RAS 14449

HARMON, CURRAN, SPIELBERG & EISENBERG, LLP
1726 M Street, NW, Suite 600 Washington, DC 20036 (202) 328-3500 (202) 328-6918 fax

October 11, 2007

Emile Julian, Director
Rulemakings and Adjudications Staff
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: *Diablo Canyon ISFSI Licensing Proceeding, Docket No. 72-26*

Dear Mr. Julian,

On behalf of San Luis Obispo Mothers for Peace ("SLOMFP"), I am enclosing the original of the Declaration by Dr. Gordon R. Thompson Regarding the NRC Staff's August 2007 Supplement to the Environmental Assessment and Final Finding of No Significant Impact Related to the Construction and Operation of the Diablo Canyon Independent Spent Fuel Storage Installation (ISFSI), dated October 1, 2007. A faxed copy of Dr. Thompson's declaration was filed on October 1, 2007, in support of SLOMFP's Response to NRC Staff's Supplement To The Environmental Assessment And Finding Of No Significant Impact For The Diablo Canyon Independent Spent Fuel Storage Installation.

Sincerely,

Diane Curran

Template=SECY-018

SECY-02

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	:	
	:	
PACIFIC GAS & ELECTRIC CO.	:	Docket No. 72-26 - ISFSI
(Diablo Canyon Nuclear Power Plant	:	
Unit Nos. 1 and 2)	:	

DECLARATION BY DR. GORDON R. THOMPSON REGARDING THE NRC STAFF'S AUGUST 2007 SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT AND FINAL FINDING OF NO SIGNIFICANT IMPACT RELATED TO THE CONSTRUCTION AND OPERATION OF THE DIABLO CANYON INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

Under penalty of perjury, I, Gordon R. Thompson, declare as follows:

I. INTRODUCTION

I-1. I am the executive director of the Institute for Resource and Security Studies (IRSS), a nonprofit, tax-exempt corporation based in Massachusetts. Our office is located at 27 Ellsworth Avenue, Cambridge, MA 02139. IRSS was founded in 1984 to conduct technical and policy analysis and public education, with the objective of promoting peace and international security, efficient use of natural resources, and protection of the environment.

I-2. I am an expert in the technical analysis of safety, security and environmental issues related to nuclear facilities. Information about my relevant experience and expertise, together with an attached copy of my curriculum vitae, is provided in my previous declaration of 27 June 2007 in this matter.[1] That declaration accompanied a report that I prepared for San Luis Obispo Mothers for Peace (SLOMFP).[2] Hereafter, I refer to that report as the "Thompson Report". My declaration and report supported contentions submitted by SLOMFP in this matter.[3] Hereafter, I refer to those contentions as the "SLOMFP Contentions".

I-3. In the present declaration I review the NRC Staff's August 2007 Supplement to the Environmental Assessment and Final Finding of No Significant Impact Related to the

---

[1] Declaration of Dr. Gordon R. Thompson in Support of San Luis Obispo Mothers for Peace's (SLOMFP's) Contentions Regarding the Diablo Canyon Environmental Assessment Supplement, 27 June 2007.
[2] Gordon R. 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* (Cambridge, Massachusetts: IRSS, 27 June 2007).
[3] San Luis Obispo Mothers for Peace's Contentions and Request for a Hearing Regarding Diablo Canyon Environmental Assessment Supplement, 29 June 2007.

Construction and Operation of the Diablo Canyon Independent Spent Fuel Storage Installation. Hereafter, I refer to that document, including the Appendix in which it addresses public comments, as the "Final EA Supplement". The NRC Staff published an earlier version of that document in May 2007.[4] Hereafter, I refer to the May 2007 version as the "Draft EA Supplement".

I-4. My review of the Final EA Supplement has three purposes. First, I examine the accuracy and completeness with which the Supplement has characterized and responded to the SLOMFP Contentions and the Thompson Report. Second, I examine the Supplement's internal consistency. Third, I examine the relevance to the Supplement of information that became available after completion of the Thompson Report and the SLOMFP Contentions.

II. The Final EA Supplement's Response to SLOMFP Contentions and the Thompson Report

II-1. The SLOMFP Contentions and the Thompson Report identified substantial deficiencies in the Draft EA Supplement. In the following paragraphs of Section II, I discuss the Final EA Supplement's response to the SLOMFP Contentions and the Thompson Report, in regard to the following issues:

> (i) definition of terms, explanation of methodology, and identification of scientific sources;
> (ii) reliance on hidden and unjustified assumptions;
> (iii) failure to consider credible threat scenarios with significant environmental impacts;
> (iv) failure to address the National Infrastructure Protection Plan (NIPP); and
> (v) failure to consider vulnerability of the ISFSI in relation to the entire Diablo Canyon spent fuel storage complex.

