Enclosures

- PATRAM Presentation by David Victor
- Koeberg, South Africa Presentations
- Sen. Pat Bates Bipartisan Resolution
- Ray Lutz email to CEP; “The Pendleton Option and questions to the CEP”, dated August 13, 2019
- Attachment to Ray Lutz’ email “Pendleton Option Handout 2”
- Lt. General Dana Letter to the NRC, dated May 8, 2018
Community Engagement at San Onofre: Implications for Packaging and Transportation

David Victor
Chair
SONGS Community Engagement Panel

Aug 8, 2019
Who am I?

• Chairman SONGS Community Engagement Panel (CEP)

• Academic
  – Professor at School of Global Policy & Strategy, UC San Diego; Professor of Climate, Atmospheric Science and Physical Oceanography, Scripps Institution of Oceanography
  – Co-leader, UC San Diego Deep Decarbonization Initiative
  – Co-leader, Initiative on Energy and Climate, Brookings Institution

• Heavily involved in US industry and R&D
  – EPRI Board of Directors and Advisory Council
  – INPO Advisory Council
  – 2 National Academy of Sciences panels on future of power sector
Today’s Topics

1. Our Mode of Community Engagement
2. Issues with Fuel Handling
3. Getting Ready for Transportation
4. Some broader lessons
1. SONGS Community Engagement Panel (CEP)

- **Role**  
  Engagement/conduit (not a decision-making body)

- **Formation**  
  Established voluntarily by SCE in 2014

- **Composition**  
  18 leaders in community representing:
  - Local government (neighboring counties and cities)
  - Environmental non-governmental organizations
  - Academia
  - Schools
  - Native Americans
  - Organized labor
  - Business
  - Neighbors (military base and state parks)
  - Emergency response professionals
What We Have Learned

• **Where volunteer engagement works**
  – Single point of conduit for engagement discussions
  – Ability to convene experts, regulators, etc
  – NOT a decision-making body
  – Engages representative local interests, notably elected officials

• **Where we have challenges**
  – Restricted scope (SONGS focused)
  – Long gestation period to earn trust
  – Grandstanding and bandwidth
  – Translating ”engineer” into “English”
Extensive Public Attention to these issues

Testimony of Prof. David G. Victor, Chairman of the San Onofre Community Engagement Panel, before the House Oversight and Government Reform Subcommittee on Interior, Energy and Environment
September 25, 2017

Subcommittee Chairman Farenthold, Ranking Member Plaskett, and members of the subcommittee, including Representative Issa and Representative Gomez, thank you for the invitation to testify today about the national problem of storage and disposal of spent nuclear fuel. About 35 years ago Congress laid out a plan for long-term disposal of spent fuel from the country’s nuclear reactors: the Nuclear Waste Policy Act (NWPA) of 1982. Since passage of that law, the government has consistently failed to meet key deadlines to remove spent fuel from the 99 operating commercial reactors at 59 sites around the country.² Worse, there are now 17 reactors at 14 sites in 11 states that are no longer operating—reactors, such as at San Onofre in Southern California where the spent fuel will remain stuck onsite long after the rest of the site has been shut down and removed.²

Safety of long-term storage in casks: Issues For San Onofre

Report of the Chairman of the Community Engagement Panel of the San Onofre Nuclear Generating Station

David G. Victor
9 December 2014

Los Angeles Times

Nuclear waste has been piling up across America with nowhere to go. Congress needs to act

By DAVID G. VICTOR, DAN STETSON and JERRY KERN  JAN 24, 2019  |  3:05 AM
2. SONGS Used Fuel Management Strategy

1. Safely manage and store San Onofre’s used nuclear fuel until it is removed from site

2. Promptly offload fuel from pools to dry cask storage
   - Spent fuel is safer in passive dry cask storage
   - Packaged for transportation

3. Support all safe and reasonable options to remove used nuclear fuel from San Onofre site
   - Developing strategic plan to assess the feasibility of relocating spent fuel to an off-site facility

