NUCLEAR REGULATORY COMMISSION ISSUANCES

September 1997

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judges (ALJ), the Directors' Decisions (DD), and the Decisions on Petitions for Rulemaking (DPRM)

The summaries and headnotes preceding the opinions reported herein are not to be deemed a part of those opinions or have any independent legal significance.

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U.S. NUCLEAR REGULATORY COMMISSION

Prepared by the
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
(301-415-6844)

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Shirley A. Jackson, Chairman

Greta J. Dicus

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B. Paul Cotter, Jr., Chief Administrative Judge, Atomic Safety & Licensing Board Panel

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COMMISSION

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Shirley Ann Jackson, Chairman
Greta J. Dicus
Nils J. Diaz
Edward McGaffigan, Jr.

In the Matter of

Docket No. 70-3070-ML

LOUISIANA ENERGY SERVICES, L.P.
(Claiborne Enrichment Center)

September 3, 1997

The Commission remands to the Atomic Safety and Licensing Board one issue for clarification, before taking action on three pending petitions for review of the Atomic Safety and Licensing Board's Partial Initial Decision, LBP-97-3, 45 NRC 99 (1997), resolving decommissioning funding matters. The remanded issue concerns the Board's finding that the NRC Staff's calculations of dose impacts from deep-mine disposal of waste to be produced at the Claiborne Enrichment Center was reasonable.

ORDER

In this proceeding for a combined construction permit and operating license, the Commission is considering together three petitions for review, two by Citizens Against Nuclear Trash (CANT) and one by Louisiana Energy Services (LES). All three petitions concern waste disposal and decommissioning funding at LES's proposed uranium enrichment facility. Before taking action on the pending petitions, the Commission requires clarification of one issue decided by the Atomic Safety and Licensing Board in LBP-97-3, 45 NRC 99 (1997). As explained below, we remand one issue to the Board for further explanation.

The issue that concerns us is the portion of LES's decommissioning funding estimate allocated for disposal of triuranium octaoxide (U_3O_8). The Board found

LES's estimate reasonable. LBP-97-3, 45 NRC at 113. The Board-approved disposal estimate assumes that deep-mine disposal of U_3O_8 is a plausible strategy that will provide adequate protection to the public and the environment. In its Final Environmental Impact Statement (FEIS) the Staff analyzed the estimated dose impacts from disposal of U_3O_8 in a hypothetical deep-disposal site and found them to be within regulatory limits. NUREG-1484, Vol. 1, at 4-66 to -68 (August 1994).

The migration of U_3O_8 from a deep-mine disposal site depends critically on the characteristics of groundwater at the site. As part of its analysis, the Staff used groundwater characteristics from an actual near-surface site to calculate solubilities and migration of waste radionuclides from two hypothetical deep-disposal sites. Based on these results, the Staff then estimated potential dose impacts from the deep disposal of U_3O_8 via radiological exposure pathways (e.g., drinking water, irrigated crops, and fish), and found them within regulatory limits.

CANT argues that "the FEIS is seriously deficient in its analysis of the likely dose calculations resulting from deeper-than-surface disposal, thereby failing to provide an adequate basis for the NRC staff's conclusion that deeper-than-surface disposal is safe. . . ." CANT Petition for Partial Review of LBP-97-3 at 5 (May 8, 1997). According to CANT, to support the plausibility of deep-mine disposal, the NRC Staff used a "very narrow mix of settings, and then picked and chose data that were not representative of the range of potential conditions [in deep mine cavities]." *See id.* at 6.

The Board rejected CANT's effort to discredit the feasibility of deep-mine disposal. *See* LBP-97-3, 45 NRC at 119-23. The Board noted that no particular mine has been selected or identified as a potential deep-disposal site so that exact characteristics of groundwater in a potentially acceptable deep-disposal facility are not available for analysis. The Staff cited data that establish the range of potential values likely to be found for each sensitive parameter in deep groundwater at the hypothetical geological settings. The Board found it reasonable that the Staff calculated dose impacts using only a single set of values taken from near-surface data for sensitive parameters, given that the near-surface values fell within the expected range for deep groundwater parameters.

