

Stop Nuke Dump on the Beach

at San Onofre Nuclear Generating Station (SONGS)

CitizensOversight.org Rev 2017-06-08





Ray Lutz

- Trained Engineer (MSEE)
- Candidate, US Congress 2010, CA Assy, 2008
- Founded Citizens' Oversight in 2006, Incorporated in 2011
- Arrested in 2011 for registering voters, sued and won.
- Concentrates on nonpartisan issues that have a technical side.



Google Satellite Image shows proximity to delicate ocean ecosystem



SITE RECLASSIFIED to same emergency response as medical research site.

Info: <http://CitizensOversight.org/StopNukeDump>

Citizens' Oversight Projects

- 501(c)3 nonpartisan nonprofit, founded in 2006
- Mission: Civic Engagement, Structurally Progressive
- Primary Current Projects
 - Election Integrity:
 - Sued San Diego County Registrar of voters in 2016 and won election audit fraud case -- now appealing so it will apply to all counties.
 - Established State and National election oversight teams
 - Helped expose irregularities in MI, FL, OH, PA.
 - San Onofre, CPUC
 - Party in \$3.3 Billion Bailout settlement Mediation.
 - Plaintiff in waste case, Federal case on bailout.
- Many successes:
 - StopBlackwater, ShutSanOnofre, OccupySD
 - Team Exposed scams by local elected officials

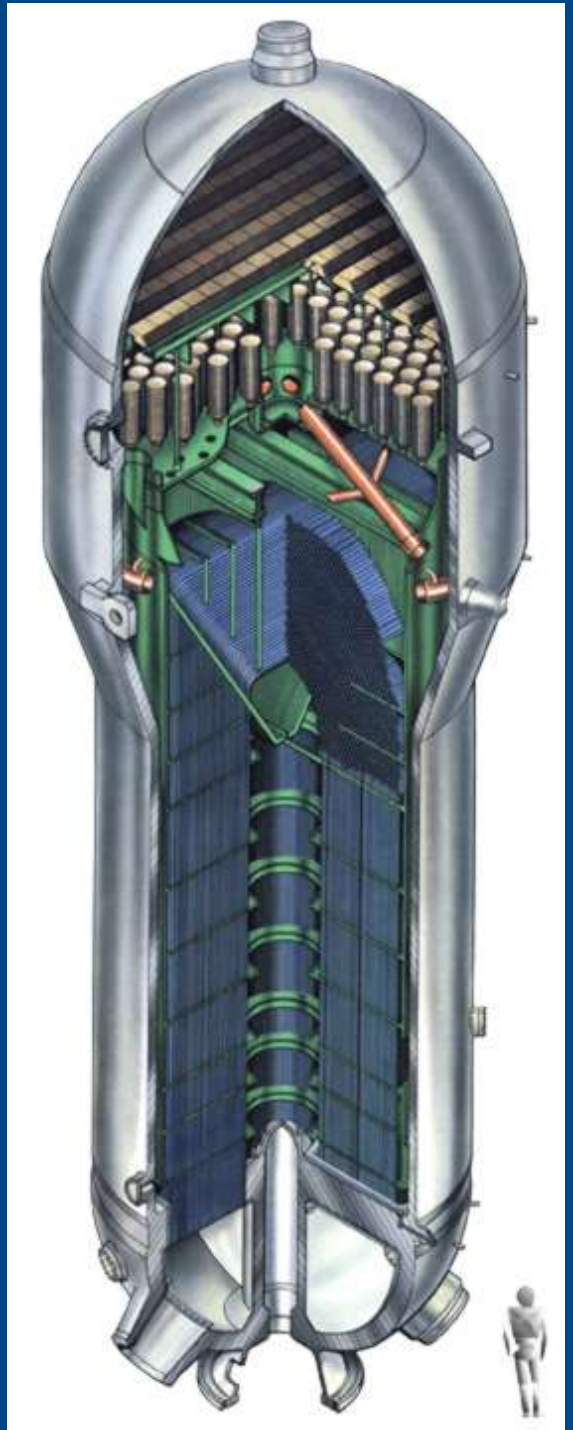
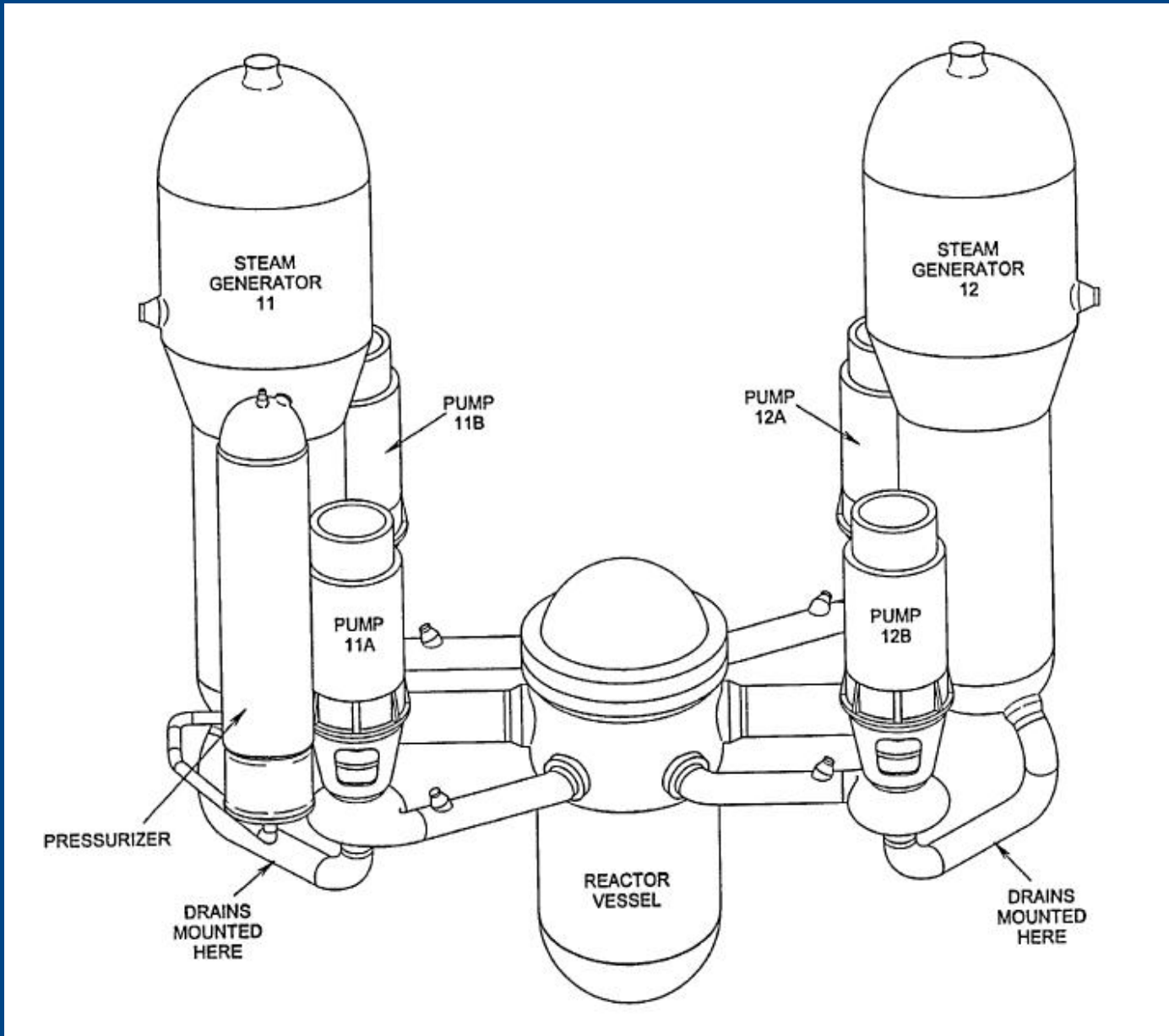
Emergency Shutdown

January 31, 2012, 5:31pm

On January 31, 2012, at 3:05 p.m. ... Operations personnel determined the leakage to be about 75 gallons per day, using a mass balance calculation (.06 gpm), from steam generator 3E0-88. This leak rate was below the Technical Specification 3.4.13, "RCS Operational Leakage," limit of 150 gallons per day for primary- to-secondary leakage through any one steam generator.

At 4:10 p.m., operations personnel evaluated that the primary-to-secondary leak rate exceeded 75 gallons per day on steam generator 3E0-88 and that **the leak was increasing at greater than 30 gallons per day per hour**, and consequently, initiated a rapid power reduction to be ≤ 50 percent power in one hour and in Mode 3 within the next two hours per Abnormal Operating Instruction SO23-13-14. In accordance with Abnormal Operating Instruction SO23-13-14, when reactor power was less than 35 percent, operations personnel tripped the reactor at 5:31 p.m. to enter Mode 3.

**LEAK INCREASING 40% PER HOUR ACROSS 1400 psia
PRESSURE AND RADIATION BOUNDARY.
OPERATORS SAFELY SHUT DOWN THE REACTOR
BEFORE CASCADING TUBE FAILURES OCCURRED.**



No NRC review was “premise”

At SONGS, the major premise of the steam generator replacement project was that it would be implemented under the 10CFR50.59 rule, that is, without prior approval by the US Nuclear Regulatory Commission (USNRC). To achieve this goal, the RSGs were to be designed as ‘in-kind’ replacement for the OSGs in terms of form, fit and function. The

Post-Shutdown Projects

- **DET. SHUTDOWN COSTS** - Resulted in shady \$3.3 billion “bailout” of utility by ratepayers, concocted in Warsaw, Poland (currently being renegotiated, Citizens Oversight is a party in the mediation)
- **DECOMMISSIONING** - Actual dismantling of the plant and “green-fielding” of site using \$4.4 billion in fund paid by ratepayers.
- **NUCLEAR WASTE** - 3.6 million pounds of high-level extremely deadly nuclear waste will remain on the site.

Shut Down Costs Disputed

- March 26, 2013: CPUC Pres. Peevey met with SCE executive Pickett in Warsaw, Poland and sketched out the \$3.3 billion bailout settlement

MICHAEL PEEVEY (CPUC)



HOTEL BRISTOL, WARSAW



STEPHEN PICKETT (SCE)



1. Pre-RSG investment: recover w/debt-level return through 2022.
2. RSG and post-RSG investment: disallow "retroactively out of rate base" effective 2/1/2012
3. Replacement power responsibility: customer
4. NEIL/insurance recoveries: to customers
5. MHI recovery: 1st to SCE to the extent of the disallowance 2^d to customers
6. Decommissioning costs: remain in rates through time of decommissioning -- periodic redetermination in CPUC proceedings as before
7. O&M: a) Already approved GRC amounts

Worst pick



8. Environmental offset: SCE to donate \$50 million per year 2019-2022 to ¹⁰ £ an agreed upon GHG, climate, or environmental academic research fund, institution, etc.
9. Process
 - a) settlement agreement approved in OII
 - b) balance of OII closed except for shutdown O&M phase
 - c) new OII phase for shutdown O&M per 7(b) and 7(d) above
 - d) 2018 GRC for shutdown O&M 2018 and beyond
 - e) Usual CPUC proceedings for review of decommissioning costs

PG&E Penalized \$1.4 billion for San Bruno Gas line accident



AS THIS EVENT WAS BEING INVESTIGATED, FBI RAIDED CPUC PRESIDENT MICHAEL PEEVEY'S RESIDENCE AND FOUND "RSG NOTE ON HOTEL BRISTOL STATIONERY"



Let's focus on the nuclear waste

Google Satellite Image shows proximity to delicate ocean ecosystem



SITE RECLASSIFIED to same emergency response as medical research site.

Info: <http://CitizensOversight.org/StopNukeDump>

- High-level waste -- extremely deadly for more than 25,000+ years (some isotopes have half lives of 9 million years)
- 3.6 million pounds
- Total of 3,855 fuel assemblies
 - 2668 assemblies in fuel pools
 - 1187 assemblies in 50 dry canisters