4. Recover used fuel storage costs from DOE
SONGS Independent Spent Fuel Storage Installation (ISFSI)
Provides Passive Dry Cask Storage for Spent Fuel While On Site

AREVA System
(50 spent fuel canisters)

Holtec System
(73 spent fuel canisters)
Expanded Holtec HI-STORM UMAX System

Corrosion-Resistant Stainless Steel Multipurpose Canister

Stainless Steel Lid

Corrosion-Resistant Stainless Steel Cavity Enclosure Container

Reinforced Concrete Pad (Top/Bottom)
Establishing Nuclear Culture in Fuel Handling

• Aug 2018 downloading incident
  – Cessation of operations; NRC and internal reviews; resumption ~year later

• Re-establishing nuclear safety culture approaches to fuel offloading
  – Active learning across sites
  – Pacing and crew renewal
  – Avoiding single points of failure

• Re-earning public trust
Defense-in-Depth

- Design
- Fabrication
- Operations, Maintenance & Security
- Inspection
- Remediation
# Aging Management Update

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3. Getting Ready for Transportation
The Original Vision for US Spent Fuel Strategy

- On-site fuel use in reactors
- Cooling in pools
- Packaging, additional cooling (if needed) then transportation to permanent repository
- 1982 Law envisioned 2+ permanent repositories
- After 1982, just one site selected (Yucca mountain, near Las Vegas)
- Yucca mountain highly controversial and not yet (never?) licensed
2018 Inventory
Centralized Used Fuel Resource for Information Exchange (CURIE)

https://curie.ornl.gov/map
U.S. Commercial Spent Fuel Storage Sites
Key Issues for Transportation

- Interim Storage is the Most Important Option right now
- Regional transportation planning & readiness are essential (~3-5 years)
- What does “consent” mean for transportation?
Some Broader Lessons

• At SONGS: Public trust is scattered and fragile
  – Hard to earn; easy to lose
• Big gap between “engineering” assessments of risk and what the public talks about
• Intense and growing public attention to long-term waste management and stewardship
• Intense concern has not yet translated into solutions
San Onofre Nuclear Generating Station
- Eskom to provide a short presentation highlighting Koeberg’s experience with ASCC

- Eskom to indicate strategy for the mitigation of ASCC at Koeberg
ASCC Background

- ASCC was confirmed as a damage mechanism on austenitic stainless steel components as far back as 2001.

- The term is used because it refers to the more commonly known Chloride-Induced Stress Corrosion Cracking (elevated temperatures 50-100°C), occurring at room temperature.

- The mechanism was active during the operating period prior to 2001, but it was likely in the initiation phase. NDE techniques applied during this period did not detect it.

- Due to the development of through-wall leaks on piping formerly inspected and cleared of crack-like indications by dye penetrant testing (PT), it was discovered that the inspection technique was inefficient in detecting cracks that developed from the bottom of corrosion pits which are evident on the surface.

- The PT-procedure was modified to include a buffing step to remove 200-250µm off the surface, and the dwell time was increased to a minimum of 30mins.
Sub-surface Nature of Cracking

1RIS 004TY/FB penetration ground and unground
Sub-surface Nature of Cracking

1RIS 004TY/FB penetration ground and unground

Surface: Cluster of Pores

Sub-Surface: Network of Cracks

2001/ 7/15 6:36pm
ASCC have been positively detected in Type 304/304L Austenitic stainless steel on the following components:

• Seam-welded piping and pipe fittings (elbows, tees etc.)

• Cast valve bodies

• Tanks of welded construction

These components are located in various environments, i.e.

• Enclosed, but unfiltered access to marine environment - PTR tanks

• Enclosed with NAB HVAC – PTR, RIS, RCV & EAS piping

• Enclosed with Containment HVAC – EAS piping
Examples of ASCC on Type 304 SS

2RIS 004 TY/FB window crack
Examples of ASCC on Type 304 SS

2RIS 004TY/FB through-wall leak
Examples of ASCC on Type 304 SS

2PTR001BA leak from bracket weld
Examples of ASCC on Type 304 SS

2PTR 001BA crack network under bracket

2001/8/20 4:16am
Examples of ASCC on Type 304 SS

2PTR001BA compensating ring weld
Leakage from PTR tank – Manhole Penetration

Examples of ASCC on Type 304 SS
Leakage from PTR tank – Manhole Cover
• ASCC has also been found on seam-welded piping of Type 316L Austenitic Stainless Steel, used for the exhaust stacks of the Emergency Diesel Generators (EDGs).

