

1 DOCKET NO.: A.18-12-008
2 EXHIBIT NO.: A4NR-1
3 DATE:
4 WITNESS: John Geesman
5

6 **BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

7
8 **PREPARED TESTIMONY OF JOHN GEESMAN**
9 **ON BEHALF OF THE ALLIANCE FOR NUCLEAR RESPONSIBILITY (“A4NR”)**
10

11 **TABLE OF CONTENTS**
12

13	I. INTRODUCTION.	page 2
14	II. SUMMARY OF TESTIMONY.	page 3
15	III. PRIMARY SAFETY INSIGHTS.	page 4
16		
17	IV. PG&E’S APPROACH TO SNF STORAGE RISKS.	page 7
18		
19	V. MALEVOLENT USE OF AIRCRAFT.	page 9
20	VI. FORMAL RISK ANALYSES AND SNF.	page 10
21	VII. OTHER ANAYTIC BLIND SPOTS.	page 11
22	VIII. PROBABILISTIC RISK ASSESSMENT AND SNF.	page 12
23	IX. WHAT PG&E KNEW.	page 15
24	X. ROLE OF PLAN 36.	page 21
25	XI. OTHER MATERIAL MISREPRESENTATIONS.	page 24
26	XII. HOLTEC’S JUNE 2019 ASSURANCES.	page 29
27	XIII. PG&E’S CONDUCT.	page 32

1 I. **INTRODUCTION.**

2

3 Q01: Please state your name and business address for the record.

4 A01: My name is John Geesman, and my business address is: Dickson Geesman LLP, 1970
5 Broadway, Suite 1070, Oakland, CA 94612.

6 Q02: Are your professional qualifications included in your testimony?

7 A02: Yes, my professional qualifications are contained as Appendix A to my testimony.

8 Q03: Was your testimony prepared by you or under your direction?

9 A03: Yes, it was.

10 Q04: Insofar as your testimony contains material that is factual in nature, do you believe it to
11 be correct?

12 A04: Yes, I do.

13 Q05: Insofar as your testimony contains matters of opinion or judgment, does it represent
14 your best judgment?

15 A05: Yes, it does.

16 Q06: Does this written submittal complete your prepared testimony and professional
17 qualifications?

18 A06: Yes, it does.

19 Q07: What is the purpose of your testimony?

20 A07: The purpose of my testimony is to provide evidence in support of A4NR's recommended
21 adjustments to portions of PG&E's Decommissioning Cost Estimate ("DCE") for the Diablo
22 Canyon Nuclear Power Plant ("DCNPP"). To avoid repetitiveness, I incorporate herein by

1 reference the entirety of A4NR’s January 11, 2019 Protest (attached as Appendix B) as a part of
2 my testimony, with one correction. Based upon PG&E’s January 16, 2019 Errata to Prepared
3 Testimony, the savings estimates on page 12 of A4NR’s January 11, 2019 Protest should be
4 revised as follows:

5 Using PG&E’s estimate of ~~\$54.7~~ 109.1 million in annual savings attributed to moving
6 spent fuel from wet storage to dry casks, the consequence of reducing the assumed wet
7 cooldown period from seven years to two or three is ~~\$219 436~~ -- ~~\$274~~ 546 million of
8 ratepayer savings.
9

10

11 **II. SUMMARY OF TESTIMONY.**

12

13

14 Q08: How would you summarize your testimony?

15 A08: A4NR is preliminarily recommending a reduction of \$509 – 619 million in the DCE, based
16 upon PG&E’s demonstrable ability to shorten the length of time spent nuclear fuel (“SNF”) is in
17 wet storage, and correction of PG&E’s unsupported presumption about a waiver of the state’s
18 once-through-cooling deadline for DCNPP Unit 2. These adjustments will have the collateral,
19 but important, benefit of improving public and operational safety without infringing upon the
20 regulatory jurisdiction of the Nuclear Regulatory Commission (“NRC”). Although there is
21 uncertainty about the precise magnitude of improved safety attributable to transferring SNF
22 from wet to dry storage, there is consensus that some enhancement of safety margin occurs.
23 PG&E has embraced a wet-is-safe-enough dogmatism and resisted, for the most part, efforts by
24 state government since 2008 to accelerate, consistent with NRC pool and cask requirements,
25 the SNF transfer process. PG&E appears to have assigned no weight to the likelihood that the
26 costs of dry storage will be reimbursed by the federal government, depriving its customers of a
27 virtually cost-free boost in safety margin. Despite its own awareness that the two leading cask

1 vendors both profess to be able to achieve SNF wet cooldown periods at DCNPP shorter than 3
2 years, PG&E has unreasonably and imprudently inflated its DCE by relying upon a 7-year
3 assumption – raising cost projections for SNF management by hundreds of million dollars. In
4 order to justify this assumption, PG&E’s filings and testimony in this proceeding contain
5 multiple misrepresentations, including several material omissions. Apart from a somewhat
6 shorter applicable period, PG&E’s handling of SNF recommendations from California state
7 government since 2008 conforms to the “historic culture” described by Governor Newsom’s
8 Strike Force: “more than two decades of mismanagement, misconduct, and failed efforts to
9 improve its safety culture.”¹

10

11 **III. PRIMARY SAFETY INSIGHTS.**

12

13 Q09: From a safety perspective, what are the primary insights you believe the Commission
14 should apply to the management of SNF at DCNPP?

15 A009: Initially, I would note that the regulation of radiological safety at commercial nuclear
16 plants falls within the exclusive domain of the NRC under the Atomic Energy Act and my
17 testimony should not be understood, nor should the Commission attempt, to second-guess the
18 NRC. Nevertheless, adjusting the PG&E DCE as proposed by A4NR, a matter wholly within the
19 jurisdiction of the California Public Utilities Commission, also carries substantial public-safety
20 and risk-mitigation benefits that should not be ignored. In this regard, perhaps the best place
21 to start is with a speech given May 13, 2008 to the Nuclear Energy Institute by then-NRC

¹Newsom Strike Force, April 12, 2019, “Wildfires and Climate Change: California’s Energy Future,” p. 44.

1 Commissioner Gregory Jazcko – before he became NRC Chair, before Fukushima, and before
2 the adoption of the AB 1632 Report by the California Energy Commission (“CEC”):

3 ... over the last half century licensees have demonstrated spent fuel can be safely and
4 securely managed onsite at nuclear power plants. That, coupled with the fact that long-
5 term disposition of this material remains a challenge in the United States, leads me to
6 believe that the focus should remain on shorter-term storage and any additional safety
7 and security improvements that can be made there.

8 The most clear-cut example of an area where additional safety margins can be
9 gained involves additional efforts to move spent nuclear fuel from pools to dry cask
10 storage...

11 The risk at a nuclear power plant site is centered on the operating plant, not the
12 spent fuel stored in massive casks and passively cooled in concrete bunkers. The threat
13 of terrorism is the one element which complicates the risk to stored fuel.²

14
15 A second source of valuable perspective is the 2016 National Academy of Sciences
16 (“NAS”) Phase 2 Report on lessons learned from the Fukushima nuclear accident. The 2016 NAS
17 Phase 2 Report characterized certain pertinent findings of the earlier 2006 NAS Report as
18 “statements of fact that require no reevaluation”:

- 19 • Finding 3D – “the vulnerabilities of spent fuel pools to terrorist attacks are plant-
20 design specific and can be understood only by examining the characteristics of spent
21 fuel storage at each plant.”³
- 22 • Finding 4D – “Dry cask storage for older, cooler spent fuel has two inherent
23 advantages over pool storage: (1) It is a passive system that relies on natural air
24 circulation for cooling, and (2) it divides the inventory of that spent fuel among a
25 large number of discrete, robust containers. These factors make it more difficult to

² NRC Office of Public Affairs, May 13, 2008, “Thoughts on Spent Fuel Storage” Prepared Remarks for The Honorable Gregory B. Jazcko, p. 1.

³ National Academies of Sciences, Engineering, and Medicine, 2016, “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2” p. 95.

1 attack a large amount of spent fuel at one time and also reduce the consequences of
2 such attacks.”⁴

3 The 2016 NAS Phase 2 Report faulted the NRC for not performing the independent
4 examination of surveillance and security measures recommended by the 2006 NAS Report for
5 protecting stored spent fuel, and reevaluated the 2006 NAS Report’s reservations about
6 applying formal risk assessment tools to SNF terrorism. The 2006 NAS Report had stated:

7 FINDING 2A: The probability of terrorist attacks on spent fuel storage cannot be
8 assessed quantitatively or comparatively. Spent fuel storage facilities cannot be
9 dismissed as targets for such attacks because it is not possible to predict the behavior
10 and motivations of terrorists, and because of the attractiveness of spent fuel as a
11 terrorist target given the well-known public dread of radiation.

12
13 The 2016 NAS Phase 2 Report recommended the NRC sponsor a spent fuel storage (wet and
14 dry) risk assessment for U.S. nuclear plants, and observed,

15 The identification of scenarios may be incomplete, and the estimates developed
16 through expert elicitation are subjective and can have large uncertainties. Nevertheless,
17 risk assessment methods that focus on the risk triplet— scenarios, likelihoods, and
18 consequences—can contribute useful security insights.⁵

19
20 The NRC subsequently assessed the 2016 NAS recommendation and, in its words, “did not
21 identify a need to initiate new activities or to otherwise redirect resources to revise existing
22 programs or to accelerate initiatives to enhance the use of risk assessment techniques in the
23 security area.”⁶

24 ///

25

⁴ *Id.*, pp. 99, 108.

⁵ *Id.*, pp. 102, 103.

⁶ NRC Chairman Stephen G. Burns, October 7, 2016, letter to U.S. Senator Edward J. Markey, Attachment 1, p. 2.

1 **IV. PG&E'S APPROACH TO SNF STORAGE RISKS.**

2

3 Q10: Apart from the allegations in A4NR's Protest, what are your general criticisms of PG&E's
4 approach to SNF storage risks at DCNPP?

5 A10: They are several. To the extent that the NRC is a rigorous arbiter of radiological safety,
6 PG&E is justified in embracing a compliance-driven safety culture. But mere compliance does
7 not necessarily provide a safe harbor from public concerns that may transcend the scope of
8 NRC safety regulation. The NRC's analytic prioritization of near-term fatalities over long-term
9 increases in latent cancers; its de-emphasis of offsite property contamination outside a 50-mile
10 radius; and its continued exclusion of a societal risk criterion from its safety goals may each
11 have its own internal logic. They are sanctified by the preemptive authority of the Atomic
12 Energy Act, but they likely fall short in quenching the DCNPP risk apprehension of the public.
13 Rote compliance with NRC license requirements does not excuse PG&E's failure to consider or
14 adopt more aggressive approaches to risk mitigation measures related to SNF storage,
15 particularly in light of California state government's longstanding interest in SNF storage
16 strategies. As the 2016 NAS Phase 2 Report observed, "Nuclear plant operators and their
17 regulators strive to make continuous improvements to nuclear plant safety."⁷

18 Second, PG&E's focus on Core Damage Frequency ("CDF") as the quantitative unit of
19 measurement of its DCNPP risk, while a logical prioritization that benefits from a maturing
20 probabilistic assessment methodology, masks difficult-to-analyze risks from spent fuel pool

⁷ National Academies of Sciences, Engineering, and Medicine, 2016, "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2" p. 17.