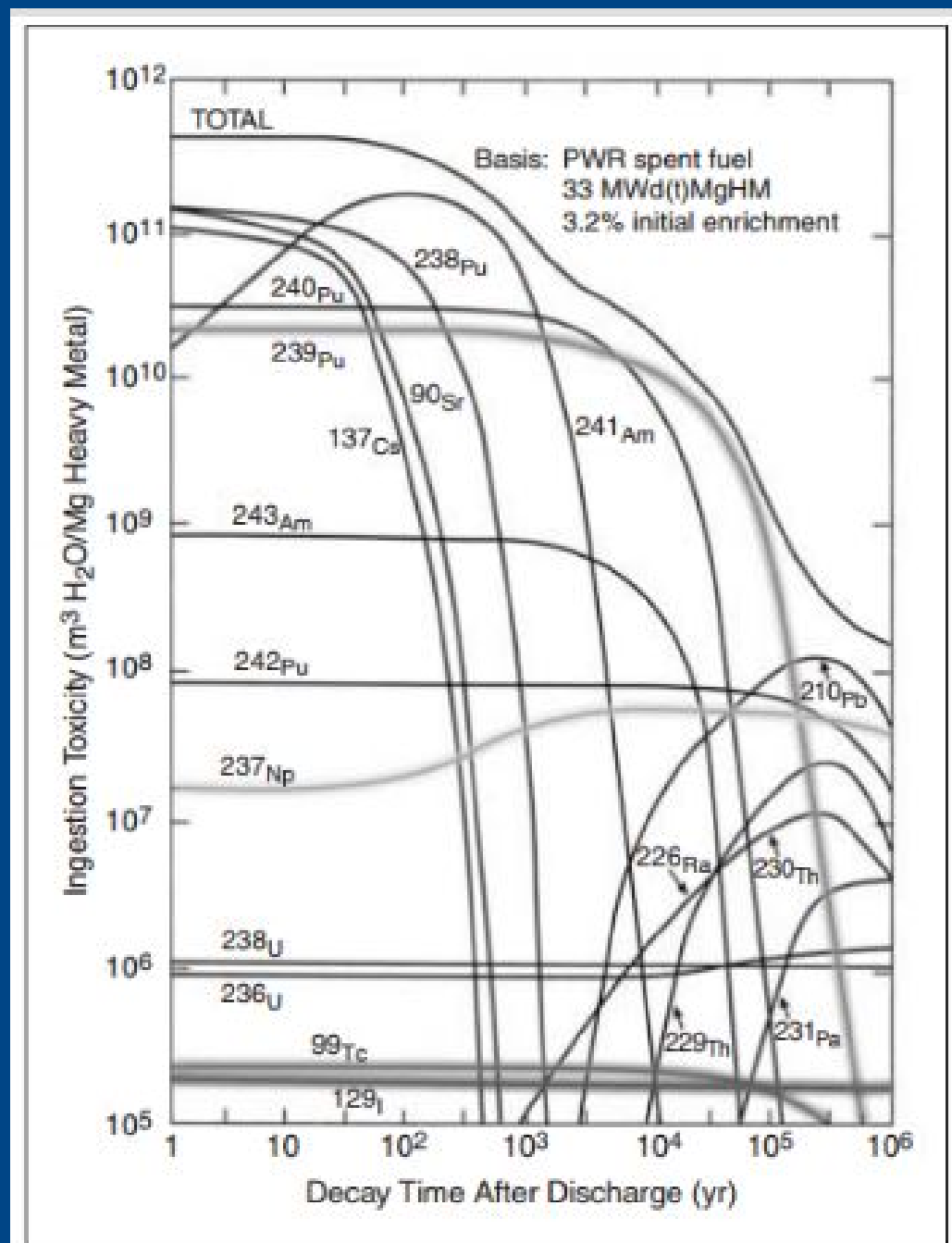


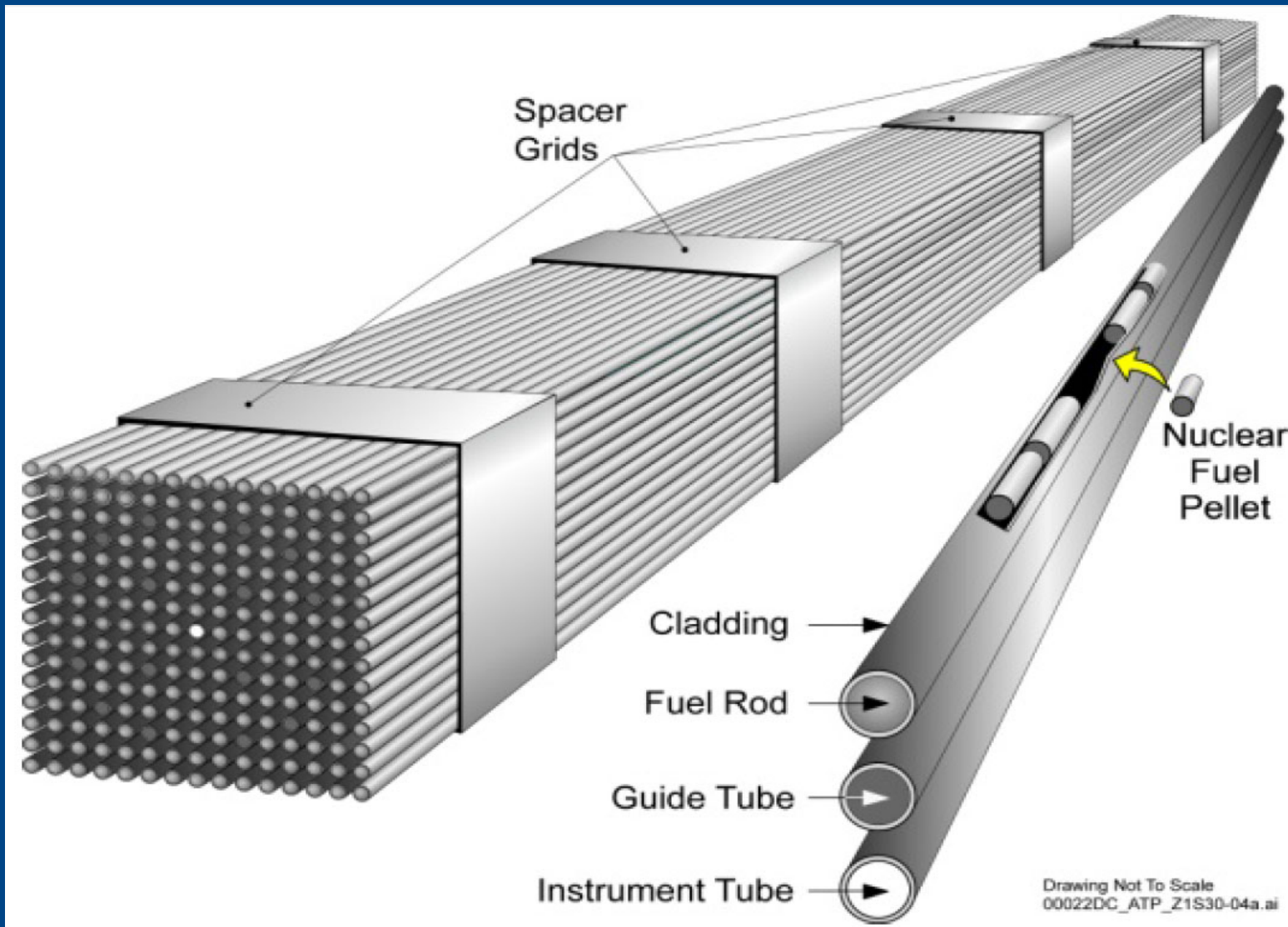
FIGURE 2 Toxicity from ingestion as a function of decay time for a number of nuclides in spent fuel from light-water reactors. Source: NRC, 1996.

Spent Fuel: Fuel Assemblies

total of 3855 fuel assemblies

Approx 13 ft long, 9" square, 1450 lbs.

two assys weigh as much as a typical car.



Spent Fuel Pools: 40 ft deep

At ground level (not three stories up like Fukushima)
Requires active cooling. Used to use once-through ocean water (OTC) but now uses huge refrigerator units



Independent Spent Fuel Storage Installation (ISFSI) 50 Canisters in NUHOMS system (1187 assys)

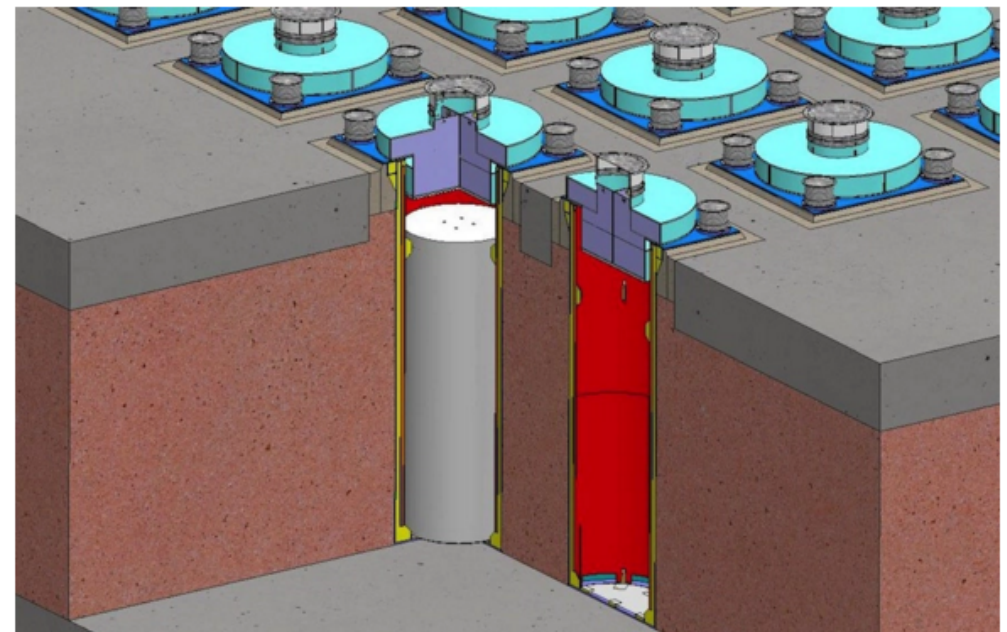
EXISTING NUHOMS HORIZONTAL
ABOVE GROUND SYSTEM -- UNITS
CAN BE BUILT AS NEEDED.

PROPOSED HOLTEC UMAX
SYSTEM IS VERTICAL AND
BELOW GROUND - 75 Canisters



HI-STORM UMAX

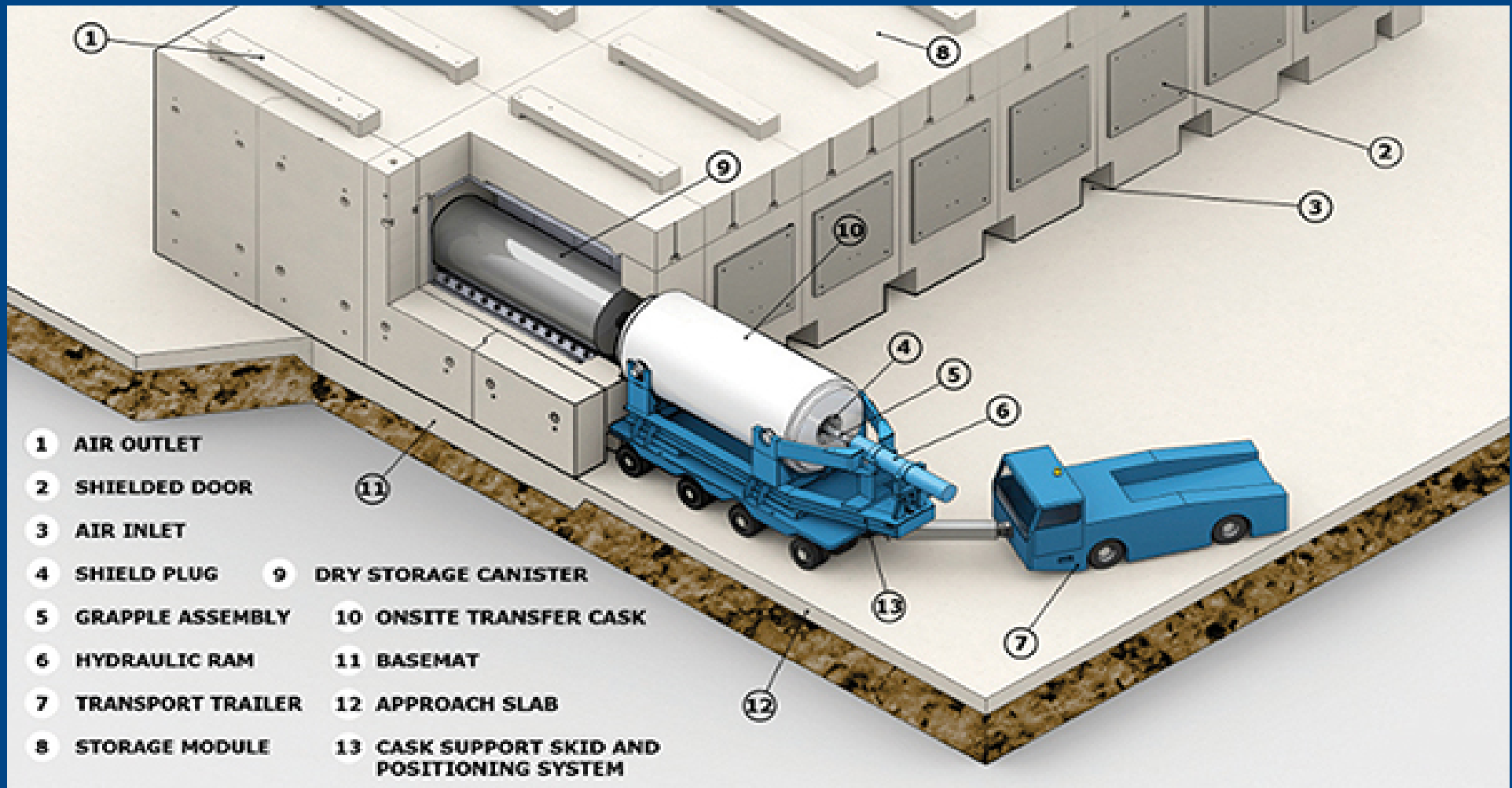
Holtec International Storage Module Underground MAXimum Capacity



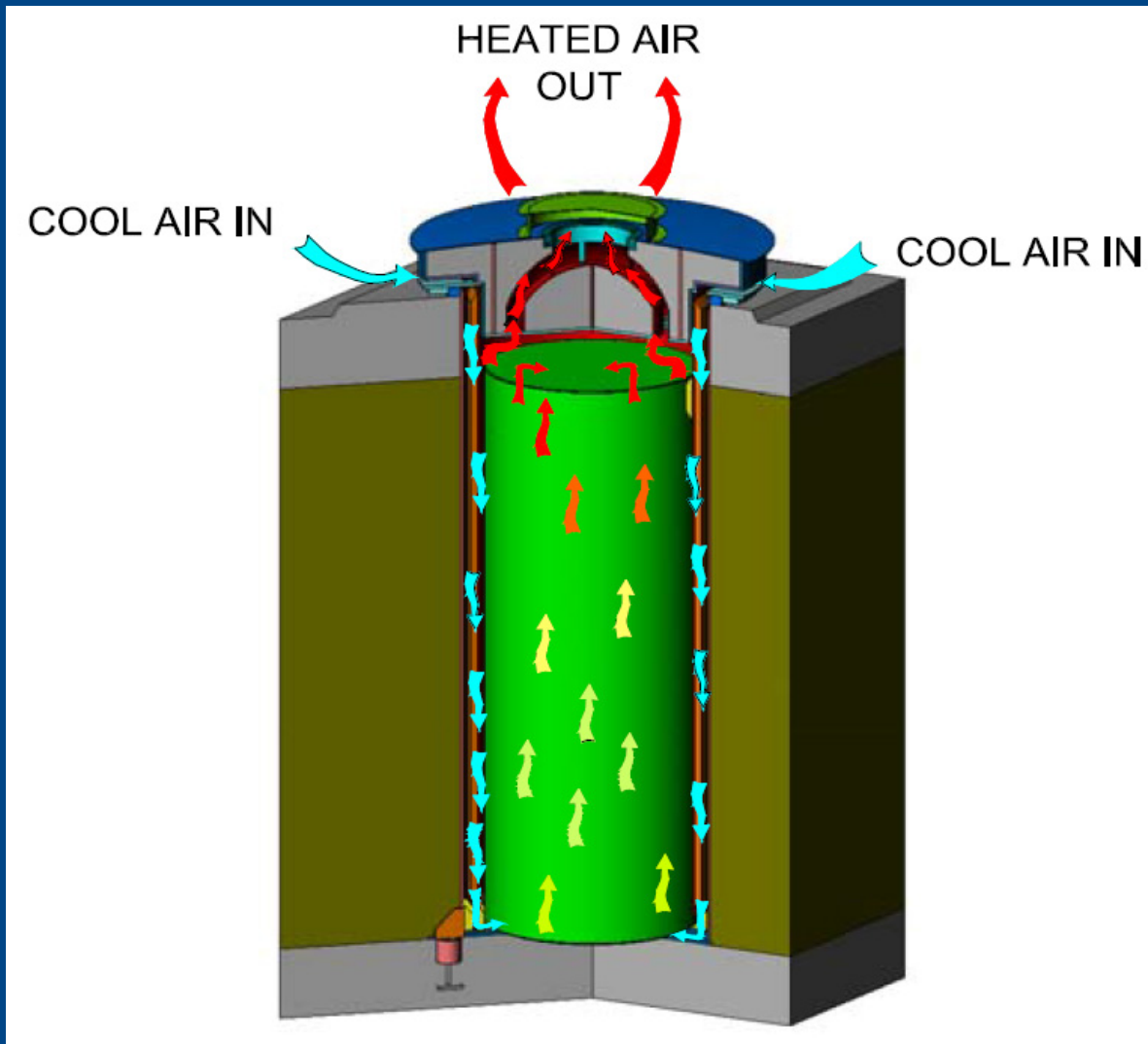
HI-STORM UMAX (Holtec International Storage Module Underground MAXimum Capacity) is an underground Vertical Ventilated Module (VVM) dry spent fuel storage system engineered to be fully compatible with all presently certified multi-purpose canisters (MPCs) under USNRC CoC 72-1014 (HI-STORM 100 dry cask storage system) and CoC 72-1032 (HI-STORM FW dry cask storage system).

AREVA "NUHOMS"

Additional canisters can be added incrementally



Proposed Vertical “UMAX” System allows hot canisters to cool, but resist attack. Surface of canisters may be very hot, 400F



We Agree that this system is better than AVEVA style to resist terrorist attack

Downside is you have to build entire facility all at once

We have no experience with this over long time periods envisioned.

Don't know if canisters can be extracted esp. if they are cracked.

Inspection technology “under development.”

