CHAIRMAN Resource

From: David Lochbaum <davelochbaum@gmail.com>
Sent: Sunday, August 23, 2020 10:58 PM
To: CHAIRMAN Resource; CMRBARAN Resource; CMRCaputo Resource; CMRWright Resource; CMRHanson Resource
Cc: Doane, Margaret; Morris, Scott; Nieh, Ho; Lee, Samson
Subject: [External_Sender] Diablo Canyon safety issue

Dear Chairman and Commissioners, U.S. Nuclear Regulatory Commission

Nearly twenty years ago, significant corrosion of the reactor vessel head was discovered at the Davis-Besse nuclear plant in Ohio that required its replacement. Last month, significant corrosion of piping in the auxiliary feedwater (AFW) system was discovered on the Unit 2 reactor at the Diablo Canyon nuclear plant in California that required its replacement. There are so many troubling similarities between that situation then and the Diablo Canyon matter now that I strongly recommend that you ensure the NRC staff does not make the very same mistake now that it made then.

The corrosion at Davis-Besse resulted from a through-wall leak in a Control Rod Drive Mechanism (CRDM) nozzle. CRDM nozzles were periodically inspected for indications of degradation, but not their entire lengths. Only the location believed to be most vulnerable, called the J-groove welds, were being inspected. But the CRDM nozzle cracked in a different location. The leakage was estimated to have begun about six years before it was discovered in March 2002.

The corrosion at Diablo Canyon came from a through-wall leak in the AFW system piping downstream of AFW pump 2-1. Piping is periodically inspected for indications of degradation, but not every inch of every pipe. The monitoring program looks for thinning of the pipe walls due to internal effects – erosion/corrosion and flow-accelerated corrosion. But this AFW pipe degraded due to external corrosion.

PG&E reported that the AFW pipe has a nominal thickness of 0.300 inches and that external corrosion occurs at a rate of 0.002 to 0.008 inches per year. If so, then it took 37.5 to 150 years for the pipe to develop a through-wall leak. Given that Diablo Canyon was not built more than a century ago, the time needed for the corrosion to cause the pipe to leak is likely towards the shorter end of the time horizon (i.e., only about four decades instead of 15 decades).

Davis-Besse's representatives informed the NRC staff that its analyses estimated that only two CRDM nozzles were likely to be cracked and leaking. The NRC staff's analyses estimated that up to five CRDM nozzles might be leaking. The operating license issued by the NRC for Davis-Besse only permitted the reactor to operate for up to six hours with a leaking CRDM nozzles.

Diablo Canyon's representatives anticipate that one or more of the three AFW trains on Unit 1 might contain piping thinned to below minimum allowable thicknesses. On August 12, 2020, they submitted an exigent license amendment request seeking the NRC's permission to extend the time Unit 1 can operate with an inoperable AFW train. Currently, the operating license permits Unit 1 to operate for up to 72 hours with one AFW train inoperable and up to six hours with two AFW trains inoperable. If all three AFW trains are inoperable, the operating license requires Unit 1 to be shut down immediately.

Davis-Besse's representatives asked that NRC permit the reactor to continue operating past a deadline imposed by the agency. The representatives put forth several contingency measures purported to offset the increased risk of operating the reactor until the postponed safety inspections could be performed.

Diablo Canyon's representatives asked the NRC to permit Unit 1 to continue operating past the 72 hours deadline imposed by the operating license issued by the agency. The representatives put forth several contingency measures purported to offset the increased risk of operating the reactor until the postponed safety inspections are performed and associated safety fixes completed.

The NRC staff assessed the potential CRDM nozzle leakage issue independently of other known safety issues at Davis-Besse. The NRC evaluated only the risk from the CRDM nozzle degradation causing a loss of coolant accident. Yet the NRC staff was concurrently evaluating the risk of impairment of the emergency system designed to mitigate a loss of coolant accident – the PWR containment sump generic safety issue. The increased risk of a loss of coolant accident due to CRDM nozzle degradation was accepted by the NRC based on the extremely high reliability of the emergency response system. The decreased reliability of the emergency response system was independently accepted by the NRC based on the extremely low probability of a loss of coolant accident. In hindsight, the NRC issued rare Red and Yellow findings to Davis-Besse's owners for the CRDM nozzle leakage and PWR containment sump impairments, respectively.

