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CITIZENS' OVERSIGHT PROJECTS
CitizensOversight.org

April 24, 2015

To: California Energy Commission
Commissioner Andrew McAllister, Lead Commissioner for 2015 IEPR
Chair Robert B. Weisenmiller, Lead Commissioner for Electricity and Natural Gas

Re: Let's find a solution for Nuclear Waste in California

There is a very disturbing situation we can observe around the country: maintaining nuclear waste at sites of nuclear power plants indefinitely, meaning decades and centuries into the future. This situation is a result of an action by the Nuclear Regulatory Commission (NRC) last August in their "Waste confidence" initiative. In essence, the NRC directed all nuclear power plants to become indefinite waste dumps.[1]

Even a cursory review of this situation leads anyone to conclude that it probably isn't our best choice. Since San Onofre is being decommissioned, it is essential that we make a careful review of our options before plunging ahead with this default situation. Most specifically, we believe that the CEC should review our current situation and consider whether an off-site interim storage facility should be developed in California, away from coast and high-population areas for California stranded spent fuel[2]. We also have a proposed game-plan for progressing a review by the relevant institutions and organizations.

The underlying philosophy of this proposal is that each state that has chosen to build nuclear plants in their state should be responsible for their own interim storage. This is simply a matter of fairness and may also underscore the point that if you decide to open a nuclear plant, there are other long-term costs and obligations that you, yourself, must endure. That includes the risk of having this waste in your state.

We are very happy to see that the California Energy Commission is holding a workshop on April 27, 2015 called the "Joint Lead Commissioner Workshop on Nuclear Power Plant Issues," including spent fuel storage. We would like to add our voice to the proposition that the state take immediate action to develop a solution to this problem at a state level, and we would like some time to present our views at this

1 http://www.huffingtonpost.com/2013/05/23/federal-nuclear-waste-rules_n_3328495.html -- "Federal Nuclear Waste Rules Need To Be Improved, Attorneys General Petition NRC"

2 "California Stranded Spent Fuel" is fuel that remains at plants that are being decommissioned, such as now at San Onofre, and in the future, at DCNPP, once it enters the decommissioning phase. We are not suggesting that the California solution become a magnet for fuel from other states of nationwide, it is not for spent fuel from DCNPP or other nearby nuclear plants.

meeting.[3] This letter is a community comment to the work on the IEPR and also includes some other ideas for a game plan to address these issues on an urgent basis.

The 2013 IEPR includes a historical summary of the various steps taken at a federal level regarding spent nuclear fuel. Since the CEC has been specifically tasked with this subject area, there is little doubt that you are likely the proper entity to spearhead the state-level activity to pursue a prudent solution to this dilemma. We understand, however, that you will need to work with other agencies and governmental institutions, and thus we have included this in our proposal and comments. We believe that most of the material below should be included in your IEPR or a related work.

About us

Citizens Oversight, a 501(c)3 Delaware Corporation with offices in California, has been an active participant representing ratepayers in proceedings at the CPUC, including the San Onofre investigation (I.12-10-013), the 2012 Nuclear Decommissioning Cost Triennial Proceeding (NDCTP, A.12-12-012/013), and now the San Onofre Decommissioning Cost Estimate (A.14-12-007) and 2014 San Onofre Decommissioning Cost Reasonableness Reviews (A.15-01-014 and A.15-02-006). We represent ratepayers and have members who are ratepayers in the areas, some of whom reside very near to the plant.

Our Comments

Based on this work for the past several years, and my background as a trained engineer[4], we have the following observations and recommendations.

1. **Default Situation is Unsatisfactory:** Fuel stored in dry casks on the nuclear reactor sites stored in Independent Spent Fuel Storage Installations (ISFSI) was originally viewed as a temporary fix to allow the Department of Energy (DOE) to develop a solution for permanent disposal in a deep geologic repository, while at the same time spent fuel pools were filled to the brim. With the delay of the opening of any such repository coupled with the closure of the San Onofre plant, the current plan is to triple the size of the on-site ISFSI on a somewhat permanent basis, in that it may be there for many decades or hundreds of years[5]. The idea that nuclear waste would be stored at these sites has not been a well-thought-out conclusion, but rather one that is simply the default situation based on the inability of the DOE to establish a permanent repository and accept the spent fuel as originally planned.

   There is some research already done on this topic by the Department of Energy in their Nuclear Fuels Storage and Transportation Planning Project regarding the issues related with relocating

3 David Victor, chair of the "San Onofre Community Engagement Panel" (CEP), as well as members Tim Brown (Mayor, San Clemente, wireless communications business background) and Dan Stetson (Ocean Institute, MBA) joined in a memo sent to members of the CEP at the recent April 16 CEP meeting. The CEP is convened by Southern California Edison and other decommissioning utilities, is not an independent body, does not represent the community, does not vote on any matters, and is unable to have a position. Therefore, it is essential that the CEC view the submission by Victor, Brown, and Stetson as opinions of individuals hand picked by the utility, and not a consensus view. The CEP Charter is available here: (http://www.songscommunity.com/docs/SONGS_Decommissioning_CEP_Charter.pdf).

