RAS 15118

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

In the matter of
Pacific Gas and Electric Company
Diablo Canyon Nuclear Power Plant
Unit Nos. 1 and 2
Independent Spent Fuel Storage Installation

Docket # 72-26

SAN LUIS OBISPO MOTHERS FOR PEACE'S RESPONSE TO NRC STAFF'S INTERROGATORIES DIRECTED TO SAN LUIS OBISPO MOTHERS FOR PEACE

Pursuant to the schedule established by the Atomic Safety and Licensing Board's ("ASLB's") Order of January 24, 2008, San Luis Obispo Mothers for Peace ("SOMFP") hereby submits its first response to the U.S. Nuclear Regulatory Commission ("NRC") Staff's Interrogatories Directed to San Luis Obispo Mothers for Peace (February 6, 2008). Factual information responsive to these interrogatories was provided by Dr. Gordon F. Thompson, whose declaration is attached.

I. GENERAL INTERROGATORIES

Interrogatory 1: State the name, business address, and job title of each person who supplied information for responding to these interrogatories and requests for production of documents. Specifically note for which interrogatories each such person supplied information. Provide a statement of qualification, resume, or *curriculum vitae* for each such person.

ANSWER: Information used in responding to these interrogatories was provided by Dr. Gordon Thompson, Executive Director of the Institute for Resource and Security Studies, located at 27 Ellsworth Avenue, Cambridge, MA, 02139. Dr. Thompson's qualifications are described in the declaration and curriculum vitae attached to San Luis Obispo Mothers for Peace's Contentions

SECY-035

SECY-02

and Request for Hearing Regarding Diablo Canyon Environmental Assessment Supplement (June 28, 2007, corrected June 29, 2007) ("SLOMFP's Hearing Request").

> *Interrogatory 2*: Identify each expert on whom the Intervenor intends to rely in its written filing for the Subpart K proceeding described in the Commission's January 15, 2008, Memorandum and Order, the general subject matter on which each expert is expected to provide sworn affidavits and declarations for the written filing, the qualifications of each expert whom the Intervenor expects to provide sworn affidavits and declarations for the written filing. Include in the qualifications a description of the educational and scientific experience of the expert; specifically addressing (1) education, training and certifications in health physics, (2) training or experience in dose modeling for calculating radiation dose, (3) a list of all dose modeling calculations and assessments performed during the last 10 years, (4) a list of publications authored by the expert within the preceding ten years, and (5) a listing of any other cases in which the expert has testified as an expert at a trial, hearing, or by deposition within the preceding four years.

ANSWER: Identification of Experts. SLOMFP currently expects to provide a sworn affidavit or declaration in connection with its written filing on Contention 2 by Dr. Gordon R. Thompson, who is an expert in the technical analysis of safety, security and environmental issues related to nuclear facilities, including probabilistic risk analysis. Dr. Thompson's qualifications are described in the declaration and curriculum vitae that are attached to SLOMFP's Hearing Request.

Dr. Thompson will testify regarding all aspects of Contention 2.

ANSWER RE: (1) Education, training and certifications in health physics. Dr. Thompson does not have specific education, training, or certification in health physics. He is, however, educated in the underlying scientific principles, and understands the principles of health physics that are relevant to the findings of the Thompson Report.

ANSWER RE: (2) Training or experience in dose modeling for calculating radiation dose. Dr. Thompson's experience with modeling of atmospheric releases of radioactive material and the resulting radiological consequences began with his use of the TIRION computer model (a straight-line Gaussian model developed by the UK Atomic Energy Authority) in the period

1977-1978. Since then, Dr. Thompson has worked on a variety of studies in which analysts, working under his direction or as colleagues, have done computer modeling of atmospheric plume dispersion and radiological consequences. In addition, in various studies, Dr. Thompson has analyzed radiological consequences without direct use of computer models for plume dispersion.

ANSWER RE: (3) a list of all dose modeling calculations and assessments performed during the last 10 years.

- In 2003, Dr. Thompson submitted an expert report, on behalf of the Office of the Attorney General of the State of Utah, in the licensing proceeding for Private Fuel Storage, L.L.C.'s proposed Independent Spent Fuel Storage Installation: *Radiation Dose from Potential Accidental Release of Radioactive Material at the Proposed PFS Facility* (September 2003). A similar analysis is contained in Dr. Thompson's June 2007 report, *Estimated Downwind Inhalation Dose for Blowdown of the MPC in a Spent Fuel Storage Module.*
- Dr. Thompson discussed radiation doses in the report he submitted in support of SLOMFP's Hearing Request. *See* Thompson Report, Table 4-1.

