Pilgrim Watch Comments: Regulatory Analysis for Regulatory Basis: Regulatory Improvements for Power Reactors Transitioning to Decommissioning NRC (January 2018)

BACKGROUND

In January of 2018, the NRC issued what it referred to as an "update" to its proposed Regulatory Analysis for Regulatory Basis: Regulatory Improvements for Power Reactors Transitioning to Decommissioning NRC-2015-0070; RIN 3150-AJ59. The entire 188 - page document (cited below as NRC ---) is available on the NRC's Adams Library – ML 173302A075.

The document proposed several regulatory changes. Those most relevant to this Panel are directed to:

- Emergency Preparedness,
- Physical Security,
- Cyber Security,
- Fitness for Duty,
- Minimum Staffing and Training Requirements,
- Decommissioning Funding Assurance,
- Offsite and Onsite Financial Protection Requirements and Indemnity Agreements,
- Application of the Backfit Rule,
- Aging Management, and
- PSDAR, Decommissioning Options, and Decommissioning Timeframe

According to the NRC, these changes:

> "…are over-all cost beneficial to the nuclear power industry, federal, state and local governments and the general public and … would result in a net averted cost from $12.5 million (7-percent NPV) to $32.3 million (3-percent NPV). Most of the cost savings are attributable to the relief of exemptions and amendments that licensees would typically submit to the NRC for review and approval during decommissioning." (NRC 154)

The proposed changes would clearly result in significant savings to licensees and the NRC. Under current regulations, licensees are required to seek exemptions from significant regulatory requirements. As proposed, it would be unnecessary for a licensee to seek, or the NRC to review, these exemptions.

The "savings" to state and local governments and the public have nothing to do with public health and safety. Rather, the NRC found that there would be "beneficial" savings because state and local governments and the public would no longer have to spend time and money in efforts to convince the NRC and exemptions or amendments to an operating license such as Pilgrims should not be granted. Under the proposed new regulations, licensees would no longer have to submit

proposed exemptions and amendments to the NRC for review, there would be no NRC review, and the public would have no opportunity to tell the NRC the other side of the story.

NRC INCORRECT ASSUMPTIONS USED TO SUPPORT PROPOSED CHANGES

The NRC's "Regulatory Improvements for Power Reactors Transitioning to Decommissioning" ignores what the NRC's Backgrounder on Decommissioning Nuclear Power Plants NRC says is one of the initial decommissioning activities – permanently removing nuclear fuel from the reactor.

The starting point for the NRC's January 2018 analysis is that a reactor has already been permanently shut down and the fuel has been moved to the spent fuel pool.

The NRC's Januaryanalysis justifies eliminating or relaxing decommissioning requirements after all the fuel has been moved from the reactor into the spent fuel pool based on the following of highly debatable assumptions.

- NRC Staff assumed after the reactor has been permanently shut down, and the fuel has been moved from the reactor core to the spent fuel pool, the only accident that might lead to a significant radiological release is a zirconium fire from a spent fuel pool (SFP) accident that drained the water in the pool. (NRC 2)

- NRC Staff assumed that the probability of a zirconium fire scenario decreases as a function of the time that the fuel has been out of the reactor core; and after a cooling period of 10 months for BWRs (example, Pilgrim) or 16 months for PWRs (example Seabrook), there is only "a low-likelihood possibility that a rapid drain down of the spent fuel pool (SFP) could cause a subsequent zirconium fire and release in less than 10 hours." (NRC, 5)

- The NRC does not consider a partial draindown of water in the pool and its impact on a subsequent zirconium fire.

- NRC assumed that in the unlikely event of a fire, it would be of small consequence. Staff says that there are "no applicable design-base events at a decommissioning licensee's facility that could result in an offsite radiological release exceeding the limits established by the U.S. Environmental Protection Agency's (EPA's) early phase protective action guides (PAGs) of 1 rem at the exclusion area boundary." (NRC 30)

- The 10-hour ignition delay time allows time for mitigation to put out the fire and time for the offsite population to evacuate. There is no need for an offsite radiological emergency plan after reactor fuel has been moved into the spent fuel pool. (NRC 29, 34-35, 36).

- NRC Staff also assumed that dry cask storage presents no risk. This is based, in part, on NRC's assumption that "the spent fuel is stored in an onsite ISFSI for 16 years before the spent fuel is transmitted to either an offsite ISFSI or a permanent geologic repository. (NRC 5)

Each of These Assumptions is Seriously Flawed.

