Myths about Continued Storage of San Onofre Used Nuclear Fuel

Southern California Edison's (SCE) fact sheet on "*Continued Safe Storage of San Onofre Used Nuclear Fuel*"[1] contains many misleading statements. Below is the text from that document followed by facts SCE may not want you to know.

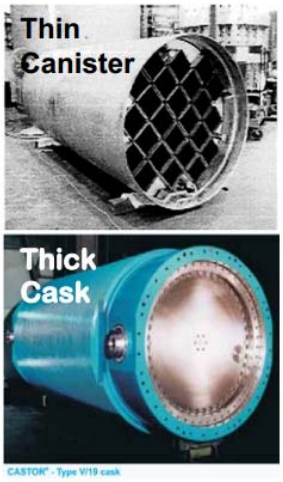
SCE: *Southern California Edison (SCE) announced in June 2013 it would permanently retire San Onofre nuclear plant Units 2 and 3 and decommission the facility. In preparation for major dismantlement work, SCE will transfer San Onofre's used nuclear fuel from steel-lined concrete pools into robust, concrete-encased steel canisters -- a proven technology known as dry storage.*

FACTS: The canisters are not robust and the concrete-encase steel canisters are not a proven technology.

- The first welded stainless steel thin (1/2" thick) canisters were loaded with used nuclear fuel in July 1989.[2] The Holtec Umax system SCE plans to use has never been used anywhere and has not been approved by the NRC and does not have funding approval by the California Public Utilities Commission (CPUC). An earlier version of the Holtec underground system has only been used at Humboldt Bay and only for 5 canisters loaded in 2008, with low burnup fuel that had been cooled in pools for 35 years.[3]
- No thin steel canisters have ever been inspected for cracks or corrosion because the technology does not exist to do this. However, a Holtec thin steel canister at Diablo Canyon has all the conditions for cracking in a two year old canister.[4] SCE has never inspected their canisters for corrosion and cracks nor have other thin steel canister been inspected in the U.S., since there is no technology to do this.
- The thin canisters cannot be repaired[5] and no plans are in place for replacing failed canisters. There is no early warning monitoring system for thin canisters, so we'll only know AFTER they start leaking millions of curies of radioactivity into the environment.
- Thick casks (up to 20" thick) have been successfully used internationally for over 40 years. However, SCE refuses to use the thick casks.[6]

Reasons to buy thick nuclear waste dry storage casks

Safety Features	Thin Canisters	Thick Casks
1. Thick walls	1/2" to 5/8"	up to 20"
2. Won't crack		√
3. Ability to repair		√
4. Ability to inspect exterior		√
5. Early warning monitor		√
6. ASME canister or cask quality certification		√
7. Defense in depth (redundant systems)		√
8. Stored in concrete building		√
9. Licensed in U.S.	*	*
10. Market leader	U.S.	World



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SCE: *In December 2014, SCE selected Holtec International to design and build a robust, underground dry storage facility for San Onofre's used nuclear fuel until the Department of Energy removes the fuel from the site. The selection of Holtec followed three detailed public discussions led by San Onofre's Community Engagement Panel. About one-third of San Onofre's used nuclear fuel is already in dry cask storage containers; Holtec plans to complete the transfer of the remaining fuel to dry storage by mid-2019.*

FACTS: The Community Engagement Panel has no authority. SCE made the decision to use Holtec in spite of the data presented at the Community Engagement Panel (CEP) meetings.

- SCE refused to allow a presentation by thick cask vendors, in spite of the request from CEP members. The thick cask design is the top design used internationally and has been proven in use for over 40 years. It is maintainable, not subject to cracking, and has early warning monitoring. The Holtec thin steel canisters do not.
- The schedule to load all the fuel into dry storage by mid-2019 is an arbitrary decision by SCE.
- The waste may need to stay at San Onofre indefinitely, due to the lack of a permanent or interim storage repository, yet the dry storage system selected is not adequate for long term storage.

SCE: *Holtec exceeded SCE's requirements for this engineering, procurement and construction contract: a design approved by the U.S. Nuclear Regulatory Commission, high seismic design specific to San Onofre, engineering and fabrication capabilities, fuel handling and cask loading experience, and experience constructing dry storage facilities.*

FACTS: SCE did not allow the CEP to see the bid requirements document, so we have no idea what these requirements are. However, given they selected the Holtec design that does not have a proven track record and may crack within a few years, the requirements are not adequate. Also, there is no seismic rating for a cracked canister. The NRC plans to allow up to a 75% crack in a canister.[7] However, they have no seismic evaluation or other basis for allowing this.

SCE: *Holtec's canister integrity monitoring program is designed to prevent, detect, monitor and address any cracking or corrosion. At SCE's request, Holtec also will provide an empty dry storage canister to be used for advanced testing and inspection techniques at San Onofre to enhance existing industry aging management programs. In addition, SCE will leverage the Holtec project by partnering with the Electric Power Research Institute (EPRI) to apply leading-edge inspection techniques at San Onofre.*

FACTS: The NRC has no technical information on this "canister integrity monitoring program." It does not yet exist. Given that the NRC is allowing 5 years for the nuclear industry to develop the ability to inspect for cracks, this is fiction. The fact Holtec is providing an empty dry storage canister and SCE is "partnering with EPRI to apply leading-edge inspection techniques" demonstrates more research is needed to attempt to developing a method to inspect and prevent cracks and corrosion. SCE is using ratepayer money to buy a "promise" of a future solution. For over a billion dollars, ratepayers should be buying existing proven technology, not promises.

