based on the LRP, and contains APS-approved projects planned for the upcoming year and conceptual projects that are expected to be approved during the budget year. Some of these projects may require several years for completion. APS also presents a forecast for the year following the upcoming budget year. E&O Committee approval of the budget provides acceptance of the total dollar value for the annual budget, but does not constitute final approval of the line items within the budget. This is because the WA process controls individual project approval. Typically, during the budget year, APS may change the timing of some individual projects to allow other emergent, higher priority work to be performed. In any case, APS implements only work approved through the WA process.

---

[4] The Administrative Committee consists of one representative appointed by each Participant (Co-Owner) who is an officer or the general manager of their company. This committee has various functions, including but not limited to: (1) providing a liaison between the Co-Owners and the management team at Palo Verde, (2) considering and resolving matters referred to it by other committees, and (3) reviewing, discussing and acting upon disputes among the Co-Owners.

Throughout the year, APS manages its expenditures within the budget approved by the E&O Committee, using the WA process to obtain specific approval for any timing or funding changes that become necessary. SCE and the other participants provide continuous oversight of this process.

VIII.

BUDGET CATEGORIZATION

A. APS Capital Budget Categories

APS groups its Palo Verde capital projects by reason or type of expenditure. There are nine categories, which are described below. The Capital Budget includes known projects, identified by category for the upcoming budget year. The budget also includes costs for nuclear support organizations that perform administrative activities directly related to the capital projects. Palo Verde classifies this support as "overheads and distributables" and identifies the costs for these support activities in their own category.

1. Plant Modifications

The Plant Modifications budget category covers changes in plant design, including simulator and process computers, but excludes Water Reclamation Facility items and non-power block buildings. Sub-categories are listed below:

(a) NRC Regulatory Requirements: Plant modifications required by a rule, regulation, or regulatory guides.

(b) Other Regulatory Requirements: Plant modifications mandated by any Federal, State, or local governmental agency other than the NRC.

(c) Non-Regulatory Safety: Plant modifications required to improve the plant industrial and personnel safety, other than items required by the Occupational Safety & Health Administration or other governmental regulatory bodies that are included in the "Other Regulatory Requirements" sub-category above.

(d) Availability Improvements: Plant modifications, other than those listed above, that are justified based predominantly on improving the availability or capacity factor of the generating Units.

(e) Economic Improvements: Plant modifications for improvements other than those included in the "Availability Improvements" sub-category above.

2. Equipment and Replacements

The Equipment and Replacements category covers the items listed below:

a) Tools & Equipment

Capitalized tools and equipment used to perform routine and repetitive maintenance, construction and training activities. This excludes items incidental to the purchase of other systems, equipment and consumable materials.

b) Replacements

This includes replacement of retirement units in-kind, excluding items controlled by the Water Reclamation Facility Department.

3. Water Reclamation Facility (WRF)

The WRF category covers WRF plant modifications, equipment, and replacements, and WRF process computers,[5] but excludes items covered by the Buildings, General Plant, and Computers budget categories.

4. Buildings

The Buildings category covers buildings (except power block buildings), structures and facilities.

5. Fukushima

Since the Fukushima nuclear event in Japan, a new category has been created to track modifications resulting from review of that event.

6. General Plant

The General Plant category covers furniture, office equipment, communications-related equipment, transportation, rolling stock and capitalized remodeling. It also covers periodic replacement of van pool and plant vehicles due to age and/or increasing maintenance costs.

7. Computers

The Computer category covers non-process[6] computer hardware and software including central processing units, personal computers and peripherals. This also includes applications and infrastructure required to maintain plant computers and systems in workable status.

8. Emergent Work Fund

The Emergent Work Fund category covers costs for needed capital investment in the plant, discovered during ongoing plant operations or during refueling outages.

---

[5] Computers directly related to WRF operation.

[6] Computers not directly related to plant operations.

9. Overheads & Distributables

The Overheads and Distributables category covers support activities required for the successful completion of the annual capital work, including administration costs for the capital program.

B. SCE Capital Cost Classifications

SCE reviews the Palo Verde Annual Capital Budget through its participation in the E&O Committee's review and approval of the Palo Verde budget, including WA packages already approved by APS management and conceptual projects forecast for approval. SCE tracks Palo Verde projects individually by creating an SCE Internal Order to mirror each Palo Verde capital project. SCE develops its work orders and forecast expenditures within SCE's budgeting system consistent with: (1) approved budget information provided by APS, and (2) SCE's forecast of Palo Verde budget changes.

IX.

SUMMARY OF 2015 CAPITAL EXPENDITURES FORECAST

Table IX-1 shows projects by budget category for Palo Verde capital expenditures for 2013-2017. Table IX-2 provides a listing by budget category of Palo Verde capital expenditures forecast for 2013-2017. It also delineates projects for which SCE's 15.8 percent share of the cost exceeds $1,000,000 over the period 2013-2017. Chapter IX.A describes these large projects.

Table IX-1
Palo Verde Units 1, 2, and 3
2013-2017 Capital Expenditures Detail
(Nominal ($ Millions) SCE Share Without Corporate Overheads)

	Prior Costs	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast	2017 Forecast	Total
Plant Modifications	14.0	8.2	6.7	7.3	5.3	6.3	47.7
Equipment & Replacements	9.3	8.7	9.8	7.9	9.0	7.7	52.4
Water Reclamation Facility	11.3	4.1	4.4	4.4	4.6	4.6	33.3
Buildings	4.3	2.2	1.8	2.6	3.6	3.9	18.4
Fukushima	0.0	1.6	3.6	2.8	0.8	0.8	9.8
General Plant	1.6	1.7	0.9	1.0	0.5	0.5	6.3
Computers	2.3	1.2	1.5	1.7	1.8	0.8	9.3
Emergent Work Fund	0.8	0.8	1.3	1.3	2.6	2.9	9.7
Overheads and Distributables	0.0	2.3	2.5	2.5	2.5	2.5	12.3
Grand Total	**43.5**	**30.8**	**32.4**	**31.6**	**30.8**	**30.0**	**199.1**

Table IX-2
Palo Verde Units 1, 2, and 3
2013-2017 Capital Expenditures Detail
(Nominal ($ Millions) SCE Share Without Corporate Overheads)