II-2. SLOMFP Contention 1 described failures by the Draft EA Supplement to define terms, explain methodology, and identify scientific sources. The Appendix to the Final EA Supplement assigns issues of that type to Public Comment Categories 1 and 2. In one respect, the Final EA Supplement responds to SLOMFP Contention 1, by citing some relevant technical documents. The Draft EA Supplement did not provide these citations. In other respects, however, the Final EA Supplement is unresponsive, and continues to exhibit the deficiencies described in SLOMFP Contention 1. The Appendix to the Final EA Supplement attributes the lack of response to the need to protect sensitive or classified information. That argument is not convincing. The Thompson Report, together with recently available technical literature as discussed below, demonstrates that the deficiencies described in SLOMFP Contention 1 could be rectified without disclosing sensitive information.

---

[4] NRC Staff, Supplement to the Environmental Assessment and Draft Finding of No Significant Impact Related to the Construction and Operation of the Diablo Canyon Independent Spent Fuel Storage Installation, May 2007.

II-3. SLOMFP Contention 2 argued that the Draft EA Supplement relied on hidden and unjustified assumptions. SLOMFP listed two examples: (i) apparent exclusion of radiological consequences other than early fatalities; and (ii) apparent reliance on unspecified emergency planning upgrades. In regard to the first example, the Final EA Supplement states (Appendix, page A-6): "To clear up some apparent confusion, the EA Supplement did not consider early fatalities as a measure of environmental impact." Yet, the Draft and Final EA Supplements clearly set forth their reliance on previous security assessments for ISFSIs and, in describing those assessments, they state (Draft EA Supplement, page 6; Final EA Supplement, page 7) that "NRC made conservative assessments of consequences, to assess the potential for early fatalities". Neither version of the Supplement discusses land contamination and its sequelae, which would be the dominant radiological impacts from an attack on an ISFSI (Thompson Report, page 37). The Final EA Supplement discusses (at page 7) the NRC Staff's estimation of individual dose at the Diablo Canyon site, without acknowledging that this indicator provides only a partial picture of potential radiological impacts. The Supplement's inappropriate focus on individual dose appears to derive from the Staff's reliance, in its previous security assessments, on early fatality as the sole indicator of harm. Thus, this example continues to support SLOMFP Contention 2.

II-4. In regard to the second example listed by SLOMFP in support of its Contention 2, the Final EA Supplement states (Appendix, page A-8): "The EA Supplement does not take credit for emergency planning actions in determining the radiological impact on nearby residents, but merely indicates that emergency planning and response actions could further mitigate (i.e., reduce) impacts in some situations." That statement is internally inconsistent. Its second portion clearly shows that the Supplement does take credit for emergency planning actions. Thus, this example continues to support SLOMFP Contention 2.

II-5. The two examples listed by SLOMFP in support of its Contention 2 are not the only instances in which the Draft EA Supplement relied on hidden and unjustified assumptions, and in which the Final EA Supplement continues this practice. A notable instance is the failure of both versions of the Supplement to consider threat scenarios that are more severe and at least as plausible as the threat scenarios that the Supplements did consider. That failure, which is discussed below in greater detail, is neither acknowledged nor explained in either Supplement.

II-6. SLOMFP Contention 3 described the Draft EA Supplement's failure to consider credible threat scenarios with significant environmental impacts. That practice continues without change in the Final EA Supplement. The latter document seeks to justify the practice by stating (Appendix, page A-6):

> "NRC's choice of scenarios was informed by information gathered through NRC's regular interactions with the law enforcement and intelligence communities, as mentioned in Section 3.1 of the EA supplement. The specific

scenarios considered cannot be publicly disclosed beyond the description in Section 4.0 of the EA supplement, due to the sensitive nature of the information."