1 incidents that pose no danger to the reactor core. Most of the radioactive material at DCNPP is
2 concentrated in the SNF that has been removed from the reactors, and most of that is presently
3 stored in the two spent fuel pools. The NRC staff has recognized the limitations of reactor-
4 derived screening criteria for analyzing spent fuel pool accident scenarios:

5 The QHOs [quantitative health objectives] effectively establish expectations related to
6 the frequency of severe accidents associated with nuclear reactors and the potential for
7 release of radioactive materials from an operating reactor core. . . . Some considerations
8 in comparing SFP [spent fuel pool] risks to the QHOs are that the potential
9 consequences of a SFP accident can exceed those of reactor accidents in terms of the
10 amount of long-lived radioactive material released, the land area affected, and the
11 economic consequences.⁸

12
13 PG&E has acknowledged, “CDF is not used to measure, and the CDF does not include, risks
14 associated with the spent fuel pools.”⁹

15
16 Third, although sabotage/terrorism risks to the DCNPP pools involve “safeguards”
17 information necessarily withheld from public review, PG&E’s decision to cancel all scheduled
18 pre-shutdown offloads – allowing SNF inventory buildup to approach the physical capacity of
19 each pool – suggests the company assigns a very low likelihood to this risk, if it hasn’t
20 completely omitted serious evaluation of it altogether. The 2016 NAS Report was particularly
21 critical of the NRC’s regulatory evaluation of expedited SNF transfer to dry storage because of
22 its failure to consider sabotage risks,¹⁰ and it is unclear that PG&E approaches the question any
23 differently. Since the September 11, 2001 attacks on the World Trade Center and the
24 Pentagon, the potential vulnerability of spent fuel pools to similar assault has been a major
25

⁸ NRC Staff, November 12, 2013, Regulatory Analysis for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel, COMSECY 13-0030, p. 9.

⁹ NuclearDecomCostTri2018_DR_A4NR_002-Q11

¹⁰ National Academies of Sciences, Engineering, and Medicine, 2016, “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2” p. 173.

1 source of public anxiety about nuclear power plants. Given PG&E’s widely publicized experience
2 in 2013 with malevolent actors at its Metcalf substation (about which, the 2016 NAS Report
3 observed, “The suspects are still at large. It is not clear whether their attack was simple
4 vandalism or a rehearsal for a possible future attack on the U.S. power grid.”), which prompted
5 a \$100 million effort to harden company substations. A prudently managed PG&E would pro-
6 actively seek out the means by which it can address public fears about the DCNPP spent fuel
7 pools, at *de minimis* short-term costs and long-term cost savings, such as expedited transfer of
8 SNF to dry storage.

9

10 **V. MALEVOLENT USE OF AIRCRAFT.**

11

12 Q11: How does the NRC address the potential terrorism/sabotage threat from malevolent use
13 of aircraft?

14 A11: I accessed the NRC website, <https://www.nrc.gov/security/faq-911.html#3>, on June 14,
15 2019, and downloaded the following:

16 **What is the NRC doing to protect nuclear facilities from an aircraft attack?**

17 The Commission believes that the best approach to dealing with threats from aircraft is
18 through strengthening airport and airline security measures. Consequently, we continue
19 to work closely with the appropriate Federal agencies to enhance aviation security and
20 thereby the security of nuclear power plants and other NRC-licensed facilities. Shortly
21 after the September 11, 2001 attacks, NRC, working with representatives of the Federal
22 Aviation Administration (FAA) and Department of Defense (DOD), determined that a
23 Notice to Airmen (NOTAM), issued by the FAA, was the appropriate vehicle to protect
24 the airspace above sensitive sites. This NOTAM strongly urged pilots to not circle or
25 loiter over the following sites: nuclear/electrical power plants, power distribution
26 stations, dams, reservoirs, refineries, or military installations or they can expect to be
27 interviewed by law enforcement personnel.

28

1 **Why doesn't the NRC install anti-aircraft weapons at nuclear power plants to protect**
2 **them against an airborne terrorist attack?**

3
4 The deployment of anti-aircraft weapons would be a decision for the Secretary of
5 Defense, not the NRC. However, NRC believes that application of anti-aircraft weapons
6 would present significant command and control challenges, particularly relating to the
7 time required to identify a hostile aircraft and get permission to shoot down a civilian
8 commercial aircraft and the potential for collateral damage to the surrounding
9 community. Additional information on this subject can be found in the testimony
10 provided by former Chairman Meserve to the U.S. House of Representatives on April 11,
11 2002, and to the U.S. Senate on June 5, 2002.

12
13
14 **VI. FORMAL RISK ANALYSES AND SNF.**

15
16
17 Q12: Since the San Bruno accident, and the resultant orders by the CPUC that PG&E verifiably
18 expand the use of formal risk analysis methodologies in its corporate decision-making, how has
19 PG&E's assessment of SNF storage risks at DCNPP changed?

20 A12: With the potential exception of the pending study announced by PG&E at the May 3,
21 2019 workshop in this proceeding, to be performed by the B. John Garrick Institute for the Risk
22 Sciences at UCLA, it is unclear that there has been any effort to bring SNF storage risks into the
23 formal risk analysis methodologies utilized by PG&E since San Bruno. I am uninformed of the
24 scope of the Garrick Institute's study, the expected review process after its completion, or the
25 likely delivery date for its results.

26 As mentioned above in response to Q10, the formal DCNPP risk analyses performed by
27 PG&E since San Bruno are all calibrated in terms of projections of CDF. PG&E's description of
28 core damaging events makes clear that the plant is designed "to contain the accident inside the
29 reactor's containment structure should it occur."¹¹ Because the DCNPP spent fuel pools are

¹¹ GRC-2020-Phi_DR_A4NR_001-Q04Atch22.pdf, pp. 81-82.

1 located in the Auxiliary Building, outside the containment structure, potential releases of
2 radiation from the pools logically fall outside PG&E’s CDF calculations. In terms of PG&E’s
3 corporate risk assessments, as documented in the company’s RAMP filings with the
4 Commission, the DCNPP spent fuel pools are located in an analytic blind spot.

5
6 **VII. OTHER ANALYTIC BLIND SPOTS.**

7
8 Q13: Are there other analytic blind spots that affect PG&E’s risk assessments of the DCNPP
9 spent fuel pools?

10 A13: In my judgment, there are at least two others—one conspicuous, one potential—that
11 appear to influence PG&E’s nonchalance about the buildup of SNF inventories in the DCNPP
12 pools. The obvious analytic blind spot is the fact that the federal government reimburses the
13 cost of transferring SNF to dry casks as a result of breach of contract litigation. This point is
14 reinforced in public meetings again and again, to PG&E and to the public, by members of the
15 Diablo Canyon Independent Safety Committee (“DCISC”)—especially by Dr. Per Peterson, who
16 served on the Obama Blue Ribbon Commission to explore options for SNF storage. Internal
17 2018 PG&E emails boast of a past “successful collection track record of around 98%”¹² in the
18 company’s SNF reimbursement claims. PG&E’s willful refusal to attach value to a virtually free
19 risk mitigation reflects the dominance of a wet-is-safe-enough dogmatism.

20 I would add a “potential” third analytic blind spot, the failure to continuously evaluate
21 the qualitative risk of terrorism/sabotage to the DCNPP spent fuel pools from the malevolent

¹² NDCTP2018_A4NR_001_00010001.

1 use of aircraft. I say “potential” because I am necessarily uninformed of PG&E’s security
2 assessments, and how or whether they formally incorporate this risk. During the January 23,
3 2019 DCNPP site visit held in this proceeding, after extoling the engineered strength of the
4 Auxiliary Building walls and the pools themselves, PG&E spokesman Eric Nelson described the
5 roof to me as “two sheets of tin.” In response to my question about vulnerability of the roof to
6 plane crash, he explained that the building’s steel frame would prevent collapse, but that debris
7 would likely fall into the pools. PG&E’s unwillingness to make greater use of the virtually free
8 risk mitigation of SNF transfer to casks suggests a confidence that any risk posed to the pools
9 from malevolent use of aircraft can be dismissed.

10

11 **VIII. PROBABILISTIC RISK ASSESSMENT AND SNF.**

12

13 Q14: Can probabilistic risk assessment (“PRA”) methodology be reliably applied to evaluate
14 spent fuel pool accident risks?

15 A14: That’s unclear. I posed that question to Dr. Robert Budnitz, a longtime member of the
16 DCISC, and one of the intellectual forefathers of PRA as applied in the nuclear industry:

17 Bob, a few years ago there was a discussion at a DCISC meeting about applying PRA
18 methodology to potential releases from spent fuel pools. Were any such PRAs
19 completed and, if so, how were they regarded by the risk assessment
20 community? Are such reports publicly accessible? I have included the following
21 excerpt from the February 2014 DCISC minutes to jog your memory (and
22 highlighted your comments which caught my attention). Any guidance you could
23 provide me would be well-appreciated. Best regards/JG

24

25 Dr. Budnitz reported he was unaware of a probabilistic risk assessment (PRA) using
26 modern analytical methods having been performed concerning the risk of a release
27 from a SFP but he reported that two such PRAs are now being performed, one for a
28 boiling water reactor, such as those at Fukushima, and the other for a pressurized

1 **water reactor, such as those at DCCP. Dr. Budnitz remarked that some in the PRA**
2 **community doubt there is sufficient data to support a useful PRA concerning this**
3 **issue. Dr. Budnitz reported a committee of the American Nuclear Society (ANS) and**
4 **the American Society of Mechanical Engineers (ASME), which Dr. Budnitz co-chairs,**
5 has developed methodology standards for PRA and a small working group of the
6 committee is also now reviewing the development of an adequate methodology, the
7 use of the same assumptions and data, and the acquisition of sufficient data to
8 support a PRA concerning the issue. He remarked that if an adequately supported
9 methodology emerges it should be employed by DCCP. Dr. Lam stated he agreed
10 with Dr. Budnitz analysis and he remarked the fundamental safety issues that must
11 be dealt with in the context of SFP safety are several and include the lack of a robust
12 containment, the presence of a significant inventory of radioactive material, the need
13 for active cooling of water, and the fact that at DCCP and other nuclear facilities the
14 SFP rack density has been increased from its original configuration. Dr. Peterson
15 stated he was skeptical that a PRA could provide a useful basis to predict frequency
16 of events where SFP inventory would be reduced as it may prove impossible to
17 identify all possible sequences and the approach that has emerged is to manage risk
18 which cannot be quantified by a PRA within the assessment of beyond design basis
19 damage and to consider the issues within the context of strategies to mitigate risk.
20 Dr. Peterson remarked that SFP structures are robust and the SFPs at Fukushima
21 remained intact and leak-tight following the accident but he stated that any type of
22 event which could challenge SFP inventory is likely to create significant challenges for
23 reactors and the time constraints for taking action with regard to reactors is very
24 short compared to the SFPs because of the very high decay heat rates. Dr. Peterson
25 stated this was a principal reason why careful review of the various capabilities and
26 procedures being put into place to use portable equipment at nuclear power plants,
27 in accordance with the industry's FLEX initiative, and to protect plant personnel are
28 important in reducing residual risk. **Dr. Budnitz commented a PRA is scenario based**
29 **and requires delineation of every sequence of events and for each sequence it**
30 **requires an engineering understanding and later a probabilistic understanding to**
31 **quantify. He stated he was confident that the scenario development is feasible but**
32 **whether there are sufficient data to support the quantification in probabilistic**
33 **terms is the issue.**
34

35 Dr. Budnitz replied to me by email on January 14, 2019:

36
37 *[This is a note from me personally. Although I am a member of the Diablo Canyon Independent*
38 *Safety Committee (DCISC), this note does not represent the position of the DCISC, which it could*
39 *not do, because such a position can only be adopted by the Committee in a public session after*
40 *having the benefit of public comment. So this is simply my own response to your inquiry. Bob]*
41

42 Your quote from the DCISC public meeting transcript in February 2014 brings back some
43 memories. I will try to bring things up-to-date.
44

45 The American Nuclear Society and the American Society of Mechanical Engineers jointly support
46 a standards-development committee, the ANS-ASME "Joint Committee on Nuclear Risk
47 Management," that is charged with developing consensus standards for the methodology of

1 PRA (Probabilistic Risk Assessment), and with maintaining those standards once developed. I
2 have been a member of that committee and its predecessor committees since 1998, and since
3 2012 I have been one of the committee's two co-chairs. The parent (voting) committee consists
4 of 35 PRA experts and has three subcommittees and ten subsidiary working groups on
5 specialized fields of PRA (like fire-PRA and seismic-PRA), with an active roster of about 150 PRA
6 experts in total.