The NRC staff is assessing the potential AFW system piping degradation independently of other known risk factors at Diablo Canyon. The NRC staff is reviewing the AFW system's role in mitigating design bases events like loss of offsite power, steam generator tube rupture, and loss of main feedwater. But there are other licensing bases events that the NRC appears not to be considered. For example, Diablo Canyon Updated Final Safety Analysis Report Section 9.5A describes how various AFW trains are credited in assuring safe shutdown of the Unit 1 reactor during postulated fires in numerous Fire Areas. There are no identified backups to these AFW trains in many, if not all, of these analyzed fire areas. The purported contingency measures advanced by PG&E do not specify any measures intended to either prevent fires in these vulnerable locations or to detect and extinguish them sooner. (In other words, while AFW Train A is taken out of service to repair degraded piping, PG&E proposes nothing to that Fire Areas relying on AFDW Train A for safe shutdown are protected from fires.)

Davis-Besse had to be shut down in order to perform the inspections that would determine whether it had leaking CRDM nozzles or not. The inspections could not be conducted with the reactor operating.

Diablo Canyon does not need to be shut down in order to perform the inspections that will determine whether the Unit 1 AFW piping is degraded to unacceptable levels or not.

Workers discovered the Unit 2 AFW system leaking pipe on July 23, 2020. By July 31, 2020, workers had inspected all applicable sections of AFW system piping and replaced five other segments that were not leaking, but which had thinned to below acceptable wall thicknesses. In less than 10 days, workers were able to find and fix the Unit 2 AFW system piping. Unit 2 was shut down during this time for other reasons. Workers shut down Unit 2 on July 17, 2020, due to indications of increasing hydrogen usage in the Main Generator.

August 12, 2020, PG&E submitted the exigent license amendment request to the NRC on August 12, 2020. Today marks more than 10 days since that submittal. Based on the recent Unit 2 experience, PG&E could have found and fixed any unacceptably degraded AFW system piping on Unit 1 – had it only wanted to do so.

Suppose that the NRC staff approves the exigent license amendment request. It would allow Unit 1 to operator for up to 7 days with one AFW train inoperable. Thus, if PG&E finally undertook to do the belated inspections and found degraded AFW system pipes, it could operate Unit 1 for up to seven days while replacing the bad pipe section(s). But this would be an unsafe clock. PG&E said that the external corrosion rate is 0.002 to 0.008 inches per year, or 0.00004 to 0.0002 inches per week. So, unless the measured AFW pipe wall thickness was within 0.0002 inches of the ASME code thickness, that pipe section would have been inoperable for longer than a week (the relaxed time frame sought by the exigent license amendment request.)

Davis-Besse's representatives conceded in fall 2002 that the reactor vessel head corrosion resulted from it placing production ahead of safety.

Diablo Canyon's representatives have not yet conceded this point in 2020, but their actions (and inactions) are virtual echoes of the past confessions.

The NRC staff approved the request to operate Davis-Besse past the imposed deadline.

Please ensure the NRC staff does not replicate that mistake by approving the request to operate Diablo Canyon Unit 1 past safety deadlines. The NRC should instead insist the PG&E inspect the Unit 1 AFW piping. If the pipe walls are below

minimum acceptable thickness, a 7-day time for fixing this condition has long since passed. Just 'cause PG&E opted to drag its feet and not inspect the piping suspected of being unacceptable should not give it a home-field clock.

Sincerely,
Dave Lochbaum

P.S. - I have already called the NRC Office of Inspector General Hotline last Friday about a process concern. The NRC staff sent PG&E three Requests for Additional Information (RAIs) regarding the exigent license amendment request and received three responses from PG&E. NONE of these documents were publicly available in ADAMS until 4.27 pm eastern time August 21, 2020. The deadline for the public to submit comments to the NRC regarding the exigent license amendment request was 5:00 pm August 21, 2020. While I appreciate the implied compliment from the NRC staff that the public can work miracles in 33 minutes (and we did, our comments were submitted at 4:59 pm August 21, 2020), this withholding vital information from the public is troubling. I strongly suspect that the records only appeared in ADAMS late Friday afternoon because I called OIG earlier that afternoon and emailed the NRC Project Manager, the NRC Region IV Administrator, and the NRC EDO about the missing records. I trust OIG will investigate how and why the NRC staff managed to keep this vital information from the public. I think at least one of the NRC's Principles of Good Regulation was violated, as well as federal regulations and NRC's procedures and policies.