To: David Victor, Chairman
Community Engagement Panel (CEP) July 17, 2014

Re: High Burnup Fuel and Dry Cask Storage Issues

There are issues about both high burnup fuel and dry cask storage that need to be resolved before Edison moves forward on their dry cask procurement. I realize the CEP is an information sharing venue. Please share this information with the CEP. Page 4 contains reference links to the information discussed here.

HIGH BURNUP FUEL – UNRESOLVED ISSUES

In your July 15th NRC testimony you said you are relying on the May 2nd letter from the NRC for your facts on high burnup fuel. That NRC letter was in response to the paper Marvin Resnikoff and I prepared regarding high burnup fuel. I sent the NRC a response to that letter on June 25th (Page 4) and they are working on a response. There is a lot of misinformation regarding nuclear waste storage technology, even within the NRC. Therefore, it's important for the NRC to substantiate their statements with technical references. Their May 2nd letter made a number of statements, but did not substantiate them with technical references. Technical references Marvin and I included in our document contradict some of their "facts".

NUCLEAR WASTE STORAGE – HIGHEST PRIORITY

You noted in your testimony that the CEP is spending a lot of time on nuclear waste storage. Of all the decommissioning issues, nuclear waste storage is the one that can have the most significant impact on Southern California and the nation. We need to spend more time on this to help ensure the right decisions are made and not rush into a decision before knowing all the significant facts. As citizens affected by this decision, it's up to us to make sure this is done right.

UNRESOLVED DRY CASK STORAGE AND AGING – NEED 300 YEAR SOLUTION

On July 14th and 15th I listened to a two day NRC public meeting on regulatory needs for dry cask licensing and license renewal. The focus was on having an aging management plan in place before relicensing or issuing new licenses, now that the NRC knows on-site or interim dry cask storage will be needed for up to 300 years or more. The NRC stated the earliest date for a permanent repository is 2048 and that is optimistic. They are researching on-site and interim dry cask storage requirements for 40,100, 150 and 300+ years. No NRC canisters are certified for long term storage or for geological repository storage. High burnup canister licenses have not been renewed past the initial 20 year license, even for expired licenses. And the NRC's Bob Einziger states there are still transportation problems with high burnup fuel. The NRC plans have a draft for public comment regarding dry cask storage relicensing by the end of 2014, according to Mark Lombard, Director, Division of Spent Fuel Storage and Transportation. However, this will not address our current issues.

STAINLESS STEEL CANISTER PROBLEMS

Darrell Dunn, an NRC materials engineer, stated stainless steel dry storage canisters are vulnerable to through-wall stress corrosion cracking within about 25 years. If any of the fuel cladding in the canister fails, there is no protective barrier and we could have a serious radiation release. The NRC said they have no current mitigation plan for that consequence. They suggested we MIGHT be able to put the fuel back in the spent fuel pool. However, Edison plans

to destroy the spent fuel and transfer pools. And there is no option to patch the canisters. The NRC said they HOPE there will be a solution for mitigation in the future. Even the NRC's May 2nd high burnup letter admits there are mitigation problems.

NO INSPECTION OF STAINLESS STEEL CANISTERS

To make matters worse, these stainless steel canisters are not inspected after they are loaded into the unsealed concrete overpacks (NUHOMS) or concrete casks (Holtec or Magnastor). The NRC proposed having each nuclear plant inspect the outside of only ONE stainless steel canister before they receive a license renewal and then do that once every 5 years. The industry balked at having to even check one canister at every plant. The problem with the stainless steel canisters is they do not protect against gamma rays, so it's not a simple task to remove a canister from the concrete overpack/cask to examine the exterior for corrosion or other degradation. And since welded canisters do not have monitoring for helium leaks, we may not have any warning of an impending radiation release.

CONCRETE OVERPACK CORROSION PROBLEMS

Darrell Dunn discussed serious corrosion problems with the concrete overpacks/casks, especially in coastal environments.

DUCTILE CAST IRON CASKS – A BETTER SOLUTION

I asked Aladar (Al) Csontos, NRC Branch Chief in the Division of Spent Fuel Storage and Transportation (SFST) if San Onofre would be better off using a ductile cast iron cask like the CASTOR, due to our coastal environment. He said that might be a better option near the ocean. Casks, such as CASTOR, may eventually have aging issues with bolts and seals. The CASTOR has double sealed lids, so even if one fails, we'll still have a sealed canister. And Edison would be able to easily monitor for cask material degradation with all the casks.

The NRC licensed the CASTOR V/21 ductile cast iron cask years ago (Page 4) and the cask is still in use. In fact, a CASTOR V/21 was used to justify all U.S. low burnup fuel dry storage for over 15 years. However, the industry moved away from this cask technology mainly due to the cost of cast iron at the time and with the assumption that the canisters would only be needed until Yucca Mountain opened. The CASTOR V/21 was considered the "Cadillac" of the industry and the CASTOR line is still very popular in other parts of the world for BOTH storage and transport (including high burnup fuel). The CASTOR canisters have multiple certifications for quality manufacturing, unlike the U.S. stainless steel canisters.

The CASTOR has pressurized lid monitoring to detect helium leaks and temperature changes. It has a nickel coating inside and out for environment corrosion protection. It does not have stress corrosion cracking issues and does not require a concrete overpack/cask, according to the NRC.