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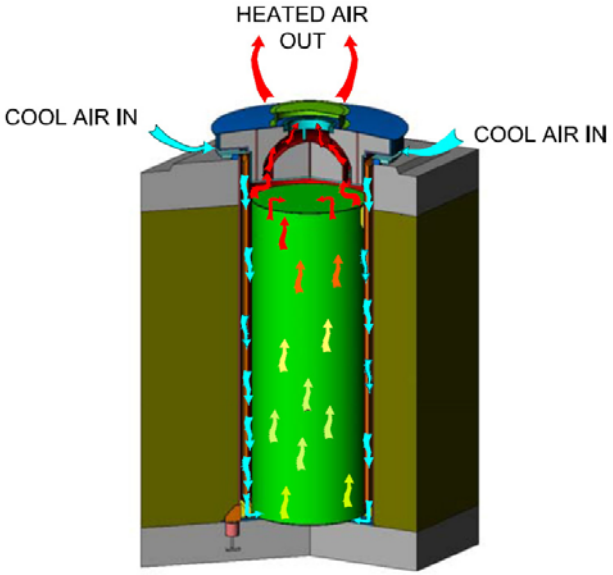
SCE: *Holtec's Hi-Storm Umax underground design for San Onofre features the most corrosion resistant grade of stainless steel. The design exceeds California earthquake requirements, and protects against hazards such as water, fire or tsunamis. The canisters weigh 45 tons, and are topped with a 12-ton steel and concrete lid. The underground storage cavities are encased in a concrete monolith. The surface of the stored canister is inaccessible to missiles or projectiles. Holtec, which has a corporate commitment to creating domestic jobs, will engineer and fabricate all components for San Onofre at its facilities in Pennsylvania, Ohio and New Jersey. Headquartered in Jupiter, Fla., Holtec performs industrial work on six continents, with 70 percent of its business in the United States.*



FACTS: The "most corrosion resistant grade of stainless steel [316L]" is subject to stress corrosion cracking.[8] Thick ductile cast iron casks do not crack, but SCE refused to consider this a critical factor in their decision-making. And there is no seismic rating for a cracked canister. The "concrete monolith" is vented to the outside environment in order to provide convection cooling to the thin canister [see Umax system diagram]. Water can enter the vents and block the required air circulation. The underground system is an unproven technology. The NRC had concerns about moisture in an underground system. Inspection of an underground system for aging management has not been adequately addressed. Geology and ground stability near the cliff has yet to be addressed. Employees working for a company that makes nuclear waste canisters that are not designed for long-term storage may want to consider other employment.

SCE: *San Onofre currently stores used nuclear fuel safely and securely using a combination of technologies: dry storage and enclosed, steel lined pools known as wet storage. San Onofre currently has about 2,668 fuel assemblies in the spent fuel pools for Units 2 and 3 and about 800 Unit 2 and 3 fuel assemblies in dry cask storage. There are about 400 Unit 1 used nuclear fuel assemblies in dry cask storage on site. In addition, there are 270 fuel assemblies for Unit 1 stored offsite at General Electric's used fuel storage facility in Morris, Ill.*

FACTS: San Onofre's used fuel is NOT stored safely. There is no remote monitoring of water level in the pools. SCE has chosen to ignore the safety lessons from Fukushima and received an exemption from the NRC requirement to add remote monitoring of water levels in the spent fuel pools. SCE is ignoring technically superior thick cask designs that can be inspected, don't crack, can be maintained, and have remote and early warning monitoring capabilities. The existing thin steel canisters have been loaded with used fuel since 2003.[9] SCE does not have technology to inspect these so has no idea if any of them are cracking. However, a pipe at San Onofre made out of similar material failed after 25 years and other similar components failed in as little as 16 years.[10] Marine salts are very corrosive to these stainless steel materials.

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Nuclear power plants throughout the United States have been safely storing used nuclear fuel in dry storage canisters since 1986. Analysis by EPRI shows that it would take at least 80 years before a severe crack could occur in a dry storage canister – a development characterized as a "through-wall" crack. Industry experts are developing advanced cask monitoring with new testing methods that are expected to be in place by 2019.

FACTS: The first welded stainless steel thin canisters were loaded in July 1989. The 1986 canister was a different design. And storage of high burnup nuclear fuel assemblies began only about a decade ago. High burnup fuel is over twice as radioactive, hotter, and unstable in storage and transport.[11] And EPRI's analysis showing it would take at lease 80 years before a severe crack could occur is based on modeling and assumptions. EPRI is ignoring their own data on the salts and temperatures they found on a Diablo Canyon canister that had only been in use for two years. They are ignoring the fact crack growth rate is higher in canisters above ambient temperature – up to four times faster.[12]

Additional information and references available at **SanOnofreSafety.org**.

References

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[4] *Diablo Canyon: conditions for stress corrosion cracking in 2 years*, D. Gilmore, October 2014 *https://sanonofresafety.files.wordpress.com/2011/11/diablocanyonscc-2014-10-23.pdf*

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[11] *High Burnup Nuclear Fuel — Pushing the Safety Envelope*, M. Resnikoff, D. Gilmore, January 2014 *http://sanonofresafety.org/2014/01/08/high-burnup-fuel-fact-sheet-2/*

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