Risks during Fuel Transfer. The NRC January analysis ignores the potential of a spent fuel fire during the initial decommissioning activity in which fuel assemblies in the reactor are moved from the reactor to the spent fuel pool. Accidents during this transfer of fuel assemblies, such as dropping an assembly, can happen, and such accidents have come very close to happening in the past.[1]

Causes of Spent Fuel Pool Cooling Water Loss. The NRC's update does not recognize that there are many potential causes of "a significant draw-down of the spent fuel pool." Water could be lost from a spent-fuel pool through leakage, boiling, siphoning, pumping, displacement by objects falling into the pool, or overturning of the pool. These modes of water loss could arise from events, alone or in combination, that include: (i) acts of malice by persons within or outside the plant boundary; (ii) an aircraft impact; (iii) an earthquake; (iv) dropping of a fuel cask; (v) accidental fires or explosions; and (vi) a severe accident at an adjacent reactor that, through the spread of radioactive material and other influences, precludes the ongoing provision of cooling and/or water makeup to the pool.[2]

Partial draindown: NRC considers a spent fuel pool "draindown." But NRC Staff fails to analyze the different consequences of both a full draindown and a partial draindown. This is an important omission because total drainage of the pool is not the most severe case of water loss. In a partial draindown the presence of residual water would block air convection, e.g., by blocking air flow beneath the racks.[3] Previously, in filings made during a 2002 license-amendment proceeding, NRC staff assumed that a fire would be inevitable if the water fell to the top of the racks.

Causes of a Dry Cask Canister Rupture. NRC ignores the potential of a dry cask canister rupture. Casks, although safer than spent fuel pool storage, are vulnerable to attack[4] and may

[1]Environmental Impacts of Storing Spent Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Nuclear Waste Confidence Decision and Environmental Impact Determination, Gordon Thompson, February 6, 2009; Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond Design Basis Earthquake Affecting Spent Fuel Pool for a US Mark 1 Boiling Water Reactor, Gordon Thompson, August 1, 2013

[2] Environmental Impacts of Storing Spent Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Nuclear Waste Confidence Decision and Environmental Impact Determination, Gordon Thompson, February 6, 2009; Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond Design Basis Earthquake Affecting Spent Fuel Pool for a US Mark 1 Boiling Water Reactor, Gordon Thompson, August 1, 2013

[3] http://www.environmental-defense-institute.org/publications/Cover.Ltr.Thompson.NRC.SNF.Short.pdf

[4] Environmental Impacts of Storing Spent Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Nuclear Waste Confidence Decision and Environmental Impact Determination, Gordon Thompson, February 6, 2009; Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond Design Basis Earthquake Affecting Spent Fuel Pool for a US Mark 1 Boiling Water Reactor, Gordon Thompson,

corrode – especially over a long period of onsite storage. For example:

- The thin (0.5") stainless steel canisters may crack within 30 years. No current technology exists to inspect, repair, or replace cracked canisters. With limited monitoring, we will only know after the fact that a cask has leaked radiation. [5]
- Casks may remain onsite indefinitely subjected at Pilgrim, for example, to salt induced stress corrosion cracking and threatened by sea level rise. Pilgrim's spent fuel dry cask pad is located very close to Cape Cod Bay.
- Licensees, like Pilgrim, are using high burnup spent fuel (fuel with a higher percentage of uranium 235) and loading it into casks, yet the NRC is just starting a test to see whether the casks can handle it, with results not in until 2027. Robert Alvarez (https://www.ips-dc.org/ips-authors/robert-alvarez/) explains the problems in doing so. He said that:

    - Research shows that under high-burnup conditions, fuel rod cladding may not be relied upon as a key barrier to prevent the escape of radioactivity, especially during prolonged storage in the "dry casks."

    - High-burnup waste reduces the fuel cladding thickness and a hydrogen-based rust forms on the zirconium metal used for the cladding, which can cause the cladding to become brittle and fail. In addition, under high-burnup conditions, increased pressure between the uranium fuel pellets in a fuel assembly and the inner wall of the cladding that encloses them causes the cladding to thin and elongate. And the same research has shown that high burnup fuel temperatures make the used fuel more vulnerable to damage from handling and transport; cladding can fail when used fuel assemblies are removed from cooling pools, when they are vacuum dried, and when they are placed in storage canisters.

    - High burnup spent nuclear fuel is proving to be an impediment to the safe storage and disposal of spent nuclear fuel. For more than a decade, evidence of the negative impacts on fuel cladding and pellets from high burnup has increased, while resolution of these problems remains elusive.