Those statements do not justify the exclusion of credible scenarios. The fact that the NRC consulted other agencies in choosing threat scenarios does not establish that the NRC developed a set of scenarios that represents the range of credible threats. In addition, the NRC Staff makes no attempt to dispute the credibility of the illustrative threat scenarios discussed in SLOMFP Contention 3 and the Thompson Report at pages 33-37. Moreover, the veil of secrecy that the NRC Staff casts over its assumed threat scenarios would not deceive an informed attacker. To such an attacker, the limited nature of the threat scenarios considered in the Draft and Final EA Supplements would be obvious from the limited radiological impacts estimated in these Supplements. In illustration, the Supplements estimate that the individual dose following an attack on an ISFSI would be less than 5 rem. The Thompson Report shows (at page 33) that an individual dose exceeding 5 rem would arise from the release of a mere two-millionths of an ISFSI module's inventory of radioisotopes in the "fines" category, through a hole with an equivalent diameter of a mere 2.3 mm. Thus, the EA Supplements have confined their consideration of threat scenarios to scenarios that cause comparatively minor damage to an ISFSI module. The NRC Staff's excessive secrecy may succeed in hiding this fact from members of the public, but would not deceive an informed attacker.

II-7. As mentioned above, the Final EA Supplement cites some relevant technical documents. One such document, classified CONFIDENTIAL National Security Information and therefore unavailable to the public, is a 2004 study by Smith et al of Sandia National Laboratories, which examined the outcomes of the impact of a large aircraft on a field of ISFSI storage modules.[5] Hereafter, I refer to that document as the "Smith et al Study". A second such document, also classified CONFIDENTIAL National Security Information, is a 2004 study by Kipp et al of Sandia National Laboratories, which examined the response of an ISFSI storage module to "a large explosive charge blast".[6] Hereafter, I refer to that document as the "Kipp et al Study". It is reasonable to assume that these two documents are the only technical documents relied upon by the Final EA Supplement to assess the vulnerability of ISFSI storage modules to attack. If other documents were relied upon for that purpose, the NRC Staff should have cited those documents. It is also reasonable to assume that each of the Smith et al and Kipp et al Studies has a scope as set forth in its title.

II-8. Presumably, the Smith et al Study analyzed the potential for an impact by a large aircraft to breach one or more of the multi-purpose canisters (MPCs) inside the affected ISFSI storage modules. Such an aircraft is a comparatively soft object containing a few

---

[5] J. A. Smith et al, *Results of a Large Airplane Impact into a Field of Holtec HI-STORM Spent Nuclear Fuel Storage Casks* (Albuquerque, New Mexico: Sandia National Laboratories, 2004). (This document is classified CONFIDENTIAL National Security Information.)

[6] M. E. Kipp et al, *Response of the HI-STORM Spent Nuclear Fuel Storage Cask to a Large Explosive Charge Blast* (Albuquerque, New Mexico: Sandia National Laboratories, 2004). (This document is classified CONFIDENTIAL National Security Information.)

hard structures. It is not surprising that Smith et al would find the potential for an MPC breach to be relatively low. Smith et al may have considered the additional effects of a jet-fuel fire and/or a fuel-air explosion. Such a fire or explosion could have a dramatic appearance. It would not, however, be surprising that Smith et al would find that combustion of jet fuel has a comparatively low potential to liberate radioactive material from the MPC to the atmosphere. Both findings by Smith et al could be consistent with assumptions that might be regarded as reasonable. I do not have access to the Smith et al Study and, therefore, cannot comment on its assumptions. It can be presumed that Smith et al did not consider the impact of a general-aviation aircraft laden with explosive material in a shaped-charge or other configuration, as discussed in the Thompson Report.

II-9. Presumably, the Kipp et al Study analyzed the potential for a large explosive charge blast to breach the MPC inside a single ISFSI storage module. This blast would take the form of a pulse of very high pressure. Used against many types of target (e.g., a masonry wall), a blast of this type could be highly destructive. In the context of an attack on an ISFSI module, however, it is not surprising that Kipp et al would find the potential for an MPC breach to be relatively low. That finding could be consistent with assumptions that might be regarded as reasonable. I do not have access to the Kipp et al Study and, therefore, cannot comment on its assumptions. It is important to note that the pulse of high pressure from an explosive blast will not cause the highly focused damage to a target that results from use of a shaped charge. A shaped charge concentrates material (e.g., a metal cone or dish) into a comparatively narrow stream that strikes the target at very high speed. It can be presumed that Kipp et al did not examine the use of a shaped charge, although such charges are used routinely to attack US ground forces in Iraq.

