Decision 14-02-024 February 27, 2014

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of Pacific Gas and Electric Company in its 2012 Nuclear Decommissioning Cost Triennial Proceeding (U39E).	Application 12-12-012 (Filed December 21, 2012)
And Related Matter.	Application 12-12-013

DECISION ON PHASE 1 OF THE TRIENNIAL REVIEW OF NUCLEAR DECOMMISSIONING COSTS AND ACTIVITIES FOR PACIFIC GAS AND ELECTRIC COMPANY AS RELATED TO THE HUMBOLDT BAY POWER PLANT UNIT 3

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1. Summary

This decision finds reasonable a cost estimate of $679 million (2011)-- approximately $400 million higher than the 2009 estimate-- to complete the decommissioning of Pacific Gas and Electric Company's (PG&E) nuclear power plant located at Humboldt Bay (HBPP3). It is a reduction of approximately $48 million (10.7%) to PG&E's request of $727.6 million. Decommissioning is well underway, and PG&E established that most of its revised estimate of necessary decommissioning costs is reasonable based on new information about the extent of contamination, actual contract costs, experience and other factors. The actual revenue requirement and ratepayer impact will be determined in Phase 2.

By this decision, we affirm that decommissioning of nuclear plants should be carried out with the safety of the workers, the public, and the environment as a driver of conservative assumptions regarding radiological contamination. Final approval for recovery of these costs from ratepayers will occur after the decommissioning projects are completed and reviewed again by the Commission.

PG&E provided evidence that two major and costly changes to the planned scope of work are reasonable approaches to safely removing unanticipated quantities of contaminated material in order to meet federal, state, and local regulatory standards. State law requires ratepayers to pay the reasonable costs of

decommissioning formerly active nuclear plants.[1] Although this revised estimated cost is substantial, the public expects and deserves no less than appropriate clean-up of a site which has been found to have higher than expected levels of toxic contaminants, including Carbon-14[2] and Cesium-137.[3] The surrounding community has expressed support for key portions of PG&E's plans.

PG&E is decommissioning HBPP3 under the authority of the United States Nuclear Regulatory Commission which requires assurance that minimum funding is available for decommissioning the site to a regulated level of decontamination. The Public Utilities Commission's authority includes determination of whether proposed cost estimates for decommissioning are reasonable, and whether actual decommissioning costs were reasonable and prudent. Reasonable costs may be captured in rates and added to the statutory nuclear decommissioning trust funds for approved expenditures.

The Decision makes other findings and finds reasonable the following:

- 2010-2013 costs for maintaining minimal plant systems during decommissioning in Safe Storage (SAFSTOR);
- SAFSTOR Operations and Maintenance expense forecast of $5.956 million in 2014, $5.559 million in 2015, and $4.921 million in 2016; and
- $25.923 million in expenditures for completed decommissioning projects.

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[1] Pub. Util. Code § 8325(c).

[2] Carbon-14 is a naturally occurring radioactive isotope of carbon with a half-life of more than 5,000 years; at certain level, it can have a significant adverse health impact on individuals exposed through inhalation or ingestion; see TR at 267.

[3] Cesium-137 is a radioactive isotope of cesium formed during the operation of a nuclear reactor, with a half-life of about 30 years.

The Commission is cognizant the higher proposed decommissioning costs should be balanced with our responsibilities to keep rates just and reasonable, particularly where public safety is concerned. We share some of the cost, accountability and transparency concerns raised by intervenors, particularly The Utility Reform Network. This decision improves the Commission's monitoring of the decommissioning activities and costs occurring between these triennial proceedings and establishes clear expectations of recordkeeping and other evidentiary support for final approval of future expenditures.

The broad purposes of the nuclear decommissioning cost triennial proceedings (NDCTP) are to set the annual revenue requirements for the decommissioning trusts for nuclear power plants owned by the electric utilities and to determine whether actual decommissioning expenditures were reasonable and prudent.[4] These NDCTP proceedings were consolidated and divided into two phases so that issues relating to estimated HBPP3 future decommissioning costs and recovery of actual expenses would be considered in Phase 1. All other NDCTP issues, including revenue requirements for HBPP3, will be considered in Phase 2. This decision resolves all issues in Phase 1.

2. Procedural Background

On December 21, 2012, Southern California Edison Company (SCE) and San Diego Gas & Electric (SDG&E) filed a Joint Application, and Pacific Gas and Electric Company (PG&E) filed its Application, for the 2012 Nuclear Decommissioning Cost Proceedings pursuant to § 8321 et seq. of the California Public Utilities Code.[5] The purposes of the Nuclear Decommissioning Costs

[4] Decision (D.) 07-01-003.

[5] Unless otherwise indicated, all references to "section" mean the Public Utilities Code.

Triennial Proceedings (NDCTP) are to establish just and reasonable rates to adequately fund the nuclear decommissioning trusts[6] for the benefit and protection of ratepayers, verify that the utilities are in compliance with prior decisions applicable to decommissioning, and determine whether the costs expended decommissioning by the utilities are reasonable and prudent.[7]

The Commission preliminarily categorized the proceedings as ratesetting in Resolution ALJ 176-3307, dated January 10, 2013. No parties opposed this categorization. The Division of Ratepayer Advocates[8] (DRA) protested both applications. The Utility Reform Network (TURN) filed a protest of the SCE/SDG&E application and a response to PG&E's application. The Merced Irrigation District and Modesto Irrigation District filed a joint response to PG&E's application, but did not otherwise participate in Phase 1.

On March 27, 2013, the Commission held a joint Prehearing Conference (PHC) for both Applications to identify issues, consider the schedule, and address other matters as necessary to proceed with these applications. At the PHC, assigned Commissioner Mark Ferron and Administrative Law Judge (ALJ) Melanie M. Darling ordered supplemental testimony and that the proceedings be consolidated. Consolidation was unopposed.

PG&E's decommissioning cost estimate for Humboldt Bay Unit three (HBPP3) reflects an increase of approximately $449 million due to expanded

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[6] In D.87-05-062, the Commission adopted externally managed trusts as the vehicle for accruing decommissioning funds and established guidelines for the trust agreements. The trust Agreements were initially authorized in Resolution E-3048.

[7] D.07-01-003 at 6-7.

scope, $245 million of which is primarily for the unplanned removal of the entire reactor caisson and more complex remediation of contaminated drainage canals. At a telephonic status conference held on June 12, 2013, PG&E requested that HBPP3 decommissioning cost reviews be separated from the other NDCTP issues and heard both separately and first. All parties agreed to the bifurcation and separate hearing schedules.

The June 17, 2013 Scoping Memorandum and Ruling provided that Phase 1 would address the reasonableness review of identified past & future decommissioning costs at HBPP3 (i.e., decommissioning cost estimate, Safe Storage Operations and Maintenance (SAFSTOR O&M), and costs of completed decommissioning projects). All other issues in these proceedings, including calculation of HBPP3 revenue requirements, are considered in Phase 2.

PG&E supported its application with prepared direct and rebuttal testimony. For Phase 1, PG&E was directed to develop the following supplemental testimony and exhibits:

- Exhibit: copy of the request for proposal (RFP) for the proposed Caisson Removal project (PG&E-12);
- Supplemental testimony about the RFP process, review criteria, and summary of decommissioning options regarding the caisson contamination (PG&E-13);
- Exhibit: copy of PG&E's December 18, 2012 Advice Letter summarizing HBPP3 decommissioning costs from January 1, 2009 and comparing recorded expenses to amounts given preliminary approval by project in the 2009 NDCTP (PG&E-4); and

[8] Division of Ratepayer Advocates (DRA) is now known as the Office of Ratepayer Advocates (ORA), however, ORA and other parties continued to refer to "DRA" in testimony and briefs for the sake of continuity.

- Exhibit: copy of the most recently revised Post-Shutdown Decommissioning Activities Report (PSDAR) submitted by PG&E to the U.S. Nuclear regulatory Commission (NRC) (PG&E-15).

DRA and TURN timely served testimony on July 12, 2013 and participated in the hearings. The evidentiary hearings for Phase 1 were held on August 7-8, 2013. At the conclusion of the hearings, the underlying testimony of witnesses in this phase of the proceeding, and other prepared exhibits, were received into evidence without objection. Subsequent to the evidentiary hearings, PG&E submitted a late exhibit identifying other nuclear facilities which removed Carbon-14 activated concrete structures.[9] DRA submitted a late exhibit which identified the Kiewit Caisson Removal Feasibility study as the basis for a piece of its testimony.[10]

Concurrent Opening Briefs and Reply Briefs were filed by PG&E, DRA and TURN on September 13, 2013, and September 27, 2013, respectively. SDG&E also filed a Reply Brief. The matter is submitted as of October 28, 2013, following the conclusion of Phase 2 hearings which included evidence related to the HBPP 2014 revenue requirement to support costs approved here.

3. Humboldt Bay Power Plant Unit 3

HBPP3 was a 65-megawatt boiling water nuclear reactor that began commercial operations in August 1963. At the time HBPP3 entered service, the nuclear fuel assemblies utilized stainless steel as the fuel rod cladding. The fuel rods experienced gross cladding failures during operation, resulting in release of

[9] PG&E-17.

[10] DRA-11.

radioactive fuel which dispersed throughout numerous plant systems spreading alpha contamination.[11]

The reactor was taken offline in 1976 for a refueling outage and to make seismic modifications. In 1979, the NRC mandated a new and comprehensive series of plant modifications which would have required PG&E to make additional capital investment.[12] In its 2002 NDCTP, PG&E sought Commission approval for early decommissioning of HBPP3. The Commission determined that early decommissioning of HBPP3 would be less costly than delaying the start of decommissioning to 2015, and approved the early decommissioning.[13]

The spent nuclear fuel (SNF) was removed from the reactor in 1984, and transferred to the Independent Spent Fuel Storage Installation (ISFSI, or dry cask storage) in 2008. PG&E intends to leave the SNF in dry cask storage until the U.S. Department of Energy (DOE) assumes control of the fuel.[14]

According to PG&E, the majority of decommissioning work over the past four years involved installation of site infrastructure and removal of systems and components, carried out under a self-perform arrangement where PG&E provided direct supervision of contracted work force performing the work.[15] This type of contracting arrangement was beneficial, argues PG&E, because the full scope of work was unknown until decommissioning was underway, thus

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[11] PG&E-10 at 4-9 (HBPP3 completed transition to zircaloy assemblies by 1969).

[12] PG&E-12 (PSDAR Rev. 4, July 2013).

[13] D.03-10-014 at 28, Findings of Fact 1.