4 Ray Lutz has an MSEE degree from SDSU, 1984.

5 The recent NRC "Waste Confidence Generic Environmental Impact Statement" NUREG 2157 -- http://pbadupws.nrc.gov/docs/ML1322/ML13224A106.pdf -- The NRC define "Short Term" as 60 years beyond licensed life and "long term" to be more than 100 years after the operation license. They assume that: a) Institutional controls would be in place; b) Spent fuel canisters and casks would be replaced approximately once every 100 years; c) Independent spent fuel storage installation (ISFSI) and dry transfer system (DTS) facilities would also be replaced approximately once every 100 years; d) A DTS would be built at each ISFSI location for fuel repackaging; e) All spent fuel would be moved from spent fuel pools to dry storage by the end of the short-term storage timeframe (60 years).

spent fuel from decommissioned reactors.[6]

2. **"Spent Fuel" is extremely dangerous:** A U.S. Nuclear Regulatory fact sheet states that after 10 years in a cooling pool, the surface radioactivity of a spent fuel assembly is still about 10,000 rem/hour. To understand the danger that poses to health, consider that a 500-rem dose delivered to a whole person in a single exposure is fatal. Close proximity to a single 10-year-old spent fuel assembly would deliver a fatal whole-body radiation dose in about three minutes.[7]

   The toxic "lifespan" of spent nuclear fuel is about one million years.[8] Dry casks are designed for about 100 years of spent fuel storage, but that is only a claim, and it appears that the ones we have at San Onofre may not last more than 20 or 30 years.

   Because a permanent solution has not been found in half a century of trying, owners of nuclear power plants are essentially required to manage this most hazardous of all man-made wastes forever. If new nuclear power plants are built, accumulation of this million-year waste will accelerate. Not only do the costs of storage become effectively unlimited; in addition, the risk of a devastating cooling pool accident becomes steadily more likely.[9]

3. **Removal of Standed Fuel:** The California Energy Commission in the 2013 Integrated Energy Policy Report[10], page 217:

   > In January 2012, the Blue Ribbon Commission on America's Nuclear Future identified removal of stranded used nuclear fuel at shutdown sites as a priority so that these sites may be completely decommissioned and put to other beneficial uses. In September 2013, the DOE Office of Nuclear Energy, as part of the Used Fuel Disposition Campaign, released a preliminary evaluation of removing used nuclear fuel from nine shutdown sites, including Humboldt Bay Nuclear Power Plant and Rancho Seco Nuclear Generating Station. Objectives of the study will be to characterize the actions necessary to remove used nuclear fuel from the shutdown sites and develop a plan and schedule for key program activities.

4. **The Blue Ribbon Commission** suggested[11] that off-site ISFSIs may be a good interim solution while we wait for the Department of Energy (DOE) to open a deep geologic repository:

   > The arguments in favor of consolidated storage are strongest for "stranded" spent fuel from shutdown plant sites. Stranded fuel should be first in line for transfer to a consolidated facility so that these plant sites can be completely decommissioned and put to other beneficial uses. Looking beyond the issue of today's stranded fuel, the availability of consolidated storage will provide valuable flexibility in the nuclear

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6 http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22418.pdf -- "Preliminary Evaluation of Removing Used Nuclear Fuel From Nine Shutdown Sites" -- DOE Nuclear Fuels Storage and Transportation Planning Project

7 http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/the-growing-problem-of-spent-nuclear-fuel.html

8 John Deutch and Ernest J. Moniz, et al., Massachusetts Institute of Technology Report, The Future of Nuclear Power: An Interdisciplinary MIT Study, 2003, 180 pages, accessed online April 16, 2011.

9 http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/the-growing-problem-of-spent-nuclear-fuel.html

10 http://www.energy.ca.gov/2013publications/CEC-100-2013-001/CEC-100-2013-001-CMF.pdf, This report covers nuclear energy issues in chapter 6, pages 195-229

11 Blue Ribbon Commission on America's Nuclear Future report, page xii http://energy.gov/sites/prod/files/2013/04/f0/brc_finalreport_jan2012.pdf

waste management system that could achieve meaningful cost savings for both ratepayers and taxpayers when a significant number of plants are shut down in the future, can provide back-up storage in the event that spent fuel needs to be moved quickly from a reactor site, and would provide an excellent platform for ongoing R&D to better understand how the storage systems currently in use at both commercial and DOE sites perform over time.

5. **Not Part of the Bargain:** The general public did not agree to permanent nuclear waste storage at the nuclear plant sites when these plants were originally approved and installed. The plan has always to completely decommission and remove radioactivity so the sites could be returned to beneficial uses. Therefore, it is essential that our state institutions take action to find the best solution to this glaring problem.