	Prior Costs	2013 Forecast	2014 Forecast	2015 Forecast	2016 Forecast	2017 Forecast	Total
Plant Modifications							
Security Access Control System Replacement	8.8	1.0	0.0	0.0	0.0	0.0	9.8
Digital Upgrade Generrex, Unit 1	0.0	1.3	1.6	0.0	0.0	0.0	2.9
Digital Upgrade Generrex, Unit 2	0.5	0.0	0.0	1.1	0.0	0.0	1.6
Digital Upgrade Generrex, Unit 3	0.1	0.0	0.2	1.5	0.0	0.0	1.8
Cyber Security Modifications and Replacements	1.5	0.6	0.7	0.8	0.7	0.8	5.1
Cooling Tower Life Extension	0.0	0.0	0.0	0.0	1.7	1.8	3.5
Plant Computer / Core Operating Limit Surveillance System, Unit 3	1.4	0.6	0.0	0.0	0.0	0.0	2.0
Replacement of Spray Pond Filtration System, Unit 3	0.0	0.0	0.0	0.3	0.7	0.0	1.0
Other	1.7	4.7	4.2	3.5	2.3	3.7	20.0
Plant Modifications Subtotal	**14.0**	**8.2**	**6.7**	**7.3**	**5.3**	**6.3**	**47.7**
Equipment & Replacements							
Nuclear Administrative and Technical Manual Replacement	3.9	1.1	1.1	0.1	0.0	0.0	6.3
Spray Pond Concrete Replacement, Unit 1	1.1	0.9	0.1	0.0	0.0	0.0	2.1
Spray Pond Concrete Replacement, Unit 2	0.0	0.1	1.3	0.1	0.0	0.0	1.4
Spray Pond Concrete Replacement, Unit 3	0.0	0.0	0.2	1.4	0.0	0.0	1.7
High Pressure Turbine Diaphragms Replacement, Unit 1	1.0	0.2	0.0	0.0	0.0	0.0	1.2
High Pressure Turbine Diaphragms Replacement, Unit 2	0.0	0.7	0.3	0.0	0.0	0.0	1.0
High Pressure Turbine Diaphragms Replacement, Unit 3	0.0	0.0	0.7	0.5	0.0	0.0	1.2
Task Level Planning	0.2	0.0	1.0	0.7	0.8	0.2	3.0
Main Generator Stator Rewind, Unit 2	0.0	0.0	0.1	0.4	0.9	0.8	2.2
Reactor Coolant Pump Motor Replacements	0.0	0.0	0.0	0.0	0.5	1.2	1.7
Polar Crane Replacement, Unit 2	1.0	0.0	0.0	0.0	0.0	0.5	1.5
Control Element Assembly Replacement, Unit 1	0.0	0.0	0.3	0.1	1.1	0.0	1.5
Other	2.1	5.6	4.7	4.5	5.7	4.9	27.6
Equipment & Replacements Subtotal	**9.3**	**8.7**	**9.8**	**7.9**	**9.0**	**7.7**	**52.4**
Water Reclamation Facility							
Evaporation Pond #1 Liner Replacement	7.6	1.4	0.1	0.0	0.0	0.0	9.1
Addition of Seventh Clarifier Train	0.1	0.3	2.3	2.2	0.8	0.0	5.7
Trickling Filter Rehabilitation Project	1.3	0.1	0.0	0.0	0.7	0.7	2.8
Clarifier Life Extension	0.1	0.1	0.1	0.1	1.0	1.0	2.4
Sewage Treatment Plant Replacement	0.1	0.1	0.4	0.7	0.0	0.0	1.3
Construction of Evaporation Pond 1A	0.2	0.8	0.3	0.0	0.0	0.0	1.3
Water Reclamation Supply System Pipeline Rehabilitation	0.0	0.0	0.0	0.0	0.5	0.8	1.3
Thickeners Life Extension	0.1	0.2	0.2	0.2	0.2	0.2	1.1
Other	1.7	1.2	1.0	1.1	1.4	1.9	8.3
Water Reclamation Facility Subtotal	**11.3**	**4.1**	**4.4**	**4.4**	**4.6**	**4.6**	**33.3**
Buildings							
Learning Center: In-Processing Facility	0.1	0.0	0.1	1.0	1.6	1.7	4.4
Security Fence Extension Plant West	1.7	1.2	0.0	0.0	0.0	0.0	2.9
Warehouse Inside Protected Area	2.2	0.6	0.0	0.0	0.0	0.0	2.8
Radiological Protection Island	0.0	0.0	0.1	0.6	1.1	0.5	2.2
Other	0.3	0.4	1.6	1.0	1.0	1.7	6.0
Subtotal Buildings	**4.3**	**2.2**	**1.8**	**2.6**	**3.6**	**3.9**	**18.4**
Fukushima							
Plant 2-Way Radio System Replacement	0.0	0.3	0.3	0.3	0.3	0.5	1.7
Seismic Hazards Validation	0.0	0.5	0.7	0.6	0.0	0.0	1.7
Emergency Equipment Storage Facility	0.0	0.0	0.1	0.4	0.3	0.3	1.1
Other	0.0	0.8	2.6	1.6	0.2	0.0	5.2
Subtotal Fukushima	**0.0**	**1.6**	**3.6**	**2.8**	**0.8**	**0.8**	**9.8**
General Plant							
Protected Area West End Expansion	1.5	0.7	0.3	0.0	0.0	0.0	2.6
Other	0.1	1.0	0.6	1.0	0.5	0.5	3.7
Subtotal General Plant	**1.6**	**1.7**	**0.9**	**1.0**	**0.5**	**0.5**	**6.3**
Computers	**2.3**	**1.2**	**1.5**	**1.7**	**1.8**	**0.8**	**9.3**
Emergent Work Fund	**0.8**	**0.8**	**1.3**	**1.3**	**2.6**	**2.9**	**9.7**
Overheads and Distributables	**0.0**	**2.3**	**2.5**	**2.5**	**2.5**	**2.5**	**12.3**
Grand Total	**43.5**	**30.8**	**32.4**	**31.6**	**30.8**	**30.0**	**199.1**

A. Plant Modifications

1. Security Access Control System Replacement

The Security Access Control and Computer System is a badging system that restricts access to the Protected Area of the facility. The integrity of this system is fundamental to the safety and security of the plant and is an NRC requirement.[7] While the existing security system continues to perform its intended functions, the components of the system have stopped being manufactured and the system is no longer supported by its vendor. As such, a reliable supply of critical spare parts does not exist.

To remedy this situation, Palo Verde has decided to replace the existing system. The scope of this work will include replacement of badges, badge readers, door locks, concentrators, and system monitoring hardware and software. These changes will provide for the continuing integrity of the Security Access Control System, allowing Palo Verde to continue to meet its regulatory obligations.

Per Palo Verde's cost estimate, SCE's share of this project is $9.8 million.

2. Digital Upgrade GENERREX Units 1, 2, and 3

Palo Verde uses the GENERREX excitation system, a General Electric (GE) product designed for large, high performance steam-turbine generators. Excitation systems directly affect power system stability by regulating terminal voltage and controlling field current.

In 2008, GE informed its customers that the GENERREX product would become an "After Market" product.[8] This designation indicates that spare parts are no longer available and support is limited to repair, exchange, or remanufacture. GE suggested that with the limited amount of time in which "some degree of after-market support shall be available," users of GENERREX should consider migrating to a new platform.

In light of this information, Palo Verde will replace its GENERREX system. The scope of work includes the installation of new excitation transformers, digital voltage regulators, and air-cooled rectifiers, as well as a Power Control Room to house the rectifiers.

Per Palo Verde's cost estimate, SCE's share of this project is $6.3 million.

---

[7] *See* Workpapers for NRC requirement 10 C.F.R. § 73.55.

[8] *See* Workpapers for Product Discontinuation Statement sent by General Electric.