II-10. The Smith et al and Kipp et al Studies examined threat scenarios that an informed attacking group would know to be comparatively ineffective against an ISFSI. It is likely that such a group would choose another mode of attack. Relevant modes could involve delivery of shaped charges by missiles, aircraft, land vehicles or personnel. Attackers could use incendiary material to ignite the zirconium cladding of spent fuel. They could reach the MPC inside an ISFSI storage module through the module's cooling vents or by removing the lid. The Thompson Report (see Section 4.3) outlines some potential modes of attack while being careful to not disclose sensitive information.

II-11. The preceding paragraphs show clearly that the Final EA Supplement fails to consider threat scenarios that are more severe and at least as plausible as the threat scenarios that it does consider. Moreover, the Supplement neither acknowledges nor explains this failure. These findings support SLOMFP Contentions 2 and 3.

II-12. SLOMFP Contention 4 described the Draft EA Supplement's failure to address the National Infrastructure Protection Plan. That practice continues without change in the Final EA Supplement. The latter document seeks to justify the practice by stating (Appendix, page A-7): "The National Infrastructure Protection Plan (NIPP) does not impose requirements on participating agencies regarding specific NEPA analyses." That response ignores the fact that the NRC is a signatory to the NIPP and, therefore, has

committed to the NIPP's purpose (see Letter of Agreement at page iii of the NIPP) of providing "the unifying structure for the integration of critical infrastructure and key resources (CI/KR) protection into a single national program". Any licensing analysis performed by the NRC should, therefore, include consideration of the concepts of deterring threats, mitigating vulnerabilities and minimizing consequences that are endorsed by the NIPP. In addition to ignoring this general responsibility under the NIPP, the NRC Staff ignores the specific argument in the SLOMFP Contentions and the Thompson Report that protective measures set forth in the NIPP could, if applied at Diablo Canyon, deter attacks on the Diablo Canyon ISFSI by altering attackers' cost-benefit calculations.

II-13. SLOMFP Contention 5 described the Draft EA Supplement's failure to consider vulnerability of the ISFSI in relation to the entire Diablo Canyon spent fuel storage complex. That practice continues without change in the Final EA Supplement. The latter document seeks to justify the practice by stating (Appendix, page A-7): "The staff previously considered the cumulative impacts of the ISFSI and reactor operation in the original EA (Section 5.4), concluding that, 'The impact of the proposed Diablo Canyon ISFSI, when combined with previously evaluated effects from the Diablo Canyon Power Plant, is not anticipated to result in any significant cumulative impact at the site.'" That response ignores the fact that no environmental analysis has been performed to address the risks of potential malicious actions at any Diablo Canyon facility other than the proposed ISFSI. Moreover, that response ignores the potential for malice-related interactions between the ISFSI and other facilities at Diablo Canyon. Two examples illustrate that potential. First, the ISFSI could be used to reduce the risk of a malice-related spent-fuel-pool fire at Diablo Canyon, by reducing the density of fuel assemblies in the pools. Second, an attack on the Diablo Canyon ISFSI could be mounted as a diversionary action, to weaken defenses of other facilities on the site preparatory to an attack on those facilities. An integrated, site-wide approach to risk assessment would allow such interactions to be identified and addressed.

III. Internal Inconsistencies in the Final EA Supplement

III-1. Paragraph II-4, above, identifies an internal inconsistency in the Final EA Supplement, regarding the Supplement's taking of credit for emergency planning actions. Another internal inconsistency deserves special mention. In discussing public comments on the Draft EA Supplement, the Final EA Supplement states (Appendix, page A-2) that the NRC Staff did not respond to "comments about the U.S. government's policies regarding terrorism", because this issue "did not directly relate to the environmental effects of the proposed action" and was "outside the scope of the NEPA review of the proposed action". Yet, elsewhere (page 4) the Final EA Supplement states: "Thus, the broad actions taken by the Federal government and the specific actions taken by NRC since September 11, 2001, have helped to reduce the potential for terrorist attacks against NRC-regulated facilities."

III-2. The preceding paragraph identifies a substantial internal inconsistency in the Final EA Supplement. That inconsistency relates directly to a point repeatedly emphasized in the Thompson Report and addressed in SLOMFP Contention 4. The Thompson Report argues that many of the policies adopted by the Federal government and the NRC to protect the nation's critical infrastructure have been counterproductive. The Thompson Report describes an alternative strategy that is termed "protective deterrence", and shows how that strategy could be implemented by the NRC using infrastructure design principles that are articulated in the NIPP. The Final EA Supplement dismisses that argument without justification or explanation, while claiming success by the Federal government and the NRC in reducing "the potential for terrorist attacks". That claim could and should be tested through environmental analyses that examine risks and risk-reducing options for facilities such as the proposed Diablo Canyon ISFSI.