7
8 The JCNRM has devoted most of its efforts to developing PRA methodology standards for
9 operating LWR power reactors, for LWR power reactors in the design and construction stage,
10 and for advanced power reactor designs including some non-LWR design types that have not yet
11 been built. Each standard developed by the JCNRM consists of a series of detailed technical
12 requirements as to what the analyst must do, and in what order, to carry out a technically sound
13 PRA analysis. If all of the requirements are accomplished, and an independent peer review is
14 performed that gives the analysis high marks, then one can say that the PRA analysis "meets the
15 standard."

16
17 Spent fuel pool risk and dry cask storage risk: Back in 2014 when I said those remarks that you
18 have quoted, the JCNRM was contemplating whether the technology was sufficiently mature to
19 support a PRA methodology standard for analyzing the risk from spent fuel pools and/or from
20 dry cask storage installations. To understand the issues, the JCNRM put together a small group
21 of experts to consider the technical issues and to recommend a course of action. The outcome
22 of that evaluation was a recommendation, from that small working group of experts, that there
23 was not enough experience with the PRA methodology for those types of facilities to support a
24 methodology standard. There were three issues. First, to structure such a PRA analysis, one
25 needs to identify every important accident scenario, and have confidence that this has been
26 done successfully. Second, one needs to analyze each such scenario, one by one, to understand
27 the various possible initiating events for each scenario, the likelihoods of various subsequent
28 equipment failures and human errors, the detailed sequence of events in the scenario, and the
29 physical-chemical-radiological evolution in time of the system (containing dangerous amounts of
30 radioactivity) that could lead to a potential release of that dangerous radioactivity. Third, one
31 needs data -- mostly failure-rate data and human-error data but important other data too -- to
32 support a quantification of the likelihood (frequency per year) of each scenario and also a
33 quantification of the consequences, if any.

34
35 The working group concluded that while it was feasible (at that time) to structure the analysis,
36 thereby identifying each important accident scenario, there had not been enough research work
37 or engineering practice to enable analysts to analyze each such scenario one-by-one. Further,
38 there was not thought to be enough data about many of the various failure-rate issues to
39 support a numerical analysis. The working group wrote down a very useful compilation and
40 discussion of those technical areas where shortcomings were thought to exist. The overall
41 conclusion was that there had not (at that time) been adequate experience with performing
42 such an analysis: nobody had done such an analysis (for either a spent-fuel-pool installation or a
43 dry cask installation), and until that had occurred the time was not ripe to develop a
44 methodology standard, which consists of a series of requirements as to what one must do, in
45 what order, to carry out the analysis.

46
47 Since that time, things have advanced, at least for using PRA methods for understanding the
48 risks from spent-fuel pools. (For dry-cask storage risks, there has not yet been any PRA analysis

1 anywhere in the world, as best I know.) For spent-fuel pools, there have been at least 4
2 analyses performed, and I have learned (informally, but from experts whom I trust) that each of
3 them was successful, in that the PRA analysts succeeded in identifying the important scenarios,
4 did the analysis of each of them, identified enough data to support a quantification of
5 likelihoods and consequences, and felt that overall the PRA was a success. (There might have
6 been more than 4, but I know of 4 on good authority.) All of this work has been accomplished in
7 the past couple of years, and some of it only in the past half year or so, according to the experts
8 with whom I've spoken. A majority of the work performed was studying power-reactor spent
9 fuel pools in reactors located abroad, but the configurations are very similar to those for pools
10 in the US, I believe.

11
12 However, none of these analyses has yet been published or released publicly. My information
13 (above) is informal and verbal, albeit reliable in my view. The publication of these studies,
14 expected soon I hope, will be important so that the broader community of PRA experts
15 (including me) can review them, pick them apart, confirm (or not) the quality of the work,
16 understand the safety insights, and build on these studies to do more of them at other nuclear
17 plants.

18
19 Only after the work in the above short paragraph has been accomplished by the broader
20 community of PRA experts (world-wide) will the ANS-ASME JCNRM standards committee (that I
21 co-chair) revisit whether the time would be ripe to develop a methodology standard for doing
22 that type of PRA analysis. The advantage of developing such a methodology standard would be
23 that analysts world-wide could use it to structure their individual plant-specific analysis, with the
24 confidence that following the standard methodology would produce a good-quality analysis --
25 always with the proviso that an outside expert peer review has been done. (Such a peer review
26 is required by each of our PRA standards as a matter of course, and guidance on how to do one,
27 included in each of our standards, is part of the way our industry works to assure that our PRAs
28 are technically adequate.) And with a standard in place, there is a stronger encouragement for
29 plants to undertake these types of analyses. That is why the PRA technical community develops
30 and supports standards like this.

31
32 Dry cast storage risk: Concerning a PRA risk assessment for dry-cask-storage installations, I
33 know of no such analyses as of now, nor do I know of anything underway or being planned.

34
35 I hope that this note responds to your inquiry.

36
37 Sincerely, Bob Budnitz

38
39 **IX. WHAT PG&E KNEW.**

40
41 Q15: In the aftermath of the June 2016 Joint Proposal by PG&E, A4NR, and other parties for
42
43

1 the retirement of DCNPP, what do you think PG&E knew about the potential to greatly reduce
2
3 the cooldown time for SNF in the DCNPP pools?
4

5 A15: Based upon data responses provided by PG&E to A4NR in this proceeding, I believe
6 PG&E knew a lot. Two weeks after PG&E filed A.16-08-006 with the CPUC, Jearl Strickland, a
7 longtime PG&E staff member responsible for DCNPP SNF management issues (who, after
8 retirement, now represents Holtec International's ("Holtec") interests at both DCNPP and
9 SONGS as an executive consultant) emailed his DCNPP colleagues on August 25, 2016:

10 All ..

11
12 I've had good productive meetings with Holtec over the last two days. They were well prepared
13 to address the questions that I sent them prior to the trip.

14 Expedited spent fuel storage:

15
16
17 We reviewed in detail the work that they have done to shorten the period of time that spent
18 fuel is required to remain in the SFP. They have developed a basket for the MPCs constructed
19 out of the neutron attenuating material Matemic.

20
21 For the BWR plants they have a revision to their general license under review with the NRC that
22 will reduce the storage time down to 2 years. They are in the process of developing a similar
23 submittal for the PWR MPC 32m for another utility. They shared the results of the analysis
24 performed to date and went as far as to take the data that they have on our fuel and run a
25 preliminary assessment. The preliminary assessment is that there is a potential to get our times
26 down to 2 to 2-1/2 years. Under this case, we could start offloading the pools after being down
27 for about a year. It would take 14 months loading one cask a week to empty both pools. They
28 are addressing how we deal with RCCAs and will gather specific information from Mark Mayer.

29
30 We talked about the constraints of the cask transfer facility and they believe they have a way to
31 address this.

32
33 They will develop a proposal to add the scope of our shortened DCPM MPC to the license
34 amendment they are currently working on. This would revise their general license and allow us
35 to make the decision in the future to either revise our site specific license or change to the
36 general license.

37
38 Proposal expected in the next two weeks.¹³
39

¹³ NDCTP2018 -A4NR -001 -0001122

1 On October 31, 2016 – apparently not having yet received the anticipated proposal, Mr.

2 Strickland corresponded with Holtec:

3 Subject: Proposal for expedited fuel movement

4 Joy ...

5 When I was last out at Holtec, a proposal was going to be developed for your team to perform
6 the evaluation associated with reducing the required time in our pools down to the 2-1/2 year
7 range. I would still like to see that ASAP so that I can get it started this year.

8

9 Thanks ... Jearl¹⁴

10 After a call with DCNPP's Terence Grebel, Holtec suggested a path forward:

11 Good morning, Jearl,

12 Terry and I just had a good conversation. Perhaps the first step is for PG&E and Holtec to have a
13 WebEx to discuss PG&E's immediate and long term needs. On this same WebEx, Holtec can
14 provide an update on the general license of HI-STORM 100 (including GTCC), HI-STAR 100, and
15 the concept of minimum of 2 year cooling. I will obtain dates from Stefan Anton and Kim
16 Manzione to support the WebEx.

17

18 Regards,

19 Joy¹⁵

20 A meeting was held on the morning of November 7, 2016 – led by Mr. Grebel and
21 facilitated by Loren Sharp, PG&E's Senior Director of Nuclear Decommissioning – with Holtec
22 linked by WebEx for the stated purpose to "Initiate discussions on Holtec performing an
23 expedited fuel offload study."¹⁶ Identified as desired outcomes in the agenda prepared by

24 PG&E were:

- 25 • *Gain understanding of DCPD decommissioning planning and commitment to perform an*
26 *expedited fuel offload study*
- 27
- 28 • *Gain understanding of current Holtec efforts related to casks design and GTCC waste*
29 *capabilities*

¹⁴ NDCTP2018 -A4NR -001 -0000962

¹⁵ NDCTP2018 -A4NR -001 -0000961

¹⁶ NDCTP2018 -A4NR -001 -0000434.

- *Alignment on what the study would include*
- *Alignment on Holtec providing a proposal and schedule to complete the study*¹⁷

By mid-afternoon that same day, Mr. Sharp and Mr. Strickland had received from their staff a draft of a Request for Proposal to be sent to Holtec the following morning.

On January 26, 2017, with the subject line “HOLTEC UNVEILS FUEL BASKET FOR FAST-TRACK DECOMMISSIONING”, Mr. Grebel circulated to his PG&E colleagues, including current PG&E witnesses Thomas Jones and Philippe Soenen, by email a news report from worldnuclearnews.org describing Holtec’s expectation that SNF cooling times could be reduced “from about seven years to two-and-a-half years:”

Holtec said it was prompted to develop the strategy to address concerns about the risk of accidental pool drainage, with the associated risks of a zirconium fire. The company said such a scenario, while ‘non-credibly improbable, stalks the decision-making process of every nuclear plant owner preparing to draw down its workforce after ceasing operations’.

When a reactor is shut down, its used nuclear fuel is usually stored in an at-reactor pool for several years to allow it to cool sufficiently to be transferred to another suitable long-term storage facility or for disposal.

Holtec's strategy relies on the use of its friction-stir welded fuel basket made of Metamic HT, an aluminium boron carbide metal matrix composite. The welds do not suffer from distortion typically seen with conventional welding process.