• These stacks are located outside, with no protection from the marine environment. Performance testing is done frequently, during which the material is exposed to elevated air temperatures (200-300°C).

• Metallurgically, it was concluded that the periodic exposure to higher air temperatures affected the composition of the scale build-up on the surface. This in turn decreased the material’s pitting resistance to the marine environment at low (ambient) temperatures. Over time this resulted in corrosion pits sufficient to initiate ASCC.

• No other instances of cracking on Type 316 SS, operating at ambient conditions, have been detected to date.
EDG Exhaust Stacks

Replication
Justification for Continued Operation

- For each component type, a fracture mechanics study was done to determine the critical crack size and demonstrate structural integrity with a through-wall leak.

- The integrity report was used to compile an Engineering Problem Report (EPR) for each affected system or component (PTR tanks).

- EPRs were used to compile the ASCC Safety Case, SC2003/0022, for continued operation with degraded components on safety related systems.

- ISIPRM AUG-14 was implemented to conduct the monitoring inspections required by the Safety Case, i.e.
  - Two monthly/Three-monthly visual inspections for through-wall leaks
  - Six-monthly leak rate check of the installed patches on the PTR tanks
  - Periodic dye-penetrant inspection of selected cracks to confirm the rate of crack propagation

2019/06/27
ASCC Mitigation Methods

- HVAC Filtering - Not feasible due to the low threshold of deposited chlorides required to prevent ASCC (<1µg/cm²).
- Buffing - It does not remove all corrosion pits and only temporarily resets the initiation of pitting/cracking.
- Washing/cleaning - Deposition rate of Chlorides are so rapid that the frequency of cleaning is not feasible (<3months).
- Fillet-welded Patches – Effectively addresses the potential for “window-failure” and contains the leak. It can induce local deformation and requires periodic monitoring. This is not a code compliant repair.
- Laser Weld Overlays – Effectively seals the leak, with negligible local deformation. It can be done on-line. It is not a code compliant repair and requires specialised equipment & procedures.
- Component Replacement – Expensive and intrusive on production.
• Leaking components are scheduled for replacement, when spare components/sections of piping are available and production plan allows.

• Replacements to be done with SCC resistant material, e.g. SAF2205 duplex stainless steel for the PTR tanks, Type 316SS for piping and smaller components (COAR).

• The implementation of a more effective NDE technique to replace dye penetrant testing (PT) for the detection and monitoring of ASCC:
  • Eddy-Current Array with surface probe - ongoing
  • Alternating Current Field Measurement (ACFM) – being considered
2PTR 001BA leaks from tell-tale holes

Leaks from redundant pipe support areas on old tank
Leaks from tank circumferential welds of old tank
Old Tank Removal

Removal of 2 PTR 001 BA
1PTR Replacement Tank Construction – March 2018
Piping Replacements – Leak on 1EAS008TY
Piping Replacements – Leak on 1EAS008TY
Thank You.

Questions?
San Onofre Experience with CISCC

David Victor
Chair
SONGS Community Engagement Panel

June 27, 2019
Who am I?