3. Cyber Security Modifications and Replacements

In early 2009 the NRC established a new regulatory requirement, 10 CFR § 73.54: "Protection of Digital Computer and Communication Systems Networks." The NRC issued 10 CFR § 73.54 in response to the increasing cyber security threat (both internal and external).[9] The NRC's first requirement was the development and submittal (by November 23, 2009) of a License Change Submittal that consisted of a Cyber Security Plan and compliance schedule. PVNGS complied with this requirement.

The overall scope of the project is to implement the cyber security requirements identified to protect the site from cyber threats. The scope will include completion of all cyber security driven revisions to site procedures and processes; confirmation of critical asset classifications and test all cyber security related field devices; completion of vulnerability mitigation planning and initiation of required plant modifications; implementation of all non-mod related cyber security; population of the cyber security database; and development and implementation of training requirements. The project will fund approximately 19 plant modifications for design and installation that will implement the Cyber Security Regulation, allowing Palo Verde to continue to meet its regulatory obligations.

The NRC Cyber Security regulation, 10 CFR § 73.54, requires changes to a number of plant systems to meet its requirements. The regulation addresses the increase of cyber security related threats, which have occurred across many sectors, including US Nuclear Power and even presumed Nation-State attacks, such as the Stuxnet computer worm on Iranian Uranium Enrichment Facilities.

The specific goal of the regulation is to defend digital computer and communications systems associated with safety-related and important-to-safety functions (including balance of plant systems that affect reactivity), security functions and emergency preparedness functions.

This project will fund design and installation of plant modifications that will implement the Cyber Security Regulation. This project includes installation of a new Digital Asset Protection System and multiple other smaller modifications to existing systems. This project is the same as number 4 under Plant Modifications except that this portion of the project will be for replacement/upgrade of existing plant components that will allow Palo Verde to continue to meet its regulatory obligations.

Per Palo Verde's cost estimate, SCE's share of this project is $5.1 million.

---

[9] *See* Workpapers for 10 C.F.R. § 73.54.

4. Cooling Tower Life Extension, Unit 1 and Long Range Plan

Palo Verde uses cooling towers to release excess heat generated during the production of electricity. Because this machinery is critical to safe plant operation, Palo Verde implemented a cooling tower refurbishment, or life extension, program. This program evaluates the structure, mechanical and electrical equipment of the cooling towers on a routine basis. During an evaluation of Units 1 and 3, Palo Verde found increased degradation within the concrete structures of the cooling towers as a result of the aggressive chemicals used to treat the water. To mitigate this issue, Palo Verde will replace and/or fill the degraded concrete sections, replace the support beams within the towers, replace the fan assemblies, and replace most of the degraded distribution deck sections in each tower. The preservation of these structures is necessary for the safe operation of Palo Verde.

Per Palo Verde's cost estimate, SCE's share of this project is $3.5 million.

5. Plant Computer / Core Operating Limit Surveillance System, Unit 3

The Plant Monitoring System (PMS) is comprised of two different sub-systems: the Plant Computer (PC) and the Core Monitoring Computer (CMC). The PC along with the Emergency Response Facilities Data Acquisition and Display System (ERFDADS) is the principal control room operator interface providing trending, reporting and alarming functions for many plant parameters from most of Palo Verde's plant systems. The PC also runs the Core Operating Limits Supervisory System (COLSS) program, which is the primary indicator of the plant's current power level. The CMC is a backup to the PC for the COLSS application. If both systems fail, 10 C.F.R. § 50.72 requires that the Unit power down to a lower power level, typically 90 percent, within four hours, since other less accurate indications of plant power must be used.[10]

To avoid system failure, Palo Verde evaluated the PMS system and determined that it was outdated and obsolete. This project will replace the PC portion of the system.

Per Palo Verde's cost estimate, SCE's share of this project is $2.0 million.

6. Replacement of Spray Pond Fuel Filtration System, Unit 3

Palo Verde Nuclear Generating Station is equipped with six essential Spray Ponds. These serve as the ultimate heat sink for the plant to remove decay heat from the reactor during shut down and accident conditions and to remove heat from the Emergency Diesel Generators. The existing

[10] *See* Workpapers for 10 C.F.R. § 50.72.

filtration system has been in place since the plant was constructed, and is severely degraded. Components are corroded and the automatic backwash system does not operate properly.

Because there is no automated system indicating when filters need to be cleaned, the filters are backwashed once per day, which is too frequent and is contributing to the premature failure of the backwash sumps. The daily manual backwash puts a burden on operators, keeping them from performing more value-added tasks.

The scope of this project is the complete replacement of the entire Spray Pond Filter System with a new modular design to facilitate operation and maintenance. The project includes mechanical, electrical, and controls for a modular skid based system. The project also includes review of the support system of the Spray Pond such as backwash sump and underground piping.

Per Palo Verde's cost estimate, SCE's share of this project is $1.0 million.

B. Equipment and Replacements

1. Nuclear Administrative & Technical Manual Replacement

The NRC and Palo Verde internal audits group have identified instances of ineffective program administration and areas for potential improvement with regards to human behavior and performance. To address these concerns, Palo Verde is replacing the Nuclear Administrative and Technical Manual (NATM).

The replacement of the NATM will improve technical specifications and reduce the likelihood of inoperable equipment, such as main steam isolation valves or station batteries, due to poorly defined maintenance procedures. It will prevent reactivity events, including plant shutdown, resulting from incomplete technical information in reactor engineering procedures, and it will capture the design basis and licensing basis of key procedure steps and sequences. The NATM Procedure Replacement Project will provide significant long-term improvement to the quality of Palo Verde procedures.

As part of the planning process, Palo Verde reviewed similar projects performed at other nuclear generating stations, including DC Cook, Callaway, Ginna, Nine Mile Point, and Turkey Point. After reviewing the different approaches taken at each of these facilities, Palo Verde decided that replacement of the entire NATM was the best option because it would allow for the inclusion of current/new regulatory requirements and specific processes and procedures for the continued safe and efficient operation of the plant.

Per Palo Verde's cost estimate, SCE's share of this project is $6.3 million.

2. Spray Pond Concrete Replacement, Units 1, 2, and 3

This project is for Spray Pond structural concrete replacement / modifications.

The Spray Ponds are large concrete pools that provide the safety related ultimate heat sink for the Units. They remove the heat from the Essential Cooling Water System (EW) during normal or emergency shutdown of the plant and also provide cooling to the Diesel Generators (DG) when the DGs are in service. The ultimate heat sink has a storage capacity that enables the associated Essential Spray Pond System (ESPS) trains to operate continuously for 26 days without any makeup water supply.

The Spray Ponds are approximately 30 years old and the concrete structure has cracks and deterioration that, if not corrected, will challenge the continued structural integrity of the Spray Pond. The likely cause of the problem is chloride and sulfate ions, along with atmospheric oxygen, leeching into the concrete and causing the rebar to corrode and expand, cracking the concrete. The replacement of the Spray Ponds structural concrete is necessary for the safe operation of Palo Verde.