The basket has over ten times the thermal conductivity of conventional stainless steel fuel baskets, which shortens the required cooling period of used fuel, prior to transfer to dry storage, from about seven years to two-and-a-half years. This would enable a shuttered plant site to be returned to its pre-plant state within about 66 months after the reactor's shutdown, the company said.

The strategy will eliminate the fuel and high-level waste "as the obstacle to demolishing the plant" and allow a site to be restored more quickly, it added.

Holtec first announced development of its latest used fuel storage baskets in January 2014.¹⁸

¹⁷ *Id.*

¹⁸ NDCTP2018 -A4NR -001 -0000943

1 A preliminary report from Holtec to PG&E was received in late January, 2017 for review,
2 with final submittal in March 2017.

3 Q16: How did the Holtec study factor into PG&E's 2018 filing of a site-specific
4 Decommissioning Cost Estimate ("DCE") for DCNPP?

5 A16: That is extremely unclear.

6 The Holtec study results, along with the results of a parallel analysis by a competing dry
7 cask storage system vendor, TransNuclear Americas ("TN Americas"), an AREVA subsidiary,
8 were primary inputs to PG&E's October 2017 "Expedited Spent Fuel Offload Study, Document
9 Number DCP-36" ("Plan 36"). Plan 36 is a 65-page document which compared alternate
10 storage system and loading options determined by an expert panel comprised of PG&E and
11 vendor personnel, and evaluated licensing options from PG&E's perspective for SNF at DCNPP.
12 According to Plan 36, "(w)hile no study was specifically completed, NAC International [a third
13 competing vendor] information was also evaluated by PG&E."¹⁹

14 Plan 36 summarized the results of this evaluation as indicating a 4.5- to 5.5-year period
15 for completion of post-shutdown transfer, depending upon the vendor selected, with both
16 estimates subject to potential refinement once DCNPP-specific fuel assumptions were used:

17 The Holtec dry cask storage systems considered for use at DCP would allow for final
18 spent fuel offload 5.5 years after DCP shutdown. The 5.5-year offload estimate may
19 potentially be refined by a detailed analysis of DCP-specific fuel data. The Holtec
20 system supporting offload in 5.5 years is not yet licensed with the NRC, but the design
21 and thermal heat model have been previously licensed by Holtec for use in another
22 system. The Holtec system is the current dry cask storage system licensed for the DC
23 ISFSI, including site-specific seismic analyses, but with different internals with higher
24 thermal transfer capability that allow for faster offload. Use of the Holtec system would
25 require no changes to the existing DC ISFSI pad or related transfer SSCs. Due to the
26 design and spacing requirements, the storage of spent fuel using the Holtec system

¹⁹ Plan 36, p. 11.

1 would utilize all existing cask space on the ISFSI pad. However, GTCC waste storage
2 casks could be stored in the existing ISFSI pad security enclosure footprint with either a
3 new partial anchored pad or base isolation design.
4

5 The TN Americas dry cask storage systems considered for use at DCPD would allow for
6 final spent fuel offload 4.5 years after DCPD shutdown. The 4.5-year offload estimate
7 may potentially be refined by a detailed analysis of DCPD-specific fuel data. The TN
8 Americas system supporting offload in 4.5 years is not yet licensed with the NRC, but is
9 anticipated to be licensed generically by 2021. Use of the TN Americas system would
10 require minor changes to the existing DC ISFSI pad and related transfer SSCs. Due to the
11 larger spent fuel capacity and compact, stacked design of the dry cask storage system, it
12 would also allow for storage of decommissioning-related waste (GTCC waste) on the
13 existing DC ISFSI pad.²⁰
14

15 The potential for refinement, after “a detailed analysis of DCPD-specific fuel data”,
16 remains unquantified for the Holtec portion of Plan 36. The TN Americas discussion is more
17 specific:

18
19 TN Americas states that a more detailed depletion analysis based on actual SFA data,
20 including the initial uranium loading of 0.430 MTU, and irradiation history is expected to
21 result in a reduction in the actual calculated decay heat, leading to qualification of the
22 SFAs sooner than 2030. This is estimated to result in a reduction in the required cooling
23 time by approximately 6 months.... TN Americas anticipates that the offload can be
24 completed in the second half of 2029, roughly four years after shutdown of Unit 2.²¹
25

26 Plan 36 made no attempt to reconcile the 5.5 years attributed to Holtec “for final spent
27 fuel offload” and the earlier “preliminary assessment” of a 2 – 2.5 years provided to Mr.
28 Strickland in August 2016 (“Under this case, we could start offloading the pools after being
29 down for about a year. It would take 14 months loading one cask a week to empty both
30 pools.”), or the 2.5-year news report circulated by Mr. Grebel in January 2017. As discussed
31 further in response to Q21, Mr. Strickland, in his current capacity as executive consultant to

²⁰ *Id.*, p. 50.

²¹ *Id.*, pp. 57 – 58.

1 Holtec, reaffirmed at the DCISC’s June 4, 2019 public meeting that Holtec’s response to PG&E’s
2 upcoming vendor solicitation will propose cooldown times of 1 – 2 years.

3

4 **X. ROLE OF PLAN 36.**

5

6 Q17: How did Plan 36 factor into PG&E’s 2018 filing of a site-specific DCE for DCNPP?

7 A17: It is unclear that Plan 36 factored into the 2018 DCE at all, other than as a source of
8 comfort for PG&E’s regulatory stratagem to eschew the shorter SNF offloading schedules

9 corroborated by Plan 36 in favor of a “conservative” DCE assumption of a 7-year offload

10 schedule purportedly “recommended” by the CPUC. This would enable “updates” in future

11 NDCTPs, including “new information” derived from choosing a vendor in 2019. As described in

12 the Conclusions and Recommendations section of Plan 36:

13 In accordance with the JPA and 2015 NDCTP CPUC Decision, this Plan demonstrates that
14 is feasible to transfer spent fuel from the SFPs to the DC ISFSI in 4.5-5.5 years after DCP
15 shutdown, which is less than the seven years recommended by the 2015 NDCTP CPUC
16 Decision. These offload estimates may potentially be refined by a detailed analysis of
17 DCP-specific fuel data.

18

19 It is recommended that the 2018 NDCTP cost estimate use Plan 24, Fuel Transfer to the
20 ISFSI, results in the 2018 NDCTP, which uses the CPUC-recommended 7-year SFPs
21 offload schedule. Further, the results of this Plan will be shown in the 2018 NDCTP as an
22 option for potential cost savings. Although vendors have indicated that the offload time
23 estimates may potentially be reduced by further detailed DCP-specific fuel analysis, it is
24 conservative to use the 7 years for cost estimating purposes. It is also conservative to
25 use the Holtec cask design that is already employed at the DC ISFSI and is known to be
26 NRC-approved for the DC ISFSI. Completing only the 2018 loading campaign prior to the
27 end of the operating licenses will allow for greater flexibility in choosing spent fuel for
28 casks, and thus allowing overall earlier final fuel offload. This recommendation is
29 consistent with the NDCTP process, which allows for updates to account for new

1 information in the later NDCTPs, such as information resulting from choosing a vendor
2 in 2019.²²

3
4 In properly evaluating these two remarkable paragraphs, it is important to point out that (1) the
5 potentially redemptive assurance that “the results of this Plan will be shown in the 2018 NDCTP
6 as an option for potential cost savings” remains unfulfilled to date; and (2) since Plan 36 was
7 originally fortified by a “Privileged and Confidential” designation on every page – such
8 protection was waived in response to an A4NR data request, although PG&E subsequently
9 retracted the waiver – dissemination of its contents outside PG&E was not originally intended.

10 PG&E did not provide Plan 36 to High Bridge Associates for its independent review of
11 the DCE. Upon learning that the CEC had never seen Plan 36, A4NR provided it on March 27,
12 2019 based upon this then-effective waiver:

13 This document was prepared at the request of counsel and, therefore, is marked
14 “Privileged and Confidential.” For purposes of this proceeding and consideration of
15 spent fuel management plans related to DCPD decommissioning, PG&E hereby waives
16 the Attorney-Client Privilege for Plan 36 – Expedited Spent Fuel Offload Study.²³

17
18 Q18: Do you have any other major concerns about Plan 36?

19 A18: I have two, both of which relate to the outsized role of semantic framing in the planning
20 process inside large institutions. How an issue is phrased often has a determinative role in how
21 it is evaluated, especially with the passage of time as more individuals become engaged in the
22 tasks at hand. Because of Plan 36’s “Privileged and Confidential” pedigree, I believe it reflects a
23 particularly candid response by its author(s) to the challenges presented. There are two core
24 issues that I believe were either misframed from the outset or mutated during the process.

²² *Id.*, pp. 62 – 63.

²³ NuclearDecomCostTri2018_DR_A4NR_001-Q11, p. 2.

1 First, I question how (and why) the primary objective became “to optimize the date that
2 the last spent fuel is removed from the SFPs”²⁴ in the context of the CEC’s AB 1632 Report in
3 2008, embraced by several CPUC decisions, which focuses on the pre-shutdown density of SNF
4 inventories in the pools. Plan 36 is blunt: “The comparison between the options principally
5 focuses on the earliest date that the spent fuel pool can be completely emptied,”²⁵ with no
6 apparent recognition of the arbitrary narrowing of objectives this singularized criterion
7 represents. To the extent that the CEC, the DCISC, and the CPUC have attempted for years to
8 nudge PG&E toward greater SNF risk mitigation, the motivation has unmistakably been broader
9 than a desire for post-shutdown cost savings. In my judgment, the collaboration and
10 coordination with the CEC required by D.17-05-013 and D.17-05-020 were designed to force
11 timely discussion of potential tradeoffs between objectives into a transparent public forum
12 before PG&E made its 2018 NDCTP filing.

13 Second, Plan 36 inexplicably converts an obligation to “plan for expedited post-shut-
14 down transfer of spent fuel to Dry Cask Storage **as promptly as is technically feasible** (emphasis
15 added) using the transfer schedules implemented at the San Onofre Nuclear Generating Station
16 as a benchmark for comparison”²⁶ into a 7-year safe harbor “recommended by” D.17-05-020.
17 Here is what D.17-05-020 actually said: “We find there is sufficient evidence to reduce the time
18 period for transferring SNF from wet pools to dry casks **no later than 7 years** (emphasis added)
19 after shut-down.”²⁷ And: “The record supports **no longer than a 7-year** (emphasis added) wet

²⁴ *Id.*, pp. 7, 11.

²⁵ *Id.*, p. 19.

²⁶ A.16-08-006, Attachment A to Application of PG&E, Section 5.4.1., approved by D.17-05-013.

²⁷ D.17-05-020, p. 51.

1 cooling period for nuclear decommissioning cost triennial proceedings consistent with industry
2 practice.”²⁸

3 In its filed 2018 DCE, PG&E characterized this misbegotten 7-year safe harbor as a
4 “CPUC request” attributable to the “ALJ decision on 2015 NDCTP application.”²⁹ PG&E’s
5 presentation materials for both the December 7, 2018 and January 16, 2019 briefings of the
6 CEC, included as attachments to its March 15, 2019 Supplemental Testimony, semantically
7 engineer this 7-year offload into “CPUC direction.”³⁰

8 PG&E’s repeated mischaracterizations of D.17-05-020 (as well as the commitment it
9 made in the Joint Proposal) is misleading, at best.

10

11 **XI. OTHER MATERIAL MISREPRESENTATIONS.**

12

13 Q19: Are there other material misrepresentations related to SNF that you believe PG&E has
14 made in its filings or testimony in this proceeding?