[14] *Ibid.*

[15] TR 125-126 (In 2007-2008 activities mostly involved movement of nuclear fuel; in 2009-2010 involved demolition of equipment systems, removal of the reactor vessel drywall head).

making it difficult to put activities out to bid. There were also some site-specific challenges of work sequencing, maintaining systems, special controls, etc.[16]

However, HBPP3 decommissioning is transitioning from the "Plant Systems Removal" phase to the "Civil Works Projects (CWP)" phase in which the work scope is well defined. PG&E intends to provide direct oversight of a large civil works contractor, competitively engaged, based on actual cost plus earned percentage of a fixed fee.[17] PG&E will continue self-performing high risk radiological and other work.

Based on PG&E's schedule of planned decommissioning activities, which incorporates various assumptions, including approval of its proposed new scope, decommissioning of the Unit 3 site is expected to occur over the next six years, concluding in 2019.[18]

3.1 PG&E's 2012 NDCTP Application

As related to the limited scope of Phase 1, in Application 12-12-012, PG&E requests the Commission:

1. Approves PG&E's cost estimate of $727.6 million to complete decommissioning of HBPP3 Unit 3 is reasonable and in accordance with §§ 8321 through 8330 of the Cal. Pub. Util. Code;
2. Finds that the $25.923 million in costs incurred for completed decommissioning projects at HBPP3 Unit 3 are reasonable and prudently incurred;
3. Finds that PG&E has made all reasonable efforts to retain and utilize qualified and experienced personnel to

[16] PG&E-8 at 7-8.

[17] *Id.* at 3.

[18] PG&E-12, Attachment A.

effectively, safely, and efficiently pursue physical decommissioning related activities at HBPP3;

4. Adopts PG&E's HBPP3 Unit 3 SAFSTOR O&M expense forecast[19] of $5.956 million in 2014, $5.559 million in 2015 and $4.921 million in 2016 and subsequent years through 2020 are reasonable;
5. Finds that the variances in actual versus forecast 2010-2012 SAFSTOR expenses are reasonable; and
6. Authorize PG&E to modify the manner in which it trues up actual and forecast SAFSTOR expenses so that SAFSTOR under-collections will be trued-up through additional withdrawals from the tax-qualified trust, and over-collections will be credited against decommissioning costs otherwise recoverable from the trusts.

3.2. Differences between 2009 and 2012 HBPP3 Decommissioning Cost Estimate

Through 2011, PG&E has expended about $254.8 million (nominal) for decommissioning related activities which it has recovered from the HBPP3 decommissioning trust funds.[20] From January 1, 2012, PG&E's updated estimated cost to complete decommissioning of HBPP3 is approximately $727.6 million.[21] The estimated total decommissioning cost is now $982.4 million,[22] an increase of approximately $449 million from the forecast approved in the 2009 NDCTP.[23]

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[19] Modified in PG&E-7 at 6-1.

[20] PG&E-6 at 4-8, Table 4-2 Cash Flow for Decommissioning.

[21] *Id.* at 4-1; PG&E-10 at 4-1 et seq. (work papers for Chapter 4 including the 2012 updated "Decommissioning Project Report for HBPP3 Unit 3).

[22] PG&E-10 at 4-5 ($727.6 + $254.8 = $982.4 million).

[23] D.10-11-051 (Commission accepted cost estimate of $499.8 million to complete HBPP3 decommissioning; TURN-1 at 4, Table 1, escalated 2009 estimate of $533.4 million).

PG&E states the principal cost drivers are unforeseen changes to scope of work, and additional labor costs. PG&E had previously assumed that the reactor caisson and associated structures three feet and more below grade level would remain in place. This is the general industry standard. In late 2011, during early decommissioning activities, PG&E discovered contamination in the bioshield wall surrounding the reactor vessel, and concluded the only viable alternative was to remove the reactor caisson containment structure.[24] Based on what it characterizes as a detailed feasibility study,[25] PG&E found that the cost for complete removal of the reactor caisson will be approximately $191.6 million, including related site improvements.[26]

The second change to work scope is based on PG&E's site restoration assumptions which now reflect actual site conditions and a more stringent standard for residual radioactivity, associated with unrestricted use of the site following license termination. This change most directly impacts the remediation of the intake and discharge canals which, with associated soil removal and disposal, is estimated to cost approximately $47 million.[27] Joint site support and groundwater treatment costs for the caisson and canal projects are $6.2 million.

Other changes to HBPP3 decommissioning costs include an additional $20 million for SNF management based on assuming four additional years of storage, until 2024, before DOE establishes a federal repository for high level

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[24] *Id.* at 4-2.

[25] PG&E-14 (Kiewit Humboldt Bay Power Plant Caisson Removal Feasibility Study, Final Report, October 29, 2012).

[26] *Ibid.*

[27] PG&E-6 at 4-2.

radioactive waste. PG&E contends the remainder of the estimated increase, approximately $184 million, is for adjusted expectations of labor/contract costs related to safely managing contamination, working in a constrained work space, and actual contract values.[28] These changes to the cost estimate are discussed in more detail below.

The new estimate is a substantial increase over the previous estimate accepted by the Commission in the 2009 NDCTP. The 2009 cost study prepared by TLG Services Inc. (TLG), followed industry methodology[29] and applied a unit cost factor to estimate various standard decommissioning activities, adjusted for expected work difficulties unique to the Humboldt site. However, PG&E asserts that with decommissioning in progress, and large civil works projects going out to bid, it did not simply update the 2009 study. Instead, the 2012 cost estimate was developed internally and reflects updated forecasts using on-the-ground experience and third party bids to augment unit cost measures.[30] PG&E refers to its 2012 Decommissioning Project Report (DPR) for HBPP3 Unit 3 as the basis of the 2012 cost estimate.

PG&E states the 2009 cost study is not a benchmark for review of the 2012 DPR which was developed over two years. During this same period, PG&E developed its License Termination Plan (LTP) for submission to the NRC in

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[28] *Id.* at 4-3.

[29] *Id.* at 4-8 to 4-9, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates" (T.S. LaGuardia et al., AIF/NESP-036, May 1986).

[30] *Id.* at 4-9.

consultation with "many of the nation's leading subject matter experts."[31] These documents reflect a consistent approach to the decommissioning.

PG&E asserts the updated estimate is reasonable because it is the result of actual decommissioning experience, including (1) an ability to undertake testing for contamination in formerly unreachable locations; (2) attempting to find and fill cracks in contaminated concrete; (3) a comprehensive evaluation of actual remaining activities; and (4) actual competitive bid pricing and schedule to decommission HBPP3.[32] Except for new regulatory requirements and other costs outside its control, PG&E asserts that it "does not foresee further expansion of the scope of decommissioning HBPP3."[33]

4. Other Parties' Positions

4.1. Division (Office) of Ratepayer Advocates

DRA does not oppose PG&E's proposed caisson removal project ($192 million), costs for four additional years of SNF storage ($20 million), groundwater treatment costs ($6.2 million), SAFSTOR O&M costs and forecasts through 2016, or recovery of expenses for the four completed decommissioning projects ($25.9 million).[34]

However, DRA opposes PG&E's proposal to increase excavation and remediation of the intake and discharge canals, and argues that PG&E has not

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[31] *Ibid.* (PG&E states it formulated necessary costs with benefit of lessons learned from other license terminations pursuant to the Multi Agency Radiation Survey and Site Investigation Manual).

[32] PG&E Opening Brief (OB) at 3.

[33] PG&E-6 at 4-3.

[34] DRA-01A at 1.

justified the expansion of work at an estimated cost of $47 million.[35] DRA focuses on the 2009 cost estimate of $3 million, and PG&E's statement that no change in the end use for the land is contemplated, as the basis for its opposition to any change in the remediation plans for the canals.

DRA also vigorously objects to PG&E's use of rebuttal testimony to first identify a modeling error in the 2009 study regarding canal remediation requirements, and to provide an expansive explanation of the basis for PG&E's remediation decision.[36] DRA did no follow-up inquiries regarding the site conditions or the modeling error, and instead contends the rebuttal is improper direct testimony which "blindsided DRA" and should be disregarded.[37]

DRA recommends the Commission do either of the following: (1) adopt the 2009 cost study estimate of $3 million to remediate the canals; or (2) order PG&E to remediate the canal sites using the Industrial Worker Scenario (instead of the Residential Farmer Scenario), at an estimated cost of $29 million.[38] DRA notes the second option is not a waiver of objections as to PG&E's proof, and that PG&E could seek additional recovery in the next NDCTP.

4.2. The Utility Reform Network

TURN opposes approval of the 2012 cost study as a whole, and the caisson removal project in particular. TURN's recommendations are:

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[35] DRA OB at 5.

[36] *Id.* at 1.

[37] TR at 346-347.

[38] DRA OB at 2-3.

- Delay approval of the 2012 cost estimate to complete the HBPP3 decommissioning until PG&E provides a table that benchmarks the costs to the 2009 study and provides additional explanation of increases;
- Find the caisson removal project is insufficiently supported by evidence it is the least-cost option, and that it is not entitled to a presumption of reasonableness;
- Defer review of actual costs for completed projects to the 2015 NDCTP; and
- Disallow $12 million of $24 million in claimed 2009-2011 planning and preparation costs.[39]

TURN focuses on the size of PG&E's proposed increase, and an inability to track estimated costs from the 2009 cost study to the 2012 cost estimate. TURN contends PG&E failed to justify its 2012 updated cost estimate, or to provide a basis for comparison to the 2009 cost study, thus limiting the ability of the Commission and parties to review the estimate for reasonableness.

Bruce Lacy, TURN's expert witness, testified that PG&E had made important progress and "established momentum for decommissioning," but argued that the proposed increases are so substantially different from the approved 2009 cost study that they should not be approved.[40] Mr. Lacy contends the changes are indicative of poor planning and, without changes to the cost recovery process, asserts Commission approval would provide no incentive for future cost containment.

TURN's summary of differences between PG&E's position in the 2009 NDCTP versus in the 2012 NDCTP are as follows:

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[39] TURN OB at 2-3.

[40] TURN-1 at 1.