The consequences of a spent fuel pool fire or cask rupture. The NRC proposal minimizes the potential consequences of a spent fuel pool fire or a cask rupture. The amount of radiation released likely would far exceed the EPA's one rem release limit, and the resulting off-site damage to property and health would be unimaginable. Pilgrim's pool contains approximately 70 million curies.[6] Much of the damage from a pool fire or dry cask failure would be caused by the release of Cesium-137. To make the risk meaningful, it is useful to compare the inventory of Cs-137 in

August 1, 2013

[5] San Onofre Dry Cask Storage Issues analyses at:
https://sanonofresafety.files.wordpress.com/2011/11/drycaskstorageissues2014-09-23.pdf

[6] Spent Nuclear Pools in the US: Reducing the Deadly Risks of Storage, Robert Alvarez, IPS, May 2011, pg., 14

Pilgrim's pool and core with the amount of Cs-137 released at Chernobyl.[7] Chernobyl - 2,403,000 curies Cs-137; Pilgrim's pool - more than 44,000,000 curies Cs-137; Pilgrim's Core - 5,130,000 curies Cs-137. Each cask contains more than half the total amount of Cs-137 released at Chernobyl

Studies of the consequences of a spent fuel pool fire show huge potential consequences.

2016 Princeton Study: A major Spent Fuel Pool fire could contaminate as much as 100,000 square kilometers of land (38,610 square miles) and force the evacuation of millions.[8]

2013 NRC Study: A severe spent fuel pool accident would render an area larger than Massachusetts uninhabitable for decades and displace more than 4 million people.[9]

2006 Massachusetts Attorney General Study: $488 Billion dollars, 24,000 cancers, hundreds of miles uninhabitable[10]

Dry Cask: A typical cask would contain 1.3 MCi of cesium-137, about half the total amount of Cesium-137 released during the Chernobyl reactor accident of 1986. Most of the offsite radiation exposure from the Chernobyl accident was due to Cesium-137. Thus, a fire inside an ISFSI module from a terrorist attack or significant rupture of the cask could cause significant radiological harm.[11]

Ignition Time. NRC Staff claims that that it would take, a minimum of 10 hours for the fuel in a boiling water reactor aged 10 months or in a PWR for 16 months to heat to zirconium ignition temperature; and that the 10- hour period "allows for the licensee to take onsite mitigation measures or, if necessary, for offsite authorities to take appropriate response actions using an all-hazards approach emergency management plan." (NRC, 29)

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[7] See 2012 GAO Report: GAO -12-797, Spent Nuclear Fuel: Accumulating Quantities at Commercial Reactors Present Storage and Other Challenges, http://www.gao.gov/assets/600/593745.pdf.

[8] Frank N. von Hippel, Michael Schoeppner, "Reducing the Danger from Fires in Spent Fuel Pools," Science & Global Security 24, no.3 (2016): 141-173 http://scienceandglobalsecurity.org/archive/sgs24vonhippel.pdf;Richard Stone, "Spent fuel fire on U.S. soil could dwarf impact of Fukushima," *Science*, May 24, 2016. (NRC variable at: http://www.sciencemag.org/news/2016/05/spent-fuel-fire-us-soil-could-dwarf-impact-fukushima

[9] Consequence Study of a Beyond Design-Basis Earthquake Affecting the Spent Fuel Pool for A U.S. Mark I Boiling Water Reactor (October 2013) at 232 (Table 62) and 162 (table 33), Adams Accession NO ML13256A342)

[10] The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.'s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New Design features to Protect Against Spent Fuel Pool Accidents, Docket No. 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Potential Consequences Of A Spent Fuel Pool Fire At The Pilgrim Or Vermont Yankee Nuclear Plant, Jan Beyea, PhD., May 25, 2006 (NRC RC Electronic Hearing Docket, Pilgrim 50-293-LR, 2—6 pleadings, MAAGO 05/26 (ML061640065) & Beyea (ML061640329)

[11] Environmental Impacts of Storing Spent Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Nuclear Waste Confidence Decision and Environmental Impact Determination, Gordon Thompson, February 6, 2009; Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond Design Basis Earthquake Affecting Spent Fuel Pool for a US Mark 1 Boiling Water Reactor, Gordon Thompson, August 1, 2013, pg., 30

NRC staff assumes that the minimum delay time for SNF ignition can be calculated by further assuming that an SNF assembly is perfectly insulated thermally. The NRC analysis provides no basis for assuming these assumptions are correct.

A 10-hour minimum delay time for BWR SNF aged 10 months is potentially plausible. But that is not the whole story. In a multi-unit site, if a SNF pool is adjacent to an operating reactor that experiences an incident, the pool could become inaccessible for much longer than 10 hours, as we saw at Fukushima. For both single unit sites, like Pilgrim, and multi-unit sites, if the reactor is shut down the pool could be inaccessible for a period exceeding 10 hours. For example, an attack scenario could cause partial drain-down and a local radiation field precluding access; and a fuel handling accident during transfer from pool to dry casks - such as a cask drop.