However, it is not clear if the Board found it plausible that a deep mine with the exact near-surface values chosen for each sensitive parameter used by the Staff would be available, or if the Board simply found it plausible that there is a mine in the U.S. with characteristics falling within the expected range. It may be unrealistic to assume that a mine exists with the exact groundwater characteristics used by the Staff in calculating dose impacts.

If, as the Commission believes likely, the Board relied only on the plausibility of the existence of a mine with characteristics lying within the potential range, the Board needs to discuss why it found that the Staff's dose impact calculations can be taken as representative of disposal in mines with groundwater characteristics

that differ from the Staff's single set of values. The Board has not identified the effect, if any, that varying the values within the expected range would have on dose impacts. It may well be that varying the values of the sensitive parameters, even using values at the limits of the range, would not result in dose impacts above the regulatory limit, in light of the significantly low dose impacts estimated using the selected values within the range. See FEIS at A-14 to -15. But the Board cited no analysis that would provide assurance that this is correct. The Commission remands this issue to the Board for clarification. "In Commission practice the Licensing Board, rather than the Commission itself, traditionally develops the factual record in the first instance." *Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-10, 42 NRC 1, 2 (1995). Accord *Ralph L. Tetrick* (Denial of Application for Reactor Operator License), CLI-97-5, 45 NRC 355, 356 (1997).

This limited remand should not unduly delay the ultimate resolution of the adjudication, in view of the substantial issues already pending before the Commission on other appeals. The Commission expects that the Board will be able to decide the remanded issue by November 17, 1997. The Board is free to solicit further affidavits or other pleadings from the parties. If the Board cannot resolve this matter by November 17, 1997, it should advise the Commission and parties of an alternative, reasonable schedule.¹

IT IS SO ORDERED.

For the Commission²

JOHN C. HOYLE
Secretary of the Commission

Dated at Rockville, Maryland,
this 3d day of September 1997.

¹ The Commission recently received a letter from counsel for LES, dated August 20, 1997, and served on the LES service list, that asks the Commission its view as to when decisions can be expected. It is not the Commission's practice to announce in advance a firm schedule for its appellate decisions. To do so in this case would be particularly infeasible in view of the complexity of the remaining issues, the incomplete status of the appellate record (final briefs on the pending appeals are not scheduled to be filed until later this month), and competing demands on the time of the Commission and its Staff. The Commission already is giving priority attention to all pending appellate matters in this case, and as evinced by its remand decision here, is asking the Licensing Board to do the same for any decisions it is called upon to make. Over the next several months, the Commission expects to issue a series of decisions, of which this is the first, that together will resolve all currently pending appellate issues.

² Commissioner Diaz was not available for the affirmation of this Order. Had he been present, he would have affirmed the Order.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Shirley Ann Jackson, Chairman
Greta J. Dicus
Nils J. Diaz
Edward McGaffigan, Jr.

In the Matter of

Docket No. 70-3070-ML

LOUISIANA ENERGY SERVICES, L.P.
(Claiborne Enrichment Center)

September 19, 1997

The Commission denies Citizens Against Nuclear Trash's motion for reconsideration of CLI-97-11, 46 NRC 49 (1997). In CLI-97-11, the Commission remanded for clarification one issue decided by the Atomic Safety and Licensing Board in its decision on waste disposal and decommissioning funding. LBP-97-3, 45 NRC 99 (1997). The remanded issue involves the Board's finding that the NRC Staff's calculations of dose impacts from deep-mine disposal of waste to be produced at the Claiborne Enrichment center is reasonable.

ORDER

Citizens Against Nuclear Trash (CANT) has filed a motion for reconsideration of CLI-97-11, 46 NRC 49 (1997). In CLI-97-11, we remanded for clarification one issue decided by the Atomic Safety and Licensing Board in its decision on waste disposal and decommissioning funding, LBP-97-3, 45 NRC 99 (1997). For the reasons discussed below, the Commission denies CANT's motion for reconsideration of CLI-97-11.