ANSWER RE: (4) a list of publications authored by the expert within the preceding ten years.

A selected list of Dr. Thompson's publications within the preceding ten years is included in his curriculum vitae. In addition, Dr. Thompson has authored the following publications:

- *Risk-Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants* 28 November 2007) (prepared under the sponsorship of Riverkeeper, Tarrytown, New York);

- *Releases of Hazardous Material from the Santa Susana Field Laboratory: a Retrospective Review* (5 June 2004) (prepared for the Santa Susana Field Laboratory Advisory Panel).
- *Design and Siting Criteria for Nuclear Power Plants in the 21st Century* (January 2008) (prepared under the sponsorship of Greenpeace Canada).

ANSWER RE: (5) a listing of any other cases in which the expert has testified as an expert at a trial, hearing, or by deposition within the preceding four years.

Dr. Thompson:

* Testimony before Minnesota Public Utilities Commission on behalf of Minnesotans for an Energy-Efficient Economy, and Minnesota Center for Environmental Advocacy (Docket No. E002/CN-05-123, February 2006)

* Testimony before Vermont Public Service Board on behalf of New England Coalition on Nuclear Pollution (February 2006)

* Testimony regarding Application No. 04-02-026 before the California Public Utilities Commission on behalf of SLOMFP (September 2004)

II. SPECIFIC INTERROGATORIES

Interrogatory 1: Do you contend that the appropriate basis for assessing the radiological consequences from a successful terrorist attack on the Diablo Canyon ISFSI would be, as stated in the Thompson report (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, June 27, 2007) at 16-17 and 37, a release of cesium-137 in the amount of 3 million curies? Specifically, with regard to this statement, please answer the following:

1) Do you contend that the release referenced above in the Thompson report would be the appropriate basis on which to estimate the health effects of a successful terrorist attack on the Diablo Canyon ISFSI?

ANSWER: The Thompson Report provides, at pages 15-17 and 33-37, illustrative discussion and findings regarding the radiological consequences of an attack on the proposed ISFSI at Diablo Canyon. Those pages describe the methodologies, assumptions, and analyses underlying Dr. Thompson's findings. They also contain references to all documents relied on by Dr. Thompson in reaching his findings.

The purpose of Dr. Thompson's illustrative discussion is to show deficiencies in the Diablo EA Supplement. Thompson Report at 33. The Thompson Report does not purport to provide a comprehensive analysis of the source term arising from an attack, or of the radiological consequences associated with that source term. (The "source term" is a set of information about a release of radioactive material to the environment, including the quantities of radioactive isotopes in the release.) SLOMFP does not have the funds required to support a comprehensive analysis, nor does SLOMFP have any obligation to perform such an analysis. The responsibility for a comprehensive analysis of the radiological impacts of an attack on the Diablo Canyon spent fuel storage facility rests with the NRC.

A comprehensive analysis would consider a range of attack scenarios, and for each attack scenario it would estimate a range of source-term parameters. Radiological consequences, both direct and indirect, would be estimated across the spectrum of attack scenarios and source-term parameters, accounting for variability of weather and other factors that are relevant to consequence estimation. Uncertainties and variabilities would be propagated throughout the analysis.

The principles of such an analysis are familiar to the NRC in the context of conventional accidents at nuclear power plants, as shown, for example, by the NUREG-1150 study. Application of those principles to attack scenarios would require a modified approach, because

there is no statistical basis for a quantitative estimate of the probability of an attack scenario. That problem could be addressed by designating the probabilities of classes of attack scenarios as free variables that are explicitly identified in the consequence findings. For policy and decision-making purposes, qualitative values could be assigned to those free variables. The consequence estimates could be published, and assignation of values to the free variables could occur in public settings. That approach would avoid many of the adverse societal impacts that arise from the NRC's current policy of secrecy.

An atmospheric release of 3 million Ci of cesium-137 is discussed in the Thompson Report for illustrative purposes. That release represents the result of a credible attack in which a capable, well-informed sub-national group attacks a number of storage modules. The postulated attack involves breaching of the canister in each affected module, allowing ingress of air, and the use of incendiary devices to ignite the zircaloy cladding of fuel inside the canister.

