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June 30, 2017

Chairman Kristine L. Svinicki
Commissioner Jeff Baran
Commissioner Stephen G. Burns

SUBJECT: Two Faceted Approach to LOCA/LOOP Licensing Basis

Dear Chairman and Commissioners:

The Nuclear Regulatory Commission (NRC) recently reached two decisions regarding the licensing basis for a loss of coolant accidents (LOCA) and a loss offsite power (LOOP). The decisions provide significantly different answers to essentially an identical question.

First Decision – Palo Verde Extended Emergency Diesel Generator Allowable Outage Time

The first decision was the license amendment dated January 4, 2017 (ML17004A020) issued by the NRC staff permitting Palo Verde Unit 3 to continue operating for up to 62 days with one of two emergency diesel generators (EDGs) out of service. Section 2.0, Regulatory Evaluation, of the Safety Evaluation prepared by the NRC staff for this license amendment listed regulations and regulatory guidance documents considered en route to the decision. The first items in this listing were General Design Criteria 17, Electric power systems, and 18, Inspection and testing of electric power systems.

Absent from this listing, and presumably also from the NRC staff's considerations, were General Design Criteria 34, Residual heat removal, and 35, Emergency core cooling. Those criteria with boldfacing emphasis added:[1]

> *Criterion 34—Residual heat removal*. A system to remove residual heat shall be provided. The system safety function shall be to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the reactor coolant pressure boundary are not exceeded.
>
> Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation **(assuming onsite power is not available)** the system safety function can be accomplished, **assuming a single failure.**
>
> *Criterion 35—Emergency core cooling*. A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

[1] Online at https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appa.html

> Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation **(assuming offsite power is not available)** and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, **assuming a single failure**.

Page 15 of the Safety Evaluation for the amendment stated "*Offsite power sources, and one train of onsite power source would continue to be available for the scenario of a loss-of-coolant accident*." In other words, the NRC staff did not consider the assumptions in GDC 34 and 35 that residual heat removal and emergency core cooling systems be capable of mitigating accidents when offsite power was not available and with a single failure applicable to the situation at Palo Verde. In essence, the NRC decoupled LOCA from LOOP when approving the amendment for a 62-day EDG outage time at Palo Verde Unit 3. The NRC staff assumed, contrary to GDC 34 and 35, that offsite power would be available should a LOCA happen.

To the question of whether LOOP could be decoupled from LOCA, the NRC staff answered "yes" at Palo Verde.

Second Decision – Proposed Rulemaking to Decouple LOOP from LOCA

The second decision was the NRC staff's recommendation in SECY-17-0013 dated January 26, 2017 (ML16341A820) that the rulemaking seeking to decouple a LOOP from a LOCA be discontinued. Via the Staff Requirements Memorandum dated April 21, 2017 (ML17110A512), you unanimously approved termination of this rulemaking effort.

On page 4 of SECY-17-0013, the NRC staff wrote that "*The staff has determined that the current regulations provide adequate protection of public health and safety*." We agree and hasten to point out that GDC 34 and 35 constitute current regulations providing adequate protection of public health and safety. But that protection is only achieved when said regulations are met, not when they are dismissed and violated.

Page 4 of SECY-17-0013 further stated "*it is unlikely that any licensee would seek licensing basis changes that would rely on the proposed rule*." The NRC staff issued SECY-17-0013 merely 22 days after it issued the amendment changing the LOCA/LOOP licensing basis for Palo Verde Unit 3 at the licensee's request. The NRC staff need not speculate about licensees' intentions—one licensee had already sought (and obtained) licensing basis changes to decouple LOOP from LOCA as sought by the proposed rule.

Page 3 of the draft Federal Register Notice (FRN) attached to SECY-17-0013 stated:

> This proposed rulemaking would provide licensees an option to relax the current analysis requirements for considering a loss of offsite power (LOOP) to occur coincident with a large-break loss-of-coolant accident (LOCA) (the LOOP/LOCA rulemaking).