IV. Relevance to the Final EA Supplement of Recently Available Information

IV-1. The Appendix to this declaration provides data from a survey of US-based experts in international security, regarding the probability of another "9/11-type" attack in the US. The survey found that 83 percent of the surveyed experts judged that an attack of this type is "likely or certain" during the next 10 years. That finding does not rest upon a statistical foundation. It does, however, show that the potential for a 9/11-type attack deserves thorough consideration in the context of licensing nuclear facilities. Such an attack would not necessarily involve targets and instruments of attack as in September 2001. Indeed, it is likely that the attackers would choose different targets and instruments. The significance of the term "9/11-type" is that attackers would have resources and capabilities comparable to those employed in September 2001. Nuclear facilities could be chosen as targets, for the reasons set forth in the Thompson Report. The Final EA Supplement does not consider the potential for an attack on Diablo Canyon facilities by a sub-national group with resources and capabilities comparable to those employed in September 2001, employing a mode of attack that exploits vulnerabilities in the Diablo Canyon facilities.

IV-2. The Final EA Supplement states (Appendix, page A-5): "The details of the NRC's security assessments cannot be disclosed publicly because of the sensitive nature of the information." The SLOMFP Contentions and the Thompson Report argue that the NRC is excessively secretive, that more details should be provided in environmental analyses, and that this can be done without disclosing sensitive information. The Thompson Report illustrates that argument by presenting general, but not specific, information about a range of threat scenarios. Three recently available papers in a technical journal provide a further illustration of the argument.[7] The authors are with Oak Ridge National

---

[7] Robert H. Morris et al, "Using the VISAC program to calculate the vulnerability of nuclear power plants to terrorism", *International Journal of Nuclear Governance, Economy and Ecology*, Volume 1, Number 2, 2006, pp 193-211; Anthony L. Honnellio and Stan Rydell, "Sabotage vulnerability of nuclear power plants", *International Journal of Nuclear Governance, Economy and Ecology*, Volume 1, Number 3, 2007, pp 312-321; Gert Sdouz, "Radioactive release from VVER-1000 reactors after a terror attack",

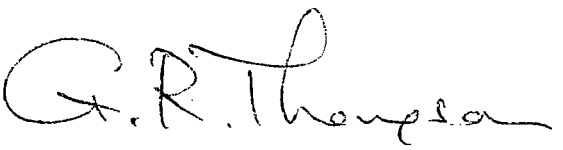
Laboratory, the US Environmental Protection Agency, and ARC Seibersdorf Research in Austria. Each paper discusses malice-related risks at nuclear facilities in greater depth than is done in the Final EA Supplement, thereby contributing to improved public understanding and policy debate regarding those risks. None of the papers discloses sensitive information.

V. Conclusions

V-1. The Final EA Supplement improves upon the Draft EA Supplement in one respect, by citing some relevant technical literature. The cited literature provides additional support for the SLOMFP Contentions and the arguments made in the Thompson Report. In other respects, the Final EA Supplement continues to exhibit the deficiencies that were identified in the SLOMFP Contentions and the Thompson Report. The Appendix to the Final EA Supplement does not provide a credible explanation or justification of the deficiencies in that Supplement.

V-2. The Final EA Supplement has significant internal inconsistencies.

V-3. Recently available information provides further support for the SLOMFP Contentions and the arguments made in the Thompson Report.



Gordon R. Thompson, D.Phil

1 October 2007

(The Appendix that appears on the following page is discussed above and is part of this declaration.)

APPENDIX

Opinions of Selected Experts Regarding the Probability of Another 9/11-Type Attack in the United States

Time Horizon for Potential Attack	Fraction of Interviewed Experts Holding Position (percent)	
	Attack has No Chance or is Unlikely	Attack is Likely or Certain
Within 6 months	80	20
Within 5 years	30	70
Within 10 years	17	83

Notes:
(a) These and other survey data are discussed in: "The Terrorism Index", *Foreign Policy*, September/October 2007, pp 60-67. The underlying data are from: "Terrorism Survey III", June 2007, accessed from the website of the Center for American Progress <www.americanprogress.org> on 21 August 2007.
(b) The following question was posed to 108 US-based experts in international security: "What is the likelihood of a terrorist attack on the scale of the 9/11 attacks occurring again in the United States in the following time frames?"