Our remand order asked the Board to clarify its explanation of why deep-mine disposal is a plausible strategy for handling depleted uranium waste. CANT believes that because its petition for review challenged the Board's explanation, the Commission is compelled by its own regulations to grant plenary review rather

than order a remand for clarification. We disagree. The section of our regulations to which CANT refers, 10 C.F.R. § 2.786, describes considerations under which the Commission "may" grant a petition for review but does not mandate any circumstance under which the Commission must take review. Commission review under section 2.786 establishes a certiorari-like process that leaves full discretion to the Commission. Nothing in the rule prevents a remand to the Board prior to a Commission decision on whether to grant plenary review.

The Commission considers an immediate remand of the deep-mine disposal issue the most efficient way to deal with what we view as an unclear Board discussion of the issue. The Board, as the Commission's primary adjudicatory fact-finder, is well equipped to handle the remanded matter. Giving the Board an opportunity to clarify the deep-mine disposal issue leaves the Commission free to focus its attention on other pending issues in this proceeding.¹

CANT is not prejudiced by a remand. The Commission expects that the deep-mine disposal issue will be fully aired by the Board and that CANT will have sufficient opportunity to have its concerns addressed. Moreover, when the Board issues its supplemental decision, CANT will be free to supplement its petitions for Commission review if CANT remains dissatisfied with the Board's treatment of the issue. The Commission has neither granted nor denied the petitions for review and would give appropriate consideration to any supplemental petition.

In sum, the Commission sees no reason to reconsider its decision to remand the deep-mine disposal issue to the Board. Accordingly, reconsideration is denied.

IT IS SO ORDERED.

For the Commission

JOHN C. HOYLE
Secretary of the Commission

Dated at Rockville, Maryland,
this 19th day of September 1997.

¹ Recently, on September 11, 1997, the Licensing Board issued a procedural order that, among other things, requested the parties' views on the "basis for the Licensing Board's jurisdiction to proceed" on the remanded issue. This Board inquiry may stem from Commission precedent divesting the Board of jurisdiction over matters pending on appeal or on a petition for review. See, e.g., *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-823, 22 NRC 773 (1985). But that general practice, while sensible in most cases, does not apply where, as in this case, the Commission expressly retains jurisdiction and orders a remand for Board consideration of a particular issue. See generally *Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), ALAB-770, 19 NRC 1163, 1168, 1181-82 (1984). In these circumstances, "[w]e see no valid purpose to be served by an extended metaphysical discussion of when jurisdiction . . . passes" from one adjudicatory body to another. See *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-726, 17 NRC 755, 757 (1983).

Atomic Safety and Licensing Boards Issuances

ATOMIC SAFETY AND LICENSING BOARD PANEL

B. Paul Cotter, Jr.,* *Chief Administrative Judge*
James P. Gleason,* *Deputy Chief Administrative Judge (Executive)*
Frederick J. Shon,* *Deputy Chief Administrative Judge (Technical)*

Members

Dr. George C. Anderson	Dr. Richard F. Foster	Dr. Kenneth A. McCollom
Charles Bechhoefer*	Dr. David L. Hetrick	Marshall E. Miller
Peter B. Bloch*	Ernest E. Hill	Thomas S. Moore*
G. Paul Bollwerk III*	Dr. Frank F. Hooper	Dr. Peter A. Morris
Dr. A. Dixon Callihan	Dr. Charles N. Kelber*	Thomas D. Murphy*
Dr. James H. Carpenter	Dr. Jerry R. Kline*	Dr. Richard R. Parizek
Dr. Richard F. Cole*	Dr. Peter S. Lam*	Dr. Harry Rein
Dr. Thomas E. Elleman	Dr. James C. Lamb III	Lester S. Rubenstein
Dr. George A. Ferguson	Dr. Linda W. Little	Dr. David R. Schink
Dr. Harry Foreman	Dr. Emmeth A. Luebke	Dr. George F. Tidey