15 A19: Yes. The DCE claims that it “meets PG&E’s commitment in the Commission-approved
16 Joint Proposal”³¹ despite PG&E’s failure to observe the requirements of Section 5.4.1. of the
17 Join Proposal to incorporate the costs of

18 a plan for expedited post-shut-down transfer of spent fuel to Dry Cask Storage as
19 promptly as is technically feasible using the transfer schedules implemented at the San
20 Onofre Nuclear Generating Station as a benchmark for comparison and provided PG&E

²⁸ *Id.*, Finding of Fact 6, p. 74.

²⁹ A.18-12-008, PG&E Prepared Testimony, Attachments Supporting Chapter 4, Volume 3, Attachment A, pp. 103 – 104.

³⁰ A.18-12-008, PG&E Supplemental Testimony, March 15, 2019, pp. 6-AtchA-5, 6-AtchA-14, 6-AtchB-15.

³¹ A.18-12-008, PG&E Prepared Testimony, Attachments Supporting Chapter 4, Volume 3, Attachment A, p. 3.

1 will also provide the plan to the CEC, collaborate with the CEC, and evaluate the CEC's
2 comments and input.³²

3
4 As made clear beyond any doubt by the presentation from CEC Executive Director Drew
5 Bohan to the February 22, 2019 public meeting of PG&E's Diablo Canyon Decommissioning
6 Engagement Panel ("DCDEP"), "PG&E did not consult with the Energy Commission on any of the
7 topics outlined in the filing documents ... during plan development".³³ Mr. Bohan's statement
8 to the DCDEP also exposes the falsity of the Application's claim to have complied with prior
9 Commission decisions,³⁴ in light of D.17-05-013's adoption of a joint settlement agreement
10 requiring PG&E to conduct

11 a study, as part of its detailed Diablo Canyon site specific decommissioning study
12 specified in Section 5.4.1 of the Joint Proposal, of the options for post shut-down
13 expedited transfer of spent nuclear fuel to dry cask storage, coordinates such studies
14 with the California Energy Commission (CEC), and evaluates the CEC's recommendations
15 and input in good faith.³⁵

16
17 Because D.17-05-020 required this study to also include an evaluation of the costs, benefits,
18 and feasibility of a pre-shutdown acceleration of DCNPP dry cask loading,³⁶ PG&E's compliance
19 claim should be seen as doubly false.

20 The Application further asserts, "PG&E has considered safety in connection with
21 developing each element of the decommissioning cost estimate,"³⁷ but as indicated in my
22 testimony in response to Q09 thru Q13, PG&E's wet-is-safe-enough dogma appears to have

³² A.16-08-006, Attachment A to Application of PG&E, Section 5.4.1.

³³ A.18-12-008, PG&E Supplemental Testimony, March 15, 2019, p. 6-AtchC-9.

³⁴ A.18-12-008, PG&E Application, pp. 16 -- 17.

³⁵ A.15-09-001 Settlement Agreement, Section 3.2.3.1.3. A4NR was one of 15 settling parties.

³⁶ D.17-05-020, OP 5, pp. 51 – 52.

³⁷ A.18-12-008, PG&E Application, p. 14.

1 curtailed a thorough assessment of the potential enhancement of safety margin stemming from
2 expedited transfer of SNF to dry casks.

3 The demonstrable inaccuracy of PG&E's compliance and safety consideration claims is
4 sufficiently egregious to challenge the verification of the Application as true and correct by
5 Generation and Decommissioning Vice President Jon Franke. Mr. Franke's verification was
6 made under penalty of perjury, and its untruthfulness exposes the SNF portions of the
7 Application to a motion to strike.

8 Q20: Are there significant omissions in PG&E's SNF-related filings or testimony in this
9 proceeding that you believe rise to the level of a material misrepresentation?

10 A20: Yes, material omissions in PG&E's March 15, 2019 Supplemental Testimony render
11 misleading its discussion of the NRC's conclusion, "expedited transfer would provide only a
12 minor or limited safety benefit, and the expected implementation costs would not be
13 warranted."³⁸ PG&E neglects to disclose that the question the NRC addressed was whether a
14 fleet-wide requirement for expedited transfer of SNF at every licensed site nationwide could
15 satisfy the cost-benefit requirements of the NRC backfit rule. DCNPP and the other western
16 plants were specifically excluded from the analysis. Because the DCNPP ISFSI had already been
17 expanded to accommodate all SNF to be generated through 2025, it would be considered a
18 sunk cost and not included in a prospective cost-benefit evaluation. The NRC's generic analysis
19 was in no way determinative of how a comparison of future costs with future benefits would be
20 answered on a site-specific basis at DCNPP.

³⁸ A.18-12-008, PG&E Supplemental Testimony, March 15, 2019, p. 6-13.

1 PG&E's March 15, 2019 Supplemental Testimony compounds this misrepresentation by
2 noting "the NRC presented the results of its studies to the National Academy of Science"³⁹ but
3 omitting any discussion of the NAS response. Surely the utility is aware of the 2016 NAS Phase
4 2 Report discussed in my testimony in response to Q09 and Q10. Simple principles of accuracy
5 and objectivity should have compelled PG&E to at least mention primary points raised in the
6 2016 NAS Phase 2 Report, including the comparison between the estimated radioactive
7 material releases, land interdiction, and displaced persons for the reference plant in the NRC
8 studies and the consequences of the Fukushima Daiichi accident. The 2016 NAS Phase 2 Report
9 observed that important conclusions "are not obvious when consequence estimates are presented
10 only after being weighted by release frequencies. The committee judges that it is important to
11 present the full risk triplet (scenarios, frequencies, and consequences) separately, as well as their
12 product, in cost-benefit analyses."⁴⁰

13 Reinforcing the importance it attached to disaggregating "the full risk triplet"
14 separately, the 2016 NAS Phase 2 Report examined the unweighted results calculated by an
15 NRC sensitivity case

16 that removes the 50-mile limit for land interdiction and population displacements and
17 raises the value of the averted dose conversion factor from \$2,000 per person-rem to
18 \$4,000 per person-rem. This scenario postulates the evacuation of 3.46 million people
19 from an area of 11,920 mi², larger than the area of New Jersey ...
20

21 In fact removing the 50-mile limit and raising the value of the averted dose
22 conversion factor to \$4,000 per person-rem increased the base-case average estimated
23 benefits of expedited transfer by a factor of 5.9, that is, from about 13 percent of the
24 estimated costs of expedited transfer to about 80 percent.⁴¹
25

³⁹ *Id.*, p. 6-12.

⁴⁰ National Academies of Sciences, Engineering, and Medicine, 2016, "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2" p. 180.

⁴¹ *Id.*, p. 181.

1 The NRC’s generic assessment placed the cost of a low-density storage scenario at \$51.4
2 – 53.8 million for each of two pools,⁴² but did not disaggregate these costs between
3 fabrication/loading of additional casks and construction of sufficient ISFSI capacity. Since full
4 build-out of the DCNPP ISFSI was already a sunk cost at the time of the NRC study, the
5 sensitivity case highlighted by the 2016 NAS Phase 2 Report would obviously hold considerable
6 relevance to PG&E ratepayers.

7 And I would add, in terms of financial significance to the 2018 DCE, one of the larger
8 material omissions from PG&E’s filings and testimony is the absolute silence over the legal
9 prerequisite to DCNPP Unit 2 operating past December 31, 2024. To do that, PG&E will have to
10 obtain a waiver from the State Water Resources Control Board’s once-through-cooling (“OTC”)
11 deadline. Section 6.2 of the aforementioned Joint Proposal provides, in pertinent part:

12 ... In order to clarify the authority of Diablo Canyon Unit 2 to operate beyond
13 December 31, 2024 under the OTC policy, PG&E will ask the State Water Board for an
14 amendment to the OTC policy to conform the compliance timeline table to the date of
15 actual expiration of the Unit 1 and Unit 2 NRC operating licenses. The amendment, if
16 approved, would confirm that Unit 2 is authorized to operate through August 26, 2025,
17 subject to continued payment of the interim mitigation during Diablo Canyon Unit 2’s
18 2025 operations. PG&E will implement the Joint Proposal regardless of the State Water
19 Board’s decision on the amendment request. The Parties will review the amendment
20 request and reserve the right to oppose it or seek additional conditions...⁴³

21
22 Three years after the Joint Proposal was executed, I don’t believe PG&E has made any
23 progress on this front. Certainly, A4NR has yet to receive a draft of any amendment request for
24 review. Given PG&E’s lowly standing in Sacramento, it’s difficult to envision DCNPP receiving a
25 waiver from California’s OTC policy in the foreseeable future just to run Unit 2 for an additional

⁴² NRC, “Staff Evaluation and Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel,” COMSECY-13-0030, November 12, 2013, p. 41

⁴³ A.16-08-006, Attachment A to Application of PG&E, Section 6.2.

1 8 months. To presume success, in the absence of any other facts, would be imprudent.
2 Significantly, the California Independent System Operator’s 2019 Transmission Plan assumes
3 both DCNPP units cease operating in 2024. For PG&E, after three years of inaction, to assume
4 an OTC waiver and to embed such optimistic speculation as a core undisclosed premise of the
5 2018 DCE strikes me as unreasonable.

6 The independent review commissioned by PG&E of the 2018 DCE by High Bridge
7 Associates zeroed in on the lost opportunity period between the assumed November 2, 2024
8 shutdown of Unit 1 and August 26, 2025 shutdown of Unit 2. Using PG&E’s estimate of \$109.1
9 million in annual savings from moving SNF out of wet storage and into dry casks, use of a non-
10 conservative assumption for Unit 2’s anticipated shutdown date appears to have contributed
11 approximately \$73 million in speculative costs to the 2018 DCE. That would modify the
12 estimated ratepayer savings from reducing the assumed wet cooldown period from seven years
13 to two or three to \$509 – 619 million.

14

15 **XII. HOLTEC’S JUNE 2019 ASSURANCES.**

16

17 Q21: You mentioned, in response to Q16, Jearl Strickland’s statement at the DCISC’s June 4,
18 2019 public meeting that Holtec’s response to PG&E’s upcoming vendor solicitation will
19 propose cooldown times of 1 – 2 years. What exactly did he say?

20 A21: The official video of the DCISC meeting, accessible at [https://cal-](https://cal-span.org/unipage/index.php?site=slo-span&owner=DCISC&date=2019-06-04)
21 [span.org/unipage/index.php?site=slo-span&owner=DCISC&date=2019-06-04](https://cal-span.org/unipage/index.php?site=slo-span&owner=DCISC&date=2019-06-04), records the
22 following statements:

1 (07:37:24)

2 JEARL STRICKLAND, Consultant, Holtec International: It used to be in the past that
3 the fuel was required to be in the spent fuel pools for five to seven years before it
4 became a candidate for being moved into dry storage. A lot of the licensing that has
5 taken place over the last couple years has continued to shorten that duration down to
6 where there are license amendments in place that are being processed for Holtec
7 products today that have that time frame down to one to two years out of the reactor.
8 So what it's doing is it's enabling Holtec to be able to advance that period of time when
9 a plant ceases operation and be able to have the fuel move from wet storage to dry
10 storage much sooner so that you can then proceed with decommissioning of power
11 plants. (ends: 07:38:05)

12
13 (08:02:43)

14 DCISC CONSULTANT RICHARD D. McWHORTER: For the multi-purpose cask currently
15 in use here—as you know there is a RFP that's gone out for proposals to use different
16 casks—of which I presume Holtec would propose some kind of modification to the
17 current casks that could be used here...