Holtec MPC-37 Canisters

Stainless steel, welded closed

About 6 ft diameter, 18 ft long, 105 tons loaded

holds 37 fuel assemblies

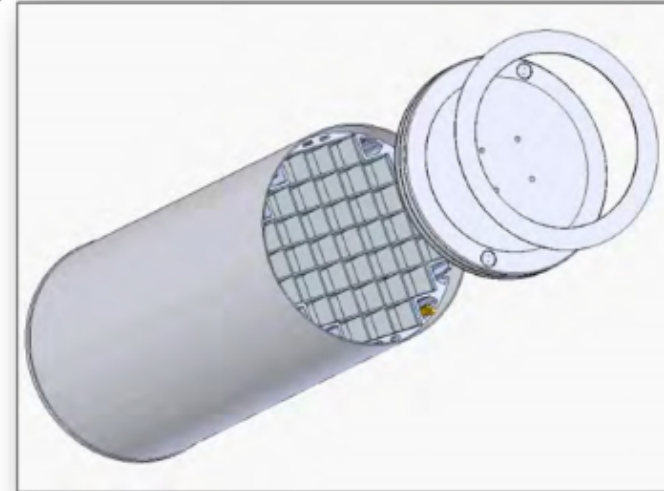
weighs about same as 20 typical cars

Holtec's HI-STORM UMAX Multi-Purpose Canister



a generation ahead by design

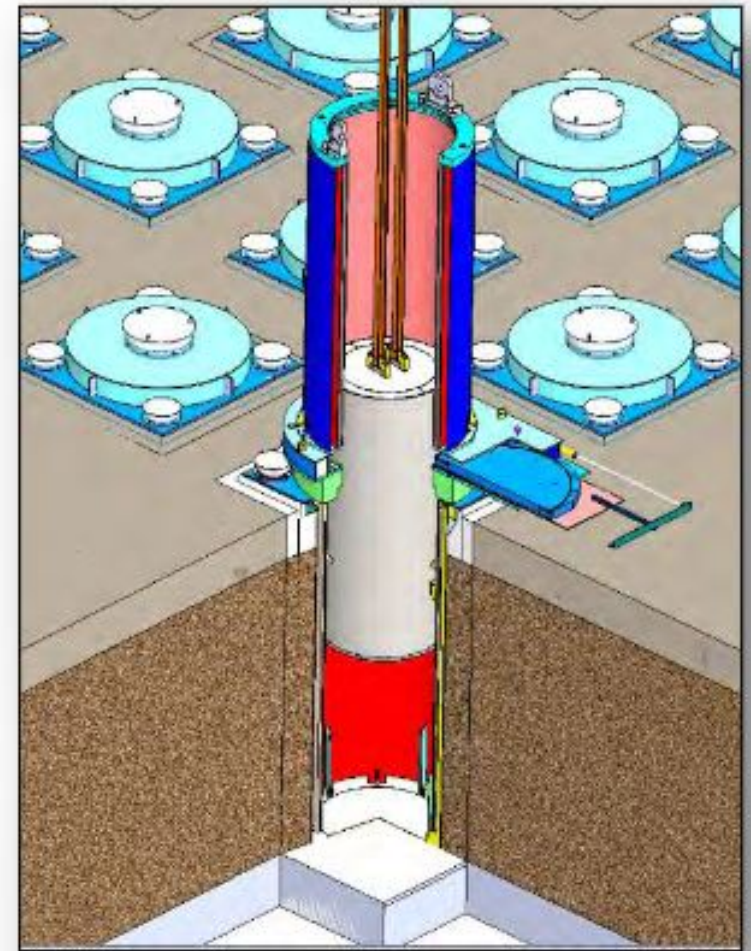
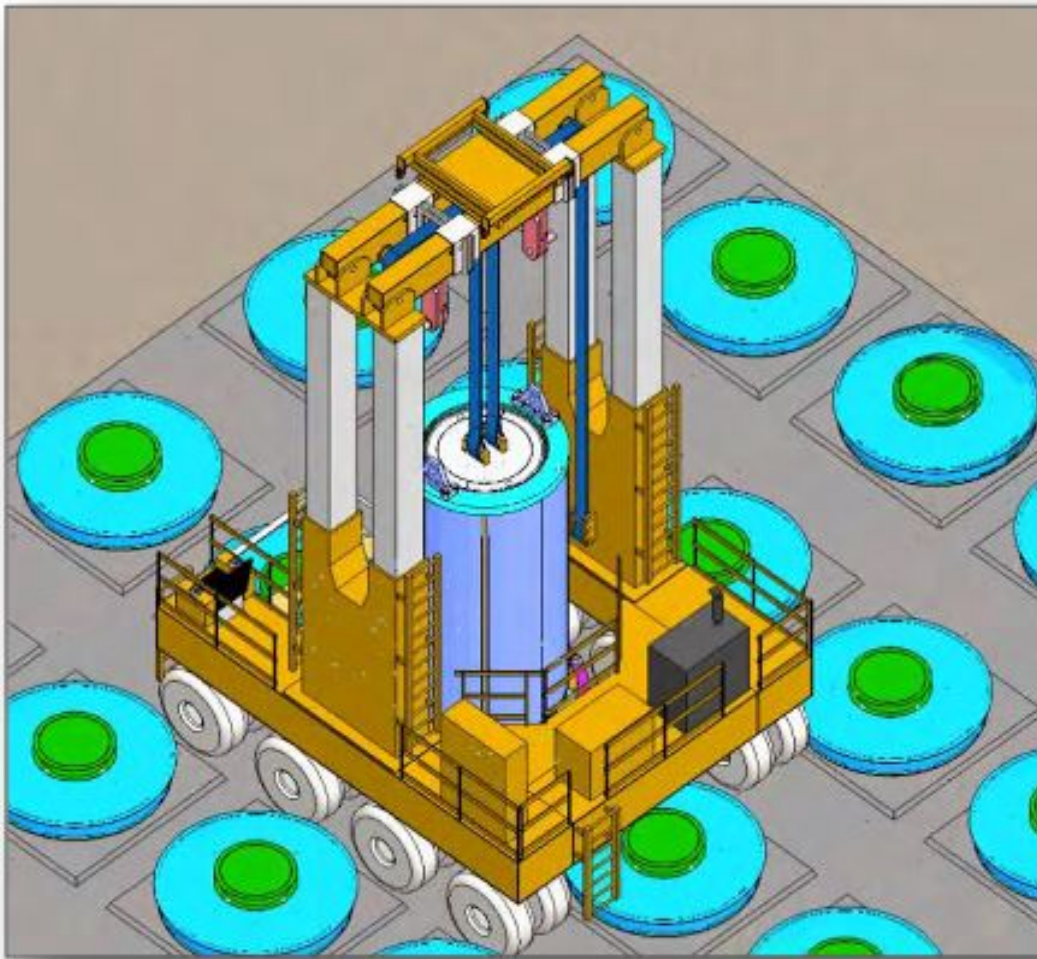
- Canister shell is made of 5/8-inch thick, high-quality, stainless steel type 316L, providing extreme corrosion resistance in marine environments.
- Canister lid (9.5-inches thick) is strength welded to the shell, and further protected by a redundant closure ring to ensure long service life.
- Canister is licensed for the storage of Damaged Fuel Containers ("cans").



HI-STORM UMAX Canister
(MPC-37)

Can canisters be removed?

No one has tried it yet!



HI-STORM UMAX MPC-37 being Installed in the Underground Cavity

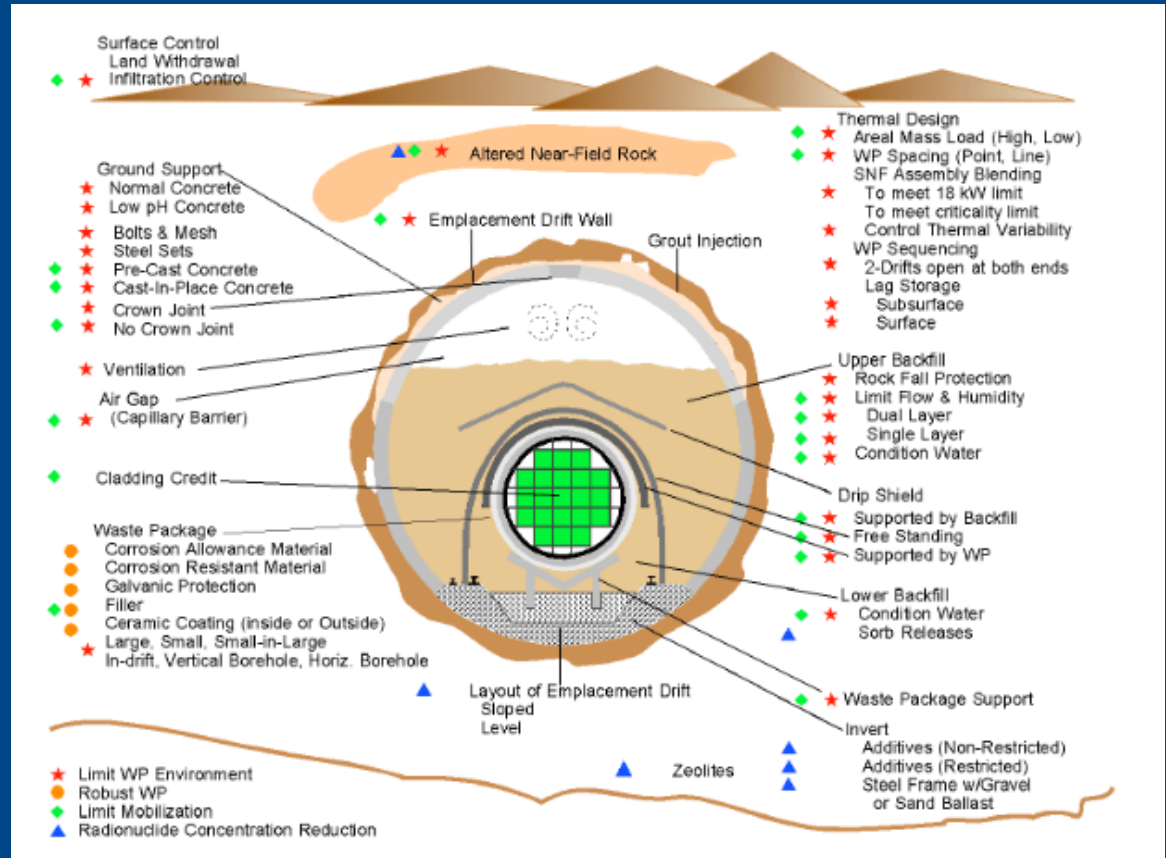
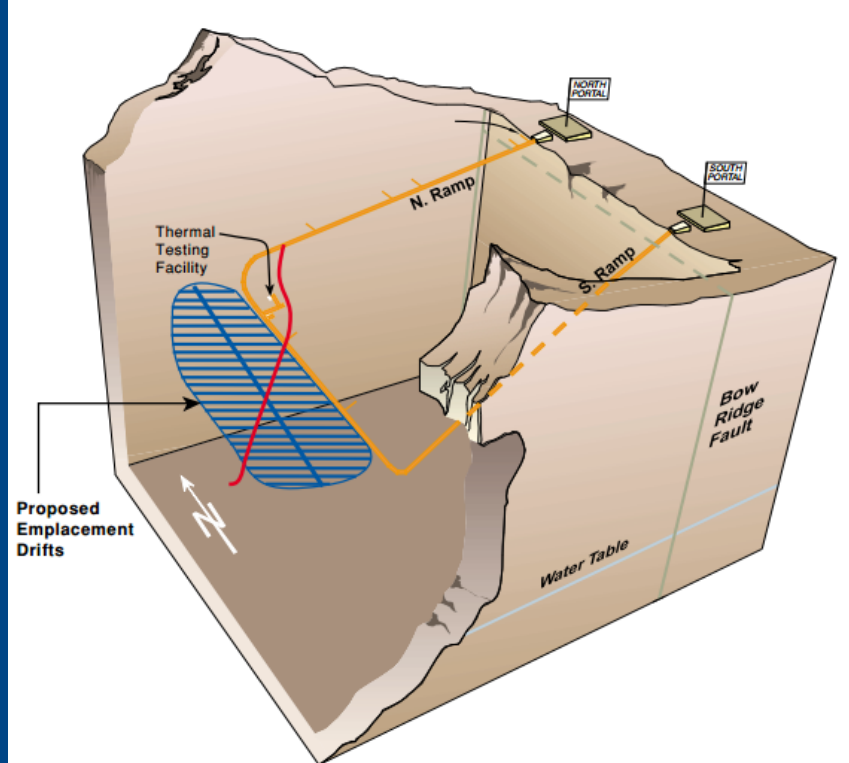
Waste: Big Picture

- Repository required “by law” in 1997 - but never opened.
- Yucca Mtn will probably never will open, is incompatible with large, hot canisters, is not a great site anyway.
 - Canisters optimized for temporary use at reactor sites, too big for perm. disposal.
 - Too hot, Yucca temp limited to 100C
- Current trend is to just leave all the waste at each of the plants, with 100+ year time frames, resulting in dandy terrorist targets
- FINGER POINTING: DOE has responsibility for Waste, NRC for safety.
- Environmentalists afraid disposal will green-light new plants.

Storage Canisters optimized for local storage, not for final deposition



Holtec Canisters are too big, too hot for Yucca Mtn even if it were open today, it would not be an option.



Dept of Energy “Waste Confidence” Generic Environmental Impact Statement GEIS Allows Indefinite storage on ANY nuke site

1.8.2 Timeframes Evaluated

The NRC evaluated the environmental impacts of continued storage in three timeframes that begin once the licensed life of the reactor ends—short-term storage, long-term storage, and indefinite storage (see Figure 1-1).