6. **Dry Cask Storage is considered safer than storage in spent fuel pools**[12] [13]. At Mark-I design nuclear plants, this is especially true since the fuel pools are three stories above ground level, as was the case at Fukushima. At San Onofre and the Diablo Canyon Nuclear Power Plant (DCNPP), the spent fuel pools are at grade level, but still must be actively cooled. Depending on how hot the fuel is, any interruption in the associated cooling system will result in evaporation of the water in the pool so as to expose the fuel to the air, resulting in auto-ignition and even an explosion of escaping hydrogen gas (perhaps within 133 hours for fuel in the pool for one year.)[14]

7. **At San Onofre:** Approximately 3.6 million pounds of high-level nuclear waste exists in the form of nuclear fuel assemblies. Most of this is in the two fuel pools that exist on the site, and the remainder is enclosed in 51 dry cask units[15]. The existing ISFSI will have to be expanded about three times its current size to accommodate all the spent fuel from the three units.

Illustration 1: Areva NUHOMS system

8. **NUHOMS®** -- The existing ISFSI at San Onofre uses the Areva Transnuclear NUHOMS® Dry Cask System[16] which uses (5/8") thick welded-shut stainless steel canisters, stored in a concrete overpack in a horizontal orientation. This is an above-ground

12 https://www.nirs.org/reactorwatch/security/nasrptsfp6.pdf -- "Dry cask storage and comparative risks." NIRS.

13 http://www.princeton.edu/sgs/publications/articles/fvhippel_spentfuel/rAlvarez_reducing_hazards.pdf -- "Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States" -- Alvarez, R.

14 http://pbadupws.nrc.gov/docs/ML0104/ML010430066.pdf -- NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants" -- "Autoignition is known to occur in zirconium alloys and zirconium hydride, especially when clean metal or hydride is suddenly exposed to air." [Page 100]; "... partial draindown will lead to a steam zirconium reaction producing hydrogen gas which could reach explosive concentrations in the atmosphere of the spent fuel building, potentially leading to a breach of that building." [Page A6-22].

15 One dry cask contains "greater than class-c" (GTCC) Low Level Radioactive Waste (LLRW) and not spent fuel. GTCC LLRW is waste that is not generally acceptable for near-surface disposal and for which the waste form and disposal methods must be different and, in general, more stringent than those specified for Class C LLRW. NRC regulations require GTCC LLRW to be disposed of in a geologic repository as defined in 10 CFR Parts 60 and 63, unless proposals for an alternative method are approved by NRC under 10 CFR 61.55(a)(2)(iv). For more information, see http://www.gtcceis.anl.gov/documents/eis/GTCC_EIS_February2011_Summary.pdf "Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375-D)"

16 http://us.areva.com/EN/home-1497/new-challenges-proven-solutions-prevention-nuhoms-dry-cask-storage.html

design which allows air to passively cool the canisters by entering in vents at the bottom and rising out of vents at the top. There is no way to seal the vents. One positive aspect of this design is that additional concrete containment overpacks can be constructed on an as-needed basis, even one at a time if necessary. Each canister weighs about 170,000 pounds loaded.

9. **Holtec Hi-Storm UMAX system:** Southern California Edison (SCE) has reviewed their options for expansion of the ISFSI. They have announced that they have selected the Holtec Hi-Storm UMAX system[17], which uses similar canisters to those used in the NUHOMS design, except that they are placed vertically, below grade level, into cylindrical steel-lined wells in a massive block of concrete. Our limited review of this system is that it offers a few superior features over the NUHOMS design, including the fact that the wells can be sealed, the casks sit on a relatively thicker base (rather than on the thin canister walls.) Holtec claims that inspection may be easier to conduct as the walls of the canister are accessible but others have brought up the point that it may be required to excavate to check ground water corrosion for the cement structure of the buried canisters[18]. Air enters the top and passively circulates over the canister from the bottom up. This system must be built in batch fashion, i.e. a large number of wells for canisters must be built at one time in contrast with the Areva Transnuclear NUHOMS design where fewer concrete structures need be built at one time. Drawback to this design appears to be regarding draining the wells of water and keeping them dry.