Mitigation. Contrary to NRC, 10 hours is not a guaranteed enough time to put out a spent fuel fire. An attack scenario could rapidly cause partial drain-down and result in a local radiation field that precludes access to the fire. There is no basis for assuming that a site's Flex program to provide supplemental water will be sufficient. For example, Pilgrim Watch and the Union of Concerned Scientists showed that Pilgrim's Flex plan to provide supplemental water had little to no probability of working, especially in severe storm conditions.[12]

Evacuation. Ten hours is not enough time for offsite authorities to take appropriate response actions using an all-hazards approach emergency management plan. NRC's emergency preparedness recommendation, option EP-2, essentially eliminates offsite emergency preparedness at Level 2 (pool storage) and Level 3 (ISFI storage). In addition, the notification requirement to State and Local Governmental is changed from 15 minutes to 60 minutes; and public alert and notification systems and Evacuation Time Estimates (even with a significant population change) are not required. As early as Level 2, challenging drills and exercises involving hostile action said not to be warranted, and ORO participation in radiological drills and exercises would no longer be required. Pilgrim Watch has previously shown that even with offsite emergency plans in place during operations, a timely (less than 10 hour) evacuation is not possible[13]; therefore, absent offsite preparedness there is no way that 10-hours would allow offsite authorities to evacuate the population.

How long will fuel be stored onsite. Contrary to NRC Staff availability of offsite storage is unlikely to occur anytime soon. The NRC assumption that "the spent fuel is stored in an onsite

[12] Presentation to NRC: Status of Fukushima Lessons, Union of Concerned Scientists, David Lochbaum, July 31, 2014, https://www.nrc.gov/reading-rm/doc-collections/commission/slides/2014/20140731/lochbaum-20140731.pdf ; Pilgrim Watch Comment (11.16.2014) Waterways Application, No. W14-414, Cape Cod Bay, Plymouth, Plymouth County, Ch 91 Application of Entergy Nuclear Operations, Inc. Pilgrim Nuclear Power Station; Pilgrim Watch Comment NRC, January 30, 2014

[13] Pilgrim Watch's 2.206 Petition To Modify, Suspend, Or Take Any Other Action To The Operating License Of Pilgrim Station Until The NRC Can Assure Emergency Preparedness Plans Are In Place To Provide Reasonable Assurance Public Health & Safety Are Protected In The Event Of A Radiological Emergency (19.30.2013);Pilgrim Watch's September 3, 2014 Supplement To Its August 30, 2013 2.206 Petition To Modify, Suspend, Or Take Any Other Action To The Operating License Of Pilgrim Station Until The NRC Can Assure Emergency Preparedness Plans Are In Place To Provide Reasonable Assurance Public Health & Safety Are Protected In The Event Of A Radiological Emergency (09.03.2014) https://www.nrc.gov/docs/ML1433/ML14338A180.pdf

ISFSI for 16 years before the spent fuel is transmitted to either an offsite ISFSI or a permanent geologic repository" (NRC 5) is based on DOE's Strategy for the Management and Disposal of Used Nuclear Fuel and High -Level Radioactive Waste, January 2013. DOE said that:

> **With the appropriate authorizations from Congress,** (Emphasis added) the Administration currently plans to implement a program over the next 10 years that:
>
> • Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
>
> • Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
>
> • Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048. Full implementation of this program will require legislation to enable the timely deployment of the system elements noted above
>
> Legislation should also include the requirements for consent-based siting; a reformed funding approach that provides sufficient and timely resources; and the establishment of a new organization to implement the program, the structure of which should balance greater autonomy with the need for continued Executive and Legislative branch oversight

We are nowhere near "appropriate authorization from Congress;" therefore, neither licensees nor NRC can assume that waste will leave decommissioned sites any time soon. NRC in fact stated in its Continued Storage of Spent Nuclear Fuel (Waste Confidence) ruling that waste may remain onsite indefinitely. Therefore, decommissioning plans and the Decommissioning Trust Fund should plan for long term storage and maintenance and security costs that will occur.

NRC'S PROPOSED CHANGES

EMERGENCY PREPAREDNESS [SECTION 5.1]

The NRC staff's recommended changes to current regulations deal with four different time frames, referred to as Levels 1 through 4. (NRC 5)

- Level 1 – A transition period after the licensee as permanently ceased operations and fuel is moved from the reactor.
- Level 2 – The at least five years during which spent fuel is stored in the spent fuel pool.
- Level 3 – All spent fuel is transferred to and stored in an ISFSI
- Level 4 - All spent fuel has been removed from the site.