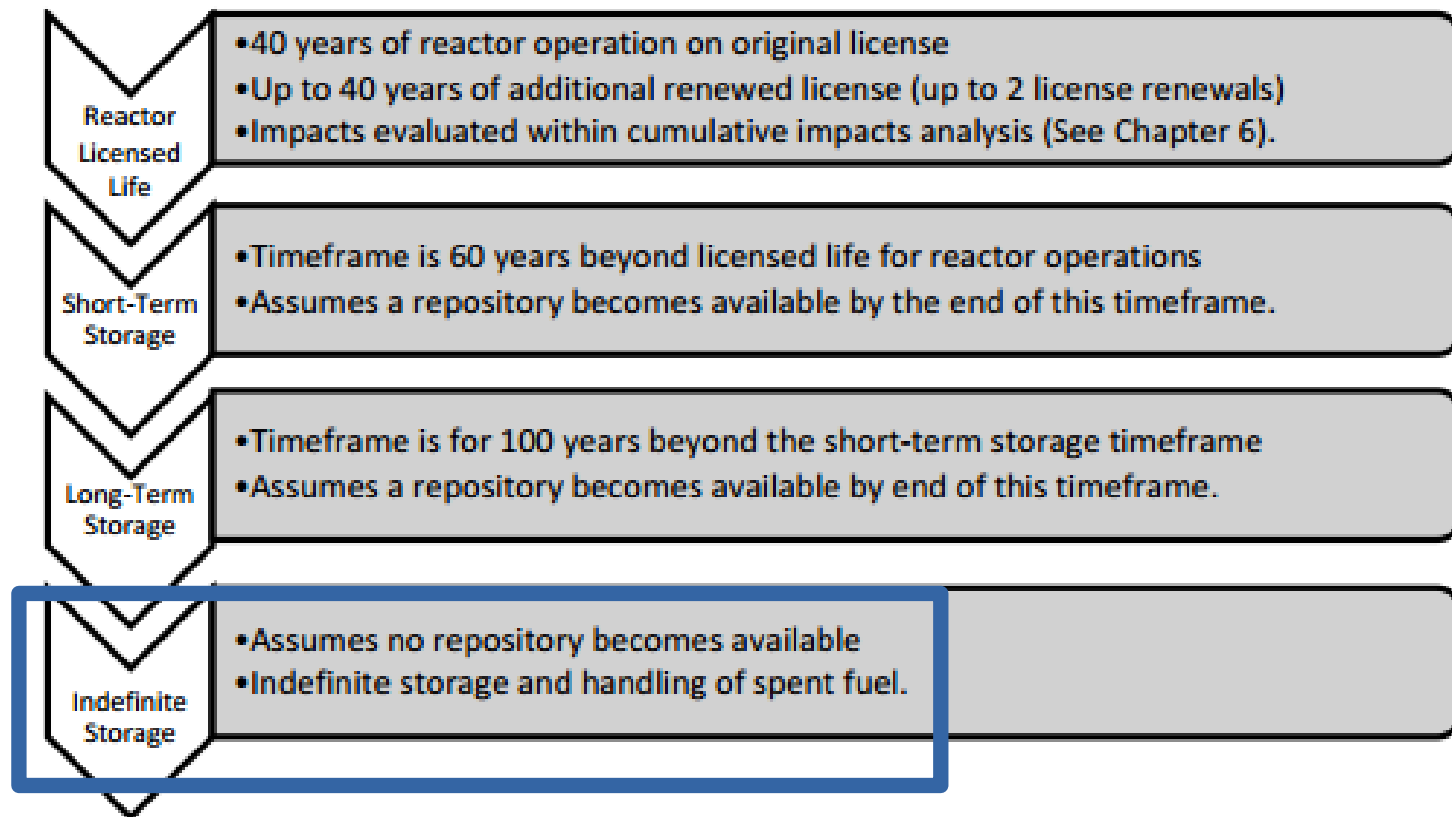
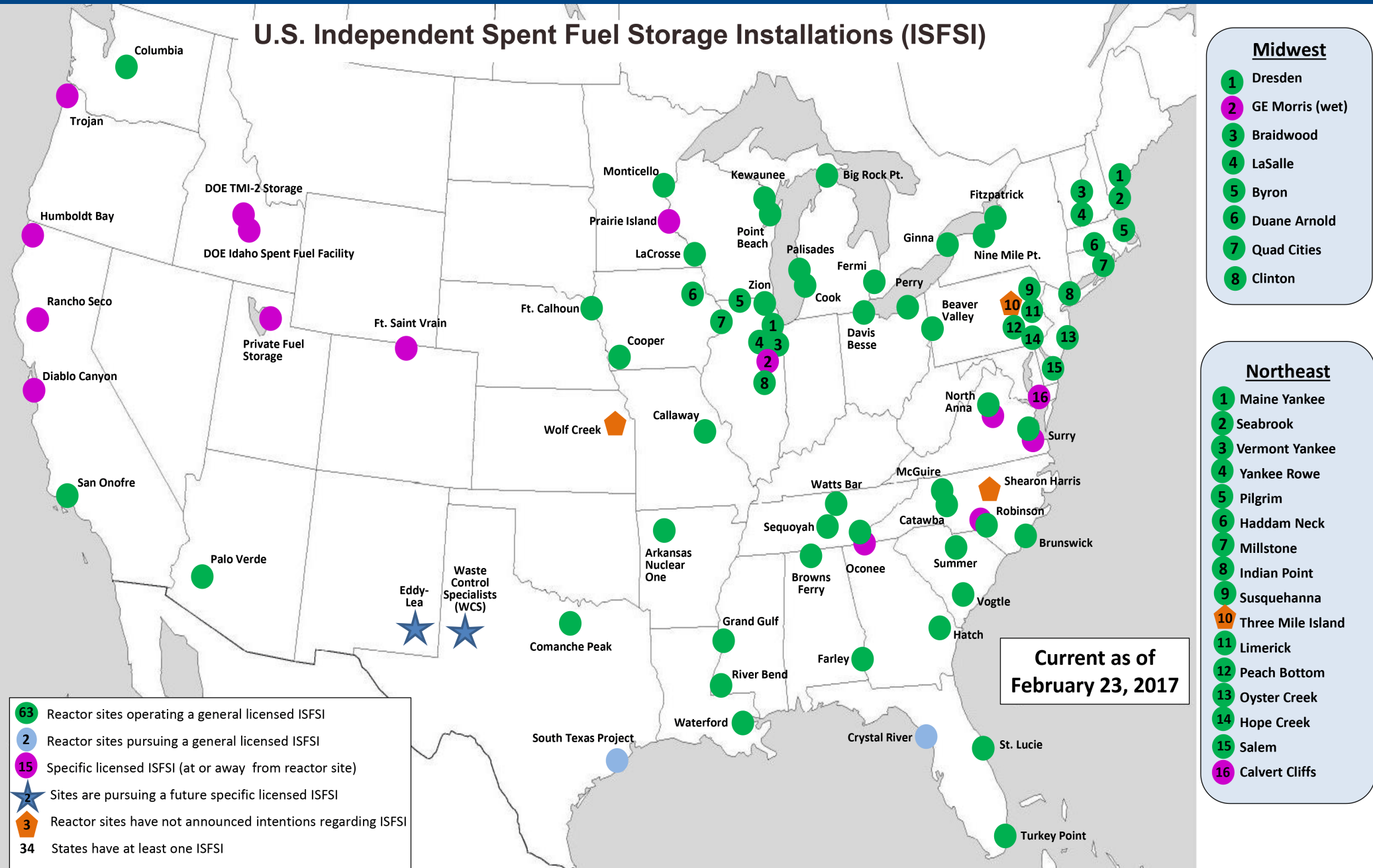


Figure 1-1. Continued Storage Timeframes

Nuke Plants now dandy Terrorist Targets

U.S. Independent Spent Fuel Storage Installations (ISFSI)



2015-10-06 -- CA Coastal Commission Grants Permit to Build ISFSI

- Permit term only 20 years but they know it has to be there at least 35. Will be very hard to remove once installed.
- “Special Conditions” require that an aging management plan (including inspection) must be in place before 19.5 years.
- Technology not currently available to inspect canisters, Edison says “we'll solve that later...” AGAIN!
- DOE says its safe to keep it there “indefinitely”
- NRC has control of all “nuclear safety” issues so CCC “can't consider risk” of nuclear waste on the coast.
- CCC won't allow roses to be planted in the coastal zone, but will permit a nuclear waste facility that may be there forever.

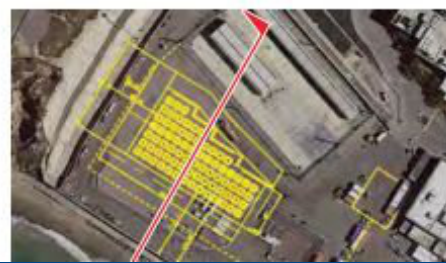
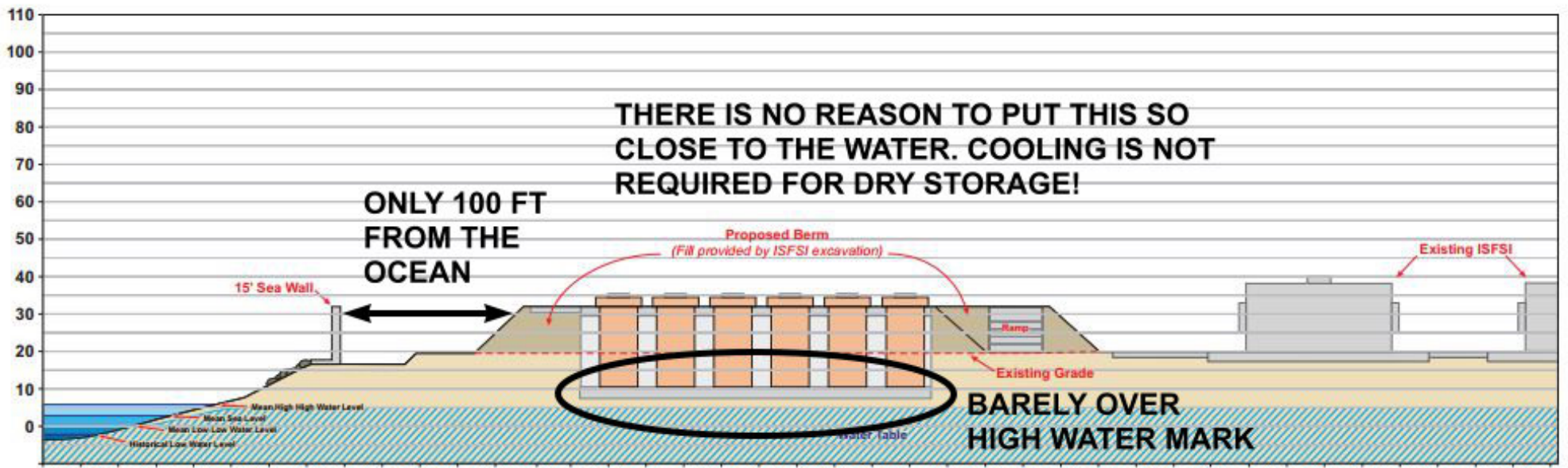
20 year permit “fixes” fatal flaws

Crucially, however, it remains uncertain whether it will be possible for SCE to remove the ISFSI as planned in 2051. In the event that no permanent repository or other offsite interim storage facility emerges, if the shipment of SONGS spent fuel to an off-site location is otherwise delayed, or if the steel fuel storage casks proposed for use in the ISFSI (which is certified by the Nuclear Regulatory Commission for a 20-year period of use) degraded to the point of becoming unsafe to transport, the proposed ISFSI could be required beyond 2051, possibly for many decades. **The ISFSI would eventually be exposed to coastal flooding and erosion hazards** beyond its design capacity, or else would require protection by replacing or expanding the existing SONGS shoreline armoring. In either situation, retention of the ISFSI beyond 2051 would have the potential to **adversely affect marine and visual resources and coastal access.**

In order to address these uncertainties, and assure that the ISFSI facility remains safe from geologic hazards and avoids adverse impacts to coastal resources over the actual life of the project, the Commission adopts **Special Condition 2**, which authorizes the proposed development period of twenty years...

Nuclear Waste “Dump”

For-profit corps + Govt Regulators = INSANITY!



- LEGEND**
- Concrete
 - Low Density Concrete
 - Stainless Steel
 - Soil
 - Soil Backfill
 - Water Table

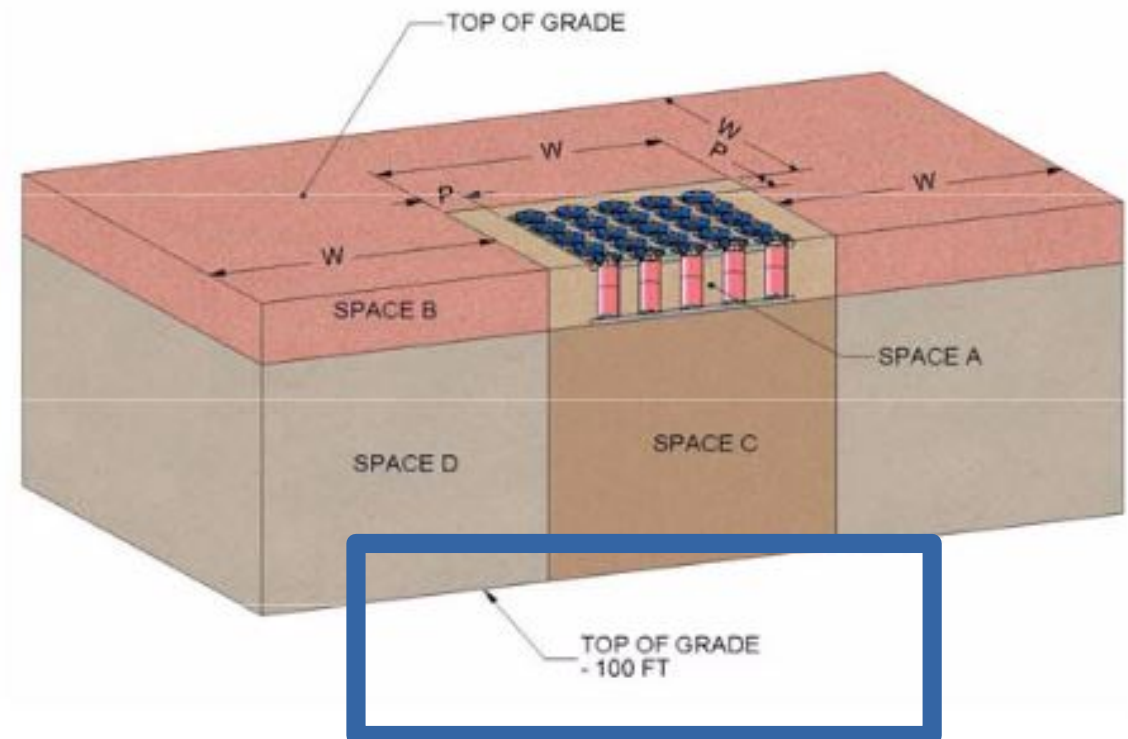
Holtec Drawing expects 100 ft below the ISFSI

ENHANCEMENTS IN HI-STORM UMAX OVER HI-STORM 100U (cont'd)



a generation ahead by design

- THE SHEAR MODULUS OF THE SUBGRADE IN SPACE A IS SUBSTANTIALLY INCREASED TO PROVIDE A STIFFER RIDING SURFACE FOR THE CASK TRANSPORTER AND TO REDUCE THE LATERAL BEARING LOAD ON THE RETAINING WALL.
- THE THICKNESSES OF THE (REINFORCED CONCRETE) ISFSI STRUCTURES HAVE BEEN INCREASED TO IMPUTE GREATER STRUCTURAL MARGINS IN THE STORAGE SYSTEM.



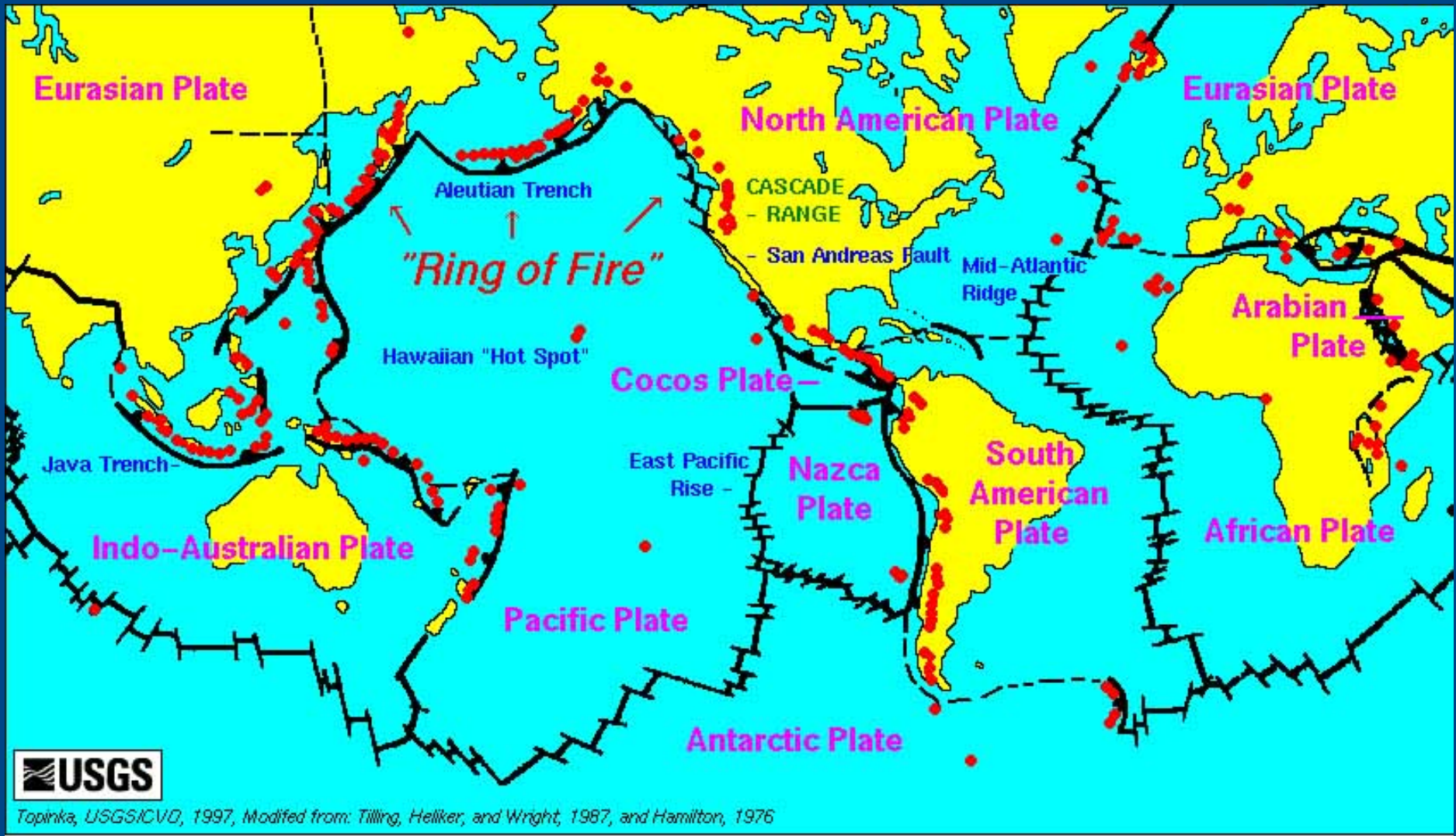
ISFSI Subgrade Nomenclature

Holtec UMAX side view (notice seawall and workers)



