

<b>DOCKETED</b>	
<b>Docket Number:</b>	19-IEPR-01
<b>Project Title:</b>	General/Scope
<b>TN #:</b>	227198
<b>Document Title:</b>	Alliance for Nuclear Responsibility Comments CEC review of expedited transfer of Diablo Canyon spent nuclear fuel to dry cask storage
<b>Description:</b>	N/A
<b>Filer:</b>	System
<b>Organization:</b>	Alliance for Nuclear Responsibility
<b>Submitter Role:</b>	Public
<b>Submission Date:</b>	2/28/2019 8:47:46 PM
<b>Docketed Date:</b>	3/1/2019

*Comment Received From: Alliance for Nuclear Responsibility  
Submitted On: 2/28/2019  
Docket Number: 19-IEPR-01*

## **CEC review of expedited transfer of Diablo Canyon spent nuclear fuel to dry cask storage**

As discussed in Appendix A of the 2017 IEPR, Energy Commission review of PG&E's plan for expedited transfer of Diablo Canyon spent nuclear fuel in the 2018 IEPR Update was to be "dependent on PG&E's 2018 NDCTP filing schedule and the degree of early communication and collaboration between Energy Commission and PG&E staff regarding these items." The Alliance for Nuclear Responsibility protested PG&E's 2018 NDCTP filing (see attachment) because no collaboration with or review by the CEC occurred and PG&E's suspension of transfers until 2032 conflicts with recommendations provided by the CEC since 2008 and the CPUC since 2014. For the reasons stated in the Alliance's Protest, a full technical assessment of PG&E's Diablo Canyon spent nuclear fuel plans should occur in the public forum provided by the 2019 IEPR.

*Additional submitted attachment is included below.*

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)
	)	
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**ALLIANCE FOR NUCLEAR RESPONSIBILITY'S  
PROTEST**

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## **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.<sup>1</sup>

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

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<sup>1</sup> 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.<sup>2</sup>

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.<sup>3</sup>

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

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

<sup>3</sup> D.17-05-020, OP 5, pp. 51 – 52.

investment in completing the DCNPP storage pads on meeting this requirement.<sup>4</sup> 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."<sup>5</sup> 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.<sup>6</sup> (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

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<sup>4</sup> D.14-08-032, OP 29.b.

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

<sup>6</sup> 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.'<sup>7</sup>

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

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<sup>7</sup> <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.<sup>8</sup>

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?”<sup>9</sup> 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.”<sup>10</sup> 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.<sup>11</sup>

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

<sup>9</sup> *Id.*, p. 51, lines 3 – 7.

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

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



### III. PG&E's SPENT FUEL PLAN CHOSE TO GO ROGUE.<sup>12</sup>

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."<sup>13</sup> 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.<sup>14</sup> (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":

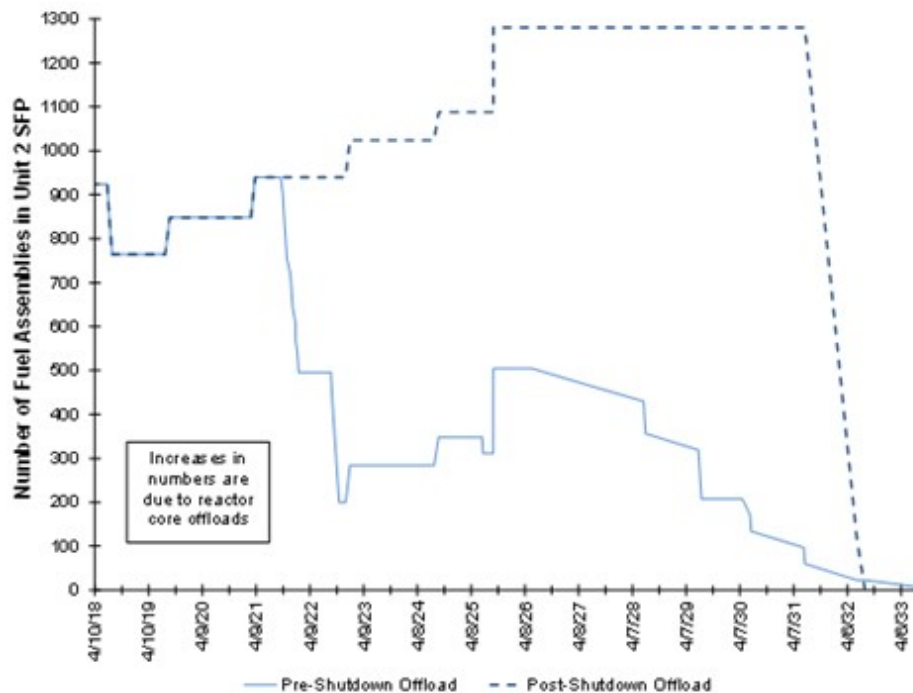
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<sup>12</sup> "To cease to follow orders; to act on one's own, usually against expectation or instruction. To pursue one's own interests." <https://www.urbandictionary.com/define.php?term=go%20rogue>

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

<sup>14</sup> *Id.*, p. 6 – 1, lines 18 – 22.

**FIGURE 6-2  
SPENT FUEL POOL OFFLOAD EXAMPLE  
COMPARING PRE-SHUTDOWN VERSUS POST-OFFLOAD<sup>15</sup>**



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): 270<sup>16</sup>
- October 2011 inventory reported by PG&E to DCISC: 1,096<sup>17</sup>
- DCISC 2013 then-current estimate: ~1,024<sup>18</sup>

<sup>15</sup> *Id.*, p. 6 – 9.

<sup>16</sup> CEC 2017 Integrated Energy Policy Report, Appendix A, Table 36, p. 4.

<sup>17</sup> DCISC 22<sup>nd</sup> 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.

<sup>18</sup> DCISC 24<sup>th</sup> Annual Report, pp.243 and 735 of pdf. The DCISC’s 24<sup>th</sup> 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: 736<sup>19</sup>
- June 2016 inventory on day Joint Proposal announced: 1,032<sup>20</sup>
- January 2017 CEC understanding of PG&E’s then-current “plan”: 772<sup>21</sup>

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

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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)

<sup>19</sup> *Id.*, p. 396.

<sup>20</sup> DCISC 26<sup>th</sup> Annual Report, p. 457 of pdf.

<sup>21</sup> 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.”<sup>22</sup> 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.”<sup>23</sup> 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.<sup>24</sup> (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,”<sup>25</sup> 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 ...”<sup>26</sup> 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.”<sup>27</sup> (emphasis added)

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

<sup>23</sup> *Id.*, p. 3.

<sup>24</sup> *Id.*, p. 9.

<sup>25</sup> *Id.*, p. 12.

<sup>26</sup> *Id.*, p. 15.

<sup>27</sup> *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.<sup>28</sup> (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.”<sup>29</sup>

## **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

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<sup>28</sup> *Id.*, pp. 20 – 21.

<sup>29</sup> *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.<sup>30</sup>

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.<sup>31</sup>

## **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

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

<sup>31</sup> 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.<sup>32</sup>

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

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<sup>32</sup> "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:

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Respectfully submitted,

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