Summary of 2009 and 2012 NDCTPs re HBPP341
(millions)

	2009 NDCTP	2012 NDCTP	Increase
Total Estimated Cost	$533.4	$982.4	$449.0
Expenditures through December 2011	$250.7	$254.8	$4.1
Estimated Cost to Complete	$282.7	$727.6	$444.9
Major decommissioning Completed	2016	2019	3 years
SNF leaves site	2020	2024*	4 years

* corrected from 2025

TURN further suggests that PG&E's 2012 approach to estimated future expenses, as well as review of actual expenses for completed projects, sets the stage for additional large cost increases in the future. TURN argues,

> Absent significant changes, PG&E will take every opportunity to change the relevant benchmarks for all expenditures, package work projects into convenient bundles, and justify every overage by claiming an increase in the scope of work. Furthermore, PG&E will seek to update its forecasts to calibrate with actual spending in order to demonstrate reasonableness.[42]

As a result, TURN suggests the Commission modify the process for reviewing the reasonableness of completed decommissioning projects. TURN recommends the following measures to implement "cost containment and accountability:"

- Require the total decommissioning scope be divided into 10-15 major work packages linked to the 2009 and/or 2012 cost estimates, subject to specific success criteria, set schedules, and cost caps;
- Retain an independent auditor to regularly review work packages, costs, and anticipated cost increases; and

[41] *Id.* at 4.

[42] TURN OB at 1-2.

- Appoint a decommissioning monitor to review and periodically report on decommissioning activities and costs.[43]

4.3. San Diego Gas & Electric Company

SDG&E filed a Reply Brief to address "assertions and arguments" by TURN due to the utility's interest in the legal standards and evidentiary review of the reasonableness of decommissioning costs.[44] In particular, SDG&E rejects as illogical TURN's central argument that the 2009 cost study is superior to the 2012 estimate, and should be relied upon by the Commission to undertake review of cost estimates and expenditures in this proceeding.

To the contrary, SDG&E argues that the 2012 estimate is informed by the "accumulated additional knowledge and information the passage of time and commencement of the project have afforded PG&E" which is entitled to an inference of more credibility than the 2009 study developed with now-stale information.[45] SDG&E finds the 2012 cost study not only a "compelling improvement" over the 2009 study, but compliant with the decision in the 2009 NDCTP which affirmed the Commission's interest in reviewing the most recent relevant information about site characteristics and costs.[46]

SDG&E argues that TURN's concerns are driven by the fact that there are cost increases, which the Commission should not view as determinative of reasonableness. Instead, the Commission knows cost estimates are speculative,

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[43] *Id.* at 4.

[44] SDG&E RB at 1.

[45] *Id.* at 6.

[46] *Id.* at 3 (citing D.11-07-003).

and will change in some respects as decommissioning occurs and previously sealed systems, equipment, and buildings become accessible for testing.

Lastly, SDG&E argues that PG&E had no reason to know the Commission expected comparability, or tracking, between the 2009 and 2012 cost estimates because it "changed the standard for reasonableness review" in the 2009 decision to remove a presumption of reasonableness if projects came in under budget and on time. [Note: In the 2009 NDCTP, the Commission declined to adopt a settlement which would have expanded to all nuclear facilities, such a rebuttable presumption approved years ago solely for the delayed decommissioning of Unit 1 at San Onofre Nuclear Generating Station.][47]

5. Standards of Review

PG&E bears the burden of proof to show that the proposed cost estimates for completing decommissioning of HBPP3 and to maintain SAFSTOR conditions during decommissioning are reasonable.

The applicable standard of review for previously incurred costs for SAFSTOR and completed decommissioning projects, is whether the actual expenditures were reasonable and prudent.[48] Consistent with prior Commission findings, the prudency of a particular management action (e.g., decision to undertake a specific activity) depends on what the utility knew or should have known at the time that the managerial decision was made.[49]

This is a ratesetting proceeding in which the estimated costs determined to be reasonable in Phase 1 will be converted to a revenue requirement by

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[47] D.10-07-047 at 9.

[48] D.10-07-047 at 54 Conclusion of Law 2.

[49] D.02-08-064 at 5-8.

determinations made in Phase 2. Therefore, the applicable standard of proof PG&E must meet is that of a preponderance of evidence.[50]

We consider the application based on these standards.

6. Discussion of 2012 Decommissioning Cost Estimate

6.1. Reasonableness of 2012 Decommissioning Cost Estimate

PG&E's projected total cost for decommissioning HBPP3 is $982.4 million, including expenditures to date. The 2012 DPR provides a summary of broad cost categories for activities necessary to complete decommissioning as of January 1, 2012.

Summary of Decommissioning Cost Contributors (Thousands)

Cost Category	% of Total	Amount
General Staffing (Excludes Caisson)	14%	100,167
Remainder of Plant Systems	8%	56, 693
Site Infrastructure	0%	2,074
Specific project Costs (Excludes Disposal/Caisson/Canals)	14%	104,254
Waste Disposal (Excludes Caisson/Canals)	10%	74,011
Small Value Contracts	5%	36,042
Spent Fuel Management	9%	62,608
Contingency (Excludes Caisson/Canals)	6%	46,552
Caisson (Includes Disposal & Contingency)	26%	191,627
Canal Remediation (Includes Disposal & Contingency)	7%	47,408
Common Site Support-Caisson & Canals	1%	6,196
TOTAL*		**$727,633**

*A slightly more detailed version of this table is in PG&E's work papers at PG&E-10 at 4-35.

6.1.1. RFP Process and Cost Estimate Methodology

PG&E undertook significant planning in 2011-2012 to prepare technical and administrative specifications for the major projects and obtain bids for the

[50] D.12-11-051 at 9.

next phase of work.[51] Instead of simply updating the 2009 cost study, PG&E developed the 2012 DPR to identify the cost and schedule to complete decommissioning, and to support its LTP. We agree that one purpose of the NDCTP is to update decommissioning cost estimates based on more current information, although significant changes should diminish as a utility progresses through actual decommissioning.

PG&E describes the DPR as based on the updated information about project scopes and methodologies reflecting new engineering studies, information and lessons learned from ongoing decommissioning activities, and/or actual contractor bids.[52] No contrary evidence was presented on this point. The estimates for remaining work, including retained self-performed work (e.g., radiological), are based on industry pricing in lieu of a budgetary estimate.

The DPR assumes PG&E transitions to lump sum fixed cost and time-and-materials contracting. No party disputes PG&E's claim such contracting is suited to the nature of the next phase of work: the Civil Works Projects Phase. This phase will have five major work scopes: Turbine Building Demolition,[53] Nuclear Facilities Demolition and Excavation, Intake and Discharge Canal Remediation, Office Facility Demobilization, and Final Site Restoration.[54]

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[51] PG&E-12 at 2; TR at 190.

[52] *Id.* at 2.

[53] PG&E-10 at 4-26 (The contract for asbestos abatement and surface decontamination and demolition of the Turbine Building was awarded in 2012 and expected to be completed in 2013).

[54] *Id.* at 4-25 to 4-26.

PG&E formed an interdisciplinary and broad-based subject matter expert team[55] to develop and vet technical and administrative specifications to define the criteria to complete the decommissioning. The resulting "Capstone Document" was provided to contract bidders to create well-developed, site-specific bids.[56] PG&E conducted the RFP in two phases to accommodate possible changes related to evaluation of the caisson removal option and results of the Kiewit feasibility study.

Phase 1 of the RFP included the installation of a slurry wall to create a dry subgrade supporting the SNF pool, and greater remediation of the intake and discharge canals.[57] Phase 1 was issued in June 2012 to eight qualified bidders. Three bids were submitted for all four projects, one higher bid was submitted just for the canal remediation project. The caisson removal project was added in Phase 2 in December 2012.[58]

Excerpts from the RFP establish that PG&E developed detailed and comprehensive proposal requirements, including substantial health and safety elements and plans for environmental protection, waste management, and asbestos abatement.[59] The three bidders submitted Best and Final Offers

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[55] *Id.* at 4-111 to 4-114 (description of the types of experts, experience, scope of contribution; no personnel identified).

[56] TR at 190.

[57] *Ibid.*

[58] *Id.* at 198.

[59] PG&E-13 at Appendix B "Specifications Health and Safety Requirements" (e.g., Contractor shall have at least one full-time experienced safety officer on-site, employee training, protective gear, compliance reports, incident reports, radiation protection, traffic, noise and odor control plans, regular safety reviews, audits, and/or inspections, details of PG&E's safety culture expectations, etc.).

in April 2013 for the four civil works projects, including caisson removal. PG&E used the competitive bids, and later, the contracts to estimate costs for this proceeding.[60] No party contested the process by which PG&E developed qualified bidders, or evaluated the bids, which included individual approaches to work scope, site personnel management, and techniques for handling soil and contaminated materials.

To evaluate the bids, PG&E's Technical Evaluation team performed detailed assessments of the two lowest bidders, both for technical expertise and the commercial terms, pricing, and compliance with PG&E's diversity goals.[61] Shaw Environmental Incorporated, experienced in the construction, operation, and maintenance of nuclear power plants, was selected as the general contractor for the CWP phase.[62] The contract has a very extensive performance management requirement to allow for weekly reports and early action if a projects gets off scope, budget, or schedule.[63] Shaw would earn a fixed fee of $20 million which removes the incentive for cost overages and schedule delays.

Neither TURN nor DRA argue that PG&E's process for developing the RFP or awarding the contract was flawed. The Commission finds that PG&E undertook a reasonable process to create the detailed technical and administrative specifications of the work scope to be accomplished in the next, most significant, phase of decommissioning. PG&E utilized these specifications

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[60] PG&E-10 at 4-6.

[61] PG&E-12 at 5.

[62] TR at 49-50 (Shaw's environmental group has extensive history working on Superfund and other hazardous waste sites).

[63] TR at 54-55.

to undertake a reasonable RFP process to identify qualified bidders to perform general management of the complex Civil Works Phase, and selected an experienced, qualified bidder among the lowest two offers. Thus, the Commission may reasonably rely on the RFP-developed costs supported by the RFP process, based on PG&E's identified work scopes, to complete PG&E's proposed decommissioning plan.

On the other hand, both TURN and DRA have concerns about the estimated costs because they question the assumed scope of work for the caisson removal project and canal remediation project, respectively. The key areas of disagreement relate to the applicable standards and methods for remediation of radiological contamination applicable to the HBPP site. These two projects are discussed separately in more detail below.

In general, we agree with the parties that there is some uncertainty about what standards will be applicable to the decommissioned site at the time of the NRC's final status surveys necessary for termination of the HBPP3 license. The 2012 cost estimate assumes the public and regulatory direction is toward lower levels of acceptable radiological and other types of contamination at the end of decommissioning. This is a reasonable assumption.