18
19 (08:03:00)

20 MR. STRICKLAND: What I understand is that the RFP is not for proposing to use
21 different casks, it's to provide PG&E with the options to be able to look at what all are
22 available and that it may be a decision by P&GE to continue with the same system. I
23 think what you'll see from the Holtec side that the proposal that will be presented will
24 provide a number of options for PG&E that could move from the thirty-two assembly
25 multi-purpose canister to the thirty-seven assembly which would involve a new transfer
26 casks that still fits within the seismic restraints. Also the licensing changes that would
27 be performed as part of that shorten the duration of fuel in the spent fuel pools from
28 the current five to seven years down to a two-year period of time. It'll be a solid
29 proposal Holtec puts together. (ends: 08:03:57)

30
31 (08:03:58)

32 DCISC CONSULTANT McWHORTER: And these are options that Holtec already has on
33 the shelf so to speak, and at a reasonably short time to licensing that would be
34 expected?

35
36 (08:04:07)

37 MR. STRICKLAND: Yes, there actually, there's a number of the these that are going
38 through the licensing with the Nuclear Regulatory Commission right now. (08:04:16)

39
40 (08:14:38)

41 MR. STRICKLAND: What you're gonna see is that the proposal that PG&E will get for
42 the future storage of fuel would be that you would move to up to thirty-seven fuel
43 assemblies that were high-burnup fuel, and that the new thermal analysis that is
44 performed today allows for higher heat loads in each of the multi-purpose canisters

1 while at the same time—being able to with that higher heat load—reduce the amount
2 of time that spent fuel is in the storage pools. And so, as part of this proposal, what
3 you'll end up seeing is that uh, it will be recommended that Diablo not wait until they
4 cease operation to start moving spent nuclear fuel; that in a matter of three, four years
5 from now that you start the transition of moving fuel from wet to dry storage. That way
6 you also limit the build-up of fuel that uh, fuel inventory in the pools. But that way it
7 also then helps shorten the overall duration for how long it takes to go from a plant that
8 no longer operates to a plant that's got all the spent fuel out of the wet storage and can
9 move into a smooth transition into full decommissioning. That help? (ends 08:15:58)

10
11 (08:25:11)

12 MR. STRICKLAND: I know that, um, that one of the current license submittals that
13 Holtec has before the NRC today actually brings that duration in the pool down to just
14 over a year and so that...and Holtec is not the only company...you look at Orano, that
15 they're doing something similar with being able to reduce the durations of time in the
16 pool. To me, it's good progress. (ends 08:25:38)

17
18 Q 22: Do you recommend that the CPUC add another \$109 million to your estimated ratepayer
19 savings from reducing cooldown times, in order to reflect Mr. Strickland's mention of "license
20 amendments in place that are being processed for Holtec products today that have that time
21 frame down to one to two years out of the reactor" and his suggestion that Orano (previously
22 called TN Americas) is "doing something similar"?

23 A22: No. That seems premature, even though it appears consistent with the "preliminary
24 assessment" Mr. Strickland was given in his August 2016 visit to Holtec while still a PG&E
25 employee. It would be prudent to wait to see what the different vendors propose to PG&E, and
26 what selection PG&E makes. On June 19, 2019 the NRC staff held a public pre-submittal
27 meeting to discuss PG&E's plan to submit a post-shutdown decommissioning activities report,
28 an irradiated fuel management plan, and a site-specific decommissioning cost estimate. PG&E
29 mentioned its upcoming vendor RFP, and described its ultimate objective once again as the
30 shortest SNF wet cooling times "technically feasible."

31

1 **XIII. PG&E'S CONDUCT.**

2

3 Q23: What is your reaction to the way in which PG&E has conducted itself in managing its SNF
4 responsibilities at DCNPP, including preparation of the 2018 DCE?

5 A23: I share the assessment attributed to Governor Newsom in the March 18, 2019 edition of
6 the New York Times: "They have simply been caught red-handed over and over again, lying,
7 manipulating or misleading the public ... They cannot be trusted." In the case of SNF, it should
8 be remembered, PG&E is steward to some of the most lethal substances known to humanity—
9 and the DCNPP spent fuel pools represent one of the largest concentrations of radioactive
10 source term found in the United States. PG&E is the only convicted felon in the U.S. legally
11 empowered with such responsibility, an unnerving circumstance whose safety implications
12 should compel intense regulatory oversight.

13 PG&E's application in this proceeding acknowledges that the California Nuclear Facility
14 Decommissioning Act of 1985 requires that the 2018 DCE "take account of changes in
15 technology and regulation of nuclear decommissioning."⁴⁴ Yet there is no discussion of PG&E's
16 knowledge about new cask designs, as reflected in Plan 36, or about the NRC approvals of
17 radically reduced wet cooling times, as emphasized by the NRC's Decommissioning Branch Chief
18 at the DCDEP's October 24, 2018 public meeting. I consider this deception by concealment.

19 PG&E's unilateral decision to cancel all further pre-shutdown transfers of SNF to dry
20 storage – announced publicly in its December 13, 2018 filing in this proceeding, but

⁴⁴ Cal. Pub. Util. Code §8327, cited in A.18-12-008, PG&E Application, p. 10.

1 communicated to its Westinghouse contractor in early July 2018,⁴⁵ more than five months
2 before PG&E’s CPUC-required coordination/collaboration with the CEC could even muster its
3 first meeting – is an affront to state government. By its own tally, PG&E’s cancellations will
4 increase the number of DCNPP casks still to be loaded at shutdown by 25%, from 64 to 80. No
5 defensible interpretation of the Atomic Energy Act can excuse PG&E’s decade-long defiance of
6 guidance from both state commissions to reduce the SNF density of the pools “while
7 maintaining compliance with NRC cask and pool spent fuel storage requirements.”⁴⁶ But PG&E
8 has behaved as if perfunctory compliance with federal requirements is sufficient and state
9 direction can be ignored with impunity. As a result, the state’s cautious attempt to achieve
10 some unknowable increment of improved safety margin – with costs likely reimbursed by the
11 federal government – has been successfully thwarted.

12 PG&E’s maneuvers may well have checkmated state government’s pre-shutdown SNF
13 transfer policy, but DCNPP’s post-shutdown SNF challenges could abruptly begin much sooner
14 than contemplated by the DCE. Although the timing of DCNPP’s retirement is not presently an
15 issue in this proceeding, the CPUC’s D.19-02-023 and data responses received by A4NR from
16 PG&E severely undermine the credibility (and prudence) of PG&E’s representation, cited by the
17 February 14, 2019 Assigned Commissioner’s Scoping Memo and Ruling, that the company “has
18 no plans to ... modify the retirement path agreed to in the Joint Proposal and approved by the
19 Commission in D.18-01-022.”⁴⁷

⁴⁵ NuclearDecomCostTri2018_DR_A4NR_001-Q14_Attch_7-CONF, p. 4.

⁴⁶ CEC, “An Assessment of California’s Nuclear Power Plants: AB 1632 Report,” adopted November 20, 2008, p. 15.

⁴⁷ A.18-12-008, Assigned Commissioner’s Scoping Memo and Ruling, February 14, 2019, pp. 6 – 7.

1 According to PG&E’s data responses, DCNPP will experience above-market costs of \$523
2 million in 2019 (up from \$410 million in 2018) and Community Choice Aggregation (“CCA”) and
3 Direct Access (“DA”) will supply 53% of the load in its service territory (up from 41% in 2018)
4 and pay a proportionate share of such above-market costs. The implications of these
5 admissions are stark: (1) DCNPP represents a substantial portion of PG&E’s above-market
6 generation costs; (2) while the Joint Proposal cited uncertainty about bundled customer load as
7 a principal reason for DCNPP’s retirement, the 2019 magnitude exceeds the Joint Proposal’s
8 projection of bundled load decay in 2025; (3) none of the CCAs serving departed PG&E load
9 include nuclear-generated electricity in their portfolios, and most are legally prevented from
10 doing so; (4) a plant in a highly politicized environment that is dependent upon surcharges on
11 non-customers for the majority of its very substantial above-market costs is a stranded asset of
12 doubtful viability; and (5) these facts will not go unnoticed in PG&E’s bankruptcy proceeding.

13 A4NR will explore the reasonableness of DCNPP’s 2020-22 revenue requirement in the
14 PG&E general rate case, A.18-12-009.

15 Q24: Does this conclude your testimony?

16 A24: Yes, it does. A4NR will make a formal recommendation to the Commission in its
17 Opening Brief.

Appendix A

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

1 QUALIFICATIONS OF JOHN L. GEESMAN

2 John L. Geesman is an attorney with the Oakland law firm, Dickson Geesman LLP, and a
3 member in good standing of the California State Bar.

4 Mr. Geesman served as a member of the California Energy Commission from 2002 to
5 2008, and was the agency's Executive Director from 1979 to 1983. Between his two tours at the
6 Energy Commission, Mr. Geesman spent nineteen years as an investment banker focused on
7 the U.S. bond markets and served as a financial advisor to municipal electric utilities throughout
8 the West.

9 Mr. Geesman has a long history of providing leadership on issues related to resource
10 planning, environmental policy, financial management, and risk practices. This is demonstrated
11 by his service in numerous executive capacities, including stints as:

- 12 • Co-Chair of the American Council on Renewable Energy;
- 13 • Chairman of the California Power Exchange;
- 14 • President of the Board of Directors of The Utility Reform Network (nee Toward Utility
15 Rate Normalization);
- 16 • Member of the Governing Board of the California Independent System Operator; and,
- 17 • Chairman of the California Managed Risk Medical Insurance Board.

18 Mr. Geesman has previously testified as an expert witness before the California Public
19 Utilities Commission.

20 Mr. Geesman is a graduate of Yale College and the University of California Berkeley
21 School of Law.

Appendix B

1

2

BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Pacific Gas and Electric Company)
In the 2018 Nuclear Decommissioning Cost) Application 18-12-008
Triennial Proceeding.) (Filed December 13, 2018)
)
_____) (U 39 E)

**ALLIANCE FOR NUCLEAR RESPONSIBILITY'S
PROTEST**

JOHN L. GEESMAN

DICKSON GEESMAN LLP
1970 Broadway, Suite 1045
Oakland, CA 94612
Telephone: (510) 919-4220
E-Mail: john@dicksongeesman.com

Date: January 11, 2019

Attorney for
ALLIANCE FOR NUCLEAR RESPONSIBILITY

I. INTRODUCTION.

Pursuant to Rule 2.6 of the California Public Utilities Commission (“Commission” or “CPUC”) Rules of Practice and Procedure, the Alliance for Nuclear Responsibility (“A4NR”) respectfully submits its Protest of the Application of Pacific Gas and Electric Company (“PG&E”) in the 2018 Nuclear Decommissioning Triennial Cost Proceeding (“NDCTP”). A4NR represents ratepayer interests on nuclear energy issues before California and Federal regulatory agencies, the Legislature, and Congress, and has intervened frequently in Commission proceedings involving the Diablo Canyon Nuclear Power Plant (“DCNPP”).