Level 1:

- An appropriate level of EP is maintained. (NRC 31).
- In NUREG-0654/FEMA-REP-1, Revision 1, Table B-1, may not be applicable or necessary in Level 1. (NRC 32)
- No requirement to update Evacuation Time Estimates (NRC 33)
- No required hostile-action-based exercises (NRC 34)
- No requirement to maintain an Emergency Response Data System (NRC 34)

All the relaxed requirements for Level 1 are based on the NRC's assumption that "for a decommissioning site, the spectrum of accidents that can have significant offsite consequences in greatly reduced and is dominated by the unlikely occurrence of a zirconium fire." (NRC 31)

Level 2 - Once the spent fuel in the reactor has been moved into the spent fuel pool:

- Evacuation Time Estimates are no longer required. (NRC 33)
- Annual dissemination of public information is no longer required (NRC 33)
- Reduced drills and exercises (NRC 33-34)
- Minimum emergency staffing requirements (NRC 35)
- Licensees are not required to perform an emergency plan staffing analysis (NRC 35)
- Emergency Action Levels related to mitigation systems not associated with the spent fuel pool are no longer applicable (NRC 36)
- Time to assess classify and declare an emergency condition is changed from 15 minutes to 60 minutes. NRC 36)
- Regulatory standards for offsite radiological emergency plans are no longer necessary (NRC 33)
- Time to notify state and local organizations is changed from 15 minutes to 60 minutes. (NRC 37)
- Public alert and notification system is no longer required (NRC 37)
- Emergency Planning Zones do not need to be maintained. (NRC 38)
- Need not develop preplanned protective action recommendations for emergency workers (NRC 38)
- Maintaining ETEs is no longer required (NRC 38)

- Requirements for Maintaining Technical Support Center, Operations Support Center, and Emergency Operations Facility designated staff and offsite field dose assessment teams are greatly reduced (NRC 39)
- Enhancements to EP in response to hostile action, such as alternative facilities for the staging of ERO personnel, protection of onsite personnel, and challenging drills and exercises involving hostile action, are not warranted for facilities in Level 2. (NRC 39)
- Drill requirement for protective action recommendation development and assessment of offsite impact of radiological releases are eliminated. (NRC 39)
- No requirement that offsite response organizations participate in radiological and exercises. (NRC 40)

All of the relaxed requirement for Level 2 are based on the NRC's assumption that a zirconium fire "after a cooling period of 10 months for BWRs or 16 months for PWRs" in the spent fuel is "highly unlikely," that a "minimum of ten hours" will elapse before spent fuel can heat up to zirconium ignition temperature, and that "the 10 hour period allows for the licensee to take onsite mitigation measures or, if necessary, for offsite authorities to take appropriate response actions." (NRC 31)

Once all fuel has been permanently removed from a site, a licensee may terminate its emergency protection program. (NRC 40)

The NRC's stated rationale for relaxing the emergency preparedness requirements is that doing so "provides the opportunity for significant adverted costs," and "reduced the regulatory burden on nuclear power plant licensees." (NRC 147)

PHYSICAL SECURITY [SECTION 5.2]

The NRC proposal says that:

> Currently, … decommissioning reactor licensees and the NRC staff have expended resources for processing security-related licensing actions, such as exemption and license amendment requests. … [T]he risk consequences presented by a decommissioning plant are much less than when it was operating. (NRC 46)

The stated purpose of the changes is to

> streamline the decommissioning process by allowing licensees to make changes to NRC-required security programs during decommissioning that reflect the reduced number of target sets and therefore a reduction in both risk and potential radiological consequences, without having to request either an exemption or amendment. (NRC 46)

As with Emergency Planning, the suggested changes deal with different Levels.

Level 1: Current regulations provide that the licensee has at least 10 armed responders for an operating reactor. The proposed change is that; when a reactor has been defueled, licensees may submit reassessment for less than 10 to NRC review. (NRC 49)

Level 2, after the spent fuel has been permanently removed from the reactor:

- Licensees are "no longer subject to NRC-conducted force-on force inspections." (NRC 47)
- A fuel handler may "approve the temporary suspension of security measures during certain emergency conditions or during severe weather." (NRC 47)
- Licensees are "relieved" from "the requirement … that a physical protection be designed to prevent significant core damage." (NRC 47-48)
- "Operational training to address loss of the ultimate heat sink is no longer necessary." (NRC 48)
- "The need for a reactor control room is eliminated." (NRC 48)
- The requirement for maintaining communications with the control room is changed to require communications between alarm stations and the Certified Fuel Handler CFH or senior on-site licensee representative. (NRC 48-49)
- Safeguards effectiveness: Licensees may make changes to their security plans without prior Commission approval if the change does not decrease the safeguards effectiveness of their security plans. (NRC 50)
- Current regulations do not define the term "decrease in safeguards effectiveness. "NRC is proposing a new definition that says, "*A decrease in the safeguards effectiveness of a security plan is a change or series of changes to the security plan that reduces or eliminates the licensee's ability to perform or maintain the security capability that was previously performed or provided by the changed element or component without compensating changes to other security plan elements or components."* (NRC 50)
- Licensees are required to provide a report of the changes to the Commission within 2 months following the change. The licensee shall maintain a record of each security plan change made without prior Commission approval for a period of 3 years from the date of the change. (NRC RC,50)