> a) If the answer is yes, please state all facts and opinions, including all references and expert testimony, which support this contention. Specifically, state whether you base this contention on the statement in the Thompson report at 37 that 3 million curies of cesium-137 represent about 50 percent of the cesium-137 in four spent fuel modules and, if so, the basis for your contention that the radiological release should be assessed based on the assumption that four modules would be impacted simultaneously, that the amount of cesium-137 that would be contained in each module would be 1.3 million curies as shown on Table 2-4 of the Thompson report or some other number, and that each of the four modules would release 50 percent of the cesium present in the module. For each assumption, explain in detail the basis for your contention that the assumption is appropriate for the Diablo ISFSI and the source for each assumption, including all calculations and references relied on. Describe the nature and extent to which your contention is premised upon the values and information in Table 4-1 to support the contention that 3 million curies, represent 50 percent of cesium, will be released from the attack. Describe all assumptions and calculations related to the zirconium fire release scenario referred to at pp. 36-37 of the Thompson report including, but not limited to (1) the specific attack scenarios and means by which you postulate simultaneous release pathways from the interior of four MPCs to the atmosphere, including the number of attackers, materials used, time needed to complete the attack, and the (sic) all facts, opinions and bases on which you conclude that the attack could have "a substantial conditional probability of

success" given the physical properties of the casks and the NRC requirements for security as (sic) ISFSIs; (2) the calculated or assumed configuration and dimension of breaches in the canister and overpack after the attack and the underlying basis, calculation, source or other reference for each postulated breach; (3) all facts, opinions, bases, references and sources which underlie your contention that zirconium fires inside each MPC will be initiated and the means by which the fire would thereafter be maintained and the duration you contend the fire will last; (4) the spent fuel decay heat levels, the air exposure and heat balance calculations, and the temperature characteristics used, relied on or assumed; and (5) the specific failure phenomena and associated calculations on which you base your contention that 50 percent of cesium released from the spent fuel assemblies and cask body will be released into the atmosphere.

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

b) If the answer is no, state what if any radiological release from a successful terrorist attack on the Diablo Canyon ISFSI you contend would be the appropriate release on which to estimate health effects. State all facts, opinions and assumptions and bases, including all references and expert testimony, which support this contention.

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

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2) Do you contend the release referenced above in the Thompson report presents a reasonable basis on which to estimate the land contamination that would result from a successful terrorist attack on the Diablo Canyon ISFSI?

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

a) If the answer is yes, state all facts and opinions, including all references and expert testimony, which support this contention. Specifically, state whether you base this contention on the statement in the Thompson report at 37 that 3 million curies of cesium-137 represents about 50 percent of the cesium-137 in four spent fuel modules and, if so, the basis for your contention that the radiological release should be assessed based on the assumption that four modules would be impacted simultaneously, that the amount of cesium-137 that would be contained in each module would be 1.3 million curies as shown on Table 2-4 of the Thompson report or some other number, and that each of the four modules would release 50 percent of the cesium present in the module. For each assumptions, explain in the (sic) detail the basis for your contention that the assumption is appropriate for the Diablo ISFSI and the source for each assumption, including all calculations and references relied on.

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

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Interrogatory No. 2: Do you contend that land contamination would result from a radiological release from a successful terrorist attack?

ANSWER: Yes.

If the answer is yes, please answer the following with regard to the land contamination you contend would result from such an attack:

1) Describe with specificity the amount of land contamination you contend would result from a successful terrorist attack. In particular, provide any opinions on which you base your contention, including, but not limited to, the amount of land that would be contaminated, the location of that land, and the extent and nature of radiological contamination that you contend would be present on the land as a consequence of a terrorist attack.

ANSWER: See answer to Specific Interrogatory 1 and Thompson Report at 15-17 and 33-37.

2) Describe with specificity the means by which you contend that land contamination will result from a terrorist attack and the specific methods used to ascertain the extent and nature of land contamination you contend will result from such an attack. Specifically, answer the following:

a) Do you contend that land contamination will result from dispersal of a radiological release into the atmosphere or any other means?

ANSWER: Offsite or onsite contamination of land could arise from dispersal of radioactive material into the atmosphere. Onsite contamination of land could also arise from the scattering of solid material.

If so, specify the following:

- The nature and extent of the radiological release upon which you base your conclusions and the (sic) all facts and opinions you rely on in determining that release;

- Specify the mechanism by which you contend the radiological release will be dispersed, including any dispersal of airborne or other form of the radiological release you contend would result from a successful terrorist attack. Identify the type, nature and magnitude of the driving force over the period of time over which you allege the dispersion would occur that would lead to land contamination. Identify the facts, opinions, calculations and sources and references which support your conclusion.