Per Palo Verde's cost estimate, SCE's share of this project is $5.2 million.

3. High Pressure Turbine Diaphragms Replacement, Units 1, 2, and 3

Steam is converted into energy by passing through the main turbine generator. The motion of the steam pushes against the fan-type blades of the turbine. This causes the turbine and the attached rotor of the generator to spin and produce electricity.

The function of the turbine control system is to regulate turbine speed, maintain set load, control rate of load increases, and provide protection for the turbine and generator. This system is a critical component as any problems with the control system have a direct effect on power generation.

The turbine control system has reached an obsolescent state and replacement parts are no longer being manufactured by the vendor, General Electric. As the system ages and becomes increasingly susceptible to electrical failures caused by such things as loose wires and switch malfunctions, this situation continues to grow in importance. While backup procedures exist, a control system failure as a result of an electrical failure could result in a system failure. In order to mitigate this risk, Palo Verde has decided to replace its existing turbine control system with a new digitally based system, which will provide increased functionality and greater system reliability.

This project has two phases. Phase One involves preliminary engineering and Phase Two involves a detailed engineering review, including: (1) identifying what existing components will require conversions or upgrades, (2) conducting planning and scheduling of activities, (3) developing a bid

specification to award the manufacturing contract, and (4) installing the new turbine control system with an updated digital model. Installation of the digital system is projected to occur in 2013.

Per Palo Verde's cost estimate, SCE's share of this project is $3.4 million.

4. Task Level Planning

As the nuclear power generation industry has matured, Work Instructions have evolved into a key and critical aspect of day to day operations. Work Instructions contain the step by step directions for the accomplishment of field maintenance. Their primary function is to provide "certainty of outcome" for any given maintenance activity such that the equipment operates reliably once returned to service. Work instructions also ensure that no failure mechanisms are introduced by the performance of maintenance. In sum they are the vehicle utilized by the organization to schedule, perform risk assessment, make equipment safe, perform work, and prove the equipment is ready to return to service and perform its function. Performing maintenance in this fashion supports excellence in equipment reliability and therefore safe and reliable generation of electricity for the long term. The primary requirement for Work Instructions is based in the Code of Federal Regulations, 10 CFR Part 50 Appendix B.[11]

This project is being implemented as a way to improve performance in Work Instructions. In some cases insufficient detail and omission of some important information in work instructions for safety related equipment has resulted in unplanned unavailability of critical equipment, created rework, and caused delays to outage critical path work. These problems also contribute to inadequate scheduling and coordination, inefficient management of site resources, increased equipment out of service time, and difficulty in scheduling and accomplishing pre-outage activities. The entire set of Work Instructions utilized to perform maintenance in the power block will be replaced with new instructions. The new Work Instructions will differ from existing documents in number, content, organization, and scope.

Per Palo Verde's cost estimate, SCE's share of this project is $3.0 million.

5. Main Generator Stator Rewind, Unit 2

A main generator is a device that converts mechanical energy to electrical energy by creating an electromagnetic field that forces electrons through rotor windings, generating electricity that can be transmitted to the power grid. The life expectancy of rotor windings, as described in the EPRI

[11] *See* Workpapers for 10 CFR Part 50 Appendix B.

document, "Life Cycle Management Planning Sourcebooks," is 20-25 years.[12] Palo Verde's main generator rotor windings are over 25 years old and are approaching the end of their useful lives. In anticipation of this, Palo Verde replaced the Unit 1 rotor during the spring 2010 outage. The removed rotor was sent to the vendor for refurbishment. When this rotor is returned, it will replace the Unit 2 rotor. The Unit 2 rotor will be returned to the warehouse to be maintained as a capital spare, which could be refurbished if needed. This systematic approach will reduce the likelihood of an outage due to a generator rotor problem, which could also impact plant reliability and power production.

Per Palo Verde's cost estimate, SCE's share of this project is $2.2 million

6. Reactor Coolant Pump Motor Replacements

The function of the Reactor Coolant System (RCS) is to cool the reactor core by transferring the heat generated in the core to the Steam Generators. The Reactor Coolant Pumps provide the driving force for the primary coolant. They are also used to heat up the Reactor Coolant System to normal operating temperature prior to a reactor startup. A three-stage mechanical seal acts as the pressure boundary between the Reactor Coolant System and Containment. An Anti-Rotation device is installed to prevent the pump from turning backwards which would Increase the starting current needed and damage the motor. A flywheel is installed to provide some coast down flow if the pumps lose power. This allows for some forced flow through the core when the initial decay heat is at its maximum and before natural circulation can be established.

The expected end of life for a RCP Motor stator is 30 years. RCP stator life-cycle management is captured in a preventive maintenance (PM) program and the Palo Verde RCP Pump and Motor Long Range Plan. Palo Verde is systematically replacing the RCP motors to address aging electrical Insulating condition, and promote reliable operation. As the RCP Motors reach the end of their lives they are replaced on a pre-set schedule. The RCP Pump and Motor Long Range Plan provides for replacement of pumps through 2017.

The RCP Pump and Motor Long Range Plan manages aging large power production equipment that is vital to economic power production, addressing stator life prior to motor and plant impact. Failure of an RCP motor stator will result in a Unit trip and approximately two and a half to three weeks of lost power production. An additional risk with running a RCP motor to failure is fire and

[12] *See* Workpapers for EPRI document, "Life Cycle Management Planning Sourcebooks."

catastrophic failure, potentially damaging adjacent equipment and increasing the time of lost power production.

Per Palo Verde's cost estimate, SCE's share of this project is $1.7 million.

7. Polar Crane Replacement, Unit 2

A polar crane is the overhead crane used inside of the reactor containment building. The crane operates on a circular rail and moves components during a refueling or maintenance outage. Palo Verde has three polar cranes, one per Unit. When a Unit is in service, the crane sits idle and is exposed to the elements which can degrade electrical and mechanical components, thereby affecting the reliability and performance of the crane. Currently, Palo Verde's three polar cranes are being operated beyond their useful design lifetimes and require component replacements and system upgrades. This project will replace Unit 2's polar crane electrical drive system, operator controls, hoist and the trolley, as well as upgrade the position indication system, all of which will improve safety and reliability.

Per Palo Verde's cost estimate, SCE's share of this project is $1.5 million.

8. Control Element Assembly Replacements, Unit 1

The Control Element Assemblies (CEAs) provide a mechanical means to shut down the reactor and to regulate reactor power level. They provide for reactivity control under all normal and adverse conditions experienced during reactor startup, normal operation, shutdown, and accident conditions. The CEAs are the primary means of shutting down the reactor during any reactor trip event. The CEAs degrade over time and periodically need to be replaced.

This project will replace the CEAs for Palo Verde Unit 1. This project provides for 89 new CEAs. This project is critical to maintaining the safety of the plant.

Per Palo Verde's cost estimate, SCE's share of this project is $1.5 million.

