Gallagher, Carol

From: rmorgal@wildblue.net
Sent: Tuesday, August 25, 2015 2:09 PM
To: Gallagher, Carol; Torres, Ricardo
Subject: [External_Sender] No Verification of Comments Received
Attachments: Richard Morgal Comments to NUREG 1927.doc

Hello Ms. Gallagher and Mr. Torres,

I recently submitted my public comment to NUREG 1927 but never received verification that my comments were received by the NRC.

Please accept the attached comments to NUREG-1927 Rev 1 Draft, Docket ID NRC-2015-0106 as my updated comments.

If you would be so kind to send back verification that these comments were indeed accepted it would be greatly appreciated.

I am also curious, what becomes of the public comments and how are they addressed by the NRC?

Is there public record of the NRC's response to each comment?

How would I gain access to the NRC's response to my comments, assuming NRC responses are made?

Thank you,

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SUNSI Review Complete
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Add= K. L. Banovac (KLB)
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August 23, 2015

To: Nuclear Regulatory Commission
Carol.Gallagher@nrc.gov
Ricardo.Torres@nrc.gov

From: Richard Morgal, rmorgal@wildblue.net

Subject: NUREG-1927 Rev 1 Draft, Docket ID NRC-2015-0106

Comments Reference: NUREG-1927, Rev 1 - Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel, revised 6/29/2015 http://pbadupws.nrc.gov/docs/ML1518/ML15180A011.pdf

Living just under 45 miles downwind from the now shuttered San Onofre Nuclear Generation Station (SONGS), I am very uncomfortable with how SCE plans on storing the plant's nuclear waste.

A majority of my concern is related to the exposure of the stainless steel dry storage canisters (DSC) to the abundant salts found in the oncoming ocean breeze used to cool these canisters. It is known by the NRC that it can take less than 16 years for a chloride induced stress corrosion crack (CISCC) to breach the canisters that SCE plans on deploying at SONGS.[1]

This information, when coupled with the results of a rare inspection at Diablo Canyon's Nuclear Power Plant DSCs performed by EPRI in January of 2014 (which documents the presence of conditions that are necessary for a CISCC crack to initiate on canisters that have been deployed for less than two years), it seems likely that DSC's will breach long before they are relocated to a permanent repository.[2] Some of the canisters at SONGS have been deployed for over 12 years to date, with no permanent repository planned to be available for decades.

What is especially chilling to me and my family are public statements made by Dr. Kris Singh, CEO of Holtec, the manufacturer of the DSC system SCE would like to deploy at SONGS. During an SCE sponsored community engagement panel discussion, Dr. Singh states that one microscopic breach of the stainless steel canisters planned for SONGS would release millions of curie of radiation into the surrounding environment.[3]

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[1] NRC's metallurgist, Darrell Dunn stating it can take as little as 16 years for salt air to corrode thru 5/8" thick stainless canister. http://pbadupws.nrc.gov/docs/ML1425/ML14258A081.pdf 8/5/2014,1st paragraph on Page 4.

[2] Unprecedented EPRI canister inspection at Diablo Canyon Nuclear Power Plant documenting corrosive salts found on the surface of stainless steel canister after only 2 years of being deployed. http://pbadupws.nrc.gov/docs/ML1405/ML14052A430.pdf Slide 18 & 19

[3] https://www.youtube.com/watch?v=euaFZt0YPi4

A nuclear accident of this magnitude happening so close to a major Interstate will surely force the public to rethink nuclear power and the NRC's ability to store the waste, IF a breached canister is ever detected. Which is my main difficulty with NUREG 1927 as it has been drafted.

It appears that NUREG 1927 has been written to reduce the possibility of a breached canister ever being detected. Since a canister breach releasing a radioactive plume is invisible, relatively rapid and the human biological response to radioactive exposure is long delayed, it is unlikely anybody driving on Interstate 5 will ever know of their radiation exposure from a breached DSC at SONGS.

Please describe how a breached canister will be detected given that SCE is allowed by the NRC to remove all installed radiation detection equipment at SONGS once the plant is decommissioned. SONGS will be decommissioned for decades, with no installed radiation detection equipment for decades, before the spent nuclear fuel is relocated to a federal permanent repository.[4] How will breached canisters be detected and how will the public be notified of a radioactive release from a CISCC breached canister? This information should be included in any comprehensive aging management plan.