- The calculations used to assess the extent and nature of land contamination resulting from that release, including all input parameters, calculations and codes supporting your assessment or any sources relied on in making that assessment;

- All assumptions and input parameters for dispersal of any airborne radiological release you contend will result in land contamination, including chemical and physical form of the dispersed material, atmospheric stability, wind speed and direction and weather conditions. Describe all facts, opinions, sources, references and bases for those assumptions and the basis for your conclusions, if any, regarding the applicability of those assumptions to the Diablo Canyon site.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

3) Describe with specificity the impacts you allege would result from land contamination, separate and apart from human effects.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

For each impact, answer the following:

- Specify the volume and areal amount of contamination you contend will occur as the result of a terrorist attack, the amount of time over which you contend health effects will occur, and the amount of contamination that will remain present over that time or each segment of time if you contend that the contamination will change over time.

- Describe each and every environmental impact of the land contamination that you contend should be considered in the environmental analysis. For each impact specify the nature and extent of the consequences you contend would result form land contamination and state all facts and opinions which support your contention;

- Specify the time period over which you are assessing the environmental impacts described above and state whether you account for any mitigation of consequences during that time frame due to clean up, evacuation or any other mitigative measures. Describe all calculations, including all input parameters and codes, sources and references which support your contention;

- State whether you contend that the statement in the Thompson affidavit at 37, in which he refers to an average economic loss of $91 billion considering five U.S. reactor sites, is an appropriate measure of economic loss that would result from a radiological release from a terrorist attack on the Diablo ISFSI. If the answer is yes, describe all facts and expert opinion, and all calculations, including input parameters and codes that support your contention that this measure is appropriate for the Diablo Canyon site.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

4) Describe with specificity all human health effects you contend would result from land contamination. For each impact, state the specific health effects you contend would occur and quantify the extent of those health effects that you contend would occur. Explain all exposure scenarios and pathways including ingestion, inhalation and external radiation by which you contend humans will ingest radioactive material or be exposed to direct radiation as a result of land contamination and the time period over which you contend that ingestion will occur. Describe any assumptions underlying your ingestion analysis regarding the extent of radiological contamination, whether people will live, work, or recreate on contaminated land and whether any contamination will naturally diminish or be abated at any time after the terrorist event and describe all facts and opinions which support those assumptions. Describe with specificity all references and expert opinion used to support your contention, including all calculations performed.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

Interrogatory No. 3: Do you contend that the radiological consequences, other than those from land contamination, from a successful terrorist attack would result in human health effects other than early fatalities, such as non-fatal or latent health effects?

ANSWER: Yes.

If so, please answer the following:

1) Describe the extent and nature of the radiological release from a successful terrorist attack that you contend would result in the human health effects described above. Specify whether the health effects would result from an atmospheric release of radiation or any other means or source of human exposure to radiation. For each source of radiological exposure, describe the following:

- The nature and extent of any radiological release you contend would occur, including all calculations, facts and opinions relied on in determining the extent and nature of the release;

- All calculations, including input parameters and codes, used to make your assessments and the source of all calculations;

- The time period over which you contend radiation exposure will occur for the purpose of assessing health effects.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

2) Describe the extent and nature of non-fatal health effects you contend would be caused by the radiological release from a successful terrorist attack. Include the following:

- The specific nature of the health effects that you contend would be caused by the radiological release. Describe with specificity all facts, opinions, and calculations which support your contention;

- The extent of the health effects, including the number and location of people you contend would be impacted for each separate health effect and the nature and extent of the health effects you contend would occur. Describe with specificity all facts, opinions, and calculations which support your contention.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

Respectfully submitted,

Diane Curran
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February 22, 2008

ATTACHMENT A

February 22, 2008

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

In the matter of
Pacific Gas and Electric Company
Diablo Canyon Nuclear Power Plant
Unit Nos. 1 and 2
Independent Spent Fuel Storage Installation

Docket # 72-26

**DECLARATION OF DR. GORDON R. THOMPSON
IN SUPPORT OF
SAN LUIS OBISPO MOTHERS FOR PEACE'S
RESPONSE TO NRC STAFF'S INTERROGATORIES
DIRECTED TO SAN LUIS OBISPO MOTHERS FOR PEACE**

I certify that the facts in San Luis Obispo Mothers for Peace's Response to NRC Staff's Interrogatories Directed to San Luis Obispo Mothers for Peace (February 22, 2008) are true and correct to the best of my knowledge, and that the opinions expressed therein are based on my best professional judgment.