C. Water Reclamation Facility

1. Evaporation Pond 1 Liner Replacement

The Plant Cooling Water system at Palo Verde is a closed-water system. Water is used to cool turbine steam using condensers, mechanical cooling towers, pumps, and other equipment. In a closed system, the water is recycled through the plant and used again. Each time this water is circulated, the chemical content, primarily sodium, increases. If too much sodium accumulates, it can adversely affect plant systems. In order to prevent this from happening, the cooling water in the system is periodically replaced with fresh water. Because environmental regulations prevent Palo Verde from discharging the waste water directly into the surrounding environment and/or water table, it is

transferred to Evaporation Ponds (EPs) where it evaporates, leaving the chemicals behind. There are three evaporation ponds at Palo Verde.

These ponds are lined to prevent their contents from entering the soil and water table. The original liner in all three ponds was degraded due to minerals in the water and wave action, and required replacement. EP #1 is the third and final pond to be re-lined. The liner system on EP #1 has reached the end of its expected 20-year useful life span and the limit of its useful life, and is experiencing an accelerated rate of degradation. Recent monthly inspections of EP #1 have shown significant liner degradation and an increasing level of breach points. These degradation issues have resulted in Palo Verde regulatory commitments to the ADEQ to conduct liner replacement efforts in a timely manner, to ensure continued operation of the plant. To address the effects of the deterioration, the lining of EP #1 will be replaced.

Per Palo Verde's cost estimate, SCE's share of this project is $9.1 million.

2. Seventh Clarifier Train

Palo Verde is the only nuclear power plant in the world not situated on a body of water to provide cooling water for nuclear Units. The Water Reclamation Facility (WRF) provides cooling water by treating effluent from local sewage treatment plants. Without this cooling water, the Units could not operate.

The WRF is organized into six trains of equipment, each with the capacity to process 10,000 gallons per minute (gpm), for a total of 60,000 gpm. When originally constructed, this overall capacity level met design basis margins by providing considerable margin for cooling water production, as the total requirements of the three Units in the peak usage summer months was 50,000 gpm. However, the completion of power uprate projects since inauguration of the plant has increased the need for cooling water to 60,000 gpm in the peak months. This has erased the original water production design basis margin, and the WRF now operates at full capacity for six months of the year, from April 1st (coming out of the spring refueling outage) through September 30 (preparing for the fall refueling outage). During the cooler months from October through March, the average demand for cooling water for the Units is 42,000 - 45,000 gpm, which makes one train redundant, after the storage reservoirs are re-filled following the fall refueling outages. During this 6 month window each year, each of the six clarifier trains is taken off line for three to four weeks for annual maintenance, to ensure the availability of all six trains during the six month peak run in the hotter months.

The industry average life expectancy of the machinery and equipment used in the clarifiers is 20 years. The equipment has been in use now for over 25 years, and requires refurbishment or replacement. In particular, the clarifier gear and bearing assemblies require replacement. In addition, the concrete structures of the clarifiers need refurbishment, as they have developed cracks from exposure to the chemicals in the effluent and the continuous wet-dry cycle. To continue to provide critical plant cooling water in sufficient amounts to support full power production, the clarifiers' concrete structures need to be refurbished and critical machinery replaced.

To perform a complete refurbishment of a clarifier train will require a minimum of four to five months, and perhaps as long as seven or eight months, working on an expedited project schedule. Taking a clarifier train out of service for this time period will reduce the WRF's maximum production capacity to 50,000 gpm, which provides some margin versus the Units' required 42,000 - 45,000 gpm during the cooler months. However, when each of the other five Units is taken offline for three to four weeks during this cooler time for annual maintenance, the entire water production margin is eliminated as the WRF will be producing 40,000 gpm. If anything goes wrong during this process (e.g., an equipment failure at one of the four operating trains, extension of the duration of a complete train refurbishment), the WRF's ability to provide sufficient cooling water to keep the Units at full power could potentially be compromised.

To avoid this risk to uninterrupted power production from refurbishment of the six clarifier trains and to restore the original design basis safety margin for production of cooling water, a seventh clarifier train is to be constructed similar to the existing six trains.

Per Palo Verde's cost estimate, SCE's share of this project is $5.7 million.

3. Trickling Filter Rehabilitation

The PVNGS Water Reclamation Facility (WRF) utilizes a total of six Trickling Filters to reduce the amount of ammonia from the WRF influent. Removing the ammonia reduces the amount of chemicals used in the downstream treatment processes, thus minimizing chemical costs and the sludge disposal volume. Each Trickling Filter is approximately 30 feet tall and 125 feet in diameter with a concrete base and is filled with egg crate style plastic media.

The Trickling Filter structure and media have deteriorated and must be replaced. The fiberglass side-walls have deteriorated so that much of the surface area has exposed fibers. The existing plastic Trickling Filter media is at the end of its useful life due to age and UV degradation. Several of the structural support beams outside the fiberglass side-wall have through-wall corrosion. The exterior

concrete basin walls are showing signs of deterioration. Continued usage of the Trickling Filters, without rehabilitation or implementing a substitute treatment method will jeopardize WRF's ability to supply cooling tower make-up water that meets the existing specification. The Trickling Filter will have the fiberglass side walls removed and replaced, concrete repairs will be made, and the rotary distributor and the PVC media will be replaced. This project will include concrete coating and steel-pipe lining to mitigate corrosion. This project is critical to the production of cooling water to maintain operation of the Units.

Per Palo Verde's cost estimate, SCE's share of this project is $2.8 million.

4. Clarifier Life Extension

The First and Second Stage Clarifiers, Lime Slaking Stations and their ancillary structures, which are located at the Water Reclamation Facility (WRF), have varying levels of deterioration in their concrete and steel components. In order to extend the life of these structures, rebuilding will be required and will extend until 2017.

There are six First Stage Clarifiers which are approximately 21 feet in height and 143 feet in diameter. There are six Second Stage Clarifiers which are approximately 22 feet in height and 128 feet in diameter. The main structures of the basins are constructed of reinforced concrete with steel assemblies and overhead walkways. There are three Lime Slaking Stations which are approximately 30 feet in height and are located between the First Stage Clarifiers. Ancillary structures include access tunnels, equipment foundations and pads, manholes, and box structures.

The degradation of the concrete in the clarifiers can be attributed to chloride from the water treatment, carbonation of the concrete paste, and sulfate attack. Some areas of significant corrosion also exist on the steel portions of the structure. There are particular areas, such as the top of clarifier walls, effluent boxes south of each clarifier, exterior walls at soil level, concrete supporting steel superstructures, and other structural elements that are in such a degraded condition that portions of the concrete have fallen off. This could eventually lead to a catastrophic localized failure. If this occurs, it could lead to a closure of the affected clarifier train. Also, if concrete continues to fall into the clarifier, these chunks could be drawn up into the pumps and cause damage. Further deterioration of portions of the walkways and equipment connections could cause the walkways to be unsafe for personnel, or cause portions of the equipment to fall into the clarifiers and effect the pumps. Concrete and steel failures of the clarifiers would reduce the capability of WRF to provide treated water to the Units.

This project is to rebuild the clarifiers and their ancillary structures.

The scope of the rebuild includes the following:

• Rebuild damaged sections of each train of clarifiers and their adjacent ancillary structures.

