

Lee, Samson

From: David Lochbaum <davelochbaum@gmail.com>

Sent: Wednesday, August 19, 2020 6:37 AM

To: Morris, Scott <Scott.Morris@nrc.gov>

Cc: Linda Seeley <lindaseeley@gmail.com>; Raspa, Rossana <Rossana.Raspa@nrc.gov>; Spicher, Terri <Terri.Spicher@nrc.gov>; pmlanch@comcast.net; Nieh, Ho <Ho.Nieh@nrc.gov>

Subject: [External_Sender] Re: Diablo Canyon's exigent LAR

Hello Scott:

Oh dopey me. I just simply assumed that the leakage resulted from erosion/corrosion factors that thinned the AFW piping to the point of leaking. Perhaps I was misled by PG&E's license amendment request that was silent as to the cause of the leakage and the less-than-allowable pipe wall thicknesses detected at six other Unit 2 AFW piping sections.

Compounding my dopey assumptions, I had assumed that a responsible licensee would report the breach of AFW piping due to external corrosion as an Unreviewed Safety Question. For such degradation represents a new and unanalyzed failure mode for this vital safety system. Or, if one dopily assumed that a pipe breach is a pipe breach is a pipe breach and thus that no new failure mode was introduced, it would then involve the increased likelihood that a previously analyzed and reviewed scenario occurs.

Since PG&E was silent about external corrosion being the cause of the through-wall leakage from AFW piping, how is the NRC confident that the replacement of the degraded Unit 2 AFW piping and the proposed replacement of the Unit 1 AFW piping will really and truly fix the problem? I assume it may, but....

In response to NRC mandates. PG&E developed erosion/corrosion monitoring programs that identified sections of piping that, based on factors like pipe material, fluid conditions, flow rates, etc., were vulnerable to wall thinning and established NDE programs and frequencies to enable pipes to be replaced before leaking.

If external corrosion is degrading piping literally (and figuratively) outside the E/C monitoring programs, those programs cannot be relied upon to ensure said piping remains adequately functional.

PG&E's license amendment request was also silent about the potential risk from taking one AFW flow path out of service for up to 7 days whilst Unit 1 continues operating. For example, Appendix 9.5A (ML17157B366) describes how the plant will survive postulated fires in various fire areas. For example, Section 4.2.1 of App. 9-5A reports that a fire in Fire Area 5-A-2 could disable AFW valves LCV-106, LCV-107, LCV-108, and LCV-109. But not to worry -- LCV-110 and LCV-111 are alleged to remain available to provide sufficient AFW flow. But what if these valves are closed to allow replacement of externally corroded piping? And Fire Area 5-A-2 is but one of many, many fire areas where hopefully some AFW components survive to enable decay heat removal to happen.

Speaking (or writing) about remaining silent, the purported reliability analysis of the AFW system at Diablo Canyon (September 1980, ML17095A390) considered common cause failures that could prevent AFW from fulfilling its safety mission. Well, it kinda did so. This study considered corrosion as a potential common cause threat to the AFW system. But look at where this study assumed (oh dopy them) corrosion would, and would not, occur:

Area	Hazardous Locations									
	1	2	3	4	5	6	7	8	9	10
Building 100 Areas										
Containment	X	X								
Plants 1 & 2 Areas	X	X	X	X	X	X	X	X	X	X
AFW Areas										
Active Spent Fuel	X	X	X	X	X	X	X	X	X	X
Minor Reactor Areas										
Piping	X	X	X	X	X	X	X	X	X	X
Emergency Diesel Generator										
Reactor Building										
Plant or Reactor Building	X	X	X	X	X	X	X	X	X	X
Containment Vessel										

Area	Number of Common Cause Threats for Selected Areas									
	1	2	3	4	5	6	7	8	9	10
Building 100 Areas	2	2	2	2	2	2	2	2	2	2
Containment	1	1	1	1	1	1	1	1	1	1
Plants 1 & 2 Areas	2	2	2	2	2	2	2	2	2	2
AFW Areas	1	1	1	1	1	1	1	1	1	1
Active Spent Fuel	2	2	2	2	2	2	2	2	2	2
Minor Reactor Areas	1	1	1	1	1	1	1	1	1	1
Piping	2	2	2	2	2	2	2	2	2	2
Emergency Diesel Generator	1	1	1	1	1	1	1	1	1	1
Reactor Building	1	1	1	1	1	1	1	1	1	1
Plant or Reactor Building	2	2	2	2	2	2	2	2	2	2
Containment Vessel	1	1	1	1	1	1	1	1	1	1

Area	Number of Common Cause Threats for Selected Areas									
	1	2	3	4	5	6	7	8	9	10
Building 100 Areas	2	2	2	2	2	2	2	2	2	2
Containment	1	1	1	1	1	1	1	1	1	1
Plants 1 & 2 Areas	2	2	2	2	2	2	2	2	2	2
AFW Areas	1	1	1	1	1	1	1	1	1	1
Active Spent Fuel	2	2	2	2	2	2	2	2	2	2
Minor Reactor Areas	1	1	1	1	1	1	1	1	1	1
Piping	2	2	2	2	2	2	2	2	2	2
Emergency Diesel Generator	1	1	1	1	1	1	1	1	1	1
Reactor Building	1	1	1	1	1	1	1	1	1	1
Plant or Reactor Building	2	2	2	2	2	2	2	2	2	2
Containment Vessel	1	1	1	1	1	1	1	1	1	1

This reliability study did not consider the common-cause failure of AFW piping due to, say, external corrosion. Nor from internal corrosion, either, for that matter.