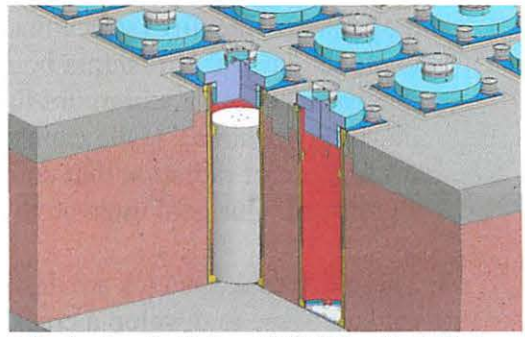

Illustration 2: Holtec UMAX Dry Cask System

10. **Coastal Salt Air Harmful:** The salt air environment at the San Onofre and DCNPP sites poses increased degradation risks due to chloride-induced stress corrosion cracking (CISCC) due to proximity to the ocean and prevailing winds. Since our experience with storing these canisters over many decades is limited, the time for onset of CISCC is not well defined although the rate of crack development is bounded. The NRC is currently actively researching CISCC. Choosing a site at least a few miles from the coast will likely drastically reduce these risk factors.[19]

11. **Inspection Tools Need to be Developed.** There is currently no technology available to completely inspect the canisters for cracks. It seems feasible that such inspection technology will be developed as the underlying technology (high resolution cameras, etc) are readily available today, although perhaps not sufficiently radiation hardened. Whether they are used or not is another matter. A dry-cask design that relies on constant inspections is not robust enough for long term storage. These inspections will likely never be done, that is the sad truth of the matter.

17 http://www.holtecinternational.com/productsandservices/wasteandfuelmanagement/hi-storm/ click on "UMAX"

18 Conversation at CEP meeting with experts on Feb. 25, 2014 (Marni Magda)

19 Our team was able to participate in the April 21, 2015 NRC meeting on Chloride Induced Stress Corrosion Cracking (CISCC). The NRC allows cracks to develop up to 75% of the thickness of the shell and have not included transportation integrity into their requirements. Thus, it is now apparent that these relatively thin canisters are insufficient for long-term storage, past the end of the operating life of the plant.

12. **Risk of Radioactivity Release Exists:** Storage of radioactive waste in dry cask system is not completely safe[20]. Some of these risks can be reduced through the careful siting and design of the ISFSI. The best choice is very important for us to make now so we are not stuck with disasters in the future. There is a risk that in accident conditions, fuel in the canisters will be damaged and may reach criticality (start a nuclear reaction). They won't explode like 150 Hiroshima bombs, but it can certainly start a nuclear reaction or a uranium fuel fire (not just a cladding fire like at Fukushima). If the canisters become breached in any way, the amount of radiation that could be released is quite significant. Our goal must be to completely avoid that possibility.

Illustration 3: Tsunami Inundation Area (US Geologic Survey) includes the San Onofre plant

13. These dry cask systems are designed to be passively cooled using airflow convection. Thus, if a canister were to develop a crack or be breached in some fashion, radioactivity would be released into the environment. There are no filters or "defense in depth" mechanisms. Typically, the canisters have a single wall between radioactivity and the environment.

14. **Ocean Proximity not Required:** Unlike the original nuclear plant which (by design) required cold ocean water to condense steam back to water (and so they were placed by the ocean) there is no need to site an ISFSI by the ocean. Locating the ISFSI away from the coast will also eliminate any risk from any tsunamis, even even if -- as at Fukushima -- it were to be a beyond design basis event. San Onofre is in a known tsunami inundation zone. No one would locate the ISFSI here if given a blank slate.

15. **High-burnup fuel** has been used at plants for a number of years now. The industry has little experience with degradation and transportation of high-burnup fuel in storage canisters. The NRC is actively researching how to do this safely. It may be necessary to wait for the fuel to cool longer in the fuel pools or in dry casks co-located at the nuclear plant sites before attempting to transport them. Some suggest that they will need additional enclosures inside the canisters, sometimes called "canning."

Illustration 4: GNS CASTOR system uses much thicker ductile cast iron walls

16. **Thicker canisters are better.** The 5/8" wall canisters used in the Areva NUHOMS and Holtec HI-STORM UMAX systems were originally designed for storage at operating plants with the expectation that the fuel stored in them would be taken by the DOE to a permanent repository within a few decades.

    Compare this with the CASTOR design[21] by the German company GNS[22] which uses ductile cast-iron material with walls almost 20" thick, nearly 32 times thicker than the thin canister designs by Areva and Holtec. This essentially eliminates any chance that a through-wall crack will develop due to corrosion and can provide a much more robust defense against many risk factors during

20 One canister contains something like 150 to 500 Hiroshima bomb's worth of radiation, based on 400,000 Curies per ton of spent fuel, 10 years after being removed from the reactor. It won't explode like a bomb, but it is very deadly to humans nonetheless.

21 http://www.siempelkamp.com/fileadmin/media/Englisch/Nukleartechnik/produkte/CASTOR_A_high_tech_Product_made_of_ductile_Cast_Iron.pdf -- Specification Sheet or Castor V/19 cask by GNS.

22 http://www.gns.de/language=en/21551/castor-v-19

transportation and handling. They include a removable dual lid system with integrated pressure sensor to detect any leaks around the seals used in the bolted lids. These canisters absorb neutron radiation with polyester inserts in the walls and do not need a concrete structure around them. In Germany, they typically house these in a hardened building. These thicker canisters are not licensed for use in the U.S. at this time.