The Palo Verde Unit 3 license amendment similarly relaxed its current requirements. It is not wild speculation to presume that another licensee, or even this licensee again, would seek to relax the current requirements.

The FRN pointed out that a rulemaking seeking to redefine the large-break LOCA ECCS analysis requirements had been proceeding in parallel with the LOCA/LOOP relaxation rulemaking. The FRN indicated that the industry discontinued support for this LOCA ECCS rulemaking in June 2008 and the

Commission approved termination of the rulemaking in April 2016. Thus, it's not a case where the LOCA/LOOP rulemaking is unnecessary because a comparable outcome will be achieved by the LOCA ECCS rulemaking—both have now been terminated.

Pages 5 and 6 of the FRN described the NRC's work on the LOCA/LOOP rulemaking, including several unresolved issues: "*LOOP/LOCA frequency determinations, seismic contributions to break frequency, the maintenance of defense-in-depth, and the treatment of delayed LOOP and double sequencing issues*."

On page 6 of the FRN, the NRC staff wrote:

> The NRC staff determined that these issues would need to be adequately addressed in order to complete a regulatory basis that could support a proposed LOOP/LOCA rulemaking.

On pages 7 and 8 of the FRN, the NRC staff wrote:

> The NRC staff determined that these issues would need to be adequately addressed in order to complete a regulatory basis that could support a proposed LOOP/LOCA rulemaking. To complete a fully developed regulatory basis for the LOOP/LOCA rulemaking, the NRC staff would need to ensure that these areas of uncertainty are adequately addressed as part of the rulemaking activity.

Three times in the FRN the NRC staff explicitly cited issues that had not been "adequately addressed" regarding the LOCA/LOOP rulemaking.

To the question of whether LOOP could be decoupled from LOCA, the NRC staff answered "no" for the proposed rulemaking. Or more precisely, the NRC staff answered "not yet" — nearly three weeks after having said "no" at Palo Verde.

Different Answers to the Same Question Imply Lack of Clarity in Regulatory Guidance

It is very hard if not impossible to understand how the numerous safety issues that had not yet been adequately addressed to decouple LOOP from LOCA for the proposed rulemaking could magically become addressed at roughly the same time for the NRC staff to decide that the public would retain adequate protection throughout the 62 days that Palo Verde Unit 3 might operate with only one EDG in service.

While the specific issue at Palo Verde Unit 3 is now moot with the one-time amendment expired and the broken EDG now repaired and returned to service, the underlying policy issue remains open. UCS does not believe, or even suspect, that the NRC staff involved in the Palo Verde decision was incompetent or safety-adverse. On the contrary, UCS believes that the NRC staff involved in both the Palo Verde decision and the LOCA/LOOP rulemaking decisions was equally capable and properly focused on safety. In our view, these seemingly disparate decisions illustrate the policy issue that should be closed.

The lack of clear guidance applicable to decisions like these makes it really difficult for the NRC staff to make the decisions and even tougher to defend them. The NRC staff did not approve a request in June 2015 by the Cook licensee for a one-time 65-day EDG LCO but approved a request in January 2017 by the Palo Verde licensee for a one-time 62-day EDG LCO. Lack of clear guidance, in our view, enabled equally capable, equally dedicated staff to reach entirely opposite decisions. And lack of clear guidance then makes it hard for the NRC staff to justify and defend decisions that, on their surface, seem contradictory. The NRC staff cannot point to the objective factors leading to a green light in one case and a red light in another and instead must hide behind "reasonable assurance" of "adequate protection" gobblygook. Such imprecise, ill-defined terms are fertile grounds for subjectivity and sterile grounds for consistency and repeatability.