In 2009, PG&E based its remediation estimates on earlier studies of likely land use and residual radiological contamination levels currently set by the NRC in agreement with the U.S. Environmental Protection Agency (EPA).[64] However, the current federal regulatory framework provides for future EPA involvement at decommissioned NRC-licensed sites upon finding residual presence of certain

[64] PG&E-10 at 4-11.

contamination levels (e.g., in groundwater) in excess of EPA limits.[65] The NRC also requires opportunities for various state and local authorities and the public to weigh in on end-state site conditions. [66]

To "anticipate the direction" expected of it, PG&E states it initiated communications with these governmental entities and helped form a Citizens Advisory Board (CAB).[67] After discussions with stakeholders and review of lessons learned at other remediated facilities, PG&E concluded it was more prudent to assume end-state Residential use and the lower EPA limits in the 2012 DPR.[68]

DRA argues that PG&E is merely speculating that higher standards will apply in the future. However, the Commission acknowledges uncertainty, and finds some merit in PG&E's effort to assess and incorporate an expectation of regulatory and public tendency towards higher standards of site clean-up. As more nuclear facilities begin decommissioning, we anticipate efforts to reduce the confusion and to improve coordination of state and federal requirements. Following the tragic and broad failure of radiological containment at the Fukushima nuclear facilities, we also think that public and regulatory interest is heightened and reasonably likely to lead to lower acceptable limits for residual radiological contamination in the future.

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[65] *Ibid.*

[66] California Coastal Commission, the California Environmental Protection Agency, California Department of Toxic Substances Control, and the State Water Control Board (PG&E-10 at 4-11); TR at 112-113.

[67] *Ibid.*

[68] *Ibid.*

Therefore, the Commission finds it reasonable that PG&E revised its 2012 cost estimates to complete decommissioning based on more recent site information and to make generally conservative adjustments for radiological decontamination. PG&E utilized actual bids for work which were incorporated into the 2012 estimate and which are more reliable than the 2009 less-specific cost estimates for that work. Performance and cost controls in place should also deter future cost increases.

6.1.2. Specific Increases from the 2009 Cost Study

The increases arise from the following factors:

- Caisson and canal projects, including joint site support: $245.2 million.
- Other estimated cost increases to expected decommissioning activities: $203.8 million.

The Caisson Removal project and the Intake and Discharge Canal Remediation project are discussed in Sections 6.1.3 and 6.1.4 below.

As PG&E undertook early decommissioning efforts, the utility claims it identified several cost items that were accruing faster than predicted in the 2009 study, and adjusted the 2012 estimate accordingly. Most increases arose from more unfavorable working conditions than anticipated, including higher levels of alpha contamination and a more physically constrained work environment.[69] In the 2012 DPR, PG&E provided a narrative basis for specified increases in the cost categories summarized below:[70]

[69] PG&E-10 at 4-37.

[70] *Id.* at 4-37 to 4-40, 4-54 to 4-62.

Summary of Proposed Cost Increases (millions)

Category	Reason for Increase	2009 Estimate	2012 Estimate
Labor-Plant Systems Removal	Enhanced safety due to higher contamination; physically constrained work environment/work rules	23.0	55.8 (+32.8)
Tools/Equipment/Supplies	High alpha contamination means higher rate of tool/equipment consumption; specialty devices needed	9.3	28.6 (+19.3)
License Termination Survey	Relied on updated industry benchmarking, including estimates for DCPP	4.0	19.0 (+15.0)
Turbine Building Demolition	Based on two competitive bids and award to specialty contractor	4.0	14.0 (+10.0)
Site Infrastructure/Plant Modifications	Unexpected costs for access to the site and providing work space for personnel on-site; additional Radiation Protection staffing, testing, facilities for packaging	8.6	16.8 (+8.2)
Small Value Contracts	(e.g., janitorial, water, garbage disposal, trailer rental, fees, etc.) not considered before	0.0	10.8
Contingency	Used $36 million of 2009 contingency; based on actual contracts w/line-item contingency	54.0	94.5 (+40.5)
ISFSI (Spent fuel storage)	An additional four years to 2024	0.0	20.0 (+20.)
TOTAL		**$102.9**	**$259.5 (+$156.6)**

PG&E presented these increases in a dissimilar way to how it aggregated costs in the primary breakdown of costs-to-complete decommissioning. PG&E also did not provide any benchmarking of these increases to any specific line items or estimates in the 2009 cost study. TURN argues these are fatal flaws in PG&E's evidence. Instead TURN attempted to create its own comparison, including analysis of the 2009 cost study to try to confirm PG&E's narrative claims of 2009 estimates.[71] The difficulty in making the comparison drives TURN's recommendations that PG&E's cost increases be rejected and all future

[71] TURN OB at 9.

costs be benchmarked against the 2009 study.[72] TURN also urged the Commission to exclude most ISFSI costs based on the assumption that PG&E's partial recovery of earlier costs through litigation with the DOE will repeat in the future.

A primary purpose of the NDCTP is to regularly review decommissioning cost estimates as updated to account for more current site-specific and cost information. TURN's emphasis on the 2009 NDCTP cost estimate does not address the underlying reality that decommissioning, by its nature, involves an evolution in knowledge. Cost studies done prior to actual decommissioning are understood to be best efforts utilizing unit cost factors modified for known conditions. They are subject to the near certainty of unknown conditions, primarily contamination, discoverable once structures and systems are opened, and actual contract pricing which will very likely result in changes to the earlier estimates.

The relevant issue is whether PG&E established that the resulting changes are reasonable. TURN challenges PG&E's claims of unforeseen changes in work scope because the 2009 study considered contingency, increases in work difficulty, the constrained work environment, and alpha contamination of systems.[73] Although admitting that "unforeseen changes can and should be expected," TURN opines that "it is not obvious" that these proposed increases

[72] *Id.* at 2-3, 10-11.

[73] TURN-1 at 16.

are reasonable, primarily because approximately $48 million is left unexplained (exclusive of the caisson and canal projects).[74]

TURN provided its own comparison of adjusted 2009 cost estimates to PG&E's proposed 2012 cost estimates.[75] However, the categories used were inconsistent with the cost breakdowns in PG&E's testimony and TURN's citation support is not consistent with TURN's figures.[76] Furthermore, TURN did not provide any analysis of specific cost increases other than to suggest that the costs should have been anticipated in the 2009 cost study.

At a facility such as HBPP, with an older model reactor situated underground at a small site, where radioactive leakage is known to have occurred, it is credible that new testing during early decommissioning would yield evidence of additional contamination, challenges for remediation, and changes to scope or methods of decommissioning.

We have some concerns about the inability to trace specific cost estimates back to the 2009 study, or even within the 2012 study as to these increases (see section 7.3). However, when taken as a whole, the record (e.g., the work papers, 2012 DPR, RFP, and 2009 cost estimate) supports a finding that the estimated cost increases identified above are reasonable based on experience at the site and with the site characteristics as they are currently known.

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[74] *Ibid.*; TURN OB at 10 (TURN's calculation of $54.2 million is higher due to omission of $6.2 million for common support costs).

[75] TURN-1 at 15.

[76] TURN's OB cites to PG&E's work papers at 4-36 to 4-40 where cost categories are different; to the extent categories are similar, the 2009 and/or 2012 costs and identified increases are inconsistent with TURN's comparison table (See, e.g., License Termination Survey, Turbine Building Demolition).

On the other hand, we agree with TURN that PG&E's documentation of basic decommissioning increases (excluding caisson removal and canal projects) is limited to $156.6 million. When combined with the proposed costs for the caisson and canal projects (including common support) of $244.2 million, the total is $400.8 million or $48.2 million less than PG&E's 2012 estimated increase.

Therefore, the Commission finds it reasonable to reduce PG&E's cost estimate by $48.2 million due to a lack of sufficient evidence to support it.

6.1.3. Caisson Removal Project

As of 2009, PG&E planned to leave in place all HBPP3 structures three feet or more below grade (except for the SNF pool), including the concrete caisson surrounding the reactor vessel.[77] In 2012, PG&E proposes the complete removal of the reactor caisson, and containment by a cement slurry wall, as the best solution to effectively comply with decontamination requirements, as well as to minimize costs and schedule delays.

On the other hand, TURN describes the proposed project as an "ambitious, and risky approach," with a large slurry wall which has not been analyzed for earthquake resilience.[78] The serious risk of slurry wall failure, argues TURN, could lead to pass-through of costs from the contractor to PG&E, and to ratepayers. TURN does not elaborate on the nature or extent of such risks.

As set forth below, we find that PG&E's cost estimate for removal of the reactor caisson is reasonable; but, as for all decommissioning expenses, PG&E bears an additional burden later to establish that actual expenses were reasonable and prudent after the project is completed.

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[77] PG&E-6 at 4-12.

[78] TURN OB at 16.

The HBPP3 reactor caisson was the first to house a nuclear containment structure and associated systems below grade. The caisson was constructed with the lowest floor at approximately 66 feet below sea level, and the bottom of the structure about 80 feet below grade; most of the structure is below the water table.[79] Installation allowed the work force to remain above ground, in contrast to decommissioning workers.[80]

A bioshield wall of concrete and rebar surround the reactor, linked by the fin wall to the caisson. There was no physical access to the bioshield wall until late 2011, when the utility removed a large portion of the wall to evaluate options for reactor removal. Radiation sampling above the core detected Carbon-14[81] (C-14) at much higher levels, and in more places, than expected and in significant portions of the concrete exposed to the neutron flux from the operating reactor.[82] No party disputed that PG&E found additional C-14.

However, TURN disputes PG&E's assumption as to how widespread the contamination is, and PG&E's conclusion that removal of the caisson is reasonable "without consideration of intermediate options."[83] TURN relies on PG&E's prior cost estimates which, consistent with industry norms, planned to limit decontamination, demolition, and removal of structures to three feet below

[79] PG&E-6 at 4-13.

[80] *Id.* at 4-12.

[81] Carbon-14 is produced during nuclear plant operation. It is a long-lived isotope with a half-life of 5,730 years that can enter biological systems through numerous pathways and cannot be removed once it enters.

[82] PG&E-6 at 4-12.

[83] TR at 354.

grade.[84] TURN also criticizes PG&E for not doing additional testing to determine the extent of neutron activation.[85]

In response, PG&E explained that earlier cost studies relied on computer modeling to estimate contamination, done in lieu of broad sampling due to access issues. Many areas remain inaccessible until portions of the bioshield wall are cut away.[86]

PG&E asserts it considered alternatives to caisson removal to address the contamination over time and in 2012. Based on a 2003 study, PG&E initially believed the C-14 could be remediated by removal of 21 inches of concrete from the bioshield wall, leaving the caisson in place. However, PG&E determined the higher levels of C-14 discovered presented technical, safety, and regulatory challenges which made leaving the caisson in place infeasible.[87]

PG&E also considered removal of only the activated concrete, but the six-week lag to identify C-14 in samples, combined with the difficulty of chasing contamination in numerous cracks and conduits, would result in schedule delays and other costs.[88] In addition, the large number of small conduits and piping in the caisson make verification of contamination difficult, and cracks in the caisson wall near the SNF pool likely contain radioactive contamination that must be removed.