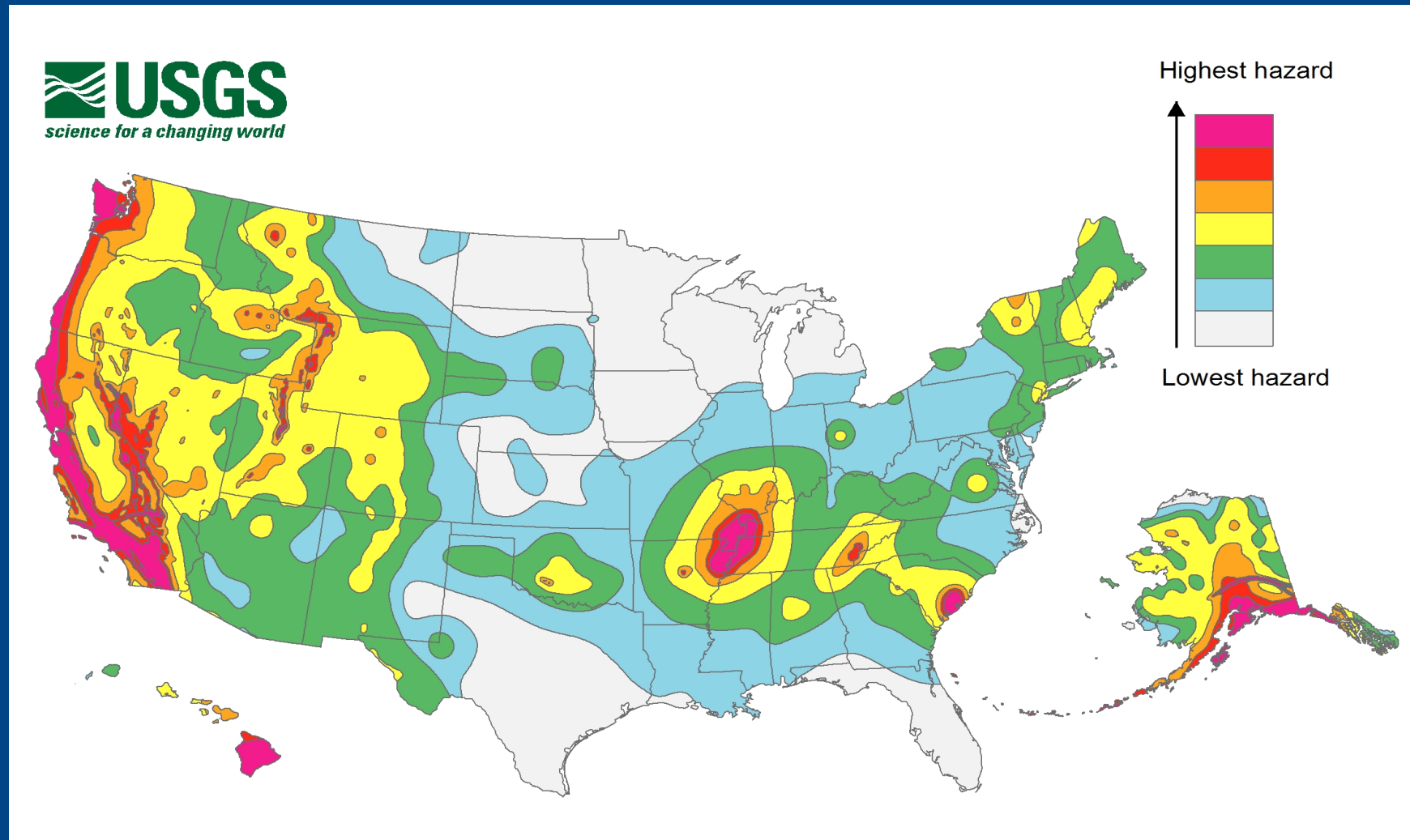
“Ring of Fire”

where 90% of the world's earthquakes and 81% of the world's largest earthquakes occur.



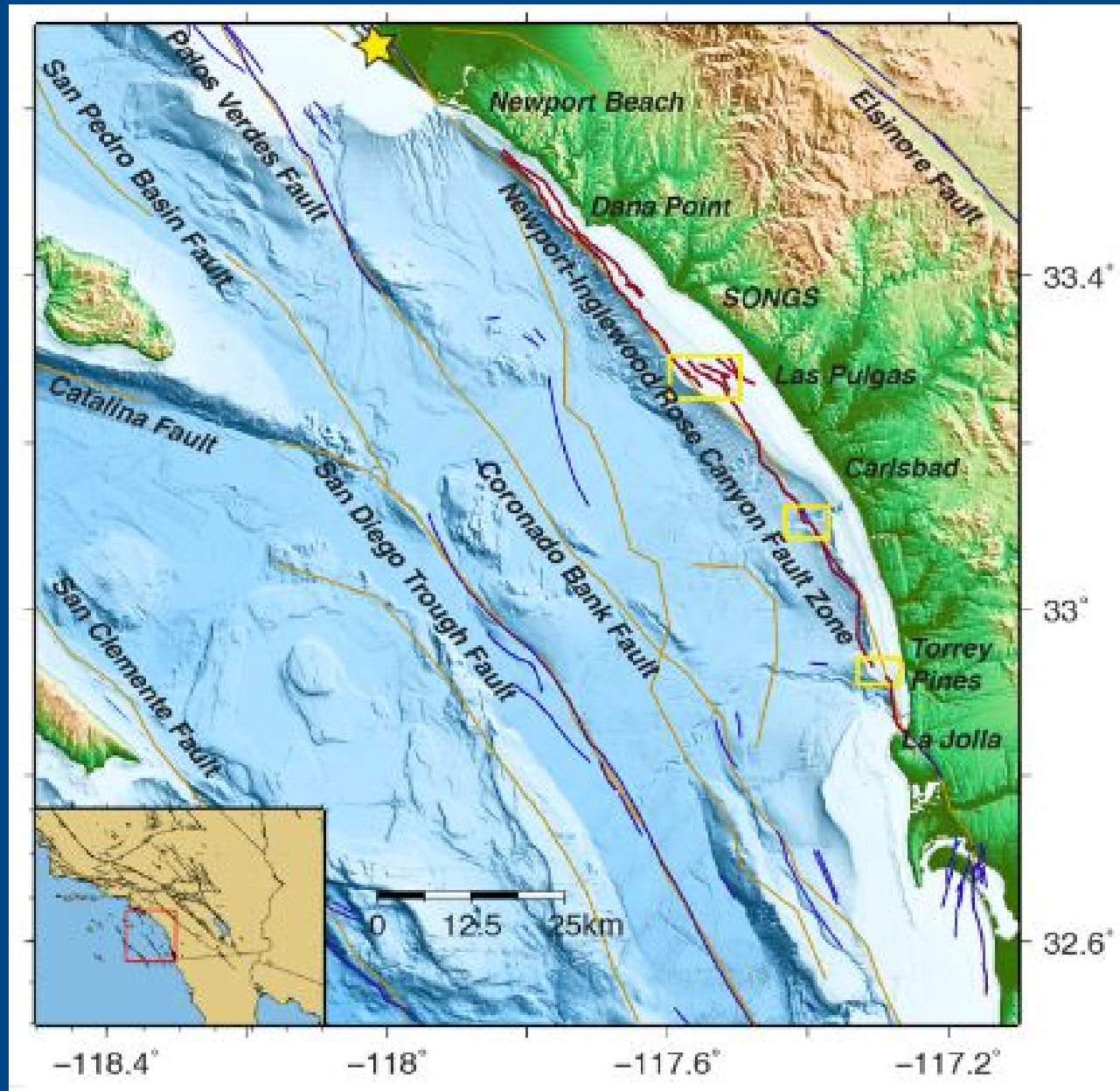
California is highest Hazard zone

No nuclear plants or storage are prudent in CA



Newport-Inglewood/Rose Canyon Fault

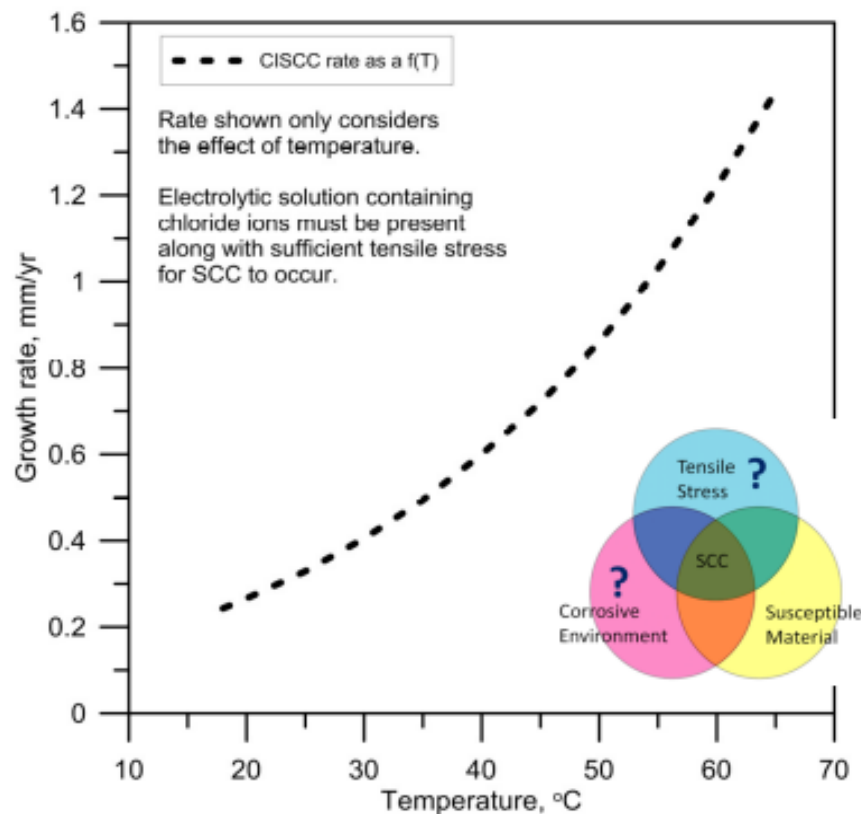
Latest research predicts 7.4 mag quake near SONGS