G.R. Thompson

Dr. Gordon R. Thompson

Feb 22, 2008

Date

February 22, 2008

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

In the matter of
Pacific Gas and Electric Company
Diablo Canyon Nuclear Power Plant
Unit Nos. 1 and 2
Independent Spent Fuel Storage Installation

Docket # 72-26

SAN LUIS OBISPO MOTHERS FOR PEACE'S RESPONSE TO NRC STAFF'S REQUEST FOR PRODUCTION OF DOCUMENTS AND THINGS DIRECTED TO SAN LUIS OBISPO MOTHERS FOR PEACE

Pursuant to the schedule established by the Atomic Safety and Licensing Board's ("ASLB's") Order of January 24, 2008, San Luis Obispo Mothers for Peace ("SLOMFP") hereby submits its first response to the U.S. Nuclear Regulatory Commission ("NRC") Staff's Request for Production of Documents and Things Directed to San Luis Obispo Mothers for Peace (February 6, 2008).

These discovery responses reflect an agreement between SLOMFP and NRC Staff counsel, reached on February 21, 2008, regarding two disputed issues. First, SLOMFP and the Staff have agreed that SLOMFP will not be required to produce drafts of documents prepared by SLOMFP's expert, Dr. Gordon Thompson, which SLOMFP considers to constitute privileged attorney work-product. Second, SLOMFP and the Staff have agreed that, consistent with F.R.A.P. 26, SLOMFP will provide information regarding SLOMFP's compensation of Dr. Thompson's employer, the Institute for Resource and Security Studies ("IRSS"). SLOMFP will not be required to produce contractual documents, however, which SLOMFP considers to constitute privileged attorney work-product.

REQUEST NO. 1: All documents and things that you identified, or were asked to

and Request for Hearing Regarding Diablo Canyon Environmental Assessment Supplement (June 28, 2007, corrected June 29, 2007) ("SLOMFP's Hearing Request").

> *Interrogatory 2*: Identify each expert on whom the Intervenor intends to rely in its written filing for the Subpart K proceeding described in the Commission's January 15, 2008, Memorandum and Order, the general subject matter on which each expert is expected to provide sworn affidavits and declarations for the written filing, the qualifications of each expert whom the Intervenor expects to provide sworn affidavits and declarations for the written filing. Include in the qualifications a description of the educational and scientific experience of the expert; specifically addressing (1) education, training and certifications in health physics, (2) training or experience in dose modeling for calculating radiation dose, (3) a list of all dose modeling calculations and assessments performed during the last 10 years, (4) a list of publications authored by the expert within the preceding ten years, and (5) a listing of any other cases in which the expert has testified as an expert at a trial, hearing, or by deposition within the preceding four years.

ANSWER: Identification of Experts. SLOMFP currently expects to provide a sworn affidavit or declaration in connection with its written filing on Contention 2 by Dr. Gordon R. Thompson, who is an expert in the technical analysis of safety, security and environmental issues related to nuclear facilities, including probabilistic risk analysis. Dr. Thompson's qualifications are described in the declaration and curriculum vitae that are attached to SLOMFP's Hearing Request.

Dr. Thompson will testify regarding all aspects of Contention 2.

ANSWER RE: (1) Education, training and certifications in health physics. Dr. Thompson does not have specific education, training, or certification in health physics. He is, however, educated in the underlying scientific principles, and understands the principles of health physics that are relevant to the findings of the Thompson Report.

ANSWER RE: (2) Training or experience in dose modeling for calculating radiation dose. Dr. Thompson's experience with modeling of atmospheric releases of radioactive material and the resulting radiological consequences began with his use of the TIRION computer model (a straight-line Gaussian model developed by the UK Atomic Energy Authority) in the period

1977-1978. Since then, Dr. Thompson has worked on a variety of studies in which analysts, working under his direction or as colleagues, have done computer modeling of atmospheric plume dispersion and radiological consequences. In addition, in various studies, Dr. Thompson has analyzed radiological consequences without direct use of computer models for plume dispersion.

ANSWER RE: (3) a list of all dose modeling calculations and assessments performed during the last 10 years.

- In 2003, Dr. Thompson submitted an expert report, on behalf of the Office of the Attorney General of the State of Utah, in the licensing proceeding for Private Fuel Storage, L.L.C.'s proposed Independent Spent Fuel Storage Installation: *Radiation Dose from Potential Accidental Release of Radioactive Material at the Proposed PFS Facility* (September 2003). A similar analysis is contained in Dr. Thompson's June 2007 report, *Estimated Downwind Inhalation Dose for Blowdown of the MPC in a Spent Fuel Storage Module.*
- Dr. Thompson discussed radiation doses in the report he submitted in support of SLOMFP's Hearing Request. *See* Thompson Report, Table 4-1.