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[84] TURN-1 at 20-21.

[85] TURN OB at 13-14.

[86] TR at 244-45.

[87] PG&E-6 at 4-13.

[88] *Id.* at 4-14.

PG&E finds supports of the removal approach by reference to the Electrical Power Research Institute (EPRI) which, based on experience at other nuclear sites, recommends removal and disposal of such contaminated structures upfront to avoid eventually higher costs.[89] EPRI found the expense of required additional modeling, chasing concrete cracks, scabbling[90] concrete surfaces, and defending residual concrete activation levels eventually exceeded the costs of an up-front decision to "rip and ship" the waste offsite.[91]

PG&E states it could not come up with any other viable solution than total removal of the caisson.[92] However, it had concerns about the impact of removal methods on the structural integrity of the caisson due to pressure from the surrounding ground. TURN agrees that the proposed removal of concrete would compromise the integrity of the structure, but asserts there must be alternatives to full removal. For example, TURN's counsel asked PG&E's HBPP plant manager (Mr. Sharp) whether PG&E had considered internal shoring of the caisson.[93] Mr. Sharp replied that this option was considered by the engineering team, but rejected because it would block removal of the steel liner resulting in repeated moving of the shoring, surgical cutting of the fin wall, and chasing of all

[89] *Ibid*; PG&E-17 (List of previously decommissioned nuclear facilities with C-14 activated concrete where chasing cracks was not successful and entire concrete structures were removed).

[90] "Scabbling" is a process for reducing concrete surfaces.

[91] *Ibid.*

[92] TR at 186.

[93] TR at 228.

the leaks in the concrete. In his professional view, the additional costs and schedule delays would be "an unacceptable waste of ratepayer's money."[94]

After consideration of the technical issues, PG&E concluded that removal of the reactor caisson is the only appropriate alternative to meet NRC standards for remediating C-14 contamination.[95] PG&E contracted for an engineering feasibility study, the Kiewit HBPP3 Caisson Feasibility Study (Feasibility Study) to evaluate methods, risks, schedules and costs for removal of the caisson.[96] The study examined different options for removal: (1) cement bentonite slurry wall; (2) ground freeze; (3) conventional shoring; and (4) the mud jack.

The Feasibility Study concluded that removal was feasible at HBPP3, and ranked the four options on various factors and selected the slurry wall as the most desirable option.[97] The primary factors cited in support of the choice are confidence in the control and maintenance of dewatering during excavation, and reliability of the containment system and performance of conventional excavation systems.[98] The slurry wall was already part of the RFP for purposes of containing the SNF pool.

PG&E proposes to construct a 712-foot slurry wall, 170 feet below grade, to adequately and safely control groundwater intrusion during removal of the caisson and the spent fuel pool.[99] PG&E has already obtained the permit to

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[94] TR at 230.

[95] PG&E-6 at 4-12; PG&E-10 at 4-36.

[96] PG&E-14 (Kiewit Study).

[97] *Id*. at 5-6 (For example, the ground freeze option was not desirable because it would take a year, had not been tried with sea water, and might not work).

[98] *Id.* at 6.

[99] PG&E-6 at 4-15.

create the slurry wall to encircle the caisson, the SNF pool, turbine building foundation, and Radwaste building.[100]

The benefits of the removal of the caisson and use of the slurry wall containment, claims PG&E, include assured compliance with NRC requirements, enhanced personnel safety during demolition, mitigation of testing challenges, and addressing the concerns and preference of the local Community Advisory Board which supports the caisson removal.

The Feasibility Study estimated the cost for the project to be $191.6 million and PG&E incorporated the estimate into the DPR.[101] No party argued that the estimation of cost was inaccurate.

Caisson Removal Project Cost Categories[102]
($millions)

Category	Field Work	Packaging/ Handling Material	Staffing	Waste Disposal	License Termination Study	Tools & Supplies	Other	Contin-gency	Total
Cost	78.0	12.9	22.1	24.0	6.2	2.3	4.2	41.8	$191.6

TURN questions the timeline of PG&E's decision and asks the Commission to reject the project on the grounds that PG&E did not conduct a formal study of alternatives to removal, and the slurry wall option is risky. TURN observes that PG&E initiated the feasibility study in early 2012 before the bioshield test results were received, suggesting an intention to change the scope before the test results were done.[103] PG&E's failure to corroborate the neutron tests, and lack of documentation about PG&E's decision to remove the whole caisson, also trouble

[100] TR at 269 (The Radwaste building handles waste contaminated by radionuclides).

[101] PG&E-10 at 4-42.

[102] *Id.* at 4-42.

[103] TURN OB at 14.

TURN. Thus, TURN concludes that PG&E did not evaluate costs or alternatives to removal, e.g., limited removal of contaminated portions of the caisson.[104]

We reach a different conclusion based on the record. The Commission has previously stated a preference for the most current site information and decommissioning solutions. Given the history of HBPP3 and the unique underground structure, we find it credible that unexpected radiological contamination is present. Based on industry experience, EPRI has recognized that it is both difficult and costly to locate and remove contaminated concrete in the reactor containment area such that up-front removal is favored. PG&E presented evidence that it considered different options for handling the radiological contamination in and around the reactor caisson and found each presented technical and safety challenges. Removal of the caisson appears feasible and industry experience supports total removal. The expense should provide ratepayer benefits, including reliability and probable lower costs than other options.

PG&E also sought expert advice on methods to safely and effectively undertake removal and selected the favored option of a slurry wall for its RFP. Since PG&E had already planned to employ a slurry wall to contain the SNF pool, this would appear to be a reasonable approach. TURN raised the question of the impact of a seismic event on the slurry wall, but offered no evidence of any impact. The Feasibility Study also makes bare reference, but acknowledged consideration of seismic events in its analysis, and identified mitigation

[104] *Id.* at 15.

strategies.[105] Shaw chose this option in its winning bid, and both the local community and local permitting authorities expressed support for the project.

Based on the foregoing, the Commission finds that the estimated costs of $191.6 million for removal of the reactor caisson, and construction of the slurry wall for groundwater containment, are reasonable. However, the Commission understands concerns about the large cost to ratepayers in return for certainty of remediation and continued decommissioning without costly delays. The Commission will review the actual project expenses in a later NDCTP to establish whether the costs were reasonable and prudent when incurred. Moreover, in Section 7.3 below, we establish some evidentiary guidelines for documentation of relevant decision-making during the next phase of decommissioning.

6.1.4. Canal Remediation

The central dispute is whether it is reasonable to assume remediation to a stricter standard than in 2009 and, if so, are the estimated costs reasonable. On balance, we agree with PG&E's preference for a stricter remediation standard than utilized in 2009, and accept the utility's argument that an erroneous assumption in the 2009 cost study resulted in a failure to consider the broad spectrum of radionuclides to be addressed by remediation requirements under either standard.[106]

The intake and discharge canals, located at the Humboldt Bay shoreline, are primarily contaminated by Cesium-137 (Cs-137), likely from historic Radwaste[107] discharge.[108] The NRC requires PG&E to demonstrate HBPP3 site

[105] PG&E-14 at 2, 28.

[106] TR at 90-92, 94-95, 100-101, and 266.

[107] Radiologically contaminated waste.

mitigation of residual radiological exposure to 22 types of radionuclides to a "critical group,"[109] to no more than 25mRem per year, plus as low as reasonably achievable.[110]

In 2009, PG&E's cost estimate assumed an "Industrial Worker Scenario" (IWS) to calculate the maximum allowable residual radioactivity; in 2012, PG&E assumed a "Residential Farmer Scenario" (RFS).[111] Although both critical group standards require meeting the same exposure limit, they differ as to the estimated time encountering the exposure and number of pathways by which a dose may be delivered. The biggest impact of changing to the RFS is to the canal remediation project.

Based on 1998 data, the 2009 cost study assumed both canals would be back-filled with clean soil from off-site, and just 945 cubic feet (ft^3) of soil and no sediment/silt would be removed.[112] Although all other nuclear sites utilize the RFS, PG&E assumed its planned 30-year retention of the HBPP3 site for industrial use was similar to the Rancho Seco site, where the NRC permitted use

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[108] PG&E-6 at 4-16.

[109] PG&E-9 at 2-3 (A "critical group" is that group of individuals with the greatest exposure to residual radioactivity under site specific circumstances).

[110] DRA-4.

[111] PG&E-9 at 2-3 (The anticipated exposure to a critical group member is used to calculate the Derived Concentration Guideline Levels that form the maximum allowable residual radioactivity).

[112] PG&E-6 at 4-11 (The Sacramento Municipal Utility District, owner of the Rancho Seco site, justified the use of the Industrial Worker Scenario because it intended to retain ownership and continue using it for industrial purposes).

of the IWS because residual radioactivity would meet RFS requirements after 30 years.[113] PG&E's 2009 cost estimate was $3 million.[114]

In the 2012 DPR, PG&E has significantly modified the scope of this project to demolish the intake and discharge canal concrete structures, remove silt/sediment and excavate six inches into the walls and bottom of the canal. To meet the RFS standard, PG&E concluded approximately 24,000 ft^3 of material must be removed from the intake canal and 160,000 ft^3 removed from the discharge canal.[115] The estimated cost is $47.4 million, including contingency.

2012 Estimated Canal Remediation Costs[116]
($millions)

Category	Removal	Disposal	Contingency	Total
Cost	21.0	20.2	6.2	$47.4

PG&E claims the higher estimate reflects (1) use of the RFS standard for site remediation;[117] (2) erroneous assumptions in 2009 about the actual soil conditions at the canals; and (3) a key error in the 2009 remediation assumptions.[118] We share DRA's frustration that PG&E revealed each of these explanations at a different point in the proceeding (i.e., direct testimony, rebuttal testimony, and at hearing, respectively).

[113] PG&E-9 at 2-4 (Sacramento Municipal Utilities District decommissioned its nuclear reactor at Ranch Seco based on IWS scenario).

[114] PG&E-6 at 4-15.

[115] *Id.* at 4-17.

[116] PG&E-10 at 4-48.

[117] *Id.* at 4-47 to 4-48.

DRA raises an important question about whether the Commission should give PG&E's unsupported rebuttal testimony any weight, when the Commission has prohibited and sanctioned utilities for attempting to prove their case by rebuttal, which deprives DRA and other interested parties of fair notice and due process.[119] DRA vigorously complains that discussion of specific state and federal standards for CS-137 and other radioactive isotopes "blindsided" DRA and prevented verification of these standards. If the only evidence in support of the revised project were in rebuttal we would likely reach a different result. However, PG&E did identify utilization of a different remediation standard and actual site conditions in its direct testimony. The rebuttal provided further explanation of the site conditions and reasons for much higher amounts of soil to be removed. PG&E's belated disclosure of an error in the 2009 study was inappropriate and given little weight, but it generally supported the conclusions reached in direct testimony.