Salty Ocean Air Implies Cracking

Onset as soon as surface < 85C

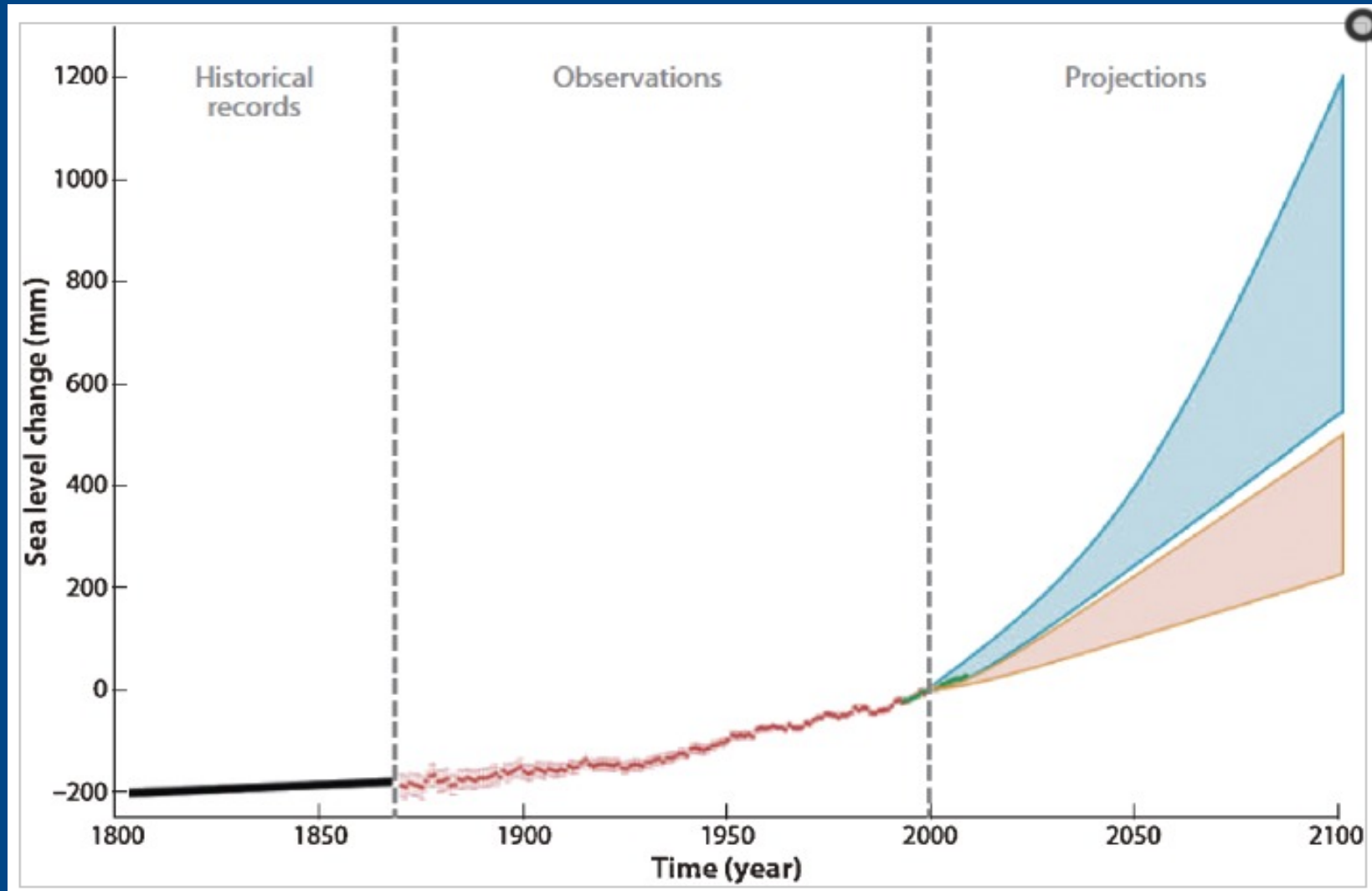
CISCC Growth Rate vs Temperature



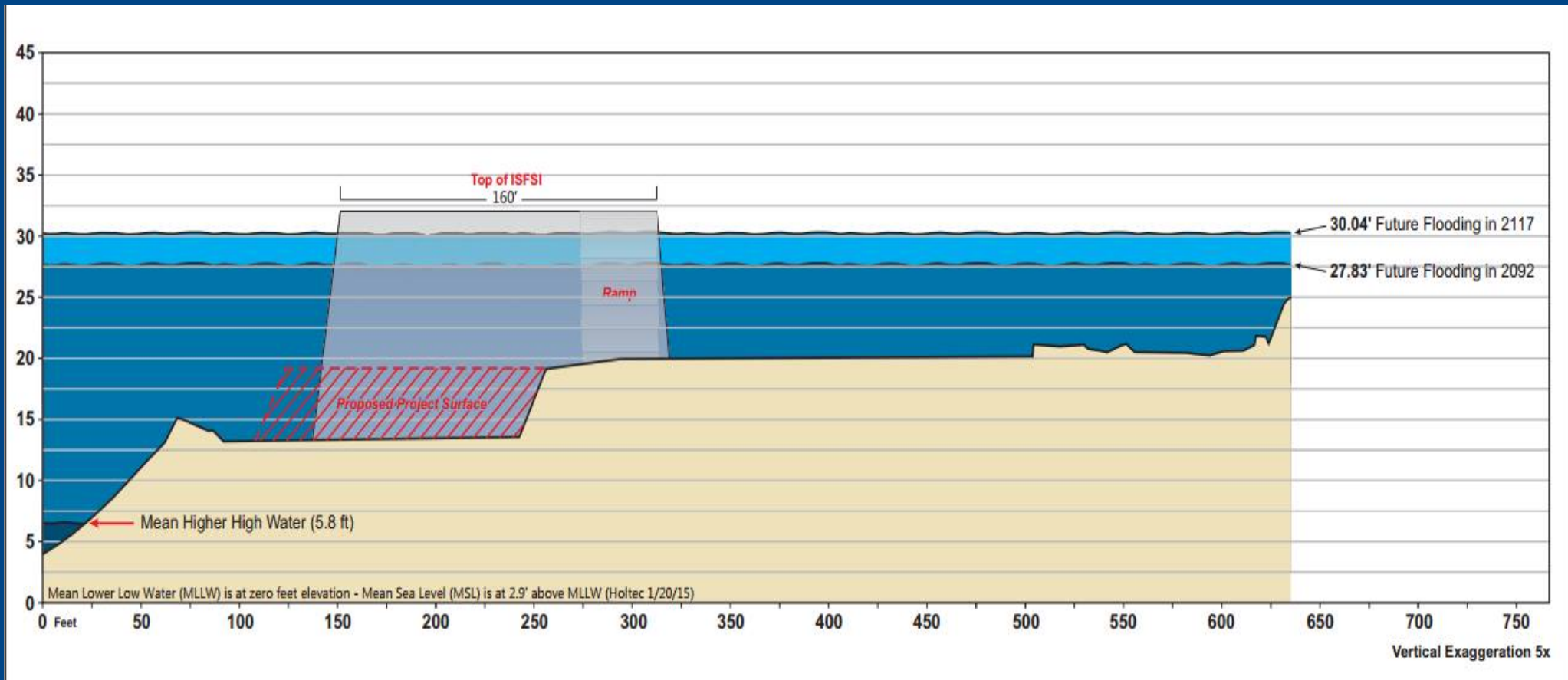
- Baseline rate of 0.29 mm/yr at 23°C from Kosaki (2008)
 - Activation energy of 31 kJ/mol from Hayashibara et al. (2008)
 - DOES NOT show crack growth rates of actual components
 - Composition and deliquescence behavior of atmospheric deposits
 - Site specific environmental data
 - Residual stress profile
 - Plant operating experience*
 - Turkey Point: 0.11 mm/yr
 - San Onofre: 0.25 mm/yr
 - St. Lucie: 0.39 mm/yr
- *Assuming crack initiation at the start of plant operation and continuous growth

Sea level rise predicted

Due to climate change



Coastal Commission Predicts Ocean will surround ISFSI



Severe Problems with this site

- Terrorist Risk
- Earthquake zone
- Tsunami zone
- >8.4 Million residents
- Risk to Ocean; Corrosive salty air
- Freeway and Railroad
- There is nothing good about this site

Where to put the waste?

- Other options exist and have not been adequately investigated:
 - Palo Verde Plant in AZ.
 - In the Mojave Desert (like Fishel Proposal)
 - In Camp Pendleton but further east, off the coast away from the freeway.
 - “Consolidated Independent Storage” (CIS)
- These are still considered temporary with the waste moved to a geologic disposal site later.
- Yucca Mountain not realistic goal.

THEY SAY IT IS PERFECTLY SAFE TO PUT
NUCLEAR WASTE 30 YARDS FROM THE OCEAN
MAYBE A BETTER PLACE AT SO CAL EDISON
HEADQUARTERS SO THEY CAN APPRECIATE
THEIR GOOD WORK FOR THE NEXT 25,000 YRS



Southern
California Edison

Dush St
Southern
California
Edison

JOIN THE FIGHT
CitizensOversight.org

Palo Verde Nuclear Plant

Perhaps the most obvious option

Since 2005, NRC has approved increases in the net generating capacity of each unit to 1,311, 1,314, and 1,312 MW, total 4,000 MW



Palo Verde has existing ISFSI



Palo Verde Existing ISFSI: Above-Ground Casks



2



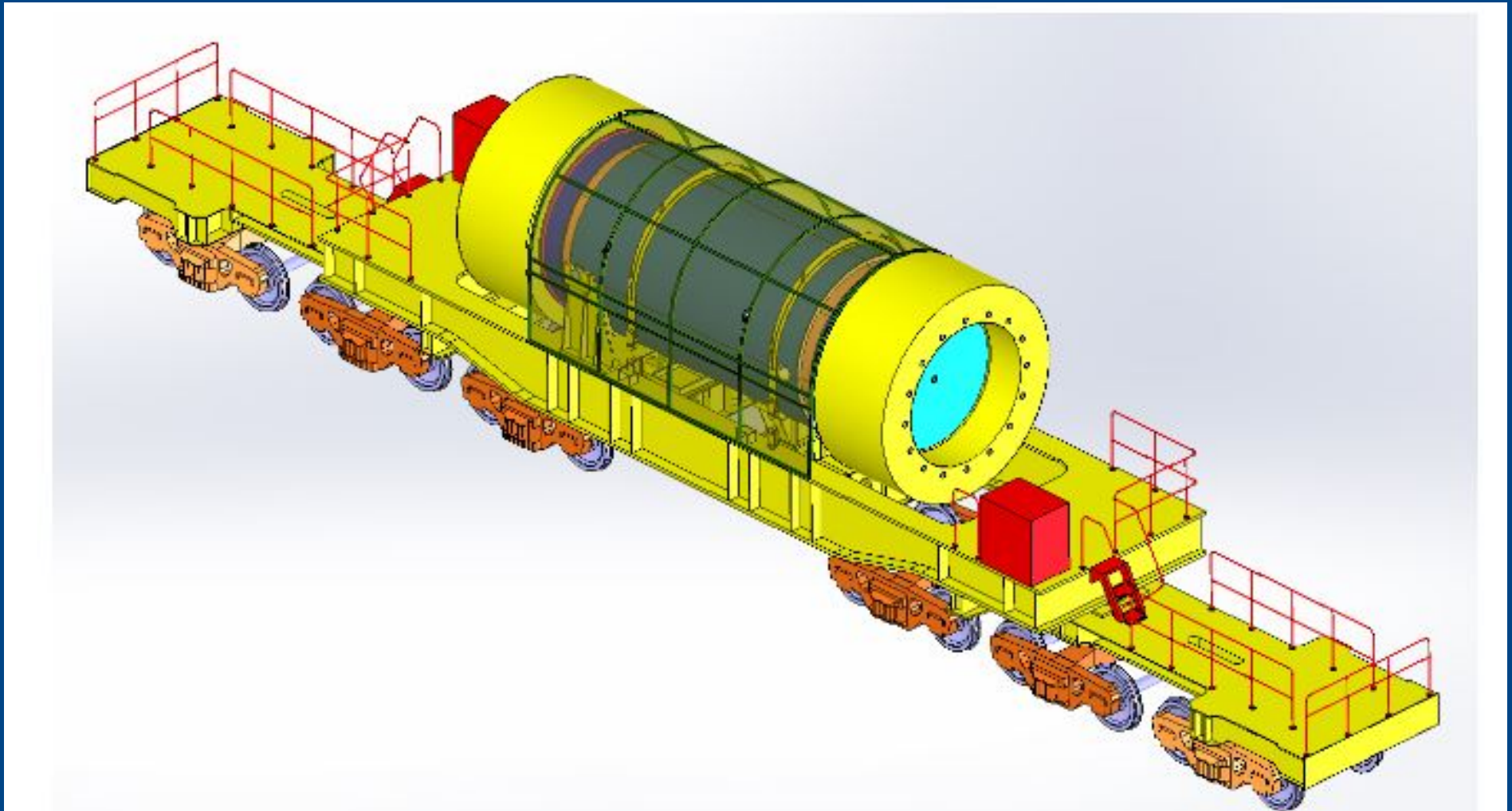
Palo Verde

- > Transportation feasible: near I-10, Rail
 - > Out of Earthquake zone
- > No Danger to/from Ocean; Minimal Corrosion Risks
 - > Already a nuclear site -- Partially owned by SCE
 - > Only paper-work is required for SONGS waste use

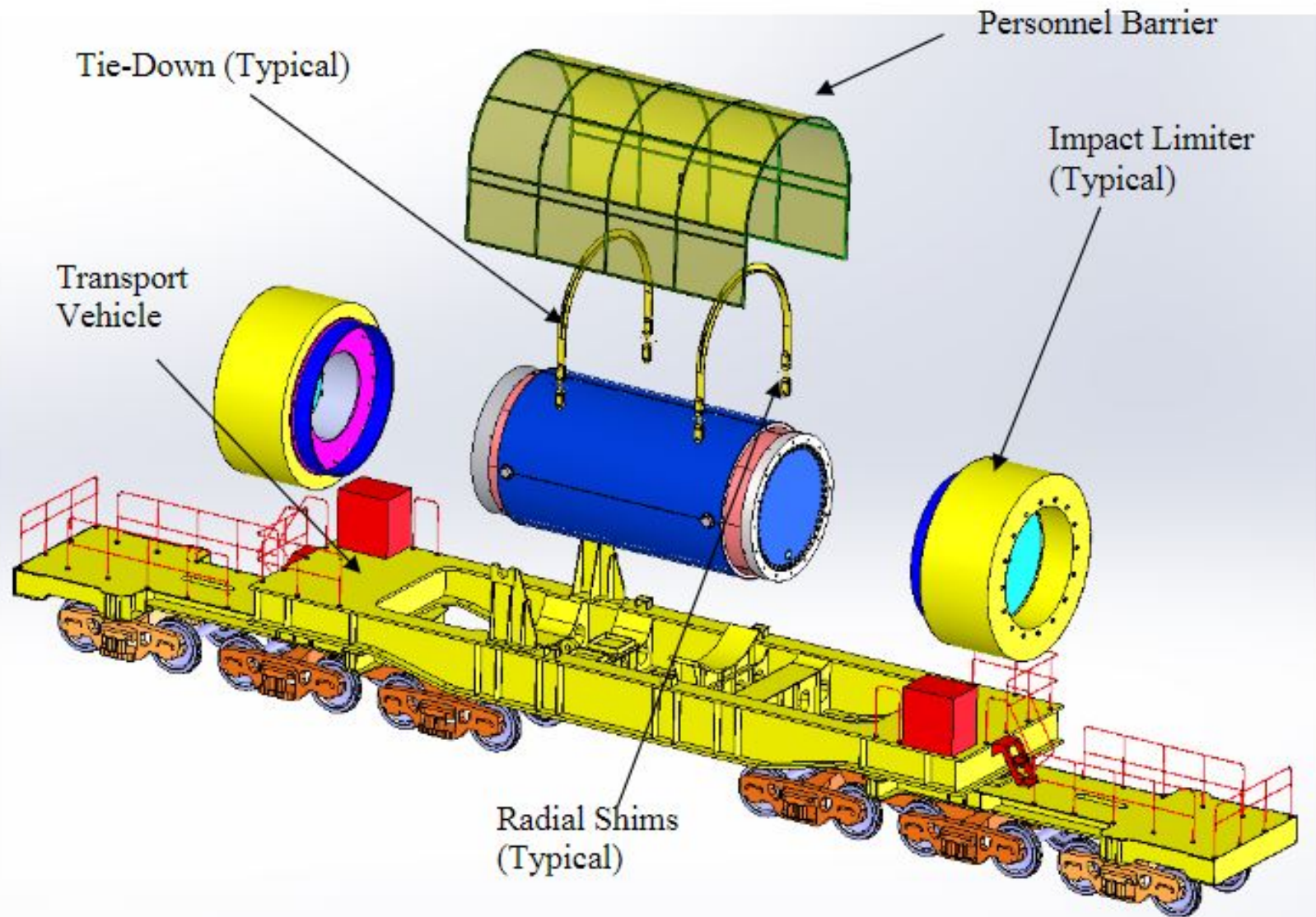


Transportation Is Feasible

Companies specialize in Spent Fuel Transportation and they say it is not a problem.



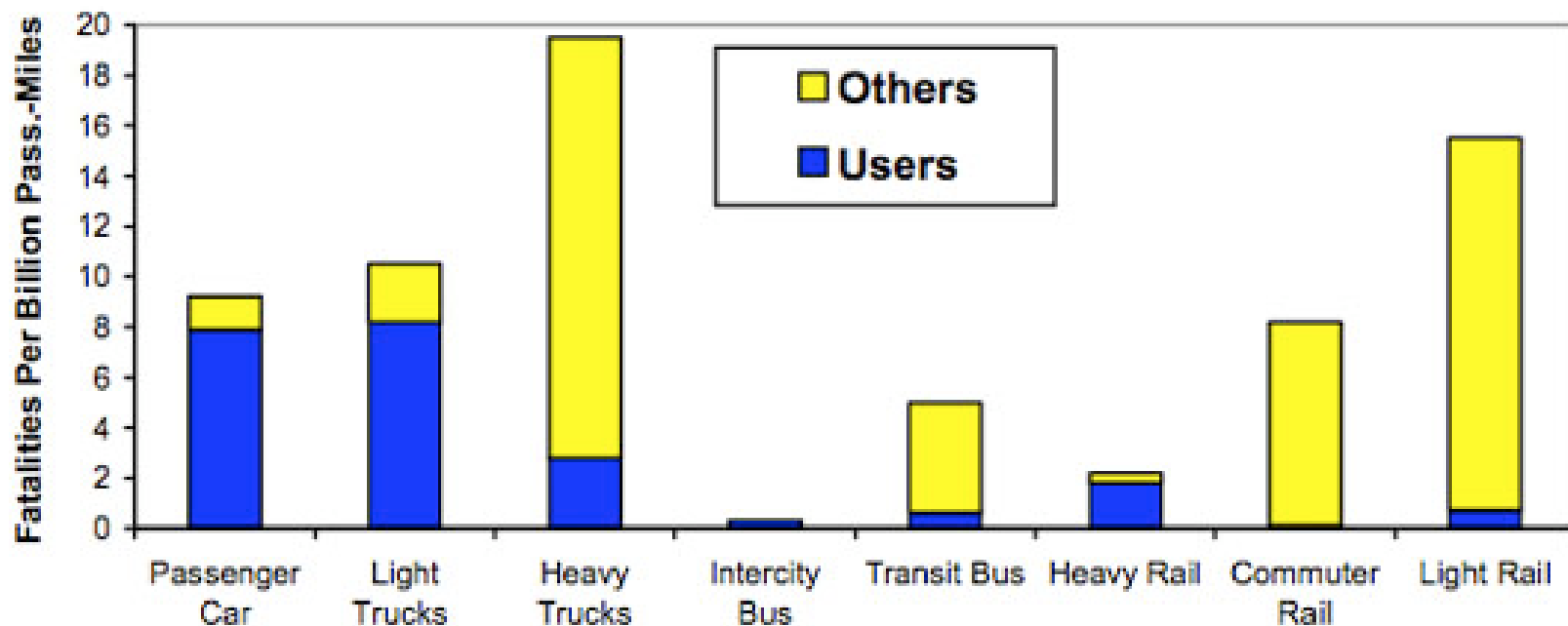
HI STAR 190 Transport Cask



Rail is rated as safest

But road fatalities may be a bad metric

Figure 13 Transport Fatalities (FHWA and APTA Data 2002)

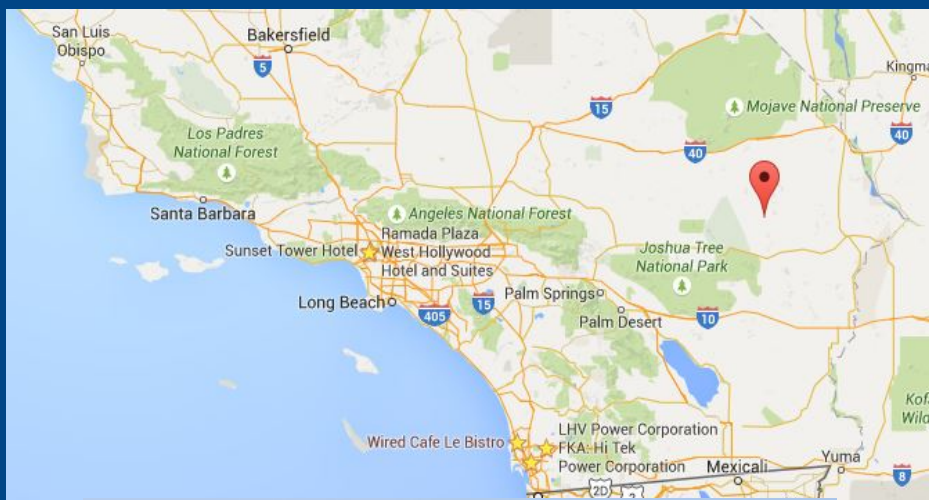


Transit travel tends to have lower crash rates than automobile travel, even taking into account risks to other road users.