ANSWER RE: (4) a list of publications authored by the expert within the preceding ten years.

A selected list of Dr. Thompson's publications within the preceding ten years is included in his curriculum vitae. In addition, Dr. Thompson has authored the following publications:

- *Risk-Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants* 28 November 2007) (prepared under the sponsorship of Riverkeeper, Tarrytown, New York);

- *Releases of Hazardous Material from the Santa Susana Field Laboratory: a Retrospective Review* (5 June 2004) (prepared for the Santa Susana Field Laboratory Advisory Panel).
- *Design and Siting Criteria for Nuclear Power Plants in the 21st Century* (January 2008) (prepared under the sponsorship of Greenpeace Canada).

ANSWER RE: (5) a listing of any other cases in which the expert has testified as an expert at a trial, hearing, or by deposition within the preceding four years.

Dr. Thompson:

* Testimony before Minnesota Public Utilities Commission on behalf of Minnesotans for an Energy-Efficient Economy, and Minnesota Center for Environmental Advocacy (Docket No. E002/CN-05-123, February 2006)

* Testimony before Vermont Public Service Board on behalf of New England Coalition on Nuclear Pollution (February 2006)

* Testimony regarding Application No. 04-02-026 before the California Public Utilities Commission on behalf of SLOMFP (September 2004)

II. SPECIFIC INTERROGATORIES

Interrogatory 1: Do you contend that the appropriate basis for assessing the radiological consequences from a successful terrorist attack on the Diablo Canyon ISFSI would be, as stated in the Thompson report (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, June 27, 2007) at 16-17 and 37, a release of cesium-137 in the amount of 3 million curies? Specifically, with regard to this statement, please answer the following:

1) Do you contend that the release referenced above in the Thompson report would be the appropriate basis on which to estimate the health effects of a successful terrorist attack on the Diablo Canyon ISFSI?

ANSWER: The Thompson Report provides, at pages 15-17 and 33-37, illustrative discussion and findings regarding the radiological consequences of an attack on the proposed ISFSI at Diablo Canyon. Those pages describe the methodologies, assumptions, and analyses underlying Dr. Thompson's findings. They also contain references to all documents relied on by Dr. Thompson in reaching his findings.

The purpose of Dr. Thompson's illustrative discussion is to show deficiencies in the Diablo EA Supplement. Thompson Report at 33. The Thompson Report does not purport to provide a comprehensive analysis of the source term arising from an attack, or of the radiological consequences associated with that source term. (The "source term" is a set of information about a release of radioactive material to the environment, including the quantities of radioactive isotopes in the release.) SLOMFP does not have the funds required to support a comprehensive analysis, nor does SLOMFP have any obligation to perform such an analysis. The responsibility for a comprehensive analysis of the radiological impacts of an attack on the Diablo Canyon spent fuel storage facility rests with the NRC.

A comprehensive analysis would consider a range of attack scenarios, and for each attack scenario it would estimate a range of source-term parameters. Radiological consequences, both direct and indirect, would be estimated across the spectrum of attack scenarios and source-term parameters, accounting for variability of weather and other factors that are relevant to consequence estimation. Uncertainties and variabilities would be propagated throughout the analysis.

The principles of such an analysis are familiar to the NRC in the context of conventional accidents at nuclear power plants, as shown, for example, by the NUREG-1150 study. Application of those principles to attack scenarios would require a modified approach, because

there is no statistical basis for a quantitative estimate of the probability of an attack scenario. That problem could be addressed by designating the probabilities of classes of attack scenarios as free variables that are explicitly identified in the consequence findings. For policy and decision-making purposes, qualitative values could be assigned to those free variables. The consequence estimates could be published, and assignation of values to the free variables could occur in public settings. That approach would avoid many of the adverse societal impacts that arise from the NRC's current policy of secrecy.

An atmospheric release of 3 million Ci of cesium-137 is discussed in the Thompson Report for illustrative purposes. That release represents the result of a credible attack in which a capable, well-informed sub-national group attacks a number of storage modules. The postulated attack involves breaching of the canister in each affected module, allowing ingress of air, and the use of incendiary devices to ignite the zircaloy cladding of fuel inside the canister.