The lack of a cause and lack of immediate biological effect will ensure that a DSC breach at SONGS will never be attributed to any illness experienced by a driver on Interstate 5 experiencing an airborne radioactive release from a breached DSC. Just ask most cancer patients what was the cause of their disease; typically there is no known cause, it just occurred.

The pressure inside the DSC is only a few PSI above atmospheric pressure so there is a relatively small volume of gas with a high concentration of radioactive material that will be released. Similar to a soft-drink being opened in an enclosed space, the initial release will quickly dissipate to an un-noticeable level in a matter of hours. Except that the CO2 is not deadly.

How likely will a quarterly manual walk-through radiation inspection of the DSC's on-site be able to detect a breached canister? Can you please provide a probabilistic risk analysis of the likelihood that breached canisters will be detected by the quarterly manual walk-through radiation inspections. Is there any data known by the NRC that determines the duration and intensity of a CISCC breached DSC's radiation release? If a microscopic CISCC breach is modeled, what means have been used to validate the model as correct? Please include this data in the NUREG 1927 so the public can be assured that the NRC has determined the likelihood of detecting a breach from the quarterly walk-through radiation inspection. I would also ask that the quarterly radiation inspection breach detection rate be compared to the breach detection rate using a real time 24/7 radiation monitoring system. What level of confidence would be added by relying upon a 24/7 radiation monitoring system versus a quarterly walk through inspection process?

[4] http://pbadupws.nrc.gov/docs/ML1423/ML14238A326.pdf

Could there be any value to detecting a DSC breach immediately rather than months after it occurred? Could the US government be setting itself up for a huge legal battle related to negligence if hundreds of thousands of cars on Interstate 5 passing through a radiation plume without knowing? Since there would be no way of telling who drove on Interstate 5 during the breach, there would be no way to determine who's possible radiation related illness would have to be covered by the US government. Could it be that one DSC breach that went undetected for a matter of days, or months, be the lynch pin that forces all illnesses possibly contracted from exposure to radioactive krypton gas to be covered 100% by the US government? As a tax payer I question the cost savings of not monitoring all DSC's in real time 24/7 for a radiation release when it is possible that taxpayers could become financially responsible for radiation related illnesses of millions of US citizens.

If a breach is detected by a manual walk-through inspection, what would be the radiation exposure of the inspector performing the inspection? Could that level of exposure be compared to the level of exposure of the security staff that is present during repeated eight-hour shifts, day after day, unknowingly being exposed to a DSC breach that was not detected for weeks after the breach occurred? Will the ISFSI security staff be wearing personal radiation detectors? If so, should these personal radiation detectors be included in the aging management plan as early warning detectors for a breached canister? Please describe the role of personal radiation detectors for security personnel in the AMP and how they would be used to protect ISFSI employees and the general public.

I understand that DSC's that contain undamaged fuel rod assemblies will not contain any gaseous radiation, thus no radiation will be released when it breaches. The calculations and assessments requested throughout my comments should be made for DSC's that are known to contain damaged fuel rod assemblies, for which SONGS is known to have an exceptionally large number of damaged fuel rod assemblies. Maybe Dr. Kris Singh should be referenced as to where his predictions of millions of curie of radiation would be released from a microscopic breach of a stainless steel DSC.

The NRC would be motivated to either set up an aging management plan that is very unlikely to detect a breached canister to avoid a public relations backlash or become hyper sensitive to radiation being released from each and every DSC. It is my opinion that the NRC has chosen to gamble by minimizing the cost of storing the nation's spent nuclear fuel for an indeterminate amount of time, putting the taxpayer on the hook should anything go wrong. Lack of 24/7 real time radiation monitoring, coupled with the "lead" canister approach to re-licensing are the leading indicators of this gamble.

NUREG 1927 allows SCE to choose ONE canister and perform an "inspection" on that singled out canister for the first time after 20 years of being deployed in the corrosive ocean air. Then once every 5 years that same ONE singled out canister is to be "inspected" again, with each "inspection" being used to certify the integrity of the 100+ canisters storing 3½ million pounds of spent nuclear fuel on the SONGS site.

Have assessments been performed on the uniformity of CISCC growth on all stainless steel DSCs that experience the exact same conditions? Can we be assured that all the conditions are exactly the same for all the DSCs at a given ISFSI? Will edge DSC's be cooler than DSC's residing in the middle of the ISFSI field? How can we be sure that different DSC's don't behave differently when one of the initiators of CISCC is stress that occurred during the manufacturing process? How can ONE canister be used to certify a field of 100+ DSCs that have each been manufactured slightly differently?