17. **Dual-Purpose Canisters.** Spent Fuel Canisters today must be "dual-purpose," which can allow both storage and transportation without removing the fuel assemblies from those canisters. Thin-walled canisters such as the Areva or Holtec systems use a transportation overpack[23] which the manufacturers claim is designed to endure design-basis accidents without radioactivity releases[24]. (Not all canisters are dual purpose. The canisters and underground Holtec system used at the Humbolt Bay Power Plant may be too large to transport, although some references state the opposite.[25]) The thick-walled CASTOR design does not use an overpack per-se, but crushable ends are added for transportation, and are themselves transportable.

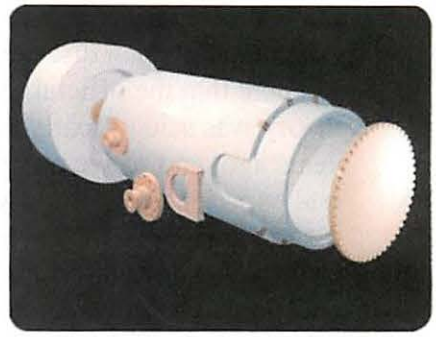

Illustration 5: Areva MP197HB Transport Cask for the NUHOMS system

18. **Transportation is Risky.** Simply said, the less these canisters are moved and handled, the better. Although unused nuclear fuel is moved around the country routinely, spent fuel is much more radioactive and dangerous than unused nuclear fuel. Any plan that includes transportation of the used nuclear fuel to another location must include the increase in risk implied by handling and transporting the fuel.

19. The Nuclear Regulatory Commission (NRC) licenses specific ISFSI designs and provides evaluation tools, but does not deal with the nuances of siting the ISFSI, such as whether one site is safer than another, and definitely they do not deal with cost issues directly. Therefore, it is up to the CEC, and others to help make informed choices in this area. We are concerned that the primary regulatory agency, the CPUC, concerns itself only with cost issues and is not necessarily seeking the best or safest solution.

20. **Fuel Pool Likely Required.** It may be necessary to maintain a fuel pool near any ISFSI so that any canister that develops a crack or otherwise is breached can be moved to the fuel pool and submerged so radioactivity will be absorbed by the water and the contents can then be removed and placed into a new canister. This is particularly true of the thin canister designs as they appear to have a high risk of developing cracks.

    There has been some talk of dry-transfer facilities but those are not yet available. Repair of the canisters is not feasible, according to Holtec's Dr. Singh at the November 2014 CEP meeting when asked about repairing canisters. He said that there's no technology to repair cracks in thin-walled canisters and then went on to explain why you wouldn't even want to try. There is essentially no

23 http://us.areva.com/home/liblocal/docs/Catalog/AREVA-TN/ANP_U_354_V1_11_ENG_MP197HB_TC.pdf -- Transporation overpack for the Areva Transnuclear NUHOMS system, MP197HB.

24 The recent April 21, 2015 NRC meeting on cracking did not include transportation in their models.

25 http://www.wmsym.org/archives/2010/pdfs/10217.pdf -- "Dry Cask Storage Pacific Gas & Electric – Humboldt Bay Power Plant - 10217" -- "This cask system is also licensed to transport under 10 CFR 71, and requires no on-site transfer activities" (Page 7) -- This contradicts what we were told at the CEP meeting by Holtec representatives who stated that these canisters were too large to transport.

chance of through-wall cracking with the thick-walled canisters such as the CASTOR designs, and thus very remote likelihood that repair will be necessary.

21. **Away from Seismic Risks:** Although the dry cask systems are not as dangerous as an operating power plant in the event of natural disasters such as earthquakes and tsunamis, the human experience with the likely magnitude of such disasters is very limited. We note that the official tectonic plate theory was scientifically accepted only 50 years ago, and so we really have very little real experience to base any predictions on the upper limit of the magnitude of earthquakes in California. It seems that after each large earthquake, we are revising our numbers ever higher in terms of possible earthquake magnitudes. Even the movement of an inch can cause a large earthquake, and we are told the San Andreas Fault is some 20 feet behind its historical movement in some areas, and a quake in those areas is overdue.[26]

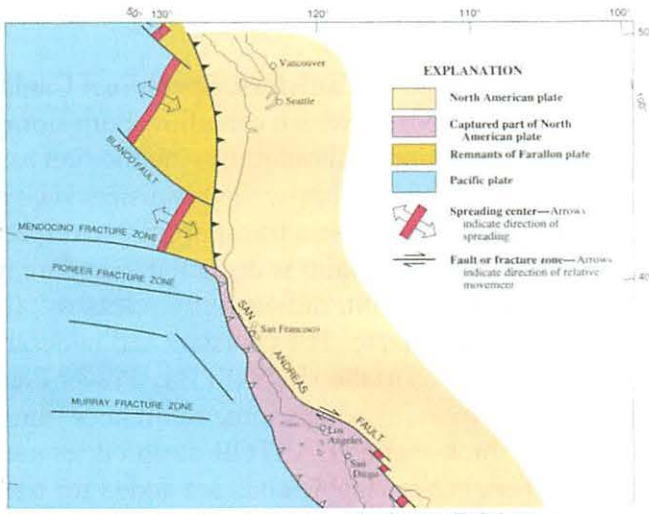

Illustration 6: Major Faults in California

Earthquake dangers were revised about a month ago because they discovered that earthquakes interact. Regional quakes are linked and increase the probability of other earthquakes. Thus, they have revised upward the probability of quakes and the associated tsunami risks.[27]