*Permanent panel members

LICENSING BOARDS

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judges:

Peter B. Bloch, Presiding Officer
Charles N. Kelber, Special Assistant

In the Matter of

Docket No. 40-8681-MLA
(ASLBP No. 97-726-03-MLA)
(Re: License Amendment)
(Alternate Feed Material)

INTERNATIONAL URANIUM (USA)
CORPORATION
(White Mesa Uranium Mill)

September 4, 1997

Petitioners' motion for reconsideration is denied because they have not provided any information, beyond conjecture, that the tailings of which they complain represent an increased health or safety hazard. Petitioners still have not met the prerequisite for standing that they show that they are injured by the proposed action. In this amendment case, Petitioners must show that the amendment may injure them *or someone they are authorized to represent*. They have not done that. Hence, the motion for reconsideration is denied for failure to show that the Presiding Officer has made a material error of law or fact.

The motion to reopen the record also is denied. No additional evidence has been presented for admission into the record and there was no showing that the motion was timely. 10 C.F.R. § 2.734.

MEMORANDUM AND ORDER
(Motions for Reconsideration, To Reopen the Record)

Pursuant to CLI-97-9, 46 NRC 23 (1997), the pleading faxed to the Commission by Native American Petitioners (Petitioners) on July 30, 1997, is now

pending before me. It shall be considered a Petition for Reconsideration of LBP-97-12 (Petition at 11) and a Motion to Reopen the Record (*ibid.*) (Petitioners' Motion).

Petitioners' Motion is carefully drafted, well written, and impassioned. The answers of the International Uranium (USA) Corporation (IUSA Answer) and of the Staff of the Nuclear Regulatory Commission (Staff Answer) were carefully written and provide excellent legal analyses of the issues that I am required by law to determine.¹

If the Native American Petitioners had documented the basis for their concerns, they would have been granted a hearing. However, the legal requirements for standing have not been met and a hearing is not appropriate.

What allegations of the Petitioners might have made a difference, if appropriately documented? Petitioners' Motion, at 1, states, about the material that is proposed to be processed at White Mesa: "The track history of Cotter Concentrate alone verifies our claims of injury in fact." Then, at 2, Petitioners' Motion states: "The radioactivity and hazardous constituent wastes of the Concentrates have caused health problems in Lincoln Park, Colorado, instigating a number of lawsuits." Petitioners' pleadings have, however, failed to provide a basis for either of those claims.

Let me agree with Petitioner's Motion, at 2, that the Department of Energy (DOE) had at one time considered the Cotter Concentrates to be mixed wastes. At the time, the DOE did not appreciate the feasibility of removing yellowcake from the Cotter Concentrates, as IUSA has now proposed to do. Under the IUSA proposal, the radioactivity of the Cotter Concentrates, which will be used as feedstock, will have little impact on the surrounding communities. Most of that radioactivity will be recovered as yellowcake and shipped off site. The relevant question for standing purposes is the composition of the "tailings" or waste material after the Cotter Concentrates have been processed. Since the disposal of tailings is already authorized under an existing license, the question of possible injury to the Petitioners is whether the tailings from the milling authorized by this amendment will be more hazardous than tailings already authorized under the license. Petitioners have not provided any information, beyond conjecture, that the tailings represent an increased health or safety hazard.

The Petitioners also argue that the milling operation is not profitable and should be treated as waste disposal rather than uranium milling. Petitioners' Motion at 5. I note that there is no documentation that would support the allegation that a subsidy is being paid to IUSA to support this project. Energy Fuels Nuclear, Inc. (EFN), predecessor in interest to IUSA, alleged on page 8 of its application that recovery of uranium would be profitable. Petitioners' Motion

¹ The "Answer of International Uranium (USA) Corporation . . ." was filed August 20, 1997 (IUSA Answer); and the "NRC Staff's Response to Petitioners' Motion . . ." was filed on August 22, 1997 (Staff Answer).

does not provide a basis to doubt this statement. Moreover, even if the Motion did provide a basis for doubting that statement, it does not address why it would be improper to operate an unprofitable milling operation that reduced the cost of waste disposal by recovering valuable yellowcake.