• Full thickness reconstruction of the upper portion of the clarifier walls at and above the water line, effluent boxes, and portions of the concrete pedestals at the lime slaking stations.

• Partial thickness rebuilding at the effluent boxes and other localized areas of deterioration, such as the exterior walls at soil level.

• Apply concrete resurfacing to the interior and exterior portions of the clarifiers and interior portions of the effluent boxes.

• Apply sealer to on-grade concrete elements for the ancillary structures.

• Rebuild miscellaneous areas of the ancillary structures and access tunnels.

• Remove and replace existing joint sealant in the topping slab over the clarifier base slab.

• Remove and replace corroded steel elements, such as metal grating, hanger rods, or base plates.

• Repair failed welds, beam support angles, or other steel elements as required.

• Spot paint or galvanize areas of steel which are subject to corrosion.

• Install missing grating tie-downs, anchor bolts, nuts and washers.

• Rebuild miscellaneous pump pedestals.

The performance of all of the clarifier structures is critical to WRF water treatment production at full capacity. The deterioration of the structures affects their structural integrity and their ability to perform at full capability. Without repair, there could be localized failures in the structure which could either damage the adjacent pumps or reduce the capacity of the clarifiers

Per Palo Verde's cost estimate, SCE's share of this project is $2.4 million.

5. Sewage Treatment Plant Replacement

The existing Water Reclamation Facility (WRF) sewage treatment plant (STP) was constructed in 1976 with a capacity of 60 KGPD (thousand gallons per day). Modifications to the STP in 1990 allowed somewhat higher capacity. However, flows now often exceed 90 KGPD making it difficult to operate and meet discharge standards, especially during outages when the site population significantly increases. There is no equipment redundancy in the current STP, requiring shut downs for

all but minor maintenance. The three existing sewage treatment tanks were extensively repaired for corrosion damage in 2000 and 2009, with end of life estimated in 2013. Inspections in 2010 also revealed degradation of the wet well and waste return sump concrete and structures. This project will construct a new sewage treatment plant similar to the existing plant.

Additionally, the STP will be relocated outside of the Security Owner Controlled Area (SOCA). Currently, sewage is piped to the STP where it is treated. Treated water is then pumped to the Water Reclamation Facility (WRF). The replacement plans call for relocation of the STP to the WRF so that sewage is piped to the WRF area where it will be treated and then added back to the site's cooling water supply. Relocation of the STP will allow sufficient space for the replacement structure, while keeping the existing plant in service during construction.

Per Palo Verde's cost estimate, SCE's share of this project is $1.3 million.

6. Evaporation Pond 1A

Palo Verde has three Evaporation Ponds (EPs), EP #1, #2, and #2A, each larger than 180 acres, that receive retention tank flow and blow down water from the Circulating Water Systems (CW). Adequate space to contain the retention tank and cooling tower blow down flows from the nuclear Units is required to continue operation of the facility. The original liner in all three ponds was degraded due to minerals in the water and wave action, and required replacement. EP #1 is the third and final pond to be re-lined. The liner system on EP #1 has reached the limit of its useful life and is experiencing an accelerated rate of degradation. These degradation issues have resulted in Palo Verde regulatory commitments to the ADEQ to conduct liner replacement efforts in a timely manner, to ensure continued operation of the plant.

Palo Verde has committed to the Arizona Department of Environmental Quality (ADEQ) and Arizona Department of Water Resources (ADWR) that as soon as EP # 2A is available, water will be transferred from EP # 1 to the other EPs to enable EP # 1 to be taken out of- service and relined in a timely manner.[13] A north-south divider dike will be constructed in EP#1 - creating ponds #1A and #1B for water storage - to help optimize future operation/maintenance and allow the one half of EP #1 to return to service sooner. A smaller, 50 acre cell will be created as #1 C to store solids currently on the floor of EP #1. EP #1 will be completely relined in compliance with the applicable governing regulations, i.e., the Best Available Demonstrated Control Technology (BADCT).

[13] *See* Workpapers for Palo Verde's commitment to ADEQ.

Per Palo Verde's cost estimate, SCE's share of this project is $1.3 million.

7. Water Reclamation Supply System Pipeline Rehabilitation

The Water Reclamation Supply System (WRSS) Pipeline consists of the pipeline that runs from the City of Phoenix to the Palo Verde Water Reclamation Facility (WRF). It also includes the pipelines from the WRF to the WRF reservoirs which then provide Cooling Water (CW) to the cooling towers and the condensers of the three Units. A comprehensive assessment of the WRSS identified severe degradation of various portions of this system due to corrosion. This condition threatened plant operability and reliability. The recovery program established as a result of those assessments successfully resolved the immediate threat to pipeline operability and avoided impacts to plant capacity. Non-destructive examination (NDE) methods and condition assessment techniques have identified ongoing corrosion at a slower pace that will continue to degrade pipe sections. Palo Verde has developed an analytical model to prioritize the pipe sections, to permit the rebuilding of the pipe sections over several years without threatening pipeline operability.

These degraded sections have to be identified and rebuilt in order to maintain pipeline reliability. This project continues the systematic evaluation and replacement of the piping and covers the scope of modifications in 2016 and 2017.

Multiple failures of the WRSS pipeline could severely impact operations of all three PVNGS Units and could have an adverse impact on the environment and regulatory margin in that area. Failure of pipe sections in portions of the WRSS System in close proximity to residential and public facilities could result in damage to adjoining facilities and personnel occupying them.

Per Palo Verde's cost estimate, SCE's share of this project is $1.3 million.

8. Thickeners Life Extension

Thickeners are used to concentrate effluent at the Water Reclamation Facility once it has been processed through the clarifiers. Thickening tanks allow the sludge to collect, settle, and separate from the water. The water is then sent back to the head of the plant for further processing and the sludge is further processed and disposed of in the local land fill.

This scope of work for this project is to do a detailed evaluation of, and then refurbishment of, the WRF structures associated with the First & Second Stage Thickeners, Spent Wash Water Thickeners, Waste Thickeners, associated underground access tunnels and pump rooms, walkways, and the Waste Centrifuges. These structures have degraded due to chemical attack from the

effluent that is treated to become plant cooling water. These degraded structures must be refurbished in order to maintain the WRF reliability.

Per Palo Verde's cost estimate, SCE's share of this project is $1.1 million.

D. Buildings

1. Learning Center: In-Processing Facility

At Palo Verde, visitors or staff members must enter the Security Owner Controlled Area (SOCA) to complete the screening process and required training. In an effort to restrict access to the SOCA, Palo Verde will build a learning center outside of the SOCA. This will reduce the number of unescorted visitors and partially-screened workers entering the SOCA, improve plant safety, and maintain security. This new facility will contain the room and equipment for in-processing, classroom training, maintenance and technical labs, medical checks, and simulator training. Training staff, classrooms, fitness for duty screening, mock-up equipment, and simulators will be consolidated from numerous locations throughout the station into the Learning Center Complex.

Per Palo Verde's cost estimate, SCE's share of this project is $4.4 million.