Final remediation standards are integral requirements of decommissioning based on removal or decay of numerous existing radiological contaminants. Thus, the recalculation of necessary remediation should not have been wholly a surprise and DRA served at least one data request to obtain additional information. Moreover, it is in PG&E's own interest to accurately model remediation of all contaminants to the required standards in order to properly scope the contract work, and to obtain license termination from the NRC. The LTP and the 2012 DPR are consistent.

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[118] TR at 92 (The 2009 study presumed only a reduction of Cs-137, when all 22 radionuclides must be considered, leading to a significant underestimation of soil to be removed); TR at 266-267.

[119] DRA OB at 8.

PG&E's 2012 cost estimate does not rely on the claimed study errors. As part of its preparatory work for the LTP and the RFP specifications, PG&E performed core sampling to determine soil characteristics and the extent of sub-surface contamination in order to determine the actual volume of soil to be removed. Based on actual data, PG&E concluded remediation of the discharge canal will require removal of the top portion of the clay layer which is submerged below four feet of silt accumulated through 2010, and four feet of silting added since 2010.[120] Thus, approximately 139,000 ft^3 of silt must be removed under either scenario to get to the clay layer, where PG&E asserts there is a "relatively small difference in remediation" to meet the RFS instead of IWS standards.

PG&E states it considered the risks and benefits of three alternatives: (1) follow the 2009 plan and assume no more rigorous criteria will be imposed; (2) defer remediation until the end of decommissioning when final standards will be in place; and (3) perform the remediation now to the lower radiological standards.

Below is a summary of PG&E's descriptions of these alternatives:[121]

Alternatives

Option	**2009 option –assume Industrial Worker Scenario (using erroneous model)**	**Defer remediation until end of decommissioning**	**Remediate now – assume Residential Farmer Scenario**
Cost	$3 million +removal of all silt to reach clay layer;	unknown	$47 million
Risks	New regulations adopted later would require duplicate costs for ground water controls, permitting, excavation, disposal, additional fill,	Potential for overwhelming the transportation process due to volume of contaminated soil to be	Higher disposal costs due to larger volume of material removed

[120] PG&E-9 at 2-5, Attachment 1.

[121] PG&E-6 at 4-16 to 4-17.

	re-performance of final status surveys.	transported at the same time frame as final soils removal from site & caisson; impractical and unacceptable burden on local roads/infrastructure	

Despite the lack of documentary evidence of its analysis, PG&E asserts that it carefully evaluated the options and determined the most reasonable and prudent course of action was to remediate now to the lower radiological standard, instead of risk significant costs later, or risk impediments to timely disposal of Radwaste at the end of decommissioning. We view these as significant risks to ratepayers.

DRA argues that PG&E's analysis of future state and local regulatory requirements are mere speculation, lacking reference to any specific pending action or proceeding. Furthermore, DRA argues that PG&E's failure to provide underlying calculations or analysis to support volume or cost estimates of soil removal is fatal. DRA also disputes PG&E's view that the difference between mitigation levels for RFS and IWS is likely less than $1 million due to small differences in the amount of clay to be removed after disposal of the silt/sediment on top.[122]

In response to a data request, PG&E concedes it did not prepare a cost estimate under the IWS, and roughly estimated the reduction to excavation and disposal costs by utilizing the IWS to be $18 million.[123] As a result, DRA,

[122] TR at 114.

[123] DRA-4 at 2-3.

recommends the Commission either retain the 2009 estimate of $3 million or reduce PG&E's estimate by $18 million to no more than $29 million.

DRA is accurate that PG&E provided narrative descriptions of its analysis, even though underlying calculations must exist. On the other hand, the RFS is the industry norm for decommissioned nuclear facilities, and we view the state and federal regulatory direction as moving towards stricter, not looser, safety standards at decommissioned nuclear facilities. We observe that portions of the actual work have been bid, providing some support to the reasonableness of the estimated costs. PG&E's arguments that later excavation of additional clay would result in extraordinary costs and schedule delays are persuasive—for purposes of finding the estimated 2012 cost increase to be reasonable. However, actual costs of this project will return to the Commission for review of the reasonableness and prudency of the expenses.

Except to reject it as unsupported or suppressed evidence, DRA does not address PG&E's site description of large amounts of sediment on top of the contaminated clay, nor does it address the claimed modeling error in the 2009 study. It is unclear why PG&E masked or was slow to discover, the significant analytical errors of the 2009 cost study and did not simply provide a full explanation in the direct testimony. However, we are not persuaded that PG&E's apparent reluctance to admit error is a basis to reject use of corrected remediation data including all applicable contaminants and more recent information about actual conditions.

On balance, the Commission finds the evidence supports: (1) PG&E considered alternatives before revising the canal project scope; (2) the revised scope is intended to reflect actual site conditions, and to correct erroneous estimates of Cs-137 remediation levels necessary to meet the RFS standard for

residual radioactive contamination at the site; and (3) the estimated costs are comparable to the RFP specifications and final bid. We also re-iterate our preference for conservative assumptions where radioactive contamination is concerned, and find PG&E's cost estimate based on the RFS requirements is reasonable. Lastly, we find PG&E's estimate of $6.2 million in site support of the caisson and canal projects to be reasonable.

Based on the foregoing discussion, including a $48.2 million reduction for unsubstantiated increases, the Commission finds that PG&E has established by a preponderance of evidence that $679 million is a reasonable cost estimate to complete decommissioning of HBPP3.

We acknowledge TURN's concern that PG&E could return in the next NDCTP and use the 2012 cost study, instead of the 2009 study, to measure the reasonableness of 2009-2011 expenditures for incomplete decommissioning projects. An inflated cost study, for example, could result in projects never coming in over budget, although this is not the only factor to be considered by the Commission. On the other hand, PG&E has undertaken sufficient preparatory work that its witness specifically stated the utility does not expect costly, unexpected work. It follows that any significant increases would be subject to interim review through PG&E's disbursement updates, and the Commission will subsequently review actual expenses for both reasonableness and prudency.

7. Completed Decommissioning Projects

PG&E seeks reasonableness review of the expenses incurred for four decommissioning projects completed since the 2009 NDCTP totaling $25.9 million. The appropriate standard of review for actual expenses is whether the costs are reasonable and prudent—assessing costs, activities and the

decisions made to incur those costs. Such review should include comparison of actual costs to estimated costs in the most recently adopted estimate, cash flows and schedule. The Commission will also examine the reasons for cost differences (e.g., labor escalation, contractor bids), as well as examine the actual activities to determine if they are appropriate decommissioning activities (e.g., changed scope), and whether the utility prudently undertook them (e.g., decision-making process).

7.1 Background

The Commission monitors a utility's nuclear decommissioning costs and activities in three stages. During the triennial proceedings, cost estimates are reviewed for reasonableness ahead of performance of the work; actual expenditures are reviewed after-the-fact to determine whether they are reasonable and prudent. When a utility undertakes actual decommissioning work, the Commission reviews periodic notices of progress as part of authorizing trust fund disbursements for costs included in the most previously approved cost estimate.

Pursuant to Commission-approved[124] procedures, PG&E has annually submitted Advice Letters requesting authorization to withdraw funds from its Nuclear Decommissioning Trust Funds to fund specific decommissioning activities at HBPP3. After specific projects are completed, PG&E brings them forth in the next NDCTP for the Commission to review and determine that the actual costs were reasonable and prudently incurred.

[124] Most recently in D.10-07-047 (2009 NDCTP).

7.2 Discussion

In this proceeding, PG&E provided a comparison of approved cost estimates ($26.649 million) and actual expenditures ($25.923 million) in connection with the completed decommissioning activities at HBPP3.

HBPP3 Unit3 3 Completed Decommissioning Projects
Authorized v. Actual Costs

Activity	Authorized Funding	Total Cost	Variance	Percent
Turbine Building Systems Removal & Disposal	$22,830,000	$21,378,000	$(1,453,000)	(6.4)
Spent Fuel Racks Removal & Disposal	929,000	831,000	(98,000)	(10.5)
Cleanup & Shutdown Heat Exchangers in Refueling Building	818,000	813,000	(5,000)	(0.6)
Condensate Storage Tan and Concentrator Waste Tanks Removal	2,072,000	2,901,000	829,000	40.0
Total	$26,649,000	$25,923,000	$ (727,000)	(2.7)

DRA does not dispute PG&E's showing or explanation of cost variances.[125]

The largest variance of actual costs to authorized costs ($1.45 million) involved the Turbine Building Systems Removal and Disposal which was completed on time, under budget, and without incident. PG&E states the lower cost was supported by good understanding of the radiological conditions and thorough controls. The removal of the Condensate Storage Tank and Concentrator Waste Tanks exceeded authorized costs ($727,000) due to higher bids than expected for cutting and disposing of the contaminated tanks, plus unexpected contamination which increased the amount of material for removal. We find these explanations reasonable.

[125] PG&E-8 at 7-5.

On the other hand, TURN disputes that PG&E established the project expenses were reasonable or prudent and asks the Commission to defer review and instead subject the expenses to new review procedures it asks the Commission to adopt.

TURN argues it takes more than a short description of the projects and a summary of total costs incurred to establish a basis for finding reasonableness. In addition, states TURN, merely finding costs did not exceed purported forecasts, DRA's position, is also insufficient.[126]

At a minimum, TURN argues, the 2009 cost estimates should be the benchmark for determining the reasonableness of any work performed through 2012.[127] Despite PG&E's claim that it identified "authorized" funding for each project from the 2009 cost study, TURN asserts the utility did not produce supporting documentation to illustrate the claimed forecasted amounts applied to the projects under review.[128] In fact, TURN claims, none of the post-2009 Advice Letters PG&E submitted to track HBPP3 decommissioning costs are sufficiently detailed to link particular project costs to line items in the 2009 cost study approved by the Commission.

TURN is correct that PG&E did not provide an explanation of how it arrived at the previously "authorized" amounts. This is troubling because PG&E did not fully comply with our expectations and order about interim tracking of decommissioning costs and activities, set forth in D.11-07-003. In the 2009 NDCTP, the Commission ordered PG&E to file Advice Letters, at least

126 TURN OB at 18.

127 *Id.* at 12.

