

MEMORANDUM

Date: 13th January 2026

From: Mark Kirk
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To: The Diablo Canyon Independent Safety Committee (DCISC)

Subj: Review of information on vessel embrittlement for Diablo Canyon Unit 1 referenced in the NRC's 2025 safety evaluation of PG&E's 2023 License Renewal Application

On 17 November 2025 DCISC Consultant Rick McWhorter sent me an e-mail stating, in part the following:

"The DCISC has been carrying an item on its open items list for reviewing any new information on vessel embrittlement coming out of DCP's license renewal activities. In June, the NRC issued its Safety Evaluation Report for the license renewal (ML25153A508), and it contains a section (4.2) regarding vessel embrittlement.

At the Committee's October Public Meeting, the members agreed to request you to review this section of the SER and see if there is anything that should be considered as new or additional information on vessel embrittlement which was not previously known or reviewed by you and the DCISC. If there is nothing new, then a simple email response stating so would be appreciated. If there is something new, the Committee would like to get a letter report or other document from you outlining what is new and what may be the implications of the new information."

In response to that request, I have reviewed the following documents:

- **NRC-SE**: Section 4.2 of the NRC Safety Evaluation dated 4 June 2025. The safety evaluation (SE) itself can be found at NRC ML25153A508. The cover letter for the SE can be found at the NRC's ADAMS ML25139A613.
- **LRA**: PG&E's original license renewal application, dated 7 November 2023, which can be found at the NRC's ADAMS ML23311A154
- **Am1**: Amendment 1 to the **LRA**, dated 14 October 2024, which can be found at the NRC's ADAMS ML24289A118.

In my previous work for the DCISC (see <https://www.dcisc.org/download/library/topical-library/report-part-2-evaluation-of-diablo-canyon-unit-1-embrittlement-76.pdf>) I reviewed and confirmed the calculations related to embrittlement that appeared in the 2023 **LRA**. Therefore, in this memo I will address only the changes made by **Am1**, which was issued by PG&E in 2024 and reviewed in **NRC-SE** in 2025.

There were no changes to the available surveillance data for the limiting weld-wire heat in Diablo Canyon Unit 1 (Heat No. 27204, Lower Shell Longitudinal Weld 3-442C) between the issuance of the original LRA in 2023 and the issuance of Am1 in 2024. The only change between these two documents that effects embrittlement calculations is a revision of the fluence values that Unit 1 in general, and the limiting weld in particular, is estimated to experience after 54 effective full power years (60 operating years) of service. As described in detail in Am1 and as reviewed by the NRC in NRC-SE, these changes account for cycle-to-cycle variations in the reactor's power distribution that can occur due variations in future fuel management strategies (e.g., placement of burned vs. fresh fuel at different positions in the core) that cannot be foreseen in advance. To bound this expected future variability, PG&E increased the value of neutron flux (n/cm²/sec) by $\approx 10\%$ from their best estimate value for all future fuel cycles. As documented in the column headed "Lower Shell Long. Weld (3-442C)" that appears on pdf page 545 of Am1, the best-estimate flux (labeled "no bias" in that table) of 1.16×10^{10} n/cm²/sec is increased to 1.29×10^{10} n/cm²/sec (labeled "with bias" in that table). This $\approx 10\%$ increase in flux applies only to future projections of plant operation.

The impact of these changes on the embrittlement (RT_{PTS}) values reported in the LRA vs. in Am1 is small, as summarized below:

- In 2023, the LRA estimated a fluence at 54 EFPY for the limiting weld Heat No. 27204, Lower Shell Longitudinal Weld 3-442C of 2.01×10^{19} n/cm². This fluence produced a RT_{PTS} estimate of 243 °F.
- In 2023, Am1 estimated a fluence at 54 EFPY for the limiting weld Heat No. 27204, Lower Shell Longitudinal Weld 3-442C of 2.13×10^{19} n/cm². This fluence produced a RT_{PTS} estimate of 245.5 °F.

The increase in estimated fluence produced a 2.5 °F increase in estimated RT_{PTS} at 54 EFPY. Most importantly, this estimate of RT_{PTS} remains well below the NRC's RT_{PTS} screening criteria of 270 °F (see 10 CFR 50.61, *Fracture toughness requirements for protection against pressurized thermal shock events*, <https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0061>).

In conclusion, I can report that the revised value of RT_{PTS} in Am1 was correctly calculated, has no impact on plant safety, and remains well below the NRC's RT_{PTS} screening criteria. Additionally, the information in these documents does not any effect on the conclusions of my previous work for the DCISC.

Should you have any questions please do not hesitate to contact me.