2. Security Fence Extension Plant West

The purpose for the Security Fence Extension Plant West Project is to extend the Protected Area (PA) fence around the expanded west end of the site to encompass the new Outage Support Facility (OSF), the Warehouse inside the PA, the new Fuel Depot, and the Vehicle Minor Maintenance Facility.

The current PA is not large enough to accommodate the four buildings which have been approved. Therefore, the buildings are being constructed outside the existing PA to reduce cost and construction complexity. Concurrently, a new security fence will be constructed to expand the PA. Once the buildings are complete and the Central Alarm Station/Secondary Alarm Station (CAS/SAS) upgrade is complete, the security fence will be closed around the expanded west end.

The scope includes the engineering work for design/development of:

- The security fence isolation zone(s)
- The microwave intrusion detection and digital camera assessment system
- The electrical power distribution for the new detection system
- The communication system interface with existing alarm systems
- Changes to the station grounding system
- Modifications to existing primary and secondary alarm stations

• Solar lights at the perimeter

• Razor wire to the Protected Area Annex (PAA) perimeter fence as a security feature

• Funds for engineering to design the extra security zones, microwave, cameras, detection systems and cable routing back to the CAS/SAS

• Engineering funds for the scope changes which involve fiber runs with new security concentrators and the Factory Acceptance Test (FAT) and Site Acceptance Testing (SAT)

• Funds for engineering to develop the Design Master Work Order (DMWO) and design cathodic protection and grounding features

• Include the Sally Port Project, the Pass-Thru and the Warehouse Security design into the Protected Area Annexation (PAA) Project for cost effectiveness.

The expansion of the PA will help the site recognize major efficiencies, especially during outages. The new, approved OSF and warehouse buildings will be within the Protected Area to support planning and execution of refueling outages and more efficient material handling, especially during outages. In addition, the existing security systems, including the fence, need to be extended to enclose the expanded area.

Construction of the extended PA inside the fence will enhance Nuclear Safety and Security, as well as efficiency at the Station; thereby mitigating several of the unique aspects of the Plant and its layout. Nuclear Safety and Security will be enhanced by establishing a buffer zone beyond the current PA providing for greater security from potential challenges. The expanded PA will also provide new lay down areas that allow for job material and equipment storage at a greater distance from the Ultimate Heat Sinks/Essential Spray Ponds, thereby further increasing Nuclear Safety. Efficiency improvement will result from the Warehouse inside the new fenced area, allowing materials to be available in the PA in closer proximity to work locations in the Power Blocks.

Additionally, the Outage Support Facility, also in the fenced area, is expected to shorten future refueling outages and provide a single location where tooling and equipment can be cleaned, organized and staged efficiently upon outage completion for subsequent outages.

Per Palo Verde's cost estimate, SCE's share of this project is $2.9 million.

3. Warehouse inside the Protected Area

The current Protected Area (PA) sally port entry (a "sally port" is a secure controlled entryway into a controlled area) has a high level of vehicle traffic. Consequently, Palo Verde is exposed to increased risk of potential threats due to the volume of traffic in and out of the PA. The delivery of

material and equipment and the travel through the sally port to the site warehouse to pick up or return material constitutes much of the traffic that needs to be reduced. To meet 10 CFR §73.55 requirements for improving Vehicle Barrier Systems, the current PA access has been modified to include a Personnel Access Control Entry (PACE) building.[14] With the addition of the new PACE building, the time required to enter the PA has increased significantly. Construction of a PA warehouse with an adjoining sally port is expected to dramatically reduce traffic and the required time needed to pass through the current sally port and improve security.

This project has the following specific security requirements as listed in NRC regulation 10 CFR §73.55, Section 8 (A): "Limit access into the protected area to only those personnel, vehicles, and materials required to perform official duties." Limiting the total number of vehicles that are required to enter and exit the PA will limit the number of vehicle inspections.

The warehouse will have an inspection area for security and adequate storage for parts and materials associated with outage work as well as on-line maintenance work. The warehouse will improve efficiency and productivity by having spare parts and material readily available and easily accessible, within the PA.

The scope of this project is the construction of the PA warehouse including the loading docks, security search area, warehouse offices, truck ramp and all equipment and software required to process equipment and material into the warehouse. It will also include the engineering evaluation and position of the potential impacts the automated and computer software may have on cyber security. The warehouse will be located near the OSF facility and along the inner fence of the PAA. The building will consist of material receiving, storing and shipping for routine maintenance, and outage activities. The warehouse receiving area will be a secured area with x-ray equipment. A security officer area for control of secured area equipment and sally port support will also be included with the warehouse.

Construction and relocation of a new warehouse inside the PA offers significant benefits to the station. It will improve the design and efficiency of the warehouse and result in streamlined search processes. Improved inventory management, security search, receipt, and storage will result in a reduction in security and warehouse resources. Security of the facility is enhanced through this project by significantly reducing the amount of individual searches through security for daily parts deliveries to maintenance groups. Current warehouse location and processes require frequent trips either through the

[14] *See* Workpapers for 10 C.F.R. §73.55.

security building or the sally port to transport parts for maintenance of the facility. The design of the warehouse system will help minimize traffic through the sally port.

A new warehouse inventory management system will revalidate and re-catalogue parts into the system to reduce duplication and ensure that all fast moving parts are easily located and retrieved. Through this effort, the ability to clean up descriptions and make parts searches easier will be enhanced. Interviews with buyers and planners have determined that significant time is spent finding and validating that the part requested is the one that is being ordered and in the warehouse. Many individuals spend hours per part in determining what to order. Streamlining parts searching capabilities will pave the way for additional savings in and outside the Supply Chain process.

Improving the service level through improved efficiency will reduce the amount of unnecessary traffic and monthly volume through the warehouse. In the month of April 2010, approximately 1200 individuals in Maintenance traveled to the warehouse to pick up parts. While there are several reasons this exists, improving the warehouse flow and delivery will greatly reduce unnecessary Maintenance production hours spent at the warehouse.

Improving the inventory management processes, included in this project, will allow improved management of inventory and allow a more timely reduction of site inventory. The carrying charges have risen approximately $1.5 million per year over the last three years as a result of increased inventory. Improved management systems and revalidating inventory will allow Palo Verde to curb the growth and methodically reduce inventory and associated carrying charges.

Per Palo Verde's cost estimate, SCE's share of this project is $2.8 million.

4. Radiological Protection Island

The radiation protection island is the controlled access point located inside of containment where employees who require access to containment are monitored for radiation exposure. The original island design was implemented in the late 1980s and is outdated. To update this area, Palo Verde will modify the current island to provide workers adequate room to access electronic radiation survey information and automated access controls, and provide sufficient room to house new monitoring equipment. The new equipment has better radiation detection capabilities with shorter and more accurate count times. This modification will increase radiological safety at Palo Verde.

Per Palo Verde's cost estimate, SCE's share of this project is $2.2 million.