Based on its initial review of PG&E’s Application, A4NR objects to the Commission granting a portion of the authority sought by PG&E regarding the projected costs of DCNPP spent nuclear fuel storage because of PG&E’s failure to comply with D.17-05-013 (approving PG&E’s 2017 general rate case) and D.17-05-020. D.17-05-013 adopted a joint settlement agreement requiring PG&E to conduct

a study, as part of its detailed Diablo Canyon site specific decommissioning study specified in Section 5.4.1 of the Joint Proposal, of the options for post shut-down expedited transfer of spent nuclear fuel to dry cask storage, coordinates such studies with the California Energy Commission (CEC), and evaluates the CEC’s recommendations and input in good faith.¹

The fore-mentioned “Joint Proposal” (for the retirement of Diablo Canyon), of which A4NR was a signatory, specified that this site-specific decommissioning study would update PG&E’s 2015 NDCTP forecast and incorporate the costs of

¹ A.15-09-001 Settlement Agreement, Section 3.2.3.1.3. A4NR was one of 15 settling parties.

a plan for expedited post-shut-down transfer of spent fuel to Dry Cask Storage as promptly as is technically feasible using the transfer schedules implemented at the San Onofre Nuclear Generating Station as a benchmark for comparison and provided PG&E will also provide the plan to the CEC, collaborate with the CEC, and evaluate the CEC's comments and input.²

D.17-05-020, at A4NR's urging in PG&E's 2015 NDCTP, broadened the scope of this contemplated review to include an evaluation of the costs, benefits, and feasibility of a pre-shutdown acceleration of dry cask loading of spent nuclear fuel at DCNPP.³

This long-awaited "study" or "plan" is described in testimony filed simultaneously with this Application, but there is no mention of any PG&E coordination or collaboration with the CEC, nor any comments or input received by PG&E from the CEC, nor any evaluation by PG&E of such comments or input from the CEC.

II. A DECADE OF FOOTDRAGGING.

PG&E's apparent choice to disregard the CEC collaboration/coordination requirements of D.17-05-013 and D.17-05-020 is the latest episode in a ten-year history of PG&E non-responsiveness to direction by this Commission and the CEC to accelerate the transfer of spent nuclear fuel to dry casks. D.14-08-032, approving PG&E's 2014 general rate case, had previously directed PG&E to file with its 2017 general rate case "a satisfactory plan to comply with California Energy Commission recommendations regarding the transfer of spent fuel to dry cask storage in its Assembly Bill 1632 Report" and conditioned approval of PG&E's capital

² A.16-08-006, Attachment A to Application of PG&E, Section 5.4.1.

³ D.17-05-020, OP 5, pp. 51 – 52.

investment in completing the DCNPP storage pads on meeting this requirement.⁴ The recommendation in the CEC's Assembly Bill 1632 Report, originally made in 2008 to both PG&E and Southern California Edison, was unequivocal: "PG&E and SCE should return their spent fuel pools to open racking arrangements as soon as feasible, while maintaining compliance with NRC cask and pool spent fuel storage requirements, and report to the Energy Commission on their progress in doing so."⁵ In the wake of seven years of PG&E resistance, the CEC's 2015 Integrated Energy Policy Report observed:

According to PG&E, it plans to complete the construction of eight dry casks in 2015 and 12 casks in 2016, allowing PG&E to approach the high density 1 x 4 loading pattern. Beginning in 2018, PG&E plans to move spent fuel from the pools to dry casks at a rate that will maintain this loading pattern. The CPUC should not allow PG&E to recover from ratepayers the additional costs associated with its failure to expedite the movement of spent fuel from the pool to dry casks. In addition, PG&E should file annual reports with the CPUC and the Energy Commission on its efforts to comply with California regulators' directives in this area, and its estimate of the costs implications.⁶ (emphasis added)

Because PG&E and other nuclear power plant owners have been successful in recovering most of their spent fuel management costs from the federal government through breach-of-contract litigation (or threat thereof), the CEC's recommendation regarding ratepayer exposure is probably best understood as focused on liability for any unreimbursed costs.

In addition to CPUC and CEC direction to expedite the transfer of spent nuclear fuel to

⁴ D.14-08-032, OP 29.b.

⁵ CEC, "An Assessment of California's Nuclear Power Plants: AB 1632 Report," adopted November 20, 2008, p. 15.

⁶ CEC 2015 Integrated Energy Policy Report, p. 186.

dry casks, PG&E received similar advice from U.S. Senator Dianne Feinstein in the aftermath of the Fukushima Daiichi catastrophe. As reported March 30, 2011 in the *San Francisco Chronicle*:

Fresh from a tour of California's two active nuclear power plants at Diablo Canyon and San Onofre, Sen. Dianne Feinstein said Wednesday that 'what jumps out at you' is that some spent nuclear fuel rods are stored in pools similar to the ones leaking radiation at a crippled Japanese reactor. Feinstein, at a Senate subcommittee meeting in Washington, called for a 'rethinking' of how spent fuel is managed at the two California plants and at other nuclear plants in the United States ... 'I have a hard time understanding why the Nuclear Regulatory Commission has not mandated more rapid transfer of spent fuel to dry casks,' Feinstein said. 'There were no problems with dry cask storage at Dai-ichi. To me, that suggests we should at least consider a policy that would encourage quicker movement of spent fuel to dry cask storage.'⁷

The response of local community leaders to Fukushima Daiichi also focused on PG&E's management of spent fuel at DCNPP. As former San Luis Obispo County Supervisor Frank Mecham recently reminded PG&E executive Tom Jones at the October 24, 2018 public meeting of the DCNPP Decommissioning Engagement Panel (of which Mecham is a member):

MR. MECHAM: Just quickly, and, Tom, this may be more for you, I'm not sure, but I remember when I was on the board and we had a presentation by PG&E, I think that there was a strong emphasis to get as much as you can in the dry cask as soon as possible. Is that not true?

MR. JONES: Correct. So, specifically, the San Luis Obispo County Board of Supervisors had asked Pacific Gas & Electric Company to expedite fuel loading as quickly as possible, and this was post Fukushima. So we had planned for modest loading campaigns of about four casks a year and we accelerated that to get to the minimum levels of fuel allowed in the spent fuel pool. There's a regulation called B5 Bravo. Basically, you have four old fuel assemblies for every one new one. They help absorb heat that way. So we got down to those minimum levels where we are today. So we did much larger loading campaigns. We loaded 10 casks for each evolution. Keep in mind the casks take about

⁷ <http://www.sfgate.com/politics/article/Nuclear-energy-Dianne-Feinstein-seeks-precautions-2376950.php>

two years from the date you sign the contract to where one shows up that's manufactured at your site.⁸

As Mecham added, “Yucca Mountain's been kicked around forever, but if, in fact, that were to happen, why would anyone want to leave things in spent fuel pools as opposed to dry cask if they'd have to get it into dry cask to move it?”⁹ On July 16, 2011, the *San Luis Obispo Tribune* had editorially urged the NRC to require “an acceleration of the transfer of waste out of pools and into dry casks” and commended PG&E for “expediting the transfer of some of its spent fuel. In fact, it’s renegotiating a contract with its supplier to speed up delivery of some dry casks.”¹⁰ By May 19, 2013 however, the *Tribune’s* praise of PG&E had been replaced by editorial disappointment:

In March 2011, *Tribune* environmental reporter David Sneed asked plant manager Jim Becker whether PG&E would consider accelerating transfer of spent fuel from storage pools to dry casks.

‘It’s a great question,’ he said then. ‘We’ll need to study it.’

A few months later, we reported that PG&E did indeed plan to reduce density inside the pools by about 45 percent over the next five years to about 600 assemblies per pool. We commended the utility for taking that step.

But when we recently asked for an update, we found there’s been no accelerated effort to move spent fuel into dry casks.

In 2011, there were about 2,170 spent fuel assemblies in the two pools — 1,072 fuel assemblies in one pool, and 1,104 in the other.

Today, there’s a combined total of 2,116 assemblies in the pools, though that will drop to 1,924 following a transfer scheduled for this summer.¹¹

⁸ PG&E transcript of October 24, 2018 meeting of the DCNPP Decommissioning Engagement Panel, p. 50, lines 4 – 24.

⁹ *Id.*, p. 51, lines 3 – 7.

¹⁰ <https://www.sanluisobispo.com/opinion/editorials/article39157806.html>

¹¹ <https://www.sanluisobispo.com/opinion/editorials/article39444711.html>

III. PG&E's SPENT FUEL PLAN CHOSE TO GO ROGUE.¹²

Notwithstanding the unmistakable specificity of D.17-05-013 and D.17-05-020, or the legally binding agreements it entered to settle A.15-09-001 and formulate the A.16-08-006 Joint Proposal, PG&E elected to avoid engagement with the CEC in crafting the expedited spent fuel transfer plan it filed December 13, 2018. PG&E's testimony submitted in the 2018 NDCTP to explain its "study" simply declares: "In 2017, PG&E evaluated options for expedited transfer of SNF and assessed the cost-effectiveness and regulatory and operational risks and benefits associated with these options."¹³ Having unilaterally severed the Commission-ordered tether of collaboration with the CEC, PG&E has steered its new spent fuel plan in a direction 180° opposite from the Assembly Bill 1632 Report recommendations and the utility's subsequent public assurances. Rather than reducing the number of spent fuel assemblies stored in the DCNPP pools, PG&E now intends a substantial increase:

PG&E's assessment of the feasibility, duration and cost of accelerating SNF loading to dry cask storage pre- and post-shutdown reveals that **the most cost-effective strategy is to eliminate SNF loading campaigns between now and permanent cessation of operations and to implement one loading campaign starting in 2030** and ending within seven years after Unit 2 shutdown.¹⁴ (emphasis added)

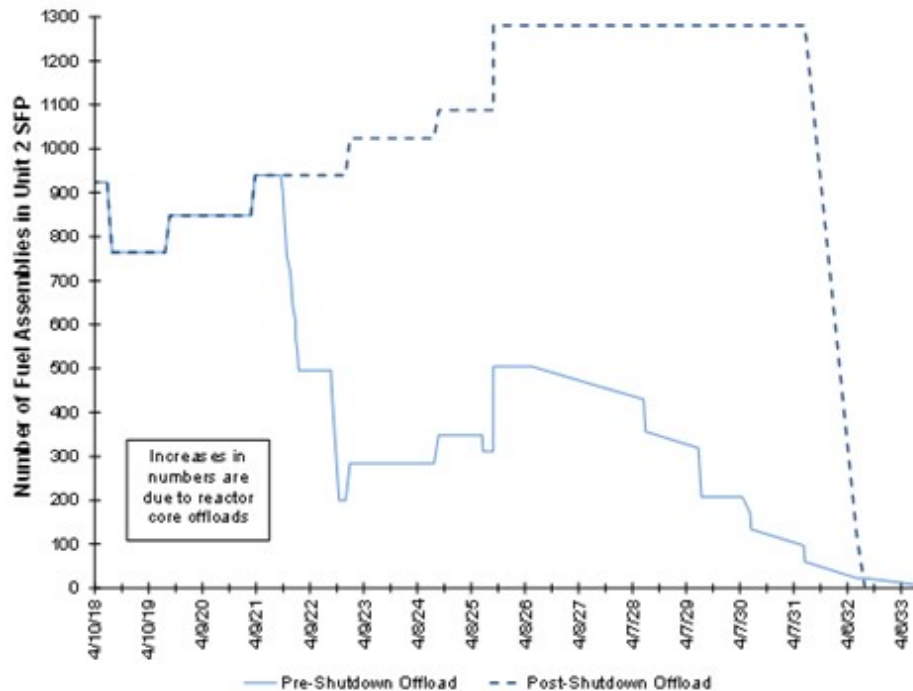
PG&E's 2018 NDCTP testimony provides the following graphic illustration of the impact on the number of spent fuel assemblies in the Unit 2 pool under what PG&E labels a "Pre-Shutdown Offload" versus a "Post-Shutdown Offload":

¹² "To cease to follow orders; to act on one's own, usually against expectation or instruction. To pursue one's own interests." <https://www.urbandictionary.com/define.php?term=go%20rogue>

¹³ A.18-12-008, PG&E Prepared Testimony, Volume 1, p. 6 -- 8, lines 4 – 6.