Then there is the possibility of insects being attracted to the warm DSC vent holes with prevailing winds creating a selection process that is not uniform for the likelihood of insects going into the ventilation openings of the concrete over pack. Insect urine and blood are known to initiate CISCC and with a higher incidence of edge DSC's possibly getting higher insect infiltrations there may be variation across the ISFSI field that are not accounted for in the lead canister selection process. Have these possible variations been considered before the NRC and industry selected the lead canister process?
Chloride Induced Stress Corrosion Cracking (CISCC) has been know for nearly 100 years and has been used by processing plant engineers for decades due to stainless steel's tendency to leak long before it ever breaks outright. Thus providing plant maintenance personnel a margin of error where a liquid filled stainless steel tank will report its breach, by leaking, well before it ever bursts. But with gaseous radioactive contents this feature of stainless steel should be considered a danger to public health and safety.

Yet CISCC in stainless steel has proven very difficult to detect before a breach due to its microscopic surface area, while penetrating deeply into the stainless steel. Given the enormity of the eight-foot diameter, eighteen feet long, 100-ton canisters it has never been demonstrated that microscopic CISCC penetrations have ever been reliably detected on a DCS containing spent nuclear fuel. Once again I rely upon Dr. Kris Singh stating his concerns about how difficult, if not impossible it is to detect a CISCC crack on one of his company's stainless steel DCSs.[5] Please publish your latest results of the nuclear industry's development to detect and quantify CISCC damage to stainless steel DSCs so we can all rest assured that the problem is solved. Because right now it seems like we are relying upon non-existent technology to keep us from experiencing radioactive harm with no plan other than to just wait.

To date, at least in the NRC public literature, not one loaded canister has ever been removed from its concrete over pack to be inspected for CISCC. All DSC inspections that have been made for ISFSI re-licensing have been performed through very small ventilation openings in the concrete over pack with a very small percentage of the overall canister area being inspected. Why has there been no minimum percent of the canister's surface area been established for inspection of the DSCs? So the ONE canister that will be inspected to re-license the entire ISFSI will have only a small percentage of its surface area inspected (with no stated minimum surface area to be inspected)?

How can a quality control inspector, evaluating the thoroughness of a DSC inspection at an ISFSI re-licensing inspection, determine that sufficient inspection of the lead DSC has

[5] https://www.youtube.com/watch?v=euaFZt0YPi4

occurred to allow the ISFSI to be re-licensed if there is no stated minimum DSC surface area to be inspected during the inspection? To be a valid inspection there needs to be clearly specified a minimum percent of the DSC's surface area to be inspected to ensure that a valid inspection has occurred. Please include a minimum surface area of the lead DSC that will be inspected to enable an ISFSI to be re-licensed.

Given the microscopic nature of CISCC, it is extremely unlikely that a visual inspection will detect a CISCC crack. How can NUREG 1927 be accepted by the public when there are no minimum DSC inspection area specifications, no CISCC blemish size or penetration specifications, no equipment specifications to perform the inspections and no procedures stated that can be used to quantify the time predicted until a given CISCC blemish can no longer be relied upon before a breach will occur? Please include measurable inspection criteria to NUREG 1927 or call out the NRC documents that specify the measurable inspection criteria to allow an ISFSI to be re-licensed, as there is not sufficient measurable inspection criteria stated in the current draft of NUREG 1927.

I have to ask about how DSC's exposed to the ocean's salt air will be treated when stored in a high seismic area? How will the CISCC damage be detected and quantified to ensure that there aren't one hundred plus salt corroded DSC's that breach all at once during a strong earthquake event? How can the NRC ensure the public that this will not happen when all seismic certifications/simulations for DSC's are performed upon brand new DSC's with no flaws? Please provide some sense of how the NRC intends to quantify CISCC damage to aged DSCs that reside in high seismic areas when there is no way of detecting CISCC damage?

Assuming industry is able to detect microscopic CISCC cracks with 100% accuracy, what will be considered an acceptable depth of a crack to allow an aged canister to reside in a high seismic area? The 75% through-wall crack suggested by ASME is not for a vessel containing radioactive material and is not specified for high seismic areas. It is hard for an engineer to comprehend how such a situation can be confidently managed amongst the eight million people that live within a 50-mile radius of SONGS. Dr. Kris Singh's millions of curie for one canister could be 100's of millions of curie of radiation with 100+ canisters breaching due to a strong seismic event. The NRC can not justify looking at CISCC and high seismic vibrations as separate, unrelated conditions, they need to be evaluated together for locations near the ocean and fault lines.