We know that when the DCNPP was first installed, claims were made that the closest fault was no closer than 30 km away. We now know that the Shoreline fault runs within 600 meters of the plant and the ISFSI[28]. Once closed, it will therefore be important to relocate the spent fuel from this site to a more stable area and it will be best to discontinue building any new ISFSI infrastructure at DCNPP if possible. As stated, our position is that the plant should be closed without delay.

California has areas with known earthquake dangers where long term storage of nuclear waste must not be allowed. The California desert provides areas away from populations and free of earthquake faults that are safer also due to the dry conditions. The challenges of heat could be mitigated by a cover structure over the ISFSI.

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26 http://pubs.usgs.gov/gip/earthq3/safaultgip.html - US Geologic Survey -- "Along the Earth's plate boundaries, such as the San Andreas fault, segments exist where no large earthquakes have occurred for long intervals of time. Scientists term these segments "seismic gaps" and, in general, have been successful in forecasting the time when some of the seismic gaps will produce large earthquakes. Geologic studies show that over the past 1,400 to 1,500 years large earthquakes have occurred at about 150-year intervals on the southern San Andreas fault. As the last large earthquake on the southern San Andreas occurred in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades." -- we can note that 1857 + 150 = 2007. We are overdue for a very large quake in the southern section of the San Andeas.

27 http://www.latimes.com/local/california/la-me-ventura-fault-20150420-story.html -- "Earthquake fault heightens California tsunami threat, experts say," Los Angeles Times, 2015-04-20

28 http://www.pge.com/includes/docs/pdfs/shared/edusafety/systemworks/dcpp/2_SFZ_EXECUTIVE_SUMMARY.pdf -- Shoreline Fault Zone Report (PG&E)

22. **Away from Dense Population Areas.** The original nuclear plant locations were partly chosen to be close to population centers and thus close to the users of the energy produced. There is no benefit to siting the ISFSI near densely populated areas and to allow them to stay in these locations increases the per-capita risk. In fact, it is obviously best to site these as far from people as reasonably feasible. There are many areas of the state that are far from human populations.

23. **Terrorist Risk Exists:** The risk of terrorist attack on the ISFSI is perhaps one of the most significant. However, the NRC Waste Confidence report said that the risk was both "unknown" and yet "small." Due to security concerns, there is very little produced on this topic for public consumption. It is clear that there are many scenarios where an attack on San Onofre could occur with devastating results. Locating the plant in a very sparsely populated area can provide significant buffer zones around the plant which is not the case at San Onofre, as it is next to a major interstate freeway, train route, and coastal access points, and thus is difficult to defend. The fact that it is so close to densely populated areas means that any release also impacts a large population.

    The SCE CEP meeting on April 16, 2014 on the subject of security made it clear that San Onofre as a long term interim storage is the wrong place because a terrorist attack with current weapons could not be stopped from the Interstate 5, the air, or the sea. Long term interim storage needs to have a no fly zone around it.

24. **Cost Effective.** An off-site ISFSI for California stranded spent fuel can reduce overall costs by:
    1. sharing the same security infrastructure for all California stranded nuclear spent fuel
    2. reducing the complexity of the security requirements by siting it in a defensible location.
    3. sharing the same fuel pool or dry transfer facility
    4. avoiding the construction of multiple ISFSIs, one on each reactor site and one at the common site.[29]

25. **Not a "Nuclear Waste Dump."** There have been attempts to establish nuclear waste dump sites in California, and these have encountered significant resistance from the community. For example, the Ward Valley site was to accept low-level nuclear waste (such as hospital waste) by direct burial[30]. This is not comparable with the off-site ISFSI storage proposal. An off-site ISFSI is a much smaller project, does not require digging trenches 600 ft deep, is much more tightly controlled, and will have very little impact on the environment, compared with directly burying waste that is allowed to mingle with ground water, etc.

26. **Not Regional:** The position presented in this document is that each state should deal with its own waste. Thus, this is not a regional solution where spent nuclear fuel will be accepted from a much larger area. This is an important concern for many in the community.

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29 It may be useful to investigate alternatives for storage of dry casks at San Onofre to allow time for planning and constructing an off-site ISFSI site. For example, storing thick canisters on an existing concrete pad inside the containment structures might be a feasible option. However, any location must be licensed by the NRC as an ISFSI.

