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DOCKET

07-AB-1632

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Subject: Comments on AB 1632 Assessment of California's Operating Nuclear Plants, Draft Report, September 2008, CEC-100-2008-005-D

These comments are submitted on behalf of the San Luis Obispo Mothers for Peace (MFP). Comments are specific to Diablo Canyon, although some may pertain to both California plants.

At the outset, MFP commends the foresight of Assembly Bill 1632, introduced by Assemblyman Sam Blakeslee. It is vital that there is a thorough, unbiased appraisal of the vulnerability of the state's two nuclear power plants to human error, mechanical failure, terrorist activity, a seismic event or plant aging. The impact of nuclear facilities on public safety and the economy must also be evaluated.

Although numerous and important vulnerabilities have been identified in this draft report, many of them remain unresolved and suggest further study.

Access Road

Draft:

Page 13: "Liquefaction and landslides do not appear to be significant hazards at Diablo Canyon...."

Page 70: "...potential landslides could temporarily block the access road at several locations. If this were to occur, emergency traffic would be rerouted. However, as discussed in Chapter 4, Diablo Canyon is located in a remote location with limited road access."

Page 18: "The primary concerns with seismic vulnerability of roadways serving Diablo Canyon and SONGS is reduced ability for emergency personnel to reach the plants and for the local community and plant workers to evacuate. Diablo Canyon is served by a two-lane asphalt road. During an emergency, this restricted access could result in traffic congestion and increase the potential for traffic accidents and further congestion."

MFP Comment: Landslides – whatever the cause - may not effect the operation of the plant per se, but the potential for landslides to impact the one road going in and out of the plant must be

considered. A landslide could impair evacuation routes for the employees as well as access for emergency equipment and personnel.

Knowledge of Fault System

Draft:

Page 12: “A consensus fault model for California indicates that the bounding faults of the San Luis-Pismo block have lower dip angles toward one another than has previously been modeled by PG&E. This fault geometry suggests that the occurrence of an earthquake directly beneath Diablo Canyon of similar nature to the 2003 San Simeon earthquake cannot be conclusively ruled out. An assessment of this possibility, if conducted, should include an analysis of the expected ground motions and vulnerabilities of plant components that might be sensitive to pulse-type, long-period motions in the near field of an earthquake rupture.”

Page 12: “Future study with newer technologies, such as three-dimensional geophysical seismic reflection mapping, could resolve questions about the characterization of the Hosgri Fault and might change estimates of the seismic hazard at the plant. Similarly, such imaging at strategically chosen locations could serve to prove or disprove the existence of subsurface faults...”

MFP Comment: The Northridge Earthquake of January 1994 was the result of a thrust fault. The December 2003 earthquake in San Luis Obispo County came from a portion of the San Simeon/Hosgri fault system previously thought to be ‘inactive.’ MFP agrees with the report that further geological studies are required.

Seismic Vulnerability of Spent Fuel Storage

Draft:

Page 14: “...spent fuel pools are associated with a higher degree of overall risk, and they are also known to experience “sloshing”—the spillage of water from the pool—during earthquakes.”

Page 17: “The greatest risk for spent fuel pools is the loss of water or the loss of active cooling. If not mitigated, such an event could result in overheating of the stored spent fuel and the subsequent release of radioactive material. The design of spent fuel storage pools reduces the possibility of drainage leading to water levels lower than the stored fuel; nevertheless, loss of any amount of water is undesirable. ... the spent fuel pools at Diablo Canyon and SONGS have been “re-racked” to provide increased storage capability by placing the fuel assemblies closer together. The more densely configured spent fuel pools are considered to have a higher degree of risk...”

Page 146: “In 2003 Robert Alvarez... evaluated the repercussions of a loss-of-coolant event in a spent fuel pool that had been reracked and was densely packed... Alvarez concluded that such an event would lead to the rapid heat-up of the newer spent fuel to temperatures at which the zirconium alloy cladding would catch fire and release many of the fuel’s fission products, particularly cesium-137. He suggested that the fire could spread to the older spent fuel in the pool, resulting in long-term contamination consequences that would be worse than those from the Chernobyl accident.”