The lack of clear guidance extends beyond determining how long a reactor can safely operate with one EDG broken. For example, the audit recently conducted by the Office of the Inspector General (ML17101A737) of fire protection oversight reported:

> NRC staff have different views on whether they can hold licensees accountable to certain regulatory requirements. For example, agency staff have differing views on whether plants are required to protect against or mitigate either single or multiple spurious operations of components, such as valves, as a result of a fire. Some staff asserted they could only hold plant officials responsible for addressing single spurious operations, but not multiple spurious operations as they had done in the past. These staff cited a perceived NRC policy change and did not understand the basis for it. Conversely, other staff expressed confusion when asked about this perceived policy change, and explained they had no difficulty holding plant officials accountable to NRC's requirements. This lack of regulatory reliability was further underscored by licensee staff, who expressed concern to OIG that NRC has not yet clarified its position on this matter, even after licensees have taken voluntary remedial measures recommended by NRC.

Fire protection regulations have been extremely high profile for decades. Yet the NRC staff isn't on the same page, perhaps not even in the same book, on which fire protection measures are required when against what hazards. Absent a good answer key, tests and inspections become mere exercises.

Our "Ask"

UCS respectfully requests that the Commission direct its staff to undertake an effort to identify and correct guidance shortcomings. One way to accomplish this effort would be to go back a period—say ten years—and identify examples of regulatory decisions founded on clear, unambiguous guidance and regulatory decisions made on less clear guidance. The former examples could illuminate elements and practices that produce clear guidance while the latter examples would show where the acquired spotlight should first be shined. UCS feels confident that sufficient examples on both sides of the guidance ledger could be identified to inform this process. For example, we are working with the NRC staff to make a presentation during the seminar series sponsored by the Office of Research. Our presentation, tentatively titled "The Other Side of the Coins," will only cover those times when the NRC's efforts yielded positive outcomes. We feel confident that examining examples of decisions relying on clear and unclear guidance will increase the number of times the former get emulated and the latter get exorcised.

UCS further recommends that the effort include a going forward component. Developing clearer guidance will identify lessons that can be incorporated into Management Directives, Inspection Manual Chapters, and other NRC documents to codify the associated process do's and don'ts.

Sincerely,

David Lochbaum
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CHAIRMAN Resource

From:	Dave Lochbaum <DLochbaum@ucsusa.org>
Sent:	Friday, June 30, 2017 8:55 AM
To:	CHAIRMAN Resource; ,gov; CMRBurns Resource
Cc:	Vietti-Cook, Annette; Bell, Hubert
Subject:	[External_Sender] Licensing Basis for LOCA/LOOP
Attachments:	20170630-ucs-nrc-loca-loop-licensing-basis.pdf

Dear Chairman Svinicki, Commissioner Baran and Commissioner Burns:

Attached is a letter regarding two decisions issued by the NRC staff in January regarding the licensing basis for a loss of coolant accident (LOCA) and a concurrent loss of offsite power (LOOP). The decisions appear contradictory.

In a Palo Verde decision, the staff assumed that LOCA and LOOP were distinct licensing basis events that need not be considered to happen concurrently.

In the proposed rulemaking decision about three weeks later, the staff recognized that current regulation paired LOCA and LOOP and identified multiple reasons for not proceeding with the rulemaking effort to separate them.

It is hard for us to understand how the staff could reach different answers to essentially the same question in the same month. It is equally hard for us to understand how the staff could separate the LOCA/LOOP licensing basis at Palo Verde despite all the unresolved issues enumerated by the staff in its proposed rulemaking decision.

We attribute the disparity to ambiguous guidance. We recommend that you direct the staff to identify examples of decisions that relied on clear, objective guidance and decision relying on less-than-clear guidance. The lessons learned from these examples should facilitate decision-making in the future as well as enhance the NRC's communication to external stakeholders of the bases for its decisions.

I do not intend to also mail in a hard copy of the letter, but will gladly do so upon request.

Thanks,
Dave Lochbaum
Director, Nuclear Safety Project
Union of Concerned Scientists