128 *Id.* at 17.

annually, to notify the Commission of HBPP3 decommissioning activities, expenses, and trust fund reimbursements.[129]

For the first time, the Commission articulated specific requirements for such disbursement requests, including: (1) amounts previously requested for each activity; (2) amount estimated to be spent on the activity in the next period; (3) correlation of cost to the most recent NDCTP cost study; (4) explanation of differences (amount and timing) from the cost study estimate; and (5) presentation of the information in an excel spreadsheet format.

If PG&E had fully complied, we could more easily verify PG&E's claimed "authorized" estimated costs as part of the review. Instead, we review the completed project expenditures based on the identification of these projects as part of the expected activities in the first phase of decommissioning, and Commission approval of the Advice Letters with broader cost categories, but which contain elements of these activities, for example in Advice Letter 3649-E, filed April 13, 2010:

- Decommissioning labor expenses thru 2011 $37.0 million
- Packaging, transporting, and disposal of low-level waste $34.0 million
- Removal of plant equip and systems $16.5 million
- Reactor vessel removal $20.1 million
- Purchase tools and equipment and Advice Letter 3483-E, filed June 29, 2009: $ 5.1 million
- Implementation of waste management & transportation plans $11.4 million
- Decommissioning labor expenses $18.0 million
- Removal and disposal of spent fuel racks and startup sources $ 1.5 million
- Initiation of necessary additional environmental studies and permitting $ 2.5 million

[129] D.11-07-003 at 43, OP3.

- Purchase tools and equipment $ 5.0 million
- Other preparatory decommissioning activities $12.1 million

In addition, DRA reviewed PG&E's request for approval and is unopposed. PG&E's actual disbursements through 2012 are less than authorized by the Commission. As summarized in PG&E's Advice Letter 4165-E, PG&E previously obtained preliminary authorization to expend $354.1 million, recorded $310.1 million through August 2012, and expects to spend $337.6 million by the end of 2012.[130] PG&E provides an unsupported comparison of decommissioning activities/costs to the 2009 TLG cost study, the last approved HBPP3 decommissioning cost estimate.

For purposes of the deconstruction and demolition of systems in the Turbine Building and Refueling Building, Waste Tank removal, and disposal of Spent Fuel racks, the Commission finds there is a bare preponderance of evidence to support that these activities and expenditures are necessary, anticipated, and within the broad annual expenditure limits approved by the Commission following the 2009 NDCTP. The activities are routine decommissioning and PG&E reported both savings and an overrun due to actual circumstances. PG&E's explanations are credible. No evidence was presented by any party, including PG&E, to suggest that the activities were imprudently conducted.

Therefore, the Commission finds that the actual expenditures for the four completed projects are reasonable and prudent.

[130] PG&E-4, Attachment 2 (December 18, 2012).

7.3. Future Review of Completed Decommissioning Projects

The Commission remains tasked with the duty to review expenditures following approval of the 2009 study, including $139.1 million between 2009 and 2011 that will not be presented for review until the 2015 NDCTP. TURN's suggested requirement that PG&E benchmark all 2009 – 2015 decommissioning expenses to the 2009 study is problematic because the 2009 substantial reliance on unit cost factors has been replaced by actual project work scopes and updated costs based on actual contract bids for identified site-specific work scope, the Civil Works Phase of decommissioning, where most expenses are incurred.

To the extent 2009-2011 expenditures are brought forward for Commission review, PG&E shall, at a minimum, provide references to the 2009 study to the extent available, and shall provide a description of the cost factors, identify the correlative cost category from an approved Advice Letter, and link it to the remaining costs to complete identified and approved in this proceeding.

The Commission shares TURN's interest in cost containment and accountability when a utility seeks after-the-fact review of its decommissioning decisions, activities, and expenditures. We consider it necessary to protect ratepayers' interests going forward by establishing clear guidelines for what is expected of a utility which seeks to obtain review of disbursements and completed projects in the future. Here, we examine TURN's recommendations:

- The Commission should require that total decommissioning scope be divided into a discrete number of specific major work packages subject to fixed success criteria, set schedules and hard caps on spending; and
- The reasonableness review of completed major work packages should consider both the 2012 and 2009 studies depending upon whether the 2012 study explicitly identified additional work that was not included in the 2009 estimate.

We agree there is value to the Commission and public in having a reasonably detailed cost breakdown of future decommissioning projects and a correlation to the previously approved cost estimate of activities, costs, and schedule. Within 30 days of the effective date of the decision, PG&E shall meet with the Commission's Energy Division staff to develop the spreadsheet for requesting disbursements as required by our earlier decision. The spreadsheet shall identify the 11 major cost categories identified by PG&E,[131] with additional subcategories for the four major civil works projects included in the Shaw contract. PG&E shall submit the spreadsheet template by Tier 1 Advice Letter no later than 60 days after the effective date of the decision.

In Comments on the Proposed Decision, PG&E asked that it be able to use the larger amounts in its DPR for purposes of tracking decommissioning expenditures by cost and categories when seeking approval for withdrawals from the decommissioning trust funds. Instead, when PG&E and Energy Division jointly develop the spreadsheet to accommodate tracking of trust fund withdrawal requests, an agreement should be reached on how to reflect the approximate 10% reduction to the overall authorized estimate.

The spreadsheet shall identify whether the cost category is contract or self-perform, identify estimated costs in the 2012 DPR by specific reference to the project and page numbers (e.g. 4-50 Staffing, 4-56 Small Contracts, 4-58 Tools and Equipment, 4-63 Contingency, etc.), and either the Capstone Document or the RFP for scope changes. Self-performed work shall include subcategories, at a minimum, for staffing, tools and equipment, and contractors.

[131] PG&E-10 at WP4-35.

PG&E shall include a comparison of actual annual cash flow to its 2012 estimated cash flow[132] and of actual project schedule to the estimated schedule in the PSDAR.[133] Because the 2009 cost estimate did not include detailed scope for the major civil projects phase, we are not persuaded there is significant value in attempts to trace these specific project costs to stale, high-level estimates.

On the other hand, for the $139.1 million estimated costs adopted in 2009 for projects not yet completed, PG&E shall identify the open cost categories and the aggregated costs on the spreadsheet to aid the Commission's interim oversight of expenditures.

The spreadsheet is intended to fulfill the Commission's prior order for submission of relevant information to evaluate requests for trust fund disbursements. It is not meant to replace the other requirements set forth in D.11-07-003, but will also aid the Commission's triennial reviews.

In addition, the Commission finds that in order to discharge its responsibilities to undertake triennial review of decommissioning expenditures for completed projects, certain basic information is expected from the utility. In addition to the improved spreadsheet, and explanations of differences between estimated and actual costs, the utility shall maintain a written record of key decisions about the cost, scope or timing of a major project or activity, i.e., any decision that results in a variation from prior estimate by +/-10%. At a minimum, the record shall include the nature of the decision, who made the decision, factors considered, and whether and what alternatives were considered.

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[132] *Id.* at 4-92.

[133] PG&E-15.

TURN also suggested the Commission retain an independent auditor to track costs, and a "decommissioning monitor" to report on the progress of decommissioning activities and costs. We understand that TURN's goal is to ensure the Commission is aware of decommissioning expenses, and has early notice of costly overruns or major changes to scope. Both DRA and TURN are very concerned that the cost increases in 2012 will continue unabated into the next NDCTP.

We share this concern but note some mitigating facts. PG&E has represented that this detailed estimate is unlikely to increase because it is based on known conditions and actual costs of contracted work scope. The contract awarded has a number of performance checks and weekly reviews of costs, schedule, and activities. Shaw has incentives to keep costs within the contract amount and performance on schedule. As for PG&E's self-perform work, there are fewer controls and incentives to contain costs. However, more detailed reporting, combined with higher expectations of sufficient evidence to support expenditures, should mitigate against rising costs and produce more information about performance. The Commission will re-visit this improved process in the next NDCTP to assess its effectiveness.

Moreover, the Commission not only has the authority to order an independent audit of the HBPP3 decommissioning, it is certainly feasible that the Commission would do so after the CWP where most of the major work is completed. Therefore, we do not adopt TURN's other recommendations at this time.

8. SAFSTOR

In 1988, PG&E placed HBPP3 into a custodial form of decommissioning defined by the NRC as Safe Storage (SAFSTOR) where it is required to safely

maintain and monitor the site until dismantled. Two issues are presented related to these important NRC safety requirements: (1) are PG&E's 2014-2016 SAFSTOR forecasts reasonable; and (2) is the difference between estimated and actual 2010-2013 SAFSTOR costs reasonable?

The NRC requires PG&E to maintain the radioactive material at HBPP3, other than SNF maintained in ISFSI, in a SAFSTOR configuration. Activities include routine and specific radiological surveys, training and qualification of radiation technicians and professionals, instrument calibration and repair, monitoring and analysis, and implementation of a radiation safety program.[134] The Commission has previously acknowledged PG&E's SAFSTOR requirements, which extend to maintaining structures, systems, and components necessary to contain various contaminants during the decommissioning process.[135]

For 2013, PG&E continued the authorized 2012 SAFSTOR rates ($6.204 million, nominal) due to Commission-authorized extensions to file this application.[136] Based on estimated staff time to support SAFSTROR activities in 2014 -2016, PG&E forecasts SAFSTOR costs of $5.956 million (nominal) for 2014, $5.559 million for 2015 and $4.921 million for 2016.[137] In support of its request, PG&E provided a description of the proposed activities and costs, and its cost estimate methodology. No party disputes the reasonableness of PG&E's compliance cost estimates.

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[134] PG&E-7 at 6-2.

[135] D.10-07-04.

[136] PG&E-7 at 6-7, Table 6-1.

[137] *Id*. at 6-2.

We expect that there would be a gradual decline in SAFSTOR expenses as HBPP3 proceeds through decommissioning, with eventual deconstruction and removal of contaminated structures and systems. PG&E's testimony is supported by its work papers. Although calculated by proposed revenue requirements, they are at least illustrative of labor, labor-related, and non-labor ratios, and costs decreasing during the forthcoming triennial period.[138]

The Commission finds PG&E's forecast SAFSTOR O&M costs of $5.956 million for 2014, $5.559 million for 2015, and $4.921 million for 2016 to be reasonable. We will review post-2016 SAFSTOR cost estimates in the next NDCTP.

In the 2009 NDCTP, the Commission adopted PG&E's uncontested forecast for 2010-2012 SAFSTOR O&M. We ordered PG&E to track its actual SAFSTOR expenses and make a "true-up" contribution to, or withdrawal from, the decommissioning trusts based on whether the amount collected in rates is greater than or less than the expenses actually incurred. To the extent that contributions differ from estimates, PG&E was ordered to report on the differences in this NDCTP where the differences are subject to reasonableness review.