• Chairman SONGS Community Engagement Panel (CEP)

• Academic
  – Professor at School of Global Policy & Strategy, UC San Diego; Professor of Climate, Atmospheric Science and Physical Oceanography, Scripps Institution of Oceanography
  – Co-leader, UC San Diego Deep Decarbonization Initiative
  – Co-leader, Initiative on Energy and Climate, Brookings Institution

• Heavily involved in US industry and R&D
  – EPRI Board of Directors and Advisory Council
  – INPO Advisory Council
  – 2 National Academy of Sciences panels on future of power sector
Today’s Topics

1. History and decommissioning timeline
2. On-site used fuel management
3. Experience with stress corrosion cracking

Documents: www.songscommunity.com
San Onofre Nuclear Generating Station (SONGS) Plant History

• Unit 1 (small PWR)
  - Online January 1968
  - Retired 1992, partially decommissioned
  - Site was semi-remote between SD/LA;
  - California economy grew and location suburbanized

• Unit 2 (large PWR)
  - Online Nov ‘83; removed Jan ‘12

• Unit 3 (large PWR)
  - Online April ’84; removed Jan ‘12

• Units 2 & 3
  - Retired June 7, 2013
Community Engagement Panel (CEP)

- **Role**: Engagement/conduit (not a decision-making body)
- **Formation**: Established voluntarily by SCE in 2014
- **Composition**: 18 leaders in community representing:
  - Local government (neighboring counties and cities)
  - Environmental non-governmental organizations
  - Academia
  - Schools
  - Native Americans
  - Organized labor
  - Business
  - Neighbors (military base and state parks)
  - Emergency response professionals
SONGS Decommissioning Plan

Subject to Change

Future milestones are tentative
ON-SITE USED FUEL MANAGEMENT
The Larger Context: Why Long Term Spent Fuel Aging Management at US reactors?
The Original Vision for US Spent Fuel Strategy

- On-site fuel use in reactors
- Cooling in pools
- Packaging, additional cooling (if needed) then transportation to permanent repository
- 1982 Law envisioned 2+ permanent repositories
- After 1982, just one site selected (Yucca mountain, near Las Vegas)
- Yucca mountain highly controversial and not yet (never?) licensed
2018 Inventory
Centralized Used Fuel Resource for Information Exchange (CURIE)
https://curie.ornl.gov/map
U.S. Commercial Spent Fuel Storage Sites

- ISFSI Site-Specific License (15)
- ISFSI General License (64)
- 34 States have at least one ISFSI
Key US SNF Policy Issues Today

- Restarting Yucca Mountain licensing process
- Opening 2 or more interim storage sites
  - New Mexico and Texas are current candidates
- Funding development of railcars to allow commercial SNF transportation
  - Certification expected next few years
- Funding pilot programs at interim storage sites
- Some startup and other money going into non-Yucca solutions such as “deep borehole”
- Ensuring robust Aging Management Procedures (AMP) for existing SNF Independent Spent Fuel Storage Installation (ISFSI) locations
1. Safely manage and store San Onofre’s used nuclear fuel until it is removed from site

2. Promptly offload fuel from pools to dry cask storage
   - Spent fuel is safer in passive dry cask storage
   - Packaged for transportation

3. Support all safe and reasonable options to remove used nuclear fuel from San Onofre site
   - Developing strategic plan to assess the feasibility of relocating spent fuel to an off-site facility

4. Recover used fuel storage costs from DOE
On-site Used Fuel Storage

INITIAL STATE
- Spent Fuel Pools
  - 2668 fuel assemblies

Existing ISFSI
- 50 canisters (1187 fuel assemblies)

EXPANDED ISFSI
- 73 canisters (2668 fuel assemblies)
  + existing 50 canisters (1187 fuel assemblies)

FUTURE STATE
- 3855 fuel assemblies in 123 canisters

29 CANISTERS HAVE BEEN LOADED ONTO THE ISFSI
SONGS Independent Spent Fuel Storage Installation (ISFSI)
Provides Passive Dry Cask Storage for Spent Fuel While On Site

AREVA System
(50 spent fuel canisters)

Holtec System
(73 spent fuel canisters)
Original AREVA NUHOMS System
Expanded Holtec HI-STORM UMAX System

Corrosion-Resistant Stainless Steel Multipurpose Canister

Stainless Steel Lid

Corrosion-Resistant Stainless Steel Cavity Enclosure Container

Reinforced Concrete Pad (Top/Bottom)
Most Spent Fuel at SONGS Ready for Transportation in Near Term