Fishel, CA Suggestion

First best guess by Citizens' Oversight

- > Away from most dangers, ocean, people, faults, terrorists
- > right on rail line, is a google-able rail stop
- > But... still in relatively active seismic zone
- > Amboy Crater not far off, geology implies volcanic activity
- > We now admit this is **TOO REMOTE, TOO ACTIVE**

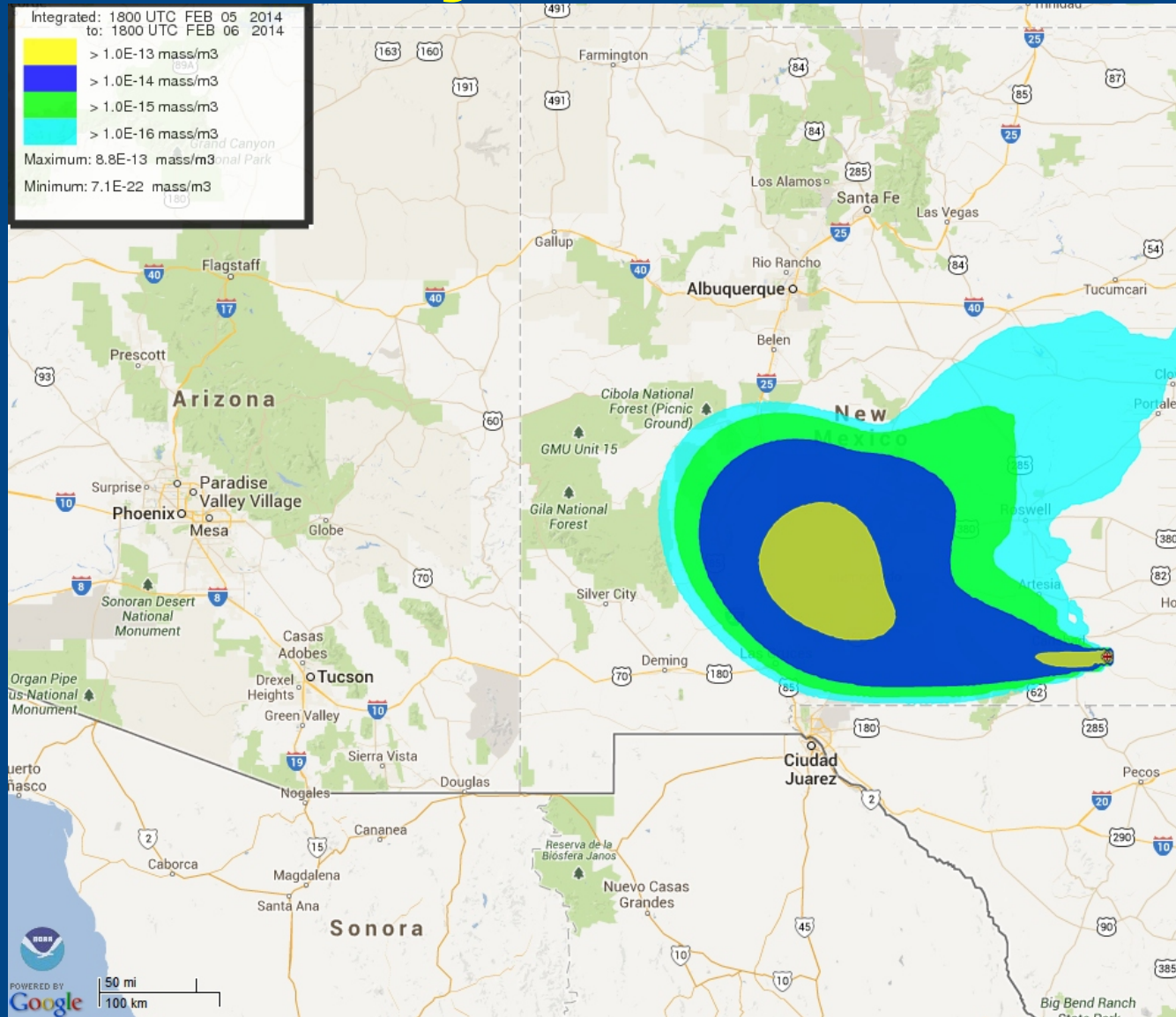


Waste Control Specialists: Andrews County, TX -- Low level waste



WIPP - Waste Isolation Pilot Plant

“Kitty Litter” ex: human error



Holtec working on Consolidated Interim Storage (CIS) in NM

Holtec Partners with ELEA, LLC in New Mexico to Build Consolidated Interim Storage Facility

April 30, 2015

We are pleased to announce the adoption of a Memorandum of Agreement by Holtec International and the Eddy Lea Energy Alliance (ELEA), LLC to establish an *underground* consolidated interim storage facility in southeastern New Mexico, approximately 12 miles from the Waste Isolation Pilot Plant (WIPP) facility (see map below). ELEA, a limited liability company owned by the cities of Carlsbad and Hobbs, and Eddy County and Lea County, has successfully secured the support of the state of New Mexico to build a state-of-the-art interim storage facility on their industrial land.

Opening the press conference held yesterday at the National Museum of Nuclear Science and History in Albuquerque, NM, ELEA Board Chairman, John Heaton, provided opening remarks stating, "This is really a big day for us. We have been working on this for a number of years so we are really excited about it.

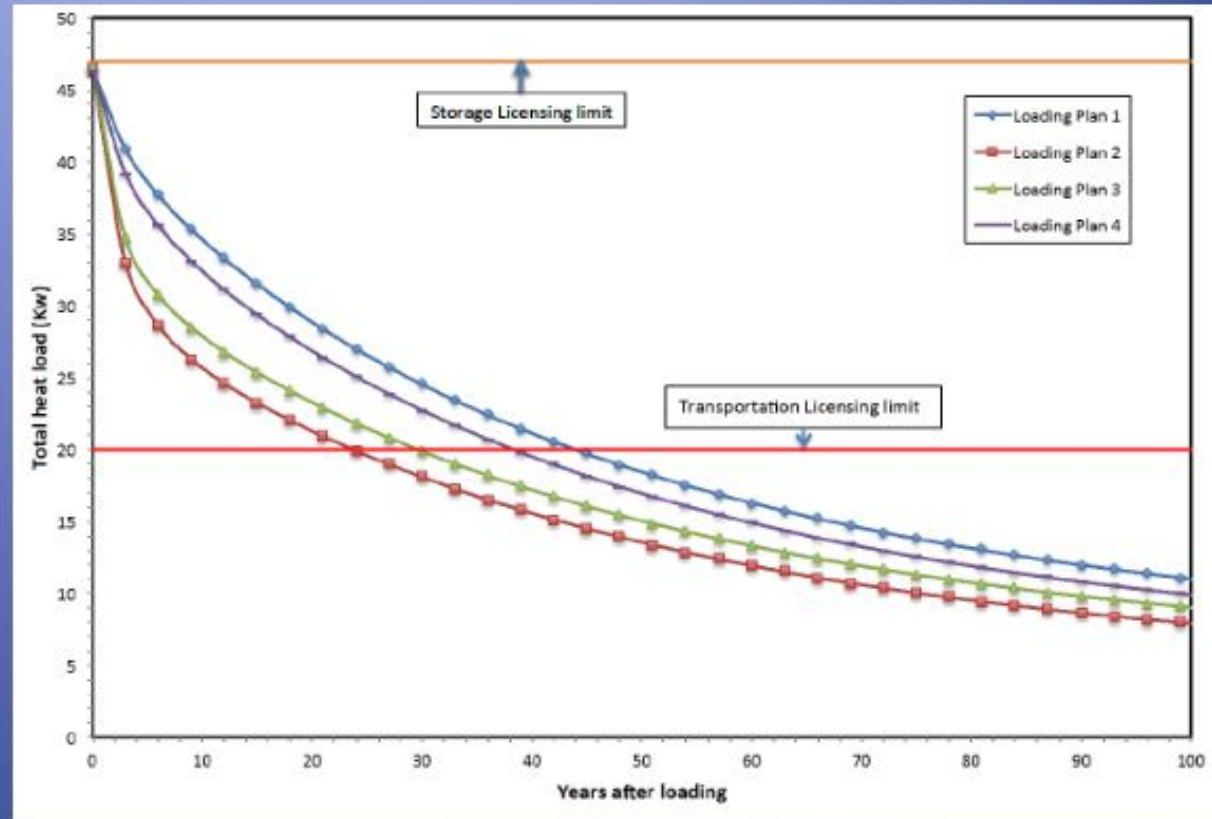


Eligible for transport?

Some data says up to 45 years of cooling

Current situation

- Dry Storage
 - Majority in welded metal canisters inserted into concrete overpacks
 - Inventory is diverse
 - Trend toward higher capacity canisters
 - Thermal constraints will limit transportability for decades – up to 5 decades



Courtesy Idaho National Lab

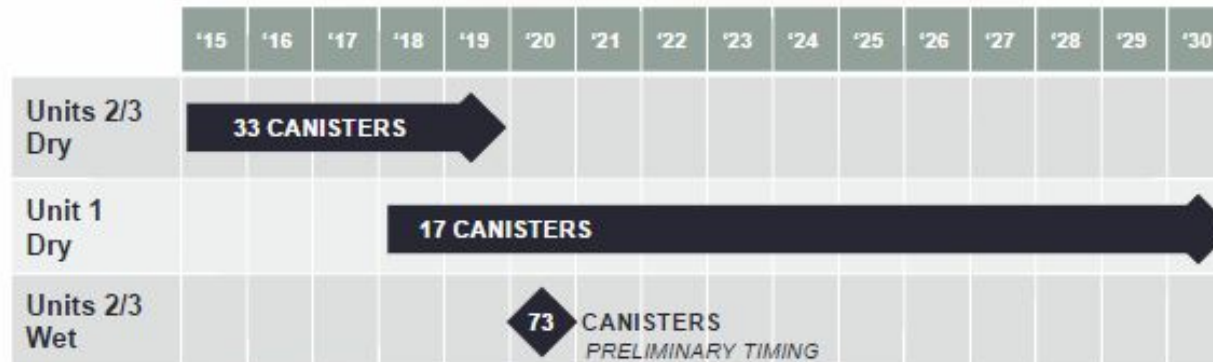
But SCE says most is eligible

Cooled transport casks may allow early transport
Even if passively cooled transport casks do not qualify



Fuel Readiness for Transportation

- Transfer estimated at 10 years from start to finish
- Some fuel qualified for transport now
- Other fuel qualifies over time



10

Status

- Citizens' Oversight filed lawsuit in 2015 to block ISFSI on the beach at San Onofre
- Aguirre & Severson LLP is law firm handling the case.
- Judge ruled case could move forward Nov 2016
- Hearing originally scheduled for April 14, 2017.
- SCE announced will enter settlement negotiations (April 7, 2017)
- Next hearing scheduled for July 14, 2017
- Citizens Oversight wants to public involvement but we must respect evidence rules on settlements.
- We will be holding public involvement meetings and gathering transcripts from other public meetings for input into the settlement process.
- Our goal: Store fuel in pools for perhaps five years with rapid removal of waste to alternate site.

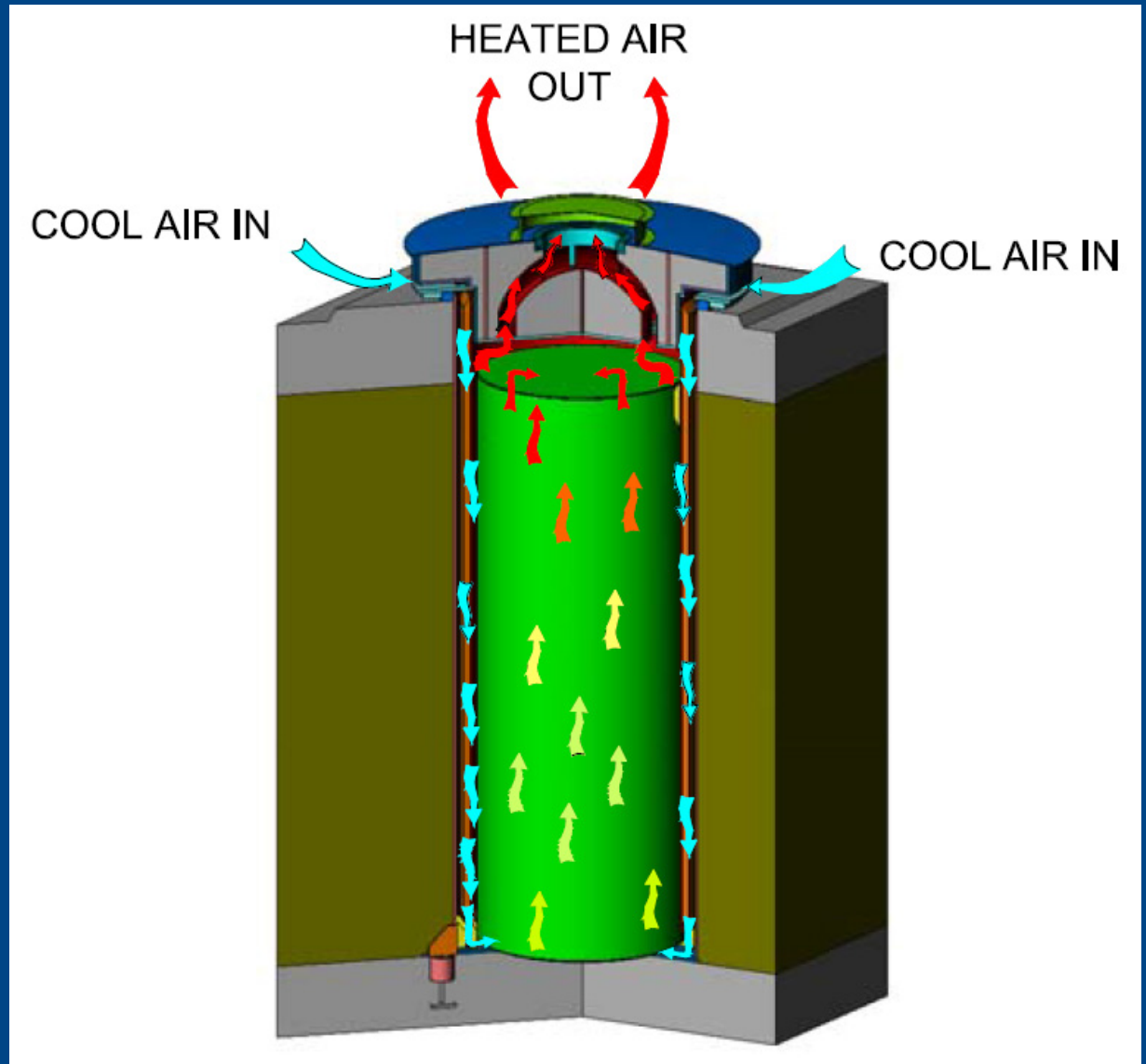
Summary

- ISFSI only 100 ft from Ocean is unreasonable and imprudent under any conditions.
 - Better casks, inspection, etc not good enough!
- San Onofre and (and all CA) is special circumstance due to seismic & ocean risk
- SCE must investigate other options esp. off-site storage and complete paperwork to move it through existing ISFSI to the new site.
- Please help us apply public pressure to get govt officials and for-profit corporation to make prudent and reasonable choices here, not easiest and quietest ones.