E. Fukushima

1. Plant Two-Way Radio Replacement

Palo Verde's two-way radio system plays an important role in security and general communications at the plant, and is an NRC requirement. The current Motorola Two-Way Radio System has been in operation for approximately 15 years and has reached the end of its product support life-cycle. Most of the key replacement parts and system components are no longer available or are scheduled to be discontinued shortly. The replacement of the plant's two-way radios is necessary for on-going communications and continued compliance with NRC requirements.

Palo Verde will replace the two-way radios currently in use at the site with current technology. Per Palo Verde's cost estimate, SCE's share of this project is $1.7 million.

2. Seismic Hazards Validation

In response to the nuclear accident at the Fukushima Daiichi nuclear plant, the NRC released on March 12, 2012 Order EA-12-049 and a 50.54(f) Letter regarding Requirements for Mitigation Strategies for Beyond-Design-Basis External Events.[15] These documents require licensees to develop, implement, and maintain guidance and strategies to mitigate the effects of beyond design basis challenges - including seismic events - to the key safety functions of core cooling, containment integrity, and spent fuel cooling. Enclosures 1 & 3 to the 50.54(f) letter require licensees to re-evaluate seismic hazards, conduct seismic walk downs to assess plant conditions, and to implement corrective actions based on the results of these efforts.

This project will perform mandated assessments, walk downs, engineering reviews, evaluations, and preparing responses to meet NRC requirements.

Per Palo Verde's cost estimate, SCE's share of this project is $1.7 million.

3. Emergency Equipment Storage Facility

As a result of the Fukushima Daichii event, Palo Verde has evaluated its emergency response preparedness and determined that, in order to be fully prepared to react to a major event involving multiple Units, it must purchase additional fire apparatus as well as pumps, generators, and other equipment that would be required for a beyond design basis event. This equipment has been purchased and a majority of it is onsite; however, it is being stored at various locations throughout the

[15] *See* Workpapers for the 10 C.F.R. § 50.54 (f) Letter regarding Requirements for Mitigation Strategies for Beyond-Design-Basis External Events and NRC Order EA-12-049.

site where space is available and not where it would facilitate the required deployment timelines in the event of an emergency. Much of this equipment is sensitive to the Arizona ambient environment and must be secured and protected.

The overall scope of this project is to perform engineering, siting, design for modifying existing site structures and for building a new equipment storage facility or facilities to house the new fire apparatus and for FLEX equipment owned by Operations, Water Reclamation, Emergency Planning and Fire Protection.

Per Palo Verde's cost estimate, SCE's share of this project is $1.1 million.

F. General Plant

1. Protected Area West End Expansion

Palo Verde has been operating for over 20 years and has received approval from the NRC to continue operating for another 20 years beyond the original license period. In recognition of this continued operation and the prior years of operation, the site undertook a review of the current state of the facilities on site and requirements for the future. This review and analysis is documented in the Site Master Facilities Plan (SMFP). The SMFP is designed to be a living document which will be updated as the site requires change in the future. It provides for a logical, sequential plan of renovation and new building to ensure the site is able to safely and efficiently generate electricity for the long-term.

In addition to buildings, the SMFP included an analysis of the infrastructure required to make the buildings habitable and functional. The Site Master Facilities Plan (SMFP) includes several new and upgraded facilities across the Palo Verde site, most situated in the plant west area. These facilities are currently either under construction or will begin construction soon. The new facilities in the PAA West Expansion area include an Outage Support Facility, to make refueling outages more efficient, the Warehouse inside the expanded PA to improve material handling efficiency, Minor Vehicle Maintenance Facility and Fuel Depot. The original infrastructure is insufficient to allow these facilities to be functional, requiring infrastructure extensions. These new facilities require water, sewer, power, fire protection/detection, Information Services and Information Technology (IS/IT), roads, sidewalks, parking and lay down areas to make them functional. The west end expansion also affects the drainage and retention both inside the PM and outside the PA which will be addressed and implemented as part of this project.

The Infrastructure Project for the West End Expansion Project, will implement the designs for all systems and tie-ins to all new Facilities and functions in the west end expansion area identified in the Site Master Facility Plan.

The systems/utilities included in this WA include:

- Domestic water
- Fire protection I detection
- Sanitary services
- Electric power supply
- Security lighting and access
- Roadways and parking areas (with lighting and signage)
- (IS/IT) services
- Site grading and drainage, landscaping, landfills, spoils, retention areas
- Site rights-of-way and easements

Per Palo Verde's cost estimate, SCE's share of this project is $2.6 million.

G. Computers

The computer blanket is used for computer-related upgrades and replacements. None of the projects are currently greater than $1 million.

Per Palo Verde's cost estimate, SCE's share of this project is $9.3 million.

H. Emergent Work Fund

The Emergent Work Fund is a blanket work authorization for unplanned capital investments at the plant to address: (1) issues raised by the NRC and other regulatory agencies, or (2) issues discovered during future operation and/or refueling outages. The foregoing issues typically arise at nuclear facilities, including Palo Verde. The Emergent Work Fund appears as a line item in the five-year capital forecast for 2013-2017. Any capital work item funded from the Emergent Work Fund requires a detailed, specific Work Authorization approved by the Engineering & Operating Committee.

Per Palo Verde's cost estimate, SCE's share of this project is $9.7 million.

I. Overheads

Significant costs are incurred in the overall support of the Capital Program at Palo Verde. Since it is not practical to assign these costs to individual projects, the "Overheads" project accounts for them. In general, groups supporting the majority of the capital projects are included; for example Business Operations, Warehouse, Long Range Planning, and Supply Chain. Additionally, a portion of the

PVNGS insurance premium is allocated to the Capital Overheads project. Similarly, the Maintenance and Project Engineering Departments incur significant costs to specifically support the categories “Plant Modifications” and “Replacements” but it is not practical to assign these costs to individual projects. The "Distributables" project accounts for them.

Per Palo Verde’s cost estimate, SCE’s share of these costs is $12.3 million.

Appendix A

Witness Qualification

SOUTHERN CALIFORNIA EDISON COMPANY

QUALIFICATIONS AND PREPARED TESTIMONY

OF THOMAS CHAMP

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

A. My name is Thomas Champ, and my business address is 5000 Pacific Coast Highway, San Clemente, CA 92674.

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

A. I am presently responsible for the O&M and Capital Finance Group at San Onofre and for Palo Verde Oversight and Finance.

Q. Briefly describe your educational and professional background.

A. I earned a Bachelor of Science Degree from the University of Phoenix in Business Administration. I have been employed at San Onofre Nuclear Generating Station since June 1983 and was hire as a Southern California Edison employee in December 1985. I have held a number of technical and supervisory positions in Maintenance and a number of management positions in Finance while in the Nuclear Generation Business Unit.

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

A. The purpose of my testimony in this proceeding is to sponsor the portions of Exhibit SCE-02, Volume 3, entitled *Generation - Palo Verde*, as identified in the Table of Contents thereto.

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

A. No, it was prepared without my supervision by my predecessor, Mr. Gerald Hammond.

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

A. Yes, I do.

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

A. Yes, it does.

Q. Does this conclude your qualifications and prepared testimony?

A. Yes, it does.