MFP Comment:

In 2004, geologist Jay Namson, Ph. D. prepared testimony for Mothers for Peace on seismology problems at Diablo Canyon. In this report, Dr. Namson states that, “DCNPP’s underlying seismology is significantly different than was assumed by PG&E when it designed and installed the plant’s seismic mitigation measures and that as a consequence public health and safety risks may well be significantly greater than previously assumed.” Dr. Namson’s testimony is available at

<http://mothersforpeace.org/data/2004-08-03MFPNamsonTestimony.pdf>

Terrorism and Lack of NRC Openness

Draft:

Page 18: “Although the primary focus of this report’s vulnerability assessment of the spent fuel storage facilities was earthquake-related, the AB 1632 Study Team also reviewed published risk analyses for terrorist events or sabotage at dry cask storage facilities. Limited information is available on the vulnerability of dry cask storage to sabotage, which is consistent with the National Academies’ finding when it conducted a study of spent fuel storage safety. While terrorist scenarios have been postulated that could release a significant amount of cesium into the environment, an assessment of the likelihood of such scenarios occurring has not been publicly released.”

Pages 150-15: “The vulnerability of dry cask storage to a terrorist attack is still being studied. A terrorist attack that breached a dry cask could potentially result in the release of radioactive material from the spent fuel into the environment...”

MFP Comment: A Call for Action to Protect the Nation against Enemy Attack on Nuclear Power Plants and Spent Fuel was prepared for MFP by the Institute for Resource and Security Studies in Cambridge, MA, in May of 2003. On page 4 of this report, the problem is summarized: “US nuclear power plants and their spent fuel are prime targets for attack by foreign or domestic enemies. The nation's 103 commercial nuclear reactors, their associated spent fuel pools, and the growing number of independent spent-fuel-storage installations (ISFSIs) are large, fixed targets that are, in a military sense, lightly defended. Although massive in their construction, these facilities are not designed to resist attack and have a number of vulnerabilities. Spent nuclear fuel is also vulnerable during transportation. A successful attack on a nuclear power plant, an ISFSI or a spent-fuel shipment could produce a large release of radioactive material, with severe impacts on health, the environment, the economy and society.”

This is a 32-page study, complete with dozens of references. MFP strongly recommends the CEC take into account the findings documented in this report in assessing the vulnerability of California nuclear facilities. It is available at <http://mothersforpeace.org/data/20030531CallForActionPdf>

MFP’s expert witness in its ongoing legal challenge of the NRC license of the ISFSI, Dr. Gordon Thompson, has done extensive research into the vulnerability of the dry casks to terrorist attacks and the consequences of such an event. [SECOND DECLARATION OF DR. GORDON R. THOMPSON ON BEHALF OF SAN LUIS OBISPO MOTHERS FOR PEACE IN SUPPORT OF CONTENTION 2 REGARDING THE CONSTRUCTION AND OPERATION OF THE DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION, April, 2008]

Pages 9 – 14 of this cited testimony describes in detail several well-researched scenarios of attack. It discusses four types of radiation releases that could be initiated by attacks on an ISFSI, as well as their respective consequences.

In another report prepared by Dr. Gordon Thompson, [ASSESSING RISKS OF POTENTIAL MALICIOUS ACTIONS AT COMMERCIAL NUCLEAR FACILITIES:

The Case of a Proposed Independent Spent Fuel Storage Installation

at the Diablo Canyon Site, 6 –27 – 07] he makes the case that in assessing the vulnerability of the ISFSI at Diablo, the NRC should be looking ahead well into the future. On page 9 of that report, Dr. Thompson states that the NRC “should consider the general threat environment over the next century. Forecasting trends in the threat environment over such a period is a daunting exercise, with inevitably uncertain findings. Nevertheless, if an ISFSI is constructed at Diablo Canyon, the security aspects of its design will reflect an implicit or explicit forecast of trends in the general threat environment. The forecast should be explicit, and should be global in

scope, because the US cannot be insulated from broad trends in violent conflict and social disorder.”

The same reasoning applies as the CEC weighs the vulnerability of nuclear facilities in California. All or some of the radioactive materials generated by the existing nuclear plants will most likely remain in the state and will need to be safeguarded from terrorist attack for at least a century. The AB 1632 assessment of the impact of nuclear facilities on the state will not be meaningful if it only looks a few decades into the future.

Additionally, the previous section on the Seismic Vulnerability of Spent Fuel Storage is pertinent to the issue of terrorism, as the spent fuel pools are not protected by containment structures, leaving them vulnerable to terrorist attack. The consequences of a fire in a spent fuel pool are the same, whether initiated by earthquake or act of malice.