Level 3, after all the spent fuel has been moved from the spent fuel pool into an ISFSI:

- "Security measures needed to protect the facility from radiological sabotage decrease significantly … [and some] are no longer necessary." (NRC 35)

All of these relaxations in required physical security rest on the NRC's assumptions that once fuel has been removed from the pool "potential adversary targets are fewer" (NRC 46), "there is no potential emergency shutdown to prevent significant core damage or a radiological release because there is no core that would pose a radiological risk" (NRC 47), and that (NRC at least after all of the spent fuel has cooled for 10 or 16 months in the pool), there "there is little chance of a spent fuel pool fire." (NRC 5).

The NRC's stated cost-benefit rationale for relaxing the physical security requirements is that "eliminating the need to submit requests for exemptions and license amendments" reduces the regulatory burden on nuclear power plant licensees, and "the need for the NRC to review these exemptions and request submittals." (NRC 148)

CYBER SECURITY [SECTION 5.3]

The NRC proposes to "remove all cyber security requirements" after a cooling period of 10 months for BWRs or 16 months for PWRs. (NRC 52).

Once again, this relaxation in security requirements rests on the NRC's assumptions that "there is little chance that the spent fuel in the SFP could heat up to clad ignition temperature within 10 hours and lead to a zirconium fire for postulated SFP draindown scenarios and configurations with restricted heat transfer" and that after a cooling period of 10 months for BWRs or 16 months for PWRs, the potential "consequences of a cyber- attack are significantly reduced, because there are no design basis events at a decommissioning plant that could result in an offsite radiological release exceeding the limits established by the EPA." (NRC 53)

FITNESS FOR DUTY – DRUG AND ALCOHOL TESTING [SECTION 5.4]

The NRC analysis says that the "purpose of a licensee's IMP [insider mitigation program] is to help insure that individuals granted unescorted access … remain trustworthy and reliable and do not pose a threat to the facility." (NRC 56)

The NRC proposes to "rework the structure of the Insider Mitigation Program (IMP) requirements" to "reduce the number of individuals that are subjected to the FFD [Fitness for Duty] elements." (NRC 57)

In doing so, the NRC assumed that "the staffing at a nuclear power plant in the beginning of decommissioning is about 20% of its fully staffing level when fully operating," and only 30% of that remaining staff "will have access to the protected area." (N57)

NRC's rationale for the change is that reducing FFD requirements "results in cost savings to industry and NRC." (NRC 151)

FITNESS FOR DUTY – FATIGUE [SECTION 5.5]

NRC staff recommended no change, "assum[ing] for this analysis that … decommissioning sites will maintain a fatigue program of some kind for their security officers as part of their security plan and will have site administrative requirements to limit the work hours for plant personnel and to maintain plant staffing levels that avoids heavy routine use of overtime consistent with their corporate practices." (NRC 59)

The staff also repeated its assumption that once spent fuel had been in the spent fuel pool of a BWR for 10 months and 16 months for a PWR, "the potential consequences of an accident or security event are further reduced because a Level 2 decommissioning plant has no design-basis events that could result in an offsite radiological release exceeding the limits established by the EPA." (NRC 59)

MINIMUM STAFFING AND TRAINING REQUIREMENT FOR NON-LICENSED OPERATORS, INCLUDING CERTIFIED FUEL HANDLERS [SECTION 5.6]

NRC "regulations do not address minimum licensed operator staffing levels or training requirements for a facility undergoing decommissioning." (NRC 40) The NRC analysis also says that "decommissioning plants are discontinuing… licensed operator training programs." (NRC 62)

The NRC proposes to provide guidance regarding minimum staffing for certified fuel handlers and non-licensed operators. The NRC analysis also says that "the CFH (Certified Fuel Handler) and NLO (NRC on-Licensed Operator) positions would not be required after all spent fuel has been transferred to dry storage." (NRC 65)

The NRC apparently assumed not only that spent fuel would remain on-site for only 16 years, but also that a problem (cask leakage, terrorist attack, etc.) involving the ISFSI would not require knowledgeable fuel handlers or operators. (NRC 5, 65)

The NRC's stated rationale is that its proposal would "reduce resources expended by both the licensee and the NRC by, among other things, eliminating the need for a licensee to seek approval for fuel handler training programs and staffing requirements." (NRC 152)

DECOMMISSIONING FUNDING ASSURANCE [SECTION 5.7]

Under current regulations, licensees must request an exemption to use Decommissioning Trust Fund monies for any purpose except radiological decommissioning. Licensees have regularly sought exemptions that would allow them to use the funds for many other expenses they might incur during or after decommissioning.