I. ORGANIZATIONAL STANDING: AUTHORIZATIONS

Petitioners' Motion, at 7, draws attention to the following statements made in filings before me:

I (Norman Begay) hold the petitions of 99% of the Native Americans of San Juan County opposing this action.

Included in Nation Navajo's initial filing was a resolution from Westwater Community representing 100% Navajo peoples opposition to the Cotter Proposal.

In addition, Mr. Begay and Ms. Katso, on behalf of all Utah Navajo Nation Chapters holds signed petitions and official resolutions representing 99% of the Navajo Nation population of the affected Navajo population of the county of San Juan in opposition to the Cotter Amendment.

For an organization to have standing, Petitioners must show whom they are authorized to represent.² I accept their representation that the sentiment against the amendment is very strong — though I have not seen the petitions. There is, however, nothing in the record of this case showing that these organizations were authorized to represent anyone other than the people signing the documents.³ Not even Avikan, a nonprofit organization, stated the manner in which the organization authorized its representative to participate in this case.

II. INJURY IN FACT

One prerequisite for standing is whether there has been "injury in fact." The rationale for this requirement is that individuals are permitted to intervene in cases only when they can show that they are injured by the proposed action.

²When an organization relies on members' interest to confer standing on it, the organization must show that at least one member who would possess standing in his own right has authorized the organization to represent him. *Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), ALAB-549, 9 NRC 644, 646-47 (1979), *aff'd*, LBP-79-10, 9 NRC 439, 447-48 (1979); *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-535, 9 NRC 377, 393-94, 396 (1979). When an individual files a request for hearing on behalf of an organization, he must show he is authorized. *Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), LBP-78-37, 8 NRC 575, 583 (1978).

³If the Petitioners continue to fear for the safety of the people who signed the petition, then that portion of the petition could have been omitted. However, we note that Petitioners have already revealed the identity of the signers by stating that almost everyone signed.

In this amendment case, Petitioners must show that the amendment may injure them *or someone they are authorized to represent*. I explained that a party that can show a plausible mechanism by which they may be injured is entitled to standing. It is not enough, in a license amendment case, to allege generally that materials may seep into the water supply. It must be shown that the tailings from the Cotter Concentrates represent an increased risk over already licensed activities.

Petitioners' Motion does not show that LBP-97-12 had an error of law or fact. *See* 10 C.F.R. § 2.771(b). In particular, they have not shown any error in the following statement about the Staff's Technical Evaluation Report (TER):⁴

It is my conclusion, after reviewing the last section of the TER, that this amendment makes very little substantive change in milling or tailing-disposal operations, making it difficult for petitioners to show "injury in fact." The Staff found, at 3-4 of the TER, that:

[T]he processing of this material will not result in (1) a significant change or increase in the types or amounts of effluents that may be released offsite; (2) a significant increase in individual or cumulative occupational radiation exposure; (3) a significant construction impact; or (4) a significant increase in the potential for or consequences from radiological accidents. This conclusion is based on the following information:

- a. Processing of this material will not result in the currently-approved annual yellowcake production limit of 4380 tons being exceeded.
- b. No physical changes to the mill circuit are required to process this material.
- c. Processing this material will not require EFN [or IUSA] to enlarge its tailings' disposal facilities.
- d. Trucks transporting the material to the mill site will be surveyed and decontaminated, as necessary, in accordance with EFN [OR IUSA]'s procedures, before leaving this site.
- e. Employees involved in handling the material will be provided with personal protective equipment. . . .

There is no information showing that these conclusions were incorrect. Accordingly, Petitioners' Motion failed to establish grounds for reconsidering the prior decision denying that they had standing.