> a) If the answer is yes, please state all facts and opinions, including all references and expert testimony, which support this contention. Specifically, state whether you base this contention on the statement in the Thompson report at 37 that 3 million curies of cesium-137 represent about 50 percent of the cesium-137 in four spent fuel modules and, if so, the basis for your contention that the radiological release should be assessed based on the assumption that four modules would be impacted simultaneously, that the amount of cesium-137 that would be contained in each module would be 1.3 million curies as shown on Table 2-4 of the Thompson report or some other number, and that each of the four modules would release 50 percent of the cesium present in the module. For each assumption, explain in detail the basis for your contention that the assumption is appropriate for the Diablo ISFSI and the source for each assumption, including all calculations and references relied on. Describe the nature and extent to which your contention is premised upon the values and information in Table 4-1 to support the contention that 3 million curies, represent 50 percent of cesium, will be released from the attack. Describe all assumptions and calculations related to the zirconium fire release scenario referred to at pp. 36-37 of the Thompson report including, but not limited to (1) the specific attack scenarios and means by which you postulate simultaneous release pathways from the interior of four MPCs to the atmosphere, including the number of attackers, materials used, time needed to complete the attack, and the (sic) all facts, opinions and bases on which you conclude that the attack could have "a substantial conditional probability of

success" given the physical properties of the casks and the NRC requirements for security as (sic) ISFSIs; (2) the calculated or assumed configuration and dimension of breaches in the canister and overpack after the attack and the underlying basis, calculation, source or other reference for each postulated breach; (3) all facts, opinions, bases, references and sources which underlie your contention that zirconium fires inside each MPC will be initiated and the means by which the fire would thereafter be maintained and the duration you contend the fire will last; (4) the spent fuel decay heat levels, the air exposure and heat balance calculations, and the temperature characteristics used, relied on or assumed; and (5) the specific failure phenomena and associated calculations on which you base your contention that 50 percent of cesium released from the spent fuel assemblies and cask body will be released into the atmosphere.

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

b) If the answer is no, state what if any radiological release from a successful terrorist attack on the Diablo Canyon ISFSI you contend would be the appropriate release on which to estimate health effects. State all facts, opinions and assumptions and bases, including all references and expert testimony, which support this contention.

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

2) Do you contend the release referenced above in the Thompson report presents a reasonable basis on which to estimate the land contamination that would result from a successful terrorist attack on the Diablo Canyon ISFSI?

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

a) If the answer is yes, state all facts and opinions, including all references and expert testimony, which support this contention. Specifically, state whether you base this contention on the statement in the Thompson report at 37 that 3 million curies of cesium-137 represents about 50 percent of the cesium-137 in four spent fuel modules and, if so, the basis for your contention that the radiological release should be assessed based on the assumption that four modules would be impacted simultaneously, that the amount of cesium-137 that would be contained in each module would be 1.3 million curies as shown on Table 2-4 of the Thompson report or some other number, and that each of the four modules would release 50 percent of the cesium present in the module. For each assumptions, explain in the (sic) detail the basis for your contention that the assumption is appropriate for the Diablo ISFSI and the source for each assumption, including all calculations and references relied on.

ANSWER: See previous answer and Thompson Report at 15-17 and 33-37.

Interrogatory No. 2: Do you contend that land contamination would result from a radiological release from a successful terrorist attack?

ANSWER: Yes.

If the answer is yes, please answer the following with regard to the land contamination you contend would result from such an attack:

1) Describe with specificity the amount of land contamination you contend would result from a successful terrorist attack. In particular, provide any opinions on which you base your contention, including, but not limited to, the amount of land that would be contaminated, the location of that land, and the extent and nature of radiological contamination that you contend would be present on the land as a consequence of a terrorist attack.

ANSWER: See answer to Specific Interrogatory 1 and Thompson Report at 15-17 and 33-37.

2) Describe with specificity the means by which you contend that land contamination will result from a terrorist attack and the specific methods used to ascertain the extent and nature of land contamination you contend will result from such an attack. Specifically, answer the following:

a) Do you contend that land contamination will result from dispersal of a radiological release into the atmosphere or any other means?

ANSWER: Offsite or onsite contamination of land could arise from dispersal of radioactive material into the atmosphere. Onsite contamination of land could also arise from the scattering of solid material.