- Majority of fuel will qualify for transport by 2020
- Remaining fuel qualifies by 2030
- Now is the time to prepare for off-site transportation

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SONGS EXPERIENCE WITH CHLORIDE-INDUCED STRESS CORROSION CRACKING
SONGS Experience with CISCC

- NRC Information Notice – IN 2012-20
- SONGS experienced CISCC in schedule 10 low pressure stainless steel piping (IN 2012-20)
- Marine environment
- CISCC is likely the limiting aging mechanism for SONGS canisters
Why we are focused on the global experience

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, DC  20555-0001

November 14, 2012

NRC INFORMATION NOTICE 2012-20: POTENTIAL CHLORIDE-INDUCED STRESS CORROSION CRACKING OF AUSTENITIC STAINLESS STEEL AND MAINTENANCE OF DRY CASK STORAGE SYSTEM CANISTERS

ADDRESSEES

Extensive Public Attention to these issues

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September 26, 2017

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Safety of long-term storage in casks: Issues For San Onofre

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Nuclear waste has been piling up across America with nowhere to go. Congress needs to act

By DAVID G. VICTOR, DAN STETSON and JERRY KERN JAN 24, 2019 | 3:05 AM
Defense-in-Depth

- Design
- Fabrication
- Operations, Maintenance & Security
- Inspection
- Remediation

Regulatory Oversight

Aging Management
SONGS Dry Fuel Storage Systems

• Required systems licensed for storage and transportation
• Required higher seismic design
• Thicker shell: 5/8-inch vs 1/2-inch (AREVA & Holtec canisters)
• 316L (low carbon) stainless steel (AREVA & Holtec canisters)
• Holtec enhancements to reduce susceptibility to CISCC:
  – Modified weld design to minimize heat input and reduce size of heat-affected zone
  – Over-rolled canister shells to minimize residual stresses
  – Laser peened welds to apply compressive stress to outer surface of welds
• Early development of Holtec Inspection & Maintenance program
Holtec Fabrication Improvement: Peening Canister Welds
Inspection capability

- SCE is working with EPRI, vendors, and suppliers
- Developed robotic inspection capability for Holtec system
- Qualifying AREVA inspection ring to inspect and characterize indications on AREVA canisters
Qualification of AREVA Inspection Ring Underway

• Qualification for use at SONGS in progress
  – Technical documentation to be final 3Q 2019
• Ring will allow for inspection of full canister shell if needed

Initial inspection with borescope
Secondary use of inspection ring, if needed
AREVA Inspection Ring Assembly
Holtec Canisters Inspections Employed Remote-Controlled Robot and Camera

- Remote-controlled robot
- Reached 99% of shell
  - Lower part of 3-inch-thick base plate not visible

Precision digital borescope (camera)

- Measured depth and length of indications
Robotic Inspections of Holtec Canisters

• To understand wear from downloading, inspected 8 canisters
  – Most observed wear was very shallow at 0.000 to 0.005 inches
  – Deepest wear was .026 inches (< thickness of credit card)
  – ASME code conservatively allows for .0625 inches

• SCE’s conclusions (NRC independently verified results)
  – Wear marks are shallow and pose no safety significance
  – Passive oxide layer re-forms to protect from corrosion
  – Canister containment integrity remains robust
  – Inspection & Maintenance program will monitor over time

• Also demonstrated effectiveness of robotic inspections
Mitigation approaches

Potential consequences negligible at ISFSI boundary

- He overpressure inside canisters
- No explosive force (dry internals; no Zr fire risk or H2 creation)
- Confirmed with MPR evaluation

Mitigation Options (2 major options)

- Weld repair: Developing capability to repair canister surface
- Canister overpack: capability exists; some sites have onsite
## Aging Management Update

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San Onofre Nuclear Generating Station
Tuesday, August 13, 2019

California State Senators Patricia Bates (R-Laguna Niguel) and Bill Monning (D-Carmel) have introduced Senate Joint Resolution (SJR) 11 this week that urges Congress and the President to approve legislation that would prioritize the removal of spent nuclear fuel from decommissioned nuclear sites in areas with large populations and high seismic hazards.