30 http://energy-net.org/01NUKE/WV/WVALLEY.HTM -- "The proposed design calls for open, unlined trenches, into which the waste will be dumped, covered with dirt and revegetated. The FEIR/S concludes that because the surface level of the basin is deep (estimated 600 feet), the region is arid and rainfall will not seep further than six inches, there is no danger of radionuclides migrating from the site into the water below. Because of the inaccessibility of the license Application, which contains the models and data used to reach these conclusions, independent hydrologists have been unable to test the veracity of these conclusions. The FEIR/S also presumes relatively short hazardous lives for the wastes (500 years or less) and states that even if migration were to reach the water, the hazard would by then have expired."

27. **Must not Green-Light More Nuclear Plants** -- The Warren-Alquist Act which established the California Energy Commission includes provisions (25524.1-2) which prohibits the development of any new nuclear fission plant unless "(a) The commission finds that there has been developed and that the United States through its authorized agency has approved and there exists a demonstrated technology or means for the disposal of high-level nuclear waste."[31]

    There is an understandable concern that the establishment of a prudent interim off-site ISFSI might lead some to believe that this is considered "disposal of high-level nuclear waste," and this would lead to a push to build new nuclear plants and also to extend the life of any existing plants.

    Therefore, we believe it is essential to clearly state that any development of an off-site ISFSI is not considered "disposal" of the waste and thus will not trigger any concern regarding the expansion of nuclear-waste generating plants in the state.

    Furthermore, we believe that the state should clearly state that no relicensing of the DCNPP will occur, to eliminate the concern that a prudent solution for our interim nuclear waste storage will improve the likelihood that the plant will be relicensed. Again, it is our view that the waste problem is so severe, and the benefits to running a plant minimal (and economically nonviable) that the DCNPP should be shut down without delay.

28. **Not for Operating Reactors** -- Sucn an off-site ISFSI must not be for fuel from operating reactors, such as from the DCNPP. It must be for "stranded" fuel only from plants that are currently undergoing decommissioning or completed decommissioning except for the remaining on-site ISFSI.

29. **Must not become a "Consolidated ISFSI"** -- There is a danger that solving the problem for San Onofre at a off-site ISFSI will mean that other plants from around the country will want to move their fuel to this storage site. Thus, this must not be considered a "consolidated ISFSI" which implies it will take fuel from all other states, but simply "off-site ISFSI for California stranded spent fuel." Even with only taking fuel from stranded California sites will represent a net savings.

30. **Should Include Electronic Monitoring** -- Current ISFSI designs require manual monitoring and inspections. Electronic monitoring that can be maintained around the clock with defense-in-depth must be a goal for development. All three aspects should be respected. Best place, best system, and best procedures.

31. **Federal Issues** - Some federal involvement will be necessary:
    1. More robust canister designs are still not licensed for use.
    2. The Nuclear Regulator Commission must license any off-site ISFSI.
    3. We understand that under current law, the state cannot operate an ISFSI, only a private company may do so. This seems backwards. If this is the case, this law may need revision.
    4. Since we propose building the off-site ISFSI within California, interstate transportation is not required

32. **Other Issues:** There are a great many issues that we do not know the answers to. For example:
    1. We assume will CEC should spearhead site selection and characterization. Is this true?
    2. How will local communities be involved?

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31 http://www.energy.ca.gov/2015publications/CEC-140-2015-002/CEC-140-2015-002.pdf -- Warren-Alquist State Energy Resources Conservation and Development Act, Public Resources Code, Section 25000 et seq. (underlining added)

3. How would "local" approval be done?
4. Who needs to be involved? What other agencies need to sign off?
5. What laws have to be changed, amended, or what new laws are needed?
6. If it is a military site, what agency do we start with?
7. Do we need Camp Pendleton involvement, or are they a passive bystander?

33. Concerns:

1. The Blue Ribbon Commission concluded that any decisions must be consent-based, and not rammed down the throat of any community. Therefore, any process undertaken should be approach with full transparency and community involvement.
2. This off-site solution should be a solution for STRANDED CALIFORNIA nuclear waste only.
3. Public land would be preferable, such as a military base, not private for cost and security reasons. Using a closed military base that is already ruined is preferred over building in a pristine area.
4. The taxpayer will pay for the contracted land, not the ratepayer or the utility.
5. The site should be a location in California to avoid interstate lawsuits during transportation, away from populations, fire storm, earthquake, and ocean environment challenges.
6. All California environmental laws should be upheld.
7. We suggest military DOD oversight of an off-site ISFSI. More not less security is needed.
8. A no fly zone over the facility and new regulations beyond NRC that deal with today's sabotage and human error realities.
9. The site should preferably be near railroad lines to facilitate transport of the casks.
10. No tribal solutions unless the State laws apply and DOD will be inspecting aging management for the centuries the fuel may remain at the site.
11. Private for-profit solutions are not recommended. Companies come and go. This plan must be here for the long-haul.