California Attorney General Bill Lockyer letter to NRC dated Feb 28, 2003, stated, “The proposed expansion of DCP’s spent fuel storage facility is inherently risky. DCP is sited in a seismically active area. Both the power generation and spent fuel storage facilities at DCP present targets for cataclysmic acts of terrorism and sabotage. The eventual transportation of spent fuel from DCP on the highways of California poses the danger of release of nuclear waste to the environment. The public has the right to ask that every reasonable measure be taken to minimize these risks, and the right to know that every such measure has been taken.” The letter includes many specifics of hazards related to the ISFSI at Diablo Canyon and to the storage of nuclear wastes in general. The concerns of a high official of the state of California should be reviewed as part of the AB 1632 assessment. That letter is available on the MFP website at

<http://mothersforpeace.org/data/20030228AttorneyGeneralCalLetter/?searchterm=seismic%20CPUC>.

The CEC can also access it through office of the Attorney General.

The National Academy of Sciences prepared a report in 2005 at the request of the United States Congress. Section 2 of that report, beginning on page 15, is on the topic of Terrorist Attacks on Spent Fuel Storage. MFP urges the CEC to also review this study. It is accessible on MFP website at <http://mothersforpeace.org/data/2005.04.06-NAS.NRC.SafetySecuritySpentFuel.pdf>, and is also available through the National Academy of Sciences.

Another study, dated January, 2003, describes the risks of densely packed spent fuel storage pools. Titled Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States, it was authored by Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Ed Lyman, Allison Macfarlane, Gordon Thompson, and Frank N. von Hippel. Because the spent fuel rods are now racked “at densities that approach those in reactor cores...in case of a loss of water in the pool, convective air cooling would be relatively ineffective in such a “dense-packed” pool. Spent fuel recently discharged from a reactor could heat up relatively rapidly to temperatures at which the zircaloy fuel cladding could catch fire and the fuel’s volatile fission products, including 30-year half-life ¹³⁷Cs, would be released. The fire could well spread to older spent fuel. The long-term land-contamination consequences of such an event could be significantly worse than those from Chernobyl.” (Quote is from page 1 of the 51 page report.) This report is available at <http://mothersforpeace.org/data/20030122ReducingTheHazardsPdf>

Page19: “Diablo Canyon appears to have a relatively effective safety culture...”

Page 182: “In a safety conscious work environment “employees feel free to raise safety concerns, both to their management and to the NRC, without fear of retaliation.”⁴²³

Page 184: “There has, however, been a recent spike in allegations regarding Diablo Canyon—10 allegations were submitted between January and May 2008.”

“At this point it is unclear whether these allegations will be substantiated and whether they will result in enforcement action. San Luis Obispo Mothers for Peace (MFP) filed one of the allegations, stating in a letter on April 14, 2008, that it had received information from Diablo Canyon employees reporting that workers perceive a high likelihood of managerial retaliation if they raise safety concerns.⁴³⁸ The allegation describes an incident in which a worker received a poor performance evaluation after filing a Difference of Professional Opinion. In addition, MFP alleges that workers have lost trust in the Employee Concerns group and that PG&E has skirted qualifications requirements in hiring new supervisors and managers.⁴³⁹ It is unclear whether the NRC has substantiated these allegations and to what extent they have responded to the MFP allegation due to the confidentiality of the review process.”

MFP Comment: The NRC has recently completed their investigation of these allegations. In a letter dated September 8, 2008, the NRC’s Senior Allegation Coordinator stated that they did not substantiate any of these allegations and asserts that even though a few employees believed that another individual had been subjected to retaliation for raising a Differing Professional Opinion, this belief would not prevent them from raising concerns themselves. The NRC also found that even though some individuals lacked confidence in the licensee’s Employee Concerns Program, that belief would not prevent them from raising concerns using a number of other methods. The licensee conducted the employee interviews related to the allegation regarding a “chilled environment” and stated to the NRC that the allegation was not substantiated.

MFP asserts that the conclusions of this investigation are questionable at best, given that the licensee was investigating itself by conducting the employee interviews. Additionally, the belief held by employees that some personnel are being subjected to retaliation is sufficient to cause a chilling effect.

Safety culture will in all likelihood be an on-going issue and will merit periodic review by the CEC as future allegations are processed.

Evaluating Economic Extravagance, the Need for Power, and Public Safety

Draft:

Page 19: “Simulations find that no electricity supply shortages would occur as the result of either Diablo Canyon or SONGS being unexpectedly shut down for an extended period in the near term...”

Page 20: “A prolonged shutdown of Diablo Canyon would not pose reliability concerns.”

Page 24: “Recent announcements of several planned large-scale solar facilities in San Luis Obispo County suggest that renewable power development could benefit San Luis Obispo County, thereby limiting the transfer of benefits away from the County... The economic impacts of closing Diablo Canyon could be offset by economic gains from alternate uses of the plant site, other commercial or

industrial development elsewhere in the county, or a potential increase in property values as a result of the plant closure.”