The shuttered San Onofre Nuclear Generating Station (SONGS) is located in Senator Bates’ district and the currently operating Diablo Canyon Power Plant is located in Senator Monning’s district. Their resolution urges the passage of Congressman Mike Levin’s (D-CA 49) Spent Fuel Prioritization Act of 2019 (H.R. 2995) which would expedite the removal of California’s nuclear waste to safer locations. H.R. 2995 is currently in the U.S. House Energy and Commerce Committee.

Senator Bates said, “California has waited for years for the federal government to do its job and help move the state’s nuclear waste away from densely populated and environmentally sensitive areas. The Legislature must add its voice for action and I’m pleased to partner with Senator Bill Monning to urge passage of pending legislation in Congress. Safeguarding our coast from the dangers of nuclear waste should not be a partisan issue.”

In 2016, Senator Bates authored Senate Joint Resolution 23 that urged the passage of a similar federal bill called the Interim Consolidated Storage Act (H.R. 4745). Former Congressman Darrell Issa (R-CA 49) supported H.R. 4745 but it did not advance beyond the U.S. House.

The State Senate will consider SJR 11 before it adjourns for the year on September 13, 2019.
Can u pls work directly w ray to get his email into system. Here is another. Thx.

Sent from limited typing device

Begin forwarded message:

From: Ray Lutz <raylutz@citizenoversight.org>
Date: August 13, 2019 at 6:20:14 PM CDT
To: <NUCOMM@songs.sce.com>
Cc: "David G. Victor" <david.victor@ucsd.edu>
Subject: The Pendleton Option, and questions to the CEP. [please forward]

[David, I am sending this again to you to make sure it gets in the queue as
NUCOMM@songs.sce.com is rejecting my emails. Please forward.]

Greetings:

The attached document and questions are being formally submitted to the Community Engagement Panel for San Onofre.
Others are included on the distribution list so they can also include this option within their scope of investigation.
Please forward it to:
    Rep. Harley Rouda & Staff (Kyle, please forward).
    SCE Expert Group (Aguirre & Severson LLP, please submit).
Please distribute the attached document to the members of the Community Engagement Panel.

Please accept the attached PDF document describing the "Pendleton Option" as the leading option for San Onofre waste which minimizes the overall risk.
Also, this web page provides more images and graphics regarding this option:
http://www.copswiki.org/Common/M1908
That page also provides a means for the public to sign our petition of support.

We suggest the following questions should be answered:
1. What would be necessary to get the military to consider and agree to this option? Who is the decision maker and what is the process?
2. What NRC licensing changes would be required regarding the site license at San Onofre?
3. What specific operations in Camp Pendleton are conducted in the vicinity of the proposed site, and is there any reason they cannot be moved to an alternative location within the facility?
4. Would the spent fuel that uses stainless steel cladding and high-burnup fuel be transportable to the site prior to the original plans, given that the transportation to the site can be handled in a super slot (2mph) speed only about 10 miles rather than on rail for 1350 miles?
5. The HELMS criteria (see http://copswiki.org/Common/HelmsProposal) requires that any storage system be capable of 1,000 year life with maintenance and 300 year life with no maintenance, and to achieve this criteria, suggest that a dual-wall cask system is one approach. Is the new CASTOR cask design being entertained by the NRC compatible with the existing thin-wall canisters, thereby achieving improved "Defense in Depth"?

6. What changes are planned for the current site to improve defense in depth, if not this proposal?

We look forward to seeing these questions addressed by the San Onofre Community Engagement Panel in the upcoming August 22nd Meeting.