Recommendations:

1. **Incorporate our Comments:** We feel that the IEPR is incomplete unless it fully addresses the issues above. This cannot be brushed aside as a federal-only issue.

2. **A "Nuclear Waste Summit,"** should be convened by the CEC to kick off this project, so that all the players are involved so as to develop legislation or modify regulations as needed to fully address this urgent issue. This is not envisioned as a new organization and does not usurp any independence or authority of any of the participants, but instead as a way to expedite an understanding of the problem with all the participants The summit should be convened with representatives from all the relevant decision-making bodies regulatory agencies, and utility stakeholders, including (but not limited to, in alphabetical order):
   - California Coastal Commission
   - California Energy Commission
   - California Public Utilities Commission
   - Department of Energy
   - Department of the Navy (who owns the San Onofre site)
   - The Governor's Office
   - Nuclear Regulatory Commission
   - Senators Dianne Feinstein's and Barbara Boxer's offices
   - State Senate Committee on Energy, Utilities, and Communications, Sen. Ben Hueso, Chair

Rancho Seco. Operated from 1975-1989 (14 yrs) 2009 formal termination 25 years ago $ billions

- State Assembly Committee on Utilities and Commerce, Asm. Anthony Rendon, Chair
- Utilities:
  - Pacific Gas & Electric (DCNPP & Humbolt Bay Power Plant)
  - Sacramento Municipal Utility District (SMUD -- Rancho Seco)
  - San Diego Gas & Electric (Their interest in San Onofre)
  - Southern California Edison (and other utilities involved in San Onofre)
- Others, such as ratepayer advocates (TURN, UCAN, A4NR, CitizensOversight, etc.), other representatives of stranded nuclear fuel (SMUD, Humbolt Bay NPP, etc.)

The summit will kick off the project to review potential off-site ISFSI sites (probably within California) to accommodate all existing and planned nuclear fuel waste from California nuclear plants and to make recommendations for changes required to carry out the plan.

3. **CEC (and others) should become a party in the CPUC proceedings on the topic.** The Energy Commission (and other interested parties) should probably become a party to the CPUC's decommissioning cost proceeding regarding the plans at San Onofre (A.14-12-007). One of the functions of this proceeding is to review the plans for the ISFSI at San Onofre in terms of cost and overall siting questions and generate a record of the facts surrounding the options for an off-site ISFSI.

4. **Construction Moratorium:** A moratorium should be placed on the construction of any new ISFSI structures at existing nuclear plants until the question is fully explored so as to avoid wasting resources on these structures and systems, and more fully inform those who are planning those projects of the possibility of a within-California solution. At San Onofre, the spent fuel can remain in the spent fuel pool until an off-site ISFSI is available.

5. **Consider an off-site ISFSI for California Stranded Fuel:** The position taken by this document is that the CEC and other agencies should consider developing an off-site ISFSI for California spent nuclear fuel that is "stranded" at decommissioned nuclear reactors, including San Onofre.

6. **What is a good site?** We understand that the CEC will likely want to do a thorough review of site options, but the following characteristics appear to be important in any off-site ISFSI site:
   - In California to avoid interstate issues and meet our philosophy of fairness and responsibility.
   - Away from the coast in an arid climate
   - On the North American tectonic plate, as far east of the San Andreas fault as possible, and away from known fault lines.
   - Near a rail line, with perhaps only the last leg needing construction.
   - Defensible location with buffer zones.
   - Not under air-traffic corridors and no-fly zone preferred.
   - Use an already-ruined closed military base or portion of a base that can be transferred to state ownership.
   - Upwind from sparsely populated or vacant lands.
   - Kept under governmental control with minimal private party influence and access.
   - Funding should be available from the Department of Energy and perhaps the Nuclear Waste Fund.
   - This should not be viewed as an opportunity for profiteering by private firms.

Without this prudent and systematic review of plans for caring for our nuclear waste, we are leaving a much larger problem to future generations. Storing more nuclear waste in densely populated salty coastal areas subject to tsunami and earthquake risks is simply unacceptable. We look forward to working with you on this issue.

Sincerely,

Raymond Lutz
National Coordinator, Citizens' Oversight Projects

Reviewed and endorsed by:

- San Clemente Green, Gary Headrick
- Roger Johnson, PhD, Professor Emeritus, San Clemente, CA
- Marni Magda, Laguna Beach Resident
- Dr. Jeoffry Gordon M.D.
- CANDOO - Coalition Against Nuclear Dumps on Our Oceans
- (other groups are still reviewing our proposals)

Observation that the testimony so far has not addressed the unsuitability of the San Onofre site.

1) Earthquake fault
2) Tsunami.

I represent a group that favors creating ① a permanent off-site facility in California

managed by DOD or other federal agency.

Rancho Seco ran 1975-1989 (14) years

Shut down - 2009 → waste is still on ground.

Fukashima

~~[illegible]~~