For example, Entergy's March 2015 Vermont Yankee PSDAR, Appendix C, Decommissioning Cost Estimate lists the following costs to come out of its DTF: Payments to the State as part of the Settlement Agreement; Emergency planning costs; shipments of non-radiological asbestos wastes;

Insurance; Property taxes; Replacement structures during Safstor; Costs associated with offsite buildings that are not radiologically contaminated.[14]

The NRC proposes changing the regulation to allow licensees, without seeking an exemption or providing any potential public input, to use the DTF "to pay for both radiological decommissioning expenses … and spent fuel management" and also for "ISFSI decommissioning."[15] (NRC 66). The proposed change would require licensees to report the status of the fund and anticipated expenses only every three years rather than annually. (NRC 68) (Emphasis added)

Licensees would have to correct shortfalls in a timely manner and provide evidence to the NRC during the next reporting cycle. (NRC 68)

According to the NRC, these changes would reduce the need for exemption requests and the burden on licensees for reporting. (NRC 152)

No suggested change would improve the way the NRC supposedly insures that the DTF will have enough money to complete the decommissioning process.

OFFSITE AND ONSITE FINANCIAL PROTECTION REQUIREMENTS AND INDEMNITY AGREEMENTS [SECTION 5.8]

"This rule change would allow the licensees of large operating reactors that have permanently shut down a reduction in both offsite and onsite financial protection without the need … to submits requests for regulatory exemptions." (NRC 70) (Emphasis added)

Offsite: The financial protection for reactors in Level 1 ($450 million offsite, and $1.06 billion on site) would not change, but Level 2 requirements are reduced from $450 million to $100 million for offsite liability claims, and from $1.06 billion to $50 million for on-site damage. (NRC 70)

This reduction in protection from potential off-site damage that could result from a fire in the spent fuel pool once again rests on the NRC assumption that "fuel cannot heat up to clad ignition temperature within 10 hours for BWRs and 16 hours for PWRs." (NRC 71)

Onsite: With respect to on-site damage, according to the NRC, $100 million was sufficient to cover offsite liability claims such as those incurred because of the 1979 Three Mile Island, Unit 2,

[14] Petition of the State of Vermont, the Vermont Yankee Nuclear Power Corporation, and Green Mountain Power Corporation for Review of Entergy Nuclear Operation, Inc.'s Planned Use of the Vermont Yankee Nuclear Decommissioning Trust Fundhttps://www.nrc.gov/docs/ML1613/ML16137A554.pdf

[15] The Staff does not make note of the fact that Pilgrim's DTF was established by Boston Edison out of ratepayer's money. Entergy has not put any of its money into the DTF. But Entergy, like other licensees, will likely continue to sue the federal government for spent fuel management costs for breaching its contracts with the company by failing to open a facility that could accept fuel by 1998 in exchange for collecting fees for the Nuclear Waste Fund.

accident" (NRC 71) The NRC here assumes both that there has been no inflation over the past 40 years, and that its estimate of offsite Three Mile Island damage is correct.

The NRC also assumed that the only potential onsite damage would be "the rupture of a large liquid radwaste storage tank (NRC approximately 450,000 gallons) containing slightly radioactive water," and that the this "postulated event was estimated to result in an onsite waste cleanup cost of approximately $50 million with negligible radiological consequences of site." (NRC 72)

A spent fuel pool fire would result a far larger release of radioactive material and dramatically increase cleanup costs both on-site and off-site.

The NRC's justification for its decision "that existing insurance requirements can be stepped down" was not only its assumed "reduced level of risk," but also that reducing protection would reduce "the need to submit exemptions for reduction to onsite and offsite financial protection" and "the need for the NRC to review these exemption submittals." (NRC 153)

APPLICATION OF THE BACKFIT RULE [SECTION 5.9]

The final regulation will apply to Pilgrim Station. The NRC uses its backfitting process to decide whether to impose new or revised regulatory requirements or staff positions on nuclear power reactor licensees or certain nuclear materials licensees. (NRC 75)

According to the NRC, "The language of the Backfit Rule clearly applies to a licensee designing, constructing, or operating a nuclear power facility," but "The application of the Backfit Rule to decommissioning plants is not as clear." (NRC 75)