The V/21 is almost 15" thick as opposed to the 1/2" to 5/8" stainless steel canisters. The newer model CASTOR V/19 is almost 20" thick (Page 4). There are other ductile cast iron canister brands that are used in other countries. However, the U.S. emphasis on cost over longer term safety discourages competition from better quality casks vendors. With new U.S. needs for longer term on-site and interim dry cask storage, this should change. But it won't happen unless we advocate for it. That was very clear after listening to the NRC July 14th/15th meeting.

FORGED STEEL CASKS (AREVA TN-24)
Areva makes a thick walled forged steel cask (the TN-24), which was approved years ago by the NRC. This TN-24 cask is much thicker and doesn't require an overpack. Its specs are not as robust as the CASTOR, but a heck of a lot better than what Areva is trying to sell us. In Areva's CEP sales presentation, they didn't mention the container models they used to transport high burnup fuel or what the state of the fuel cladding was or the many other variables. They likely used other technology than what they are selling us (especially since they are trying to sell us newly designed canisters that are still going through the NRC licensing approval process). Fukushima Daiichi and Germany use some TN-24's.

ENCLOSE CASKS IN BUILDINGS
Both Japan and Germany enclose their casks in a building as additional protection from the environment.

ACTION NEEDED
No dry cask solution is even close to perfect, but we need to buy ourselves as much time as possible. Given the issues with stress corrosion cracking within 25 years, concrete degradation, lack of monitoring, lack of even external inspection of stainless steel canisters, we can do better for Southern California. I realize the spent fuel pools are dangerous. However, the fuel needs to cool for a number of years anyway, so we have time to do a better job selecting dry cask storage.

We can't wait for the NRC to take the lead. They stated they only react to vendor license applications. However, the vendors only apply for NRC licensing if they think they have a customer lined up for their product. We need to be that customer. We need to find a way to have vendors with better cask technology bid on the San Onofre dry cask storage system. The CEP had a presentation from Areva, but from no other dry cask storage vendors.

Edison has not shared with us the documents they used to solicit bids (Request for Proposal), so we have no idea what the requirements are in that bid package. That would be useful information and the public should have access to this information.

If you have questions about sources for any information, please feel free to contact me. I have references that are not on the SanOnofreSafety.org website. Listening and participating in the NRC July 14th/15th dry cask meeting gave me confirmation that my research findings are valid. A link to the meeting agenda and presentations is included on Page 4. However, not everything discussed is in the written material.

I appreciate your interest in these important issues. I understand the CEP is an avenue for information sharing only, but these issues affect all of us and we need to take individual action accordingly. No one else appears to be doing this. We only have one opportunity to get this right.

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Document References

High Burnup Nuclear Fuel – Pushing the Safety Envelope, M. Resnikoff, D. Gilmore, January 2014
http://sanonofresafety.files.wordpress.com/2014/01/hbffactsheet01-09-2014.pdf

Letter from Chairman Macfarlane regarding high burnup fuel, May 2, 2014
http://sanonofresafety.files.wordpress.com/2013/06/05-02-14-ltr-to-priscilla-star-fm-chairman-macfarlane.pdf

Response from Donna Gilmore to NRC regarding May 2, 2014 request for NRC high burnup fuel technical basis, June 25, 2014
http://sanonofresafety.files.wordpress.com/2013/06/responsetonrc-hbf-recommendations2014dg.pdf

David Victor testimony to NRC Commissioners, July 15, 2014
http://www.nrc.gov/reading-rm/doc-collections/commission/slides/2014/20140715/victor-20140715.pdf

NRC Meeting to Obtain Stakeholder Input on Potential Changes to Guidance for Renewal of Spent Fuel Dry Cask Storage System Licenses and Certificates of Compliance, July 14th/15th, 2014 (includes slide presentations)
http://www.nrc.gov/waste/spent-fuel-storage/public-involvement.html

Dry Cask Storage References

CASTOR V/21 NRC Certificate of Compliance and Safety Analysis Report, August 17, 1990
http://pbadupws.nrc.gov/docs/ML0330/ML033020117.pdf

CASTOR brochure (includes the CASTOR V/19 and other ductile cast iron casks).
http://www.siempelkamp.com/fileadmin/media/Englisch/Nukleartechnik/produkte/CASTOR_A_high_tech_Product_made_of_ductile_Cast_Iron.pdf

GNS' [CASTOR] experience in the long-term storage at dry interim storage facilities in Ahaus and Gorleben, IAEA Vienna, May 20, 2014
http://bit.ly/1jUSNOZ

TN-24 NRC Certificate of Compliance and Safety Analysis Report, November 4, 1993
http://pbadupws.nrc.gov/docs/ML0330/ML033020128.pdf

AREVA Innovation in the Design of the Used Fuel Storage System, CRIEPI Tokyo, November 15-17, 2010 (includes information on TN 24 casks)
http://criepi.denken.or.jp/result/event/seminar/2010/issf/pdf/4-1_powerpoint.pdf

AREVA Dual Purpose Casks in Operation, AREVA TN Experience, Vienna, May 19-21, 2014
http://bit.ly/1l9xO5R

Spent Fuel Storage and Transportation Experience, Idaho National Engineering Laboratory (GNS Castor V/21, Transnuclear TN-24P, Westinghouse MC-10, NAC S-100-C), 1987
https://canteach.candu.org/Content%20Library/NJC-1-2-11.pdf