To its credit, NRC Inspection Procedure 49001, "Inspection of Erosion-Corrosion/Flow-Accelerated-Corrosion Monitoring Program," was not silent about the safety requirement involved:

When reviewing these systems consider that all safety-related piping systems and certain non-safety-related piping systems are under the regulatory auspices of the maintenance rule and license renewal, which require licensees to demonstrate that the performance or condition of these systems and components are being effectively controlled and managed through condition monitoring and preventive maintenance to ensure that they remain capable of performing their intended function.

Condition monitoring goals or measures should be predictive in nature, providing early warning of degradation before failures occur.

Whether due to internal factors (e.g., erosion-corrosion) or external contamination, the fact remains that seven sections of AFW system piping on Unit 2 degraded until the pipe wall thickness was less than allowed by the ASME code. As a direct consequence, an AFW pipe failed and leaked at a rate of 3.9 gpm. PG&E has ample reason to suspect that Unit 1 AFW system piping is degraded to the point there replacement of sections will be necessary to restore minimum safety margins.

What might happen if an earthquake occurs while Unit 1 operates with degraded AFW piping?

The earthquake could result in loss of the normal feedwater system via any one of numerous ways.

And the earthquake's ground motion could also rupture the degraded sections of the AFW system piping.

So, for the NRC to approve the exigent license amendment request by PG&E and allow Unit 1 to continue operating in this known degraded condition would be akin to the NRC approving the request by FirstEnergy to allow Davis-Besse to continue operating with a known degraded condition of CRDM nozzle cracking and leakage. And we all know how well that worked out.

I assume that the people of California will be protected by luck while PG&E and NRC gambles with their lives like the people of Ohio were back in 2001. There I go again with flawed assumptions.

Thanks,
Dave Lochbaum

On Tue, Aug 18, 2020 at 5:37 PM Morris, Scott <Scott.Morris@nrc.gov> wrote:

Hello David!

Thank you for cc'ing me on your email to Paul. Please know that we are keenly aware of this issue at Diablo Canyon Unit 2 and are actively reviewing its nuclear safety (and any associated potential licensee performance assessment) implications consistent with our independent oversight mission here in Region IV ... which includes a review of the "extent of condition" of this issue to Unit 1. We are also coordinating with our colleagues in headquarters (NRR) as they follow their established process for considering the exigent technical specification amendment request for Unit 1. One item worthy of note here is that the AFW leak

apparently resulted from external corrosion of the piping, which is unusual and (to my current understanding) not explicitly addressed by ASME Code requirements.

I have ensured that the NRR staff considering the amendment request are aware of the concerns expressed in your (and Paul's) email.

I will provide a follow up email with more details in the coming days.

Best Regards,

Scott A. Morris

Regional Administrator

U.S. Nuclear Regulatory Commission / Region IV

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From: David Lochbaum <davelochbaum@gmail.com>
Sent: Tuesday, August 18, 2020 7:03 AM
To: pmlanch@comcast.net
Cc: Linda Seeley <lindaseeley@gmail.com>; Raspa, Rossana <Rossana.Raspa@nrc.gov>; Spicher, Terri <Terri.Spicher@nrc.gov>; Morris, Scott <Scott.Morris@nrc.gov>
Subject: [External_Sender] Diablo Canyon's exigent LAR

Hello Paul:

According to the highlighted passages on page 7 of the 22-page attachment to PG&E's license amendment request, workers discovered a 3.9 gallon per minute leak from a section of AFW piping on Unit 2 last month. I'm impressed -- I can't tell you how many times I've mistaken a 3.9 gpm leak for a 4 gpm leak.

In any case, workers conducted an extent of condition and found no more puddles under Unit 2 AFW pipes. But they found six pipe sections where the wall thickness had dropped below minimum allowed by the ASME code. Those thinned sections were replaced.

The license amendment request seeks to allow workers to find and fix thinned pipe sections PG&E expects to exist on Unit 1's AFW system.

What is not explained in the license amendment request is why it took a 3.9 gpm leak for workers to notice thinned AFW piping on Unit 2.

Attached are just a small, small handful of the many, man NRC's correspondence to plant owners about pipe wall thinning. Thinned pipe sections that ruptured have killed workers at Surry in Virginia and Mihima in Japan. Both to avoid killing workers and to keep cooling water inside pipes instead of on floors, the NRC required -- not suggested, but required -- owners implement pipe wall thickness monitoring programs that replace pipe sections BEFORE their wall thickness drops below ASME allowables. Waiting until notices observe a 3.9 gpm leak is NOT one of the monitoring programs permitted by the NRC. And yet,

So, how did so many AFW pipes on Unit 2 thin below ASME allowable limits? And why are AFW pipe sections suspected of intolerable thinning on Unit 1? If PG&E was implementing an effective pipe wall thinning monitoring program, these sections would have been detected and remedied before leaking water on the floor. But nooooo!

So, for not doing what the NRC repeatedly mandated them to do, PG&E wants the NRC's permission to keep operating Unit 1 while it plays catch up. Maybe crime does pay, after all.

Thanks,

Dave Lochbaum