--Ray Lutz

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Ray Lutz
Citizens' Oversight Projects (COPs)
http://www.citizensoversight.org
619-820-5321
THE “PENDLETON OPTION” FOR SAN ONOFRE WASTE

PROBLEM: 3.6 million pounds of extremely toxic heavy metal waste on the beach
1. The waste on the beach is a ridiculous idea -- probably the worst place, not the best.
2. It is only about 100 ft from the seawall and only inches over the high-water mark.
3. It is too easy for terrorists to access.
4. It is too close to the delicate ecosystem of the ocean and is in a tsunami inundation area.
5. It is next to the second most traveled railroad in the nation and Interstate 5, the only N/S link for miles.
6. It is near millions of people and there are dense neighborhoods under 2.5 miles away.
7. The Newport-Inglewood-Rose Canyon fault complex is within 4 miles of the site and is estimated to be capable of a 7.4 magnitude quake.
8. There is really nothing good about this site from a safety standpoint. Saving a few dollars now is not worth it.

The usual alternatives are not available and/or unacceptable
1. Yucca Mountain was supposed to be the ultimate destination, and it was supposed to open in 1998. As it turns out, the site is not open nor is it at all the right geology for a permanent site, and Nevada wants no part of the project. Even if it were open, the waste is far too hot to intern there without the need for giant ventilation fans for probably 150 years. That hardly makes a lot of sense, but indeed it was in the original plan for the site.
2. Current thinking is to move it thousands of miles to New Mexico or Texas to a "Consolidated Interim Storage" (CIS) storage facility, such as the one in New Mexico named "Eddy-Lea". ¹
3. There is a great deal of push-back in NM and TX in terms of accepting this waste. The new NM governor intends to block the project, and there are concerns about sink-holes and potash mines.
4. We have learned how difficult it is to handle these 50-ton canisters in the August 3, 2019, San Onofre Canister Drop Incident, where a 50-ton canister was nearly dropped 18 feet². The Holtec vaults are only about 1500 ft from the spent fuel pools, and they almost lost control of a canister with possible devastating results. Moving them 1350 miles by rail to a New Mexico destination, for example, is about 4800 times further. How can anyone suggest SCE be trusted to move them 1350 miles when they can’t control a canister when moving it only 1500 feet.

SOLUTION: Keep the waste at Camp Pendleton, inland 5 miles and to a higher elevation
1. Moving the waste to a higher elevation and away from the coast but still in Camp Pendleton will remove it from most of the hazards of the current location. It is recommended that it be moved at least five miles from the coast to reduce terrorist threat, risk to the rail and freeway corridor, risks to dense populations, and to reduce corrosion risk (as inland will reduce the salt content of the air.) Please note

¹ http://copswiki.org/Common/M1844
² http://copswiki.org/Common/SanOnofreCanisterDropIncident
that the exact location would need to be determined with much more investigation regarding geology, access, and all other normal constraints.

2. The route to the proposed site about 5 miles from the coast will use local roadways, mostly within Camp Pendleton, and therefore away from high populations, the general public, and terrorist interception. Most of the road already exists, but it will likely need to be improved to handle the weight of a single canister with its protective overpack. The last mile or so of the road would need to be newly constructed.

3. The total transportation distance is about 10 miles for the suggested site. If moved at only 2 miles an hour, this distance can be accomplished in only one day for each canister. Thus, all 125 canisters, in theory, could be moved in only 4 months instead of 4 years. The total cost to move the waste would be far less than transporting it 1350 miles.

4. If both Greenland and Antarctica both fully melt, sea level is predicted to rise no higher than about 230 feet\(^3\). Therefore, site should be at least that high. Proposed sites in Camp Pendleton over five miles inland are over 450 feet in elevation. The "Mesa", just across the freeway from the plant and previously used by SCE for offices and other buildings, is only about 100 ft in elevation, and thus is too low for a long-term location (although it is certainly better than being right next to the water).

5. The earthquake threat is not avoided at this location. However, moving inland five miles more than doubles the distance from the Newport-Inglewood-Rose Canyon fault complex and that should reduce this risk substantially although not entirely. We also found no other possible site in CA that had very low seismic risk.

6. Camp Pendleton is a military base and is not heavily populated. Military personnel can be utilized to provide security and it will be a convenient security training opportunity.

7. The ultimate mission of the military is to protect the public from threats. Since our venture into nuclear energy was brought on by the development of nuclear weapons, it is only proper and fair for the military to take on the responsibility of protecting the waste at this site.