Holtec asks for 30 day checks

UMAX system requires that exhaust ports be checked every 24 hrs as full blockage will result in over-temperature condition.

Holtec asks for 30-day checks instead of 24-hour checks saying it is okay to go into accident condition.

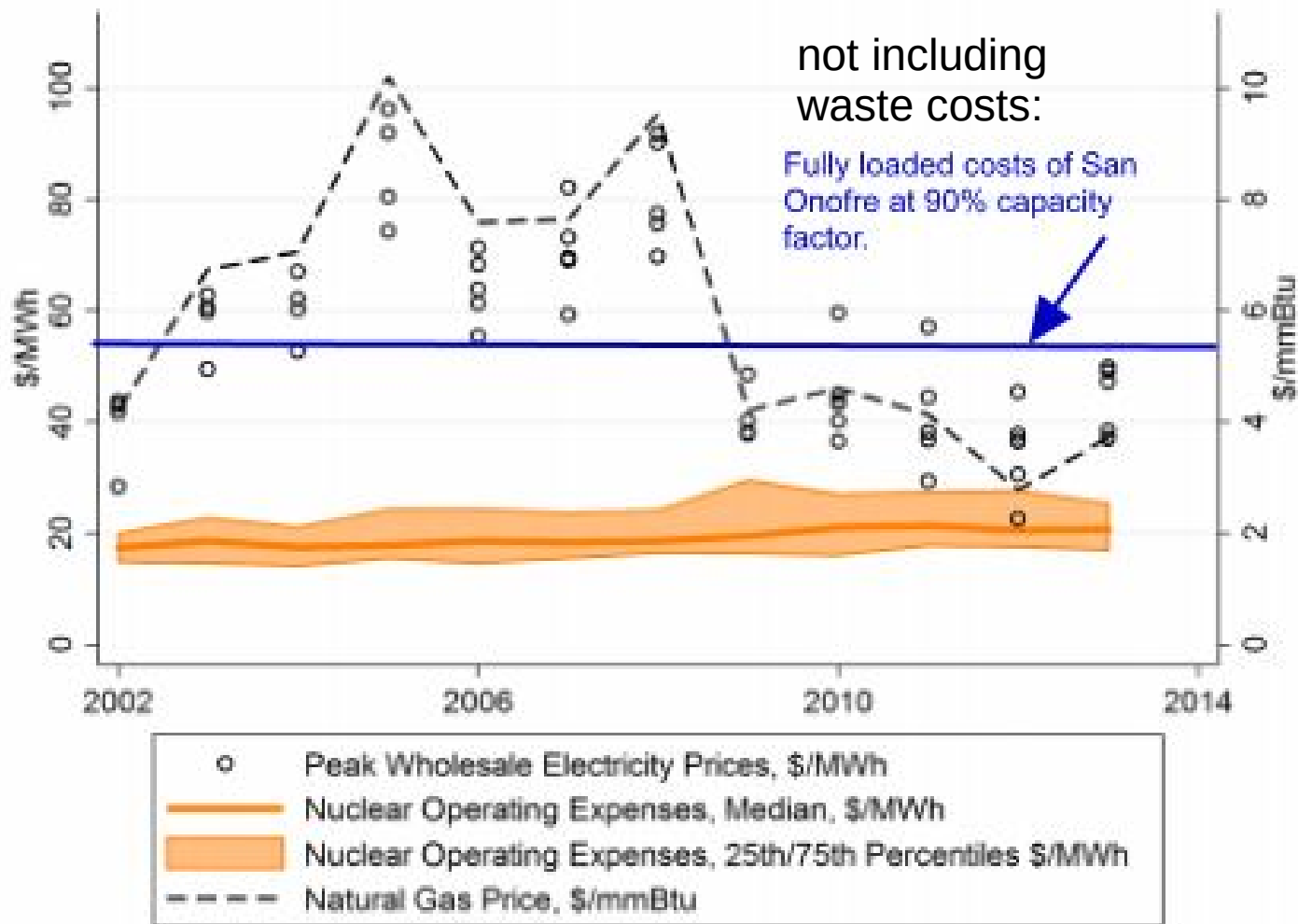


Nuclear: worst human blunder

- Nuclear power is expensive.
 - Power from San Onofre costs 2x market rates even during 2012, when market prices should have been highest.
- Waste will cost even more.
 - No one is really factoring in the cost of dealing with waste for 5,000 generations, 40x all recorded history.
- Any technology that generates waste faster than you can recycle it is irresponsible.
- Large accidents happen regularly.
- Bigger problem than climate change.



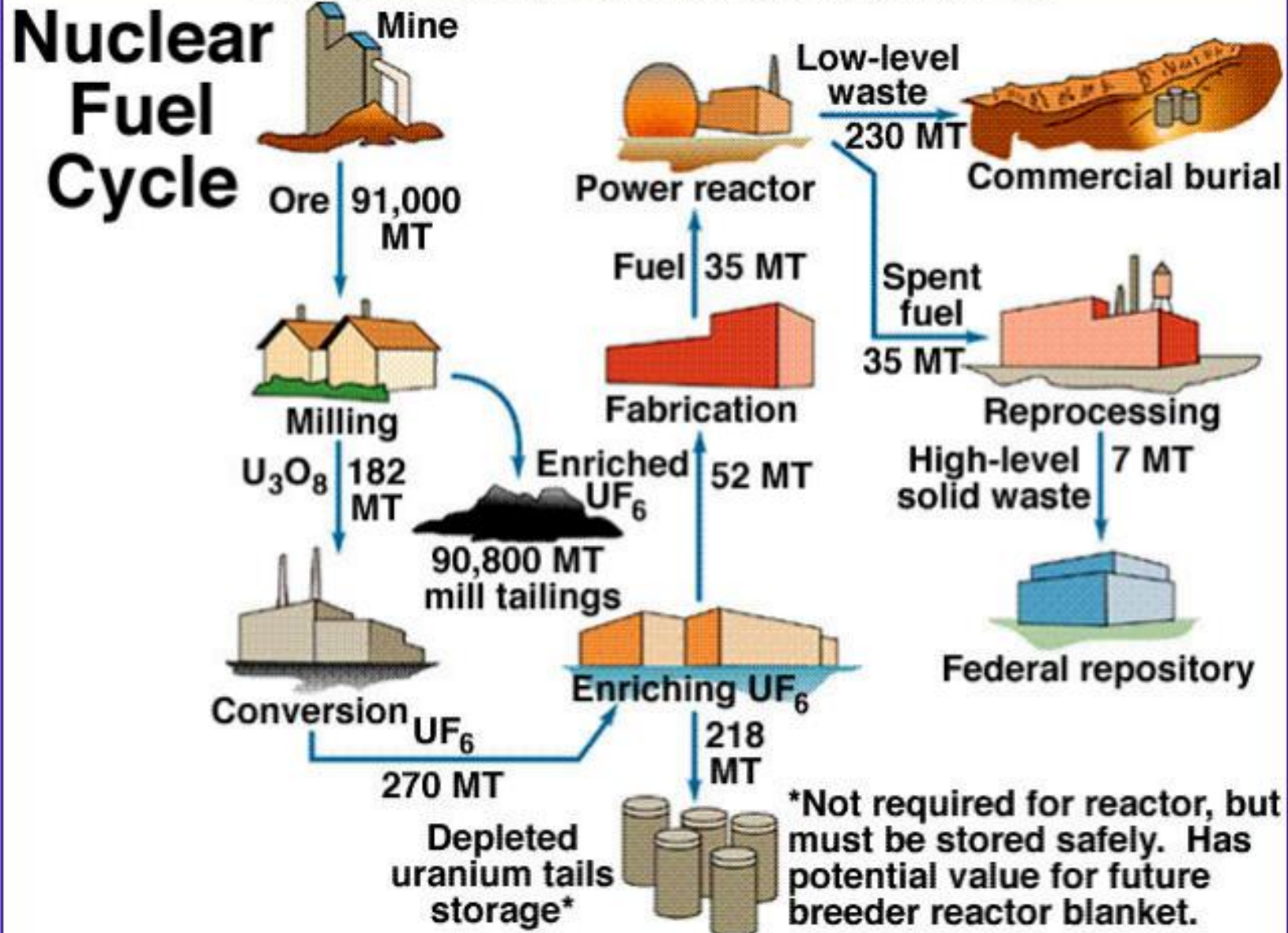
Figure 1: Declining Profitability of U.S. Nuclear Power Plants



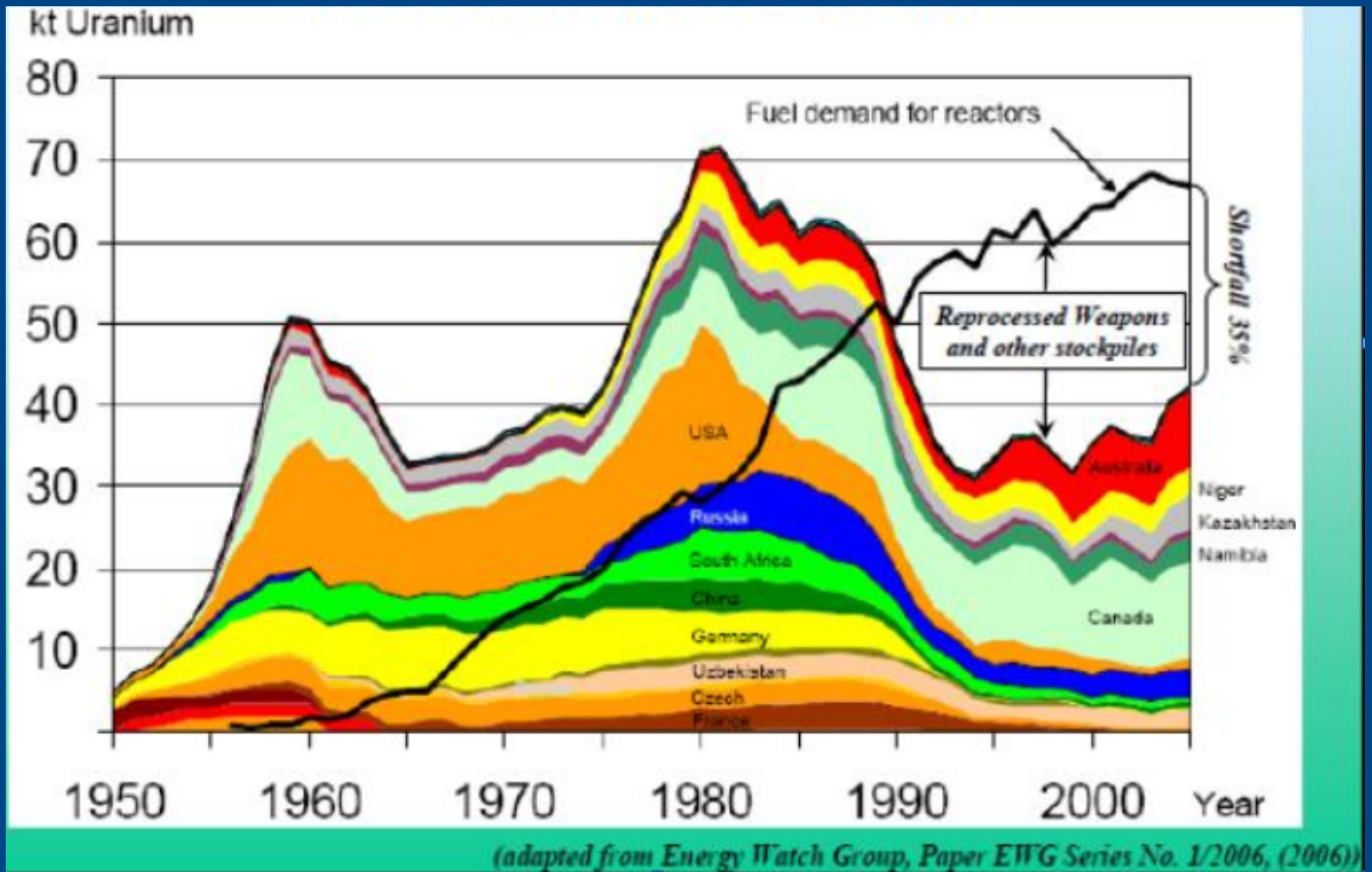
Note: This figure plots wholesale peak electricity prices in real \$/MWh at various ICE hubs around the country. The dashed black line shows Henry Hub natural gas prices (in \$/mmBtu), the driver of wholesale peak electricity prices. The orange lines show the mean, 25th percentile, and 75th percentile operating expenses at U.S. nuclear plants, in real \$/MWh. Electricity and natural gas prices are from EIA; operating expenses are from EUCG, Inc.

Nuclear Fuel Cycle produces waste, GHG emissions

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Nuclear is not sustainable



STATEMENTS OF CONCERN AT RECENT DEMCCO MEETING BY PRO-NUKE SPEAKER

- Call it "spent fuel" not "nuclear waste". (Not all waste is spent fuel)
- We have no choice, unless we send it to the moon, but to store it on site.
- Carbon footprint is less than other fuels. (but not less than renewables)
- NRC can shut down plant with no explanation. (not true, must be a safety concern)
- Harry Reid and Obama made political decision to shut Yucca Mountain.
- Nuclear waste was safely stored on unit one for +/- 26 years.
- Wear and tear in 3000 tubes. Steam generator 65 feet high. It was Mitsubishi's fault, a Japanese firm, that shouldn't have been trusted. 2022 was the license termination date. SCE could have gotten extension to 2024.
(Arbitration tribunal found it was not MHI's fault)
- Carbon footprint for coal is 1000+, oil 650, nuclear 5. (Solar and wind are negative, does not account for thermal radiation of nuke plants, worth about 80,000 cars)
- Pentagon says climate change is a threat multiplier. (but nuclear is not climate change soln)
- Waste could be stored 10 feet or 5 inches from the ocean. No problem, (yes problem)
- the San Onofre site belongs to Edison. (Site belongs to NAVY)
- Plan is to have all fuel in casks, out of pools by 2019. (Actually plan is by 2022)
- The fuel pools are overcrowded. (But considered safe by NRC)
- The right thing is to store fuel on site. That is the NRC's decision until they reopen Yucca Mountain.
- Citizens' Oversight is in it for the money. (Wrong, \$0 is payroll)
- Nuclear electricity is cheaper than coal and gas. (Not true, currently 50% more costly)

Take Action!

- Court Hearing scheduled for July 14
- Coastal Commission coming back to San Diego in October
- citizenoversight.org/signup
- Get and display stickers!
- We embrace “Diversity of Tactics”



Further Information

- Please sign up on sheet.
- CitizensOversight.org/StopNukeDump
- Facebook: “No Nuke Dump on the Beach”
- RayLutz@CitizensOversight.org
- We need your help to provide oversight!