The "lead" canister approach to certification of the entire field of 100+ canisters at any Independent Spent Fuel Storage Installation (ISFSI) demonstrates how unwilling the NRC and SCE are towards doing anything to the canisters, except let them sit. Without real time radiation detection, without meaningful inspection I have to ask, what would be done if somehow it is determined that a CISCC breach did occur?

Please state where the NRC documents what will be done when a DSC has aged to the point of breaching from CISCC. It is likely this will happen and it should either be in the aging management plan (AMP) or the AMP should reference the NRC document(s) that describes in detail what will be done, what equipment is needed on-site, and how long the

DSC repair is to be relied upon before it requires further inspection. This information needs to be documented before DSCs are deployed on-site to ensure equipment needed will be at hand to repair a breached DSC. In addition, once one DSC has breached what will be the procedure to evaluate the remaining aged DSC's at the ISFSI site?

SCE is very interested in dismantling the current spent fuel pools ASAP and will be allowed to do so unless there are NRC documents that state spent fuel pools are an integral portion of the AMP to address breached DSCs. The NRC should not allow any more nuclear power plants to be decommissioned until it is known what infrastructure residing on a recently shuttered nuclear power plant would be needed to repair or replace breached DSCs on-site.

This is a public safety issue, in that once one DSC breaches it is likely others will breach as well (same logic as is used in the lead canister approach that the NRC chooses to apply to the field, only the 1st breached canister is the lead canister). Once one DSC breaches, it would seem likely all other DSCs at the ISFSI would need to be evaluated to ensure further radiation releases were not eminent. All damaged DSCs would need to be repaired ASAP to reduce the likelihood of additional radiation releases. But if a spent fuel pool is required to repair faulty DSCs and there is no pool on site it could take years and 100's of millions of dollars to rebuild a pool that was hastily dismantled. Although the cost is an issue, the years it would take to replace the spent fuel pool while the public awaits the next canister to breach will not fair well on the nuclear industry's image.

I would think that the AMP would include all aspects of aging canisters including transportation of aged canisters. What equipment will be required to ensure that canisters that have been exposed to the ocean's salty air for decades will be robust enough to transport? How will these aged canisters be reliably inspected given the lack of any demonstrated ability to inspect for CISCC? Assuming industry is able to detect microscopic CISCC cracks with 100% accuracy, what will be considered an acceptable depth of a crack to allow an aged canister to be transported? What criteria will be used to evaluate this allowance? Please relate the transportation CISCC crack penetrations maximums to high seismic area calculations to provide a sense of how robust a transport cask must be in relation to a cask that is expected to survive a strong earth quake event. If a crack is determined to be too deep, what is the procedure to repair or replace the damaged canister? The equipment required also needs to be included in an aging management plan. Please specify.

It appears that NU-REG 1927 has been set up to minimize the likelihood of a CISCC breached canister ever being detected. I would argue that the cost of 24/7 real time monitoring and Internet reporting of DSC radiation retention would provide the public with hard evidence that there are no current radiation leaks, and over the test of time that stainless steel DSCs are robust and long lasting. If the industry and NRC are so confident that this storage technology is robust enough to endure the high salt content found in the ocean air, there is little reason to avoid a robust radiation monitoring approach. A rigorous radiation monitoring approach provides confidence to other on-site ISFSI environments that experience less harsh exposure to salts than SONGS, that these less harsh sites are safe as well. Real time radiation release information immediately following an earthquake could provide the general public insight into how to respond to a possible rapid release of radioactive gas emitted from an aging ISFSI on an earthquake fault. If no means to combine both CISCC and Seismic impacts can be derived, maybe 24/7 radiation monitoring and reporting could be the mitigating solution to this complex problem. The reduced liability of stopping people from exposing themselves to a radioactive plume on Interstate 5 might be enough of a public safety benefit to consider SONGS to become the "DSC robustness demonstration" venue with 24/7 radiation monitoring and reporting. But NUREG 1927 leaves the public in the dark with little to no confidence that the NRC is doing anything more than hiding the elephant in the room. The public deserves better, proving the spent nuclear fuel storage technology's ability to reliably contain it contents even in the harshest environment found at SONGS with radiation monitoring equipment and reporting. The public is hoping it is going to work and should be immediately notified if the canisters fail.