According to PG&E, SAFSTOR costs in 2010 exceeded the annual revenue requirement by $1.15 million purportedly due to a forecast modeling error, and were slightly lower than forecast for 2011. PG&E expects to exceed total authorized revenue requirements for 2010-2012 SAFSTOR expenses, and seek the

[138] Work Papers , Chapter 8, 8-1 to 8-18 (The calculations are part of revenue requirement calculations and are based on assumptions which will not be determined until Phase 2 of these proceedings are completed).

remainder of the costs from the HBPP3 Trust Funds by its annual nuclear decommissioning trust revenue requirement Advice Letter.[139]

No party disputed that PG&E had sufficiently explained the variances from estimated SAFSTOR costs since 2009 or improperly applied the true-up method. We recognize that PG&E incurs these expenses to meet the NRC's license requirements for containment of dangerous contaminants, even if actual costs exceed estimated costs. The Commission finds PG&E's explanations for differences (overruns and undercollections) between estimated and actual SAFSTOR O&M costs to be reasonable.

Beginning in 2014, PG&E proposes to handle its true-up for overcollections differently than adopted in D.10-07-047 because it intends to terminate its non-qualified trust fund.[140] Instead, PG&E will credit overcollections against otherwise recoverable decommissioning costs. It is not surprising that PG&E wants to terminate its non-qualified trust fund, a relic of prior tax laws. We find PG&E's proposal to be reasonable as long as the credit is identified and included in its decommissioning disbursement Advice Letter reports to the Commission.

9. Compliance with D.10-07-047

As relevant to Phase 1, we review three orders to PG&E from our 2009 NDCTP decision. We ordered PG&E to serve testimony in the 2012 NDCTP: 1) to demonstrate they have made all reasonable efforts to retain and utilize sufficient qualified and experienced personnel; 2) to show they tracked actual SAFSTOR expenses during the triennial period and reported and explained differences; and 3) to report the pro rata share of funds Accumulated

[139] PG&E-7 at 6-5.

[140] *Ibid.*

for
NRC License Termination and provide copies of their most recent funding assurance letters (pursuant to 10 C.F.R. 50.75) sent to the NRC.[141]

PG&E provided uncontested evidence in response to all three requirements as discussed in the preceding text. Therefore, the Commission finds PG&E is in compliance with ordering paragraphs 4, 5, and 9 of D.10-07-047 described above.

10. Revenue Requirement Deferred to Phase 2

In the foregoing discussion, we determined a reasonable cost estimate for 2014 – 2016 HBPP3 decommissioning and SAFSTOR activities, but the scope of Phase 1 excluded the issues necessary to develop the revenue requirement for these expenses. Hearings have been held in Phase 2 which considers all other relevant decommissioning issues, including cost estimates for other nuclear facilities owned, in whole or part, by California electric utilities, trust fund review, and development of revenue requirements.

11. Comments on the Proposed Decision

The proposed decision of the ALJ in this matter was mailed to the parties in accordance with § 311 of the Public Utilities Code on January 28, 2014, and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed on February 18, 2014 by PG&E, SDG&E, TURN, and Coalition to Decommission San Onofre (which had not previously participated in this Phase), and reply comments were filed on February 24, 2014 by PG&E and TURN .

[141] D.10-07-047 at 60-62, OP 4, 5, and 9.

PG&E and SDG&E generally support the proposed decision with minor changes. TURN supports the PD but seeks several specific "clarifications" or changes. CDSO rejects the PD, comments beyond the scope of the PD, and requests several changes without citation to the record. After due consideration and consultation with the assigned commissioner, some non-substantive changes have been made to the decision.

12. Assignment of the Proceedings

The proceeding was reassigned from Mark J. Ferron to Michael Peevey as the assigned Commissioner, and Melanie M. Darling is the assigned ALJ in these proceedings.

Findings of Fact

1. PG&E filed Application 12-12-012, its 2012 NDCTP on December 21, 2012.
2. In 2012, PG&E developed an estimate of costs to complete future decommissioning at HBPP3 based on more recent site information, engineering studies, actual bids for contract work, and more conservative assumptions for radiological decontamination. The 2012 estimate was not linked to the cost study or estimates adopted in 2009.
3. The Caisson Removal project and the Intake and Discharge Canal Remediation project account for an estimated increase of $245.2 million of a total $449 million increase over the 2009 estimate to complete decommissioning of HBPP3.
4. There is some regulatory uncertainty about the applicable standards and methods for remediation of radiological contamination which will be required by the NRC for license termination at the HBPP3 site.

5. PG&E formed an interdisciplinary and broad-based subject matter expert team to develop and vet technical and administrative specifications to define the criteria to complete the decommissioning.

6. PG&E undertook a reasonable process to solicit and evaluate bids for general contractor of the CWP of decommissioning at HBPP3 and awarded the bid to an experienced contractor.

7. PG&E did not establish that $48.2 million of its proposed increase to basic decommissioning costs for HBPP3 are reasonable.

8. PG&E identified differences between estimated 2010-2012 SAFSTOR expenses and actual expenses, including continuing the authorized 2012 SAFSTOR rates in 2013.

9. PG&E forecasts SAFSTOR costs of $5.956 million (nominal) for 2014, $5.559 million for 2015, and $4.921 million for 2016.

10. PG&E incurred $25.9 million for four decommissioning projects completed since the 2009 NDCTP and provided a reasonable explanation of the variances from previously approved estimates.

11. PG&E did not fully comply with our expectations and order about interim tracking of decommissioning costs and activities, set forth in D.11-07-003.

12. Approximately $140 million authorized in the 2009 NDCTP was expended between 2009 and 2011 for incomplete decommissioning projects and not subject to review in this NDCTP.

13. Ratepayers have an interest in cost containment and accountability when the Commission reviews expenditures for completed decommissioning projects.

14. Commission review of the prudency of decommissioning expenditures may require an examination of the decision-making process by which the utility determined to incur particular costs or cost increases.

15. In D.10-07-047, the Commission ordered PG&E to serve testimony in the 2012 NDCTP to demonstrate they have made all reasonable efforts to retain and utilize sufficient qualified and experienced personnel.

Conclusions of Law

1. The applicable standard of review for cost estimates to complete decommissioning and to maintain SAFSTOR is one of reasonableness; the applicable standard of review for previously incurred expenses is whether the actual expenditures are reasonable and prudent.

2. PG&E's 2012 cost estimate reasonably assumes the public and regulatory direction is toward lower levels of acceptable radiological and other types of contamination at the end of decommissioning.

3. It reasonable to reduce PG&E's HB PP3 decommissioning cost estimate by $48.2 million due to a lack of sufficient evidence to support it.

4. PG&E established by a preponderance of evidence that $679 million is a reasonable estimate of the costs required to complete decommissioning at HBPP3.

5. PG&E reasonably explained the differences between estimated SAFSTOR costs and actual costs for 2010-2013.

6. PG&E's forecast SAFSTOR O&M costs of $5.956 million for 2014, $5.559 million for 2015, and $4.921 million for 2016 are reasonable.

7. PG&E established by a preponderance of evidence that the $25.9 million expended for deconstruction and demolition of systems in the Turbine Building and Refueling Building, Waste Tank removal, and disposal of Spent Fuel racks are reasonable and prudent.

8. The interest of ratepayers would be served if, in the future, PG&E provides a reasonably detailed cost breakdown of completed decommissioning projects

and a correlation to the previously approved cost estimate of activities, costs, and schedule.

9. The interest of ratepayers would be served if PG&E maintains a written record of key decisions about the cost, scope or timing of a major project or activity.

10. PG&E is in compliance with prior decisions applicable to decommissioning, including the ordering paragraphs 6, 7, and 8 of D.07-01-003.

11. PG&E established through uncontested evidence that the utility made all reasonable efforts to retain and utilize sufficient qualified and experienced personnel, and comply with other relevant ordering paragraphs of D.10-07-047.

O R D E R

IT IS ORDERED that:

1. The adopted cost estimate of $679 million to complete decommissioning at Humboldt Bay Power Plant Unit 3, and the adopted cost estimates for 2014-2016 Safe Storage Operations and Maintenance costs, shall be utilized in the calculation of revenue requirements and rate impacts undertaken by the Commission in Phase 2 of these consolidated proceedings.

2. Within 30 days of the effective date of the decision, Pacific Gas and Electric Company (PG&E) shall meet with the Commission's Energy Division staff to develop the spreadsheet for requesting decommissioning trust fund disbursements as required by Decision 10-07-047. The spreadsheet shall identify the eleven major cost categories identified by PG&E, with additional subcategories for the four major civil works projects. PG&E shall submit the spreadsheet by Tier 1 Advice Letter no later than 60 days after the effective date

of the decision and serve it on the service list for this proceeding. The spreadsheet shall:

a. Identify whether the cost category is contract or self-perform work, and identify estimated costs in the 2012 Decommissioning Project Report, adjusted to conform with the overall cost estimate adopted herein, by specific reference to the project and page numbers;

b. Self-performed work shall include subcategories, at a minimum, for staffing, tools and equipment, and contractors;

c. For the $139.1 million estimated costs adopted in 2009 for decommissioning projects not yet completed, PG&E shall identify the projects and aggregated expenditures; and

d. Include a comparison of actual annual cash flow to PG&E's 2012 estimated cash flow and of actual project schedule to the estimated schedule in the Post-Shutdown Decommissioning Activities Report.

3. Pacific Gas and Electric Company shall track its actual safe storage expenses during the triennial period and report and explain any differences in Pacific Gas and Electric Company's next Nuclear Decommissioning Cost Triennial Proceeding application.

4. Beginning no later than 30 days after the effective date of this decision, Pacific Gas and Electric Company shall maintain a written record of key decisions about the cost, scope or timing of a major decommissioning project or activity at Humboldt Bay Power Plant Unit 3, i.e., any decision that results in a variation from prior estimate by +/-10%. At a minimum, the record shall include the nature of the decision, who made the decision, factors considered, and whether and what alternatives were considered.

5. Pacific Gas and Electric Company shall serve testimony in its next triennial review of nuclear decommissioning trusts and related decommissioning activities

that demonstrates it has made all reasonable efforts to retain and utilize sufficient qualified and experienced personnel to effectively, safely, and efficiently pursue any physical decommissioning related activities for the nuclear generation facilities under its control.

6. Application 12-12-012 and Application 12-12-013 remain open for Phase 2.

This order is effective today.

Dated February 27, 2014, at San Francisco, California.

MICHAEL R. PEEVEY
President
MICHEL PETER FLORIO
CATHERINE J.K. SANDOVAL
CARLA J. PETERMAN
MICHAEL PICKER
Commissioners