8. Moving the waste to this site will provide the opportunity to improve the canisters to a "thick" two-layer system utilizing a pressurized outer shell that can be easily inspected for leaks and replaced if the outer shell is compromised. This will allow the design life of the cask system to be easily pushed to over 1,000 years instead of only 40 and become HELMS compliant.\(^4\)

9. The older waste uses stainless steel cladding. These cannot be moved until 2030 by rail, but they can probably be moved much sooner if it is transported slowly and on isolated roadways and not on public thoroughfares. The same is true for high-burnup spent fuel.

10. Keeping the waste within state and preferably within the service area of the people who received the benefit of the power is a responsible way to deal with the waste rather than pawning it off on someone else.

11. If deep borehole technology continues to be developed utilizing oil-well drilling technology\(^5\), a site within Camp Pendleton may be suitable to place the waste underground without the risk of moving it thousands of miles to a CIS site first. This option is compatible with that possibility.

NO PLACE IS PERFECT. BUT THIS IS THE BEST SOLUTION TO REDUCE MOST THREATS WHILE AVOIDING OTHERS. PLEASE HELP USE PROMOTE THE “PENDLETON OPTION”

Please visit this link for more information: [http://www.copswiki.org/Common/M1908](http://www.copswiki.org/Common/M1908)
WE NEED YOUR HELP. CitizensOversight.org
– Ray Lutz, Engineer, Citizens Oversight Projects. raylutz@citizensoversight.org

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\(^3\) For more information on sealevel rise, see "Sea Level Rise Can No Longer be Stopped, what next?" at [https://youtu.be/MvqY2NcBWf8?t=2131](https://youtu.be/MvqY2NcBWf8?t=2131)

\(^4\) [http://copswiki.org/Common/HelmsProposal](http://copswiki.org/Common/HelmsProposal)

\(^5\) See [https://www.deepisolation.com](https://www.deepisolation.com)
Honorable Kristine Svinicki  
Chairman, United States Nuclear Regulatory Commission  
Mail Stop O-16B33  
Washington, DC 20555-0001  

Dear Chairman Svinicki:

I am writing on behalf of the Commandant of the Marine Corps, General Robert Neller. As the Deputy Commandant for Installations and Logistics, I share the Commandant’s responsibility for the security and safety of Marines, their families, and civilians working and residing on all Marine Corps installations. Accordingly, my purpose in writing is to request your support seeking to expeditiously relocate San Onofre Nuclear Generating Station (SONGS) spent fuel to a storage facility off Marine Corps Base (MCB), Camp Pendleton.

Ensuring the security of Marine Corps installations and facilities is one of my most important tasks. SONGS presents a unique challenge in this area. While it is located on Marine Corps property, the facility is owned and operated by a corporation that is regulated by a non-Department of Defense Agency. Owing to this circumstance, I am intent on using all of the authority I have to ensure to the best of my ability that SONGS is a secure facility that does not present a danger to MCB Camp Pendleton and the surrounding community.

Southern California Edison (SCE)-SONGS currently operates an independent spent fuel storage installation (ISFI) on MCB Camp Pendleton. While the ISFI’s operations are properly permitted, expeditiously transferring SONGS spent fuel to a more inland location off MCB Camp Pendleton would promote Marine Corps security and safety interests, as well as restore valuable coastal land to military use.

We understand that the transfer of SONGS spent fuel is subject to an agreement settling litigation involving the California Coastal Commission. The settlement agreement includes a provision for the proposed relocation of SONGS spent fuel. This provision requires SCE to use “Commercially Reasonable” efforts to relocate the fuel. We request that the NRC consider this requirement and Marine Corps interests when taking regulatory action to permit any offsite storage facilities within the Western Region. This support would increase the likelihood that SCE would relocate the spent fuel pending the development of a permanent nuclear spent fuel repository.

Sincerely,

Michael G. Dana  
Lieutenant General, U.S. Marine Corps  
Deputy Commandant for Installations and Logistics