The NRC proposed to amend 10 CFR 109 "to provide licensees that have had their 10 CFR 50.82 (NRC) certifications docketed by the NRC [i.e., have permanently shut down and removed fuel from the reactor] with the same backfitting protection as they had during their operating phase." (NRC 77)

The stated justification is that "This may lead to less time spent by industry and the NRC for determining what regulatory action applied to a decommissioning licensee is or is not a backfit." (NRC 152)

According to NRC Staff, under current practice, the NRC would not use the provisions of the Backfit Rule that concern reactors that are being designed, constructed, or operated" in applying backfit requirements "to a licensee of a reactor that has already terminated the design, construction, and operation phases of its reactor's life." (NRC 76)

Left unanswered is the extent, if any, to which reactors that have shut down and are in the process of decommissioning, or those that may shut down within a relatively short period of time, will be required to backfit anything.

The NRC analysis also said that "Two of the factors used in evaluating a backfit – costs of construction delay/facility downtime, and changes in plant/operational complexity – are …'conceptually inappropriate in evaluating the impacts of a backfit on a decommissioning plant,'" (NRC 75)and that "the notion of a 'substantial increase' in protection to public health and safety from a backfit does not appear to be particularly useful [in decommissioning]," (NRC 76)

AGING MANAGEMENT [SECTION 5.10]

The regulations do not limit the number of 20-year renewal terms that may be issued. Therefore, a reactor and its SFP may be in operation for up to 80 years. The requirements in 10 CFR 50.82, "Termination of License," allow the licensee up to 60 years to decommission the site, with a provision for extensions. A licensee may use 60 years to decommission, following 80 years of reactor operation. The NRC staff assumed that a spent fuel pool may operate for up to 140 years. (NRC 78)

To assure that spent fuel is maintained in a safe condition, the NRC said it is reviewing the need for revisions to its regulatory guidance for aging management, with respect to certain long-lived, passive structures and components (SCs) (e.g., neutron absorbing materials, SFP liner, SFP cooling system) required to maintain nuclear fuel in a safe condition during the decommissioning period while nuclear fuel is in the SFP. (NRC 79-80

NRC Staff does not include in aging management, as they should, the spent fuel dry casks, ISFSI pad, haul road and any other ancillary structures.

Entergy's John Ohrenberger told the NDCAP's PSDAR review sub-committee (Feb. 15, 2018) that Entergy planned to have all the spent fuel moved from the pool to the ISFI within 30-36 months post-shutdown.

PSDAR, DECOMMISSIONING OPTIONS, AND DECOMMISSIONING TIMEFRAME [Section 4]

Section 4.1 of the NRC analysis is directed to "The Level of PSDAR Review by the NRC" (NRC 8), Section 4.2 to "Maintaining the Decommissioning Options" (NRC 13) and Section 4.3 to the "Timeframe Associated with Decommissioning." (NRC 16).

PSDAR: With respect to all three, the NRC Staff recommended "update[ing] guidance documents" of each (NRC 9, NRC 14, NRC 17), but the only suggested regulatory changes concerned the PSDAR. These would require licensees:

(1) to "evaluate the environmental impacts associated with specific decommissioning activities and determine whether such impacts are bounded by appropriate previously issued environmental statements, at the PSDAR stage" (NRC 13);
(2) address state and local government input and feedback "before the PSDAR could be implemented" (NRC 10); and
(3) Update PSDARs on a five- year basis (NRC 10)

The PSDAR procedure would not be changed to require the NRC to approve, rather than simply review, a PSDAR. The NRC said that it did not want to "reduce the flexibility provided by the use of a PSDAR instead of a decommissioning plan…or impose unnecessary burdens on licensees

and the RC staff to create and review additional documents that do not have any net positive impact on public health and safety." (NRC 144)

Decommissioning Options: With respect to the decommissioning options, the NRC "guidance" would "include an additional discussion of SAFSTOR and DECON," provide enhanced guidance to licensees regarding the potential merits and disadvantages of each and remove the discussion of **ENTOMB.** RG 1.184 also "would be updated to encourage licensees to add additional detail to the PSDAR, DCE, and Irradiated Fuel Management Plan (IFMP) regarding the option selected for decommissioning, the motivation of selecting that option, and what impact that decision has on long term storage of spent fuel." (NRC 14)

Decommissioning Timeframe: The Timeframe section noted that the "Commission must approve completion of decommissioning beyond 60 years" (NRC 16.

The Staff reiterated its goal of not "reducing the flexibility provided by the current decommissioning regulations or imposing unnecessary burdens on licensees and NRC staff through the rulemaking process." (NRC 146)

Respectfully submitted,
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