Page 23: “The long-term storage, packaging, and transport of this waste add to the expense and the risk of nuclear power in California.”

Page 25: “The costs for constructing and loading the dry cask storage facilities are substantial. On a present value basis, the total cost is \$160 million for Diablo Canyon...”

Page 26: “The costs for transport of spent fuel to off-site storage or disposal facilities will be substantial, including costs for security, accident prevention, and emergency preparedness.”

Page 26: “...a substantial quantity of low-level waste will need to be disposed of when the plants are decommissioned, and the cost to transport and dispose of this waste, presuming a disposal facility is available, is expected to be hundreds of millions of dollars or more. Low-level waste disposal costs have been rising in recent years, and current estimates of disposal costs during decommissioning are based on outdated cost information. Costs could be substantially higher than estimated during the most recent California regulatory proceeding on decommissioning costs in 2005. ‘

Page 28: “No power generation technology is free of environmental impacts....” **BUT** “Nuclear energy generation also imposes impacts from nuclear waste storage, transport, and disposal and from a potential major plant accident or terrorist event.”

MFP Comment: While the probability of a major release of radiation from a California nuclear facility can not be quantified with precision, the economic, environmental and health consequences of such an event have been well quantified by Dr. Gordon Thompson. [ASSESSING RISKS OF POTENTIAL MALICIOUS ACTIONS AT COMMERCIAL NUCLEAR FACILITIES: The Case of a Proposed Independent Spent Fuel Storage Installation at the Diablo Canyon Site By Gordon R. Thompson, 27 June 2007] One major release of radiation would have consequences so dire and long-lasting that any case presenting nuclear power in a favorable economic light would be negated. To assert that nuclear power is an economic asset is to assert that there will never be a major radiological release from a reactor, a spent fuel pool, a dry cask facility, or from fuel in transit through a major city. There is no justification for such an assumption.

Maintenance and the Cost of Nuclear Power

Draft:

Page 29: “The cost of power from the nuclear plants over the license renewal period will be linked to the performance of the plants. If the plants maintain high levels of performance and safety and do not require significant repairs, the costs could remain comparable to current levels with relatively minor increases due to higher nuclear fuel costs and potentially stricter security requirements. However, degradation of major components or extended outages could result in much higher costs. In addition, the plants may be required to retrofit their once-through cooling systems prior to a license renewal. In a study for the Ocean Protection Council, Tetra Tech estimated that the retrofit and outage would cost a net present value of \$2.6 billion at SONGS and \$3.0 billion at Diablo Canyon.”

Page 29: “In addition, it is important to consider the environmental impacts from plant operations over an extended 20-year license period, including once-through cooling ocean impacts and impacts from continuing waste accumulation at these plants. The extent of the impacts will depend on the outcomes of state and federal policies and requirements for once-through cooling and on whether a long-term solution to the waste disposal problem is found.”

Page 171: “Degradation of nuclear plant components can have economic, reliability, and safety implications.”

Page 173: “...originally designed to last the life of a plant, the thousands of tubes in steam generators have degraded more rapidly than expected.”

Pages 177-178: “Indeed, the steam generators at the plants will be replaced between 2008 and 2010 and the reactor vessel heads will be replaced between 2009 and 2012.”

MFP Comments: The maintenance costs of a nuclear facility are tremendous, and at the Diablo Canyon facility, these expenses are passed onto the ratepayers. Significant degradation of major components has already occurred. The ongoing replacement of the 8 steam generators that were, in fact, flawed even when originally installed is one example of a high-cost maintenance project.

David Lochbaum of the Union of Concerned Scientists has written a report titled “U.S. Nuclear Plants in the 21st Century: The Risk of a Lifetime” published May, 2004. It is available at

http://www.ucsusa.org/assets/documents/nuclear_power/nuclear04fnl.pdf

On page 14 of that report the author gives an example of flawed maintenance practice at Diablo Canyon Unit Two that is illustrative of the risks and uncertainties that exist where regulations, human judgment and mechanical failure intersect.

On pages 21 and 22 David Lochbaum describes some of the inadequacies in the NRC license renewal process that have the potential to impact both economics and public safety in California as the two existing plants apply for renewals, as expected. “If today’s existing nuclear reactors are to be in service for another 20 years, there needs to be strong aging management programs at all reactors to ensure failures are found before it is too late.” The report goes on to spell out three major reforms necessary to the license renewal process. MFP strongly suggests AB1632 takes into account the problems presented in this report as part of its assessment of nuclear power in California.

Typographical Error:

Disclaimer: 2nd paragraph “...to a major disruption due to a seismic event {of} plant aging.”