If so, specify the following:

- The nature and extent of the radiological release upon which you base your conclusions and the (sic) all facts and opinions you rely on in determining that release;

- Specify the mechanism by which you contend the radiological release will be dispersed, including any dispersal of airborne or other form of the radiological release you contend would result from a successful terrorist attack. Identify the type, nature and magnitude of the driving force over the period of time over which you allege the dispersion would occur that would lead to land contamination. Identify the facts, opinions, calculations and sources and references which support your conclusion.

- The calculations used to assess the extent and nature of land contamination resulting from that release, including all input parameters, calculations and codes supporting your assessment or any sources relied on in making that assessment;

- All assumptions and input parameters for dispersal of any airborne radiological release you contend will result in land contamination, including chemical and physical form of the dispersed material, atmospheric stability, wind speed and direction and weather conditions. Describe all facts, opinions, sources, references and bases for those assumptions and the basis for your conclusions, if any, regarding the applicability of those assumptions to the Diablo Canyon site.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

3) Describe with specificity the impacts you allege would result from land contamination, separate and apart from human effects.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

For each impact, answer the following:

- Specify the volume and areal amount of contamination you contend will occur as the result of a terrorist attack, the amount of time over which you contend health effects will occur, and the amount of contamination that will remain present over that time or each segment of time if you contend that the contamination will change over time.

- Describe each and every environmental impact of the land contamination that you contend should be considered in the environmental analysis. For each impact specify the nature and extent of the consequences you contend would result form land contamination and state all facts and opinions which support your contention;

- Specify the time period over which you are assessing the environmental impacts described above and state whether you account for any mitigation of consequences during that time frame due to clean up, evacuation or any other mitigative measures. Describe all calculations, including all input parameters and codes, sources and references which support your contention;

- State whether you contend that the statement in the Thompson affidavit at 37, in which he refers to an average economic loss of $91 billion considering five U.S. reactor sites, is an appropriate measure of economic loss that would result from a radiological release from a terrorist attack on the Diablo ISFSI. If the answer is yes, describe all facts and expert opinion, and all calculations, including input parameters and codes that support your contention that this measure is appropriate for the Diablo Canyon site.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

4) Describe with specificity all human health effects you contend would result from land contamination. For each impact, state the specific health effects you contend would occur and quantify the extent of those health effects that you contend would occur. Explain all exposure scenarios and pathways including ingestion, inhalation and external radiation by which you contend humans will ingest radioactive material or be exposed to direct radiation as a result of land contamination and the time period over which you contend that ingestion will occur. Describe any assumptions underlying your ingestion analysis regarding the extent of radiological contamination, whether people will live, work, or recreate on contaminated land and whether any contamination will naturally diminish or be abated at any time after the terrorist event and describe all facts and opinions which support those assumptions. Describe with specificity all references and expert opinion used to support your contention, including all calculations performed.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

Interrogatory No. 3: Do you contend that the radiological consequences, other than those from land contamination, from a successful terrorist attack would result in human health effects other than early fatalities, such as non-fatal or latent health effects?

ANSWER: Yes.

If so, please answer the following:

1) Describe the extent and nature of the radiological release from a successful terrorist attack that you contend would result in the human health effects described above. Specify whether the health effects would result from an atmospheric release of radiation or any other means or source of human exposure to radiation. For each source of radiological exposure, describe the following:

- The nature and extent of any radiological release you contend would occur, including all calculations, facts and opinions relied on in determining the extent and nature of the release;

- All calculations, including input parameters and codes, used to make your assessments and the source of all calculations;

- The time period over which you contend radiation exposure will occur for the purpose of assessing health effects.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

2) Describe the extent and nature of non-fatal health effects you contend would be caused by the radiological release from a successful terrorist attack. Include the following:

- The specific nature of the health effects that you contend would be caused by the radiological release. Describe with specificity all facts, opinions, and calculations which support your contention;

- The extent of the health effects, including the number and location of people you contend would be impacted for each separate health effect and the nature and extent of the health effects you contend would occur. Describe with specificity all facts, opinions, and calculations which support your contention.

ANSWER: See answer to Interrogatory 1 and Thompson Report at 15-17 and 33-37.

Respectfully submitted,

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ATTACHMENT A

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CERTIFICATE OF SERVICE

I certify that on February 22, 2007, copies of San Luis Obispo Mothers for Peace's Response to NRC Staff's Interrogatories Directed to San Luis Obispo Mothers for Peace Regarding Contention 2 and San Luis Obispo Mothers for Peace's Response to NRC Staff's Request for Production of Documents and Things Directed to San Luis Obispo Mothers for Peace Regarding Contention 2 were served on the following persons by e-mail and first-class mail:

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