¹⁴ *Id.*, p. 6 – 1, lines 18 – 22.

**FIGURE 6-2
SPENT FUEL POOL OFFLOAD EXAMPLE
COMPARING PRE-SHUTDOWN VERSUS POST-OFFLOAD¹⁵**



While the variance between the two lines on PG&E’s graph is stark, even greater perspective on the significance of PG&E’s new strategy can be gained from past reference points:

- CEC 2008 target (original design capacity before re-racking): 270¹⁶
- October 2011 inventory reported by PG&E to DCISC: 1,096¹⁷
- DCISC 2013 then-current estimate: ~1,024¹⁸

¹⁵ *Id.*, p. 6 – 9.

¹⁶ CEC 2017 Integrated Energy Policy Report, Appendix A, Table 36, p. 4.

¹⁷ DCISC 22nd Annual Report, p. 370 of pdf. This was the Unit 2 inventory level at the time of Senator Feinstein’s comments, the San Luis Obispo County Board of Supervisors recommendation, and the San Luis Obispo *Register’s* initial editorial.

¹⁸ DCISC 24th Annual Report, pp.243 and 735 of pdf. The DCISC’s 24th Annual Report stated “The Independent Spent Fuel Storage Installation (ISFSI) **provides a safer method for storage of used nuclear fuel assemblies than do the Spent Fuel Pools**” (at pp. 244, 626, and 632); commended PG&E for having “reached the decision to

- PG&E’s 2014 announced target to achieve in 2016: 736¹⁹
- June 2016 inventory on day Joint Proposal announced: 1,032²⁰
- January 2017 CEC understanding of PG&E’s then-current “plan”: 772²¹

PG&E was ordered by this Commission to file with its 2017 general rate case a satisfactory plan to implement the CEC’s Assembly Bill 1632 Report recommendation (“return ... to open racking arrangements as soon as feasible, while maintaining compliance with NRC cask and pool spent fuel storage requirements”). Instead of complying, PG&E entered into a settlement agreement (and a Joint Proposal) which obligated it to “collaborate” and “coordinate” with the CEC. PG&E chose to ignore that obligation and instead has embarked upon a course to **increase** its dependence on wet storage far beyond the levels that triggered the CEC recommendation in 2008; the post-Fukushima concerns of Senator Feinstein, the Board of Supervisors, and the local newspaper in 2011; and even the utility’s modest targets of 2014 and 2016. **And the company intends to maintain these elevated levels until 2032.**

IV. EVEN PG&E’S CONSULTANT BALKED AT WET COOLING ASSUMPTION.

In September 2018, PG&E retained High Bridge Associates (“HBA”) to “perform an independent review” of the DCNPP site-specific decommissioning plan’s “execution schedule

procure a significant number of dry casks and **to offload fuel as rapidly as possible** so it could reach the minimum fuel inventory allowed by current regulations” (at p. 246); and observed “The State of California is interested in reducing the density of fuel bundles in the Spent Fuel Pool” (at p. 629). (emphases added)

¹⁹ *Id.*, p. 396.

²⁰ DCISC 26th Annual Report, p. 457 of pdf.

²¹ CEC 2016 Integrated Energy Policy Report Update, p. C-6, footnote 427: “The current dry fuel storage plan is based upon maintaining about 772 assemblies in the spent fuel pool to accommodate core offloads.”

and selected portions of the project cost estimate.”²² The HBA Report was included as an attachment to PG&E’s 2018 NDCTP filing, and it characterized PG&E’s site-specific plan as “atypically long compared to other recently completed or currently planned nuclear plant decommissioning projects resulting in higher total project costs than expected.”²³ As HBA summarized its findings,

The most significant finding is the overall fourteen (14) year schedule duration for the decommissioning work from shutdown of Unit 1 to the end of site restoration is longer than the current industry norm. This duration is **primarily due to a longer than expected period for fuel cool down** and other activities that could be managed so they are off the schedule critical path.²⁴ (emphasis added)

Noting that—compared to nuclear industry practice—the elapsed time assumed by PG&E before all spent fuel is in dry casks “is near the high end of all planned and executed decommissioning schedules,”²⁵ HBA recommended “PG&E should challenge their (sic) assumptions about the duration after reactor shutdown and defueling until ... start of fuel movement to the onsite ISFSI ...”²⁶ HBA provided a “much more aggressive plan yielding an overall duration of ten (10) years, based on recent experience with **much shorter periods for spent fuel cooling and transfer to the onsite ISFSI,**” and characterized such a revised schedule as “achievable.”²⁷ (emphasis added)

²² A.18-12-008, PG&E Prepared Testimony, Attachments Supporting Chapter 1, Volume 2, Attachment A, (“HBA Report”) p.1 .

²³ *Id.*, p. 3.

²⁴ *Id.*, p. 9.

²⁵ *Id.*, p. 12.

²⁶ *Id.*, p. 15.

²⁷ *Id.*, p. 17.

The HBA Report accepted PG&E’s explanation that its present license restricts it to “using site-specific licensed casks with a limited thermal capacity” and that DCNPP “cannot utilize the general license casks utilized by most nuclear stations,” but with a notable (and CEC-review relevant) caveat:

While HBA accepts this difference, **no calculation-based model of cask loading has been presented for HBA to review and therefore HBA cannot establish the validity of this assertion.** The PG&E assumed duration for the Spent Fuel Cooling and Transfer to Dry Storage window of seven (7) years in the DCPD DSS is longer than comparative averages as shown in Figure IV.1.1. HBA experience with other decommissioning plans would indicate that this period could be reduced substantially ... **Because HBA was unable to validate the seven (7) year duration through technical review or benchmarking, it is recommended that PG&E pursue further analysis of the required duration for the spent fuel cooling window.** In addition, as PG&E states in its analysis, significant cost savings may be possible to achieve if future dry cask technology results in a dry cask design that is capable of supporting a greater heat load than current cask technology allows... It is recommended that PG&E engage in conversations with nuclear fuel cask vendors on this topic **and remain engaged throughout the entire pre-shutdown period** with the goal of further reducing duration for the fuel cooldown period.²⁸ (emphass added)

The HBA Report estimated an \$8.89 million/month savings from reducing the duration of the spent fuel cooling and transfer period, attributing approximately \$2.4 million/month to “security costs alone.”²⁹

V. NRC DECOMMISSIONING BRANCH CHIEF POINTS TO 3 YEARS.

PG&E invited Bruce Watson, the Decommissioning Branch Chief at the NRC, to make a presentation to the October 24, 2018 public meeting of the DCNPP Decommissioning

²⁸ *Id.*, pp. 20 – 21.

²⁹ *Id.*, p. 32.

Engagement Panel. His presentation provided some quantification of the wet spent fuel cooldown period associated with current cask technology and regulation, which he elaborated on in response to a question from panel member Linda Seeley:

MS. SEELEY: Okay. And then to my understanding, it was that they had to keep this spent fuel, especially high burn-up fuel, in the pools for, like, five to seven years.

MR. WATSON: That was what the casks were licensed for. The actual cask that the fuel gets transferred into, the fuel had to be cooled to a certain point to meet that criteria. Okay. Since then, at one point, it used to take about five to seven years to get there. Right now it's three because there's some upgraded casks, licensed casks that will allow you to move the fuel at a certainly higher -- slightly higher heat load. Doesn't have to be high burn-up fuel, but the heat load allowed in these casks is a little higher and so they can move it over in three years. So it's a function of the container it's going in and the actual heat load or heat disbursement (sic) from the fuel bundle.³⁰

In fact, in early 2018 the NRC staff recommended approval of a 2-year wet cooldown period to accommodate the accelerated transfer of high burn-up fuel assemblies from Vermont Yankee's final core offload.³¹

VI. THE EFFECT OF PG&E'S APPLICATION ON A4NR.

As a party to the A.15-09-001 settlement and a signatory of the A.16-08-006 Joint Proposal, A4NR is directly impacted by the breaches of these agreements made clear by PG&E's application in this proceeding. A4NR is hardly alone in experiencing first-hand PG&E's scofflaw culture, however, and the larger effect of PG&E's refusal to evaluate expedited transfer of spent fuel to casks as directed by D.17-05-013 and D.17-05-020 is to A4NR as a representative

³⁰ PG&E transcript of October 24, 2018 meeting of the DCNPP Decommissioning Engagement Panel, p. 41, line 19 – p. 42, line 10.

³¹ NRC Docket Nos. 51-271, 72-59, and 72-1014, Safety Evaluation Report, February 2, 2018.

of ratepayer interests. Using PG&E's estimate of \$54.7 million in annual savings attributed to moving spent fuel from wet storage to dry casks, the consequence of reducing the assumed wet cooldown period from seven years to two or three is \$219 -- \$274 million of ratepayer savings. Using HBA's estimated annual savings of \$106.68 million, the difference is \$427 -- \$533 million. PG&E's refusal to engage with the CEC to conduct a properly robust, calculation-based assessment of accelerated fuel transfer has significant implications for ratepayers. These implications are only aggravated by PG&E's resort to licensure-based excuses, which ignore the frequency of its own self-initiated DCNPP license amendment requests and the fact that its current cask vendor began the (successful) licensing process for a 3-year cask as far back as 2011.³²

And while A4NR recognizes the federal preemption of radiological safety issues at DCNPP, it goes without saying that this Commission has a considerable jurisdictional interest in the economic consequences to PG&E and its ratepayers from any large-scale radiation releases (e.g., land contamination, population dislocation, etc.) stemming from adverse incidents at the DCNPP spent fuel pools.

A4NR anticipates raising other DCNPP-related issues after it has completed discovery, and envisions presenting testimony supporting this Protest in the evidentiary hearings

³² "This LAR proposes heat load patterns for the HI-STORM FW to accommodate plants that have loaded canisters with predominantly low decay heat fuel assemblies over the years, and have thus substantially depleted the number of cold fuel assemblies remaining in their pool inventory. This LAR has also been prompted by the cataclysmic events at Fukushima Daiichi which indicates that a more rapid movement of used fuel in wet storage to dry storage may be the preferred approach." <https://holtecinternational.com/2011/06/24/three-years/#more-1916>

anticipated in PG&E's application. A4NR does not object to PG&E's statement on the proposed category, need for hearing, issues to be considered, or proposed schedule. A4NR specifically requests that the Scoping Memorandum in this proceeding contain an Order to Show Cause why PG&E and its Senior Vice President of Energy Supply and Policy, Steven E. Malnight (who signed the A.15-09-001 settlement agreement on behalf of PG&E), should not be found in contempt of this Commission for their seemingly willful refusal to comply with D.17-05-013 and D.17-05-020.

The undersigned will be A4NR's principal contact in this proceeding, but A4NR also asks that the following individuals be placed in the "*information only*" category of the Service List:

Rochelle Becker
rochelle@a4nr.org

David Weisman
david@a4nr.org

Respectfully submitted,

By: /s/ John L. Geesman

JOHN L. GEESMAN
DICKSON GEESMAN LLP

Date: January 11, 2019

Attorney for
ALLIANCE FOR NUCLEAR RESPONSIBILITY