The Staff has documented an error in my earlier decision. I mistakenly stated that information about the composition of the Cotter Concentrates was not publicly available. There was information, not in the record of this case, that was made available to the public since May 1997. Staff Response at 18, including note 13. Hence, Petitioners did have an opportunity to examine the

⁴LBP-97-12, 46 NRC 1, 7 (1997).

public record and to explain why the materials might pose a risk to them or to the environment.

The motion for reconsideration is denied for failure to show that the Presiding Officer has made a material error of law or fact. 10 C.F.R. § 2.734; *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), CLI-86-7, 23 NRC 233, 235 (1986); *Louisiana Power & Light Co.* (Waterford Steam Electric Station, Unit 3), CLI-86-1, 23 NRC 1, 6 (1986). The motion to reopen the record is denied because no additional evidence has been presented for admission into the record and there was no showing that the motion was timely. 10 C.F.R. § 2.734.

IT IS SO ORDERED.

Peter B. Bloch, Presiding Officer
ADMINISTRATIVE JUDGE

Rockville, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Charles Bechhoefer, Chairman
Dr. Jerry R. Kline
Dr. Peter S. Lam

In the Matter of

Docket No. IA 97-068
(ASLBP No. 97-731-01-EA)
(Order Superseding Order
Prohibiting Involvement in
NRC-Licensed Activities,
Effective Immediately)

AHARON BEN-HAIM, Ph.D.
(Upper Montclair, New Jersey)

September 25, 1997

The Atomic Safety and Licensing Board issues a Memorandum and Order that confirms an oral ruling at a prehearing conference denying, pursuant to 10 C.F.R. § 2.202(c)(2)(i), a request for rescission of an immediately effective order issued by the NRC Staff.

ENFORCEMENT ACTIONS: IMMEDIATELY EFFECTIVE ORDERS

RULES OF PRACTICE: IMMEDIATE-EFFECTIVENESS REVIEW

An immediately effective enforcement order issued by the NRC Staff may be challenged pursuant to 10 C.F.R. § 2.202(c)(2)(i).

ENFORCEMENT ACTIONS: STANDARD FOR IMMEDIATE EFFECTIVENESS

An immediately effective order may be challenged as not based on adequate evidence, which the Commission has equated to "probable cause."

RULES OF PRACTICE: BURDEN OF GOING FORWARD AND OF PERSUASION

The movant challenging an immediately effective Staff enforcement order bears the burden of going forward to demonstrate that the Staff's order is not founded on adequate evidence, but the Staff has the ultimate burden of persuasion on whether the requisite standard has been satisfied.

RULES OF PRACTICE: IMMEDIATE-EFFECTIVENESS REVIEW

Claims of a movant under 10 C.F.R. § 2.202(c)(2)(i) may properly suggest the existence of factual disputes, but they may not be sufficient to demonstrate lack of probable cause for a Staff immediately effective order.

PREHEARING CONFERENCE ORDER (Denying Rescission and Establishing Schedules)

I. BACKGROUND

This proceeding concerns the NRC Staff's Order Superseding Order Prohibiting Involvement in NRC-Licensed Activities (Effective Immediately), dated August 27, 1997, published at 62 Fed. Reg. 47,224 (Sept. 8, 1997) (hereinafter, Superseding Order). This Atomic Safety and Licensing Board has been designated to conduct any hearing arising from this Order, which superseded an earlier order dated July 31, 1997.¹ The Superseding Order prohibits Dr. Aharon Ben-Haim from serving as a consultant or otherwise becoming involved in NRC-licensed activities for a period of 5 years, running from July 31, 1997, the effective date of the earlier order.

In his answer to the initial order, dated August 19, 1997, Dr. Ben-Haim requested a hearing and also sought rescission of the immediate effectiveness of the order. The hearing request in summary form outlined Dr. Ben-Haim's answer to many (although not all) of the assertions of the initial order. By filing

¹The Licensing Board was established on August 25, 1997. See 62 Fed. Reg. 46,381 (Sept. 2, 1997).

dated September 8, 1997, supported by four affidavits, the NRC responded to the answer of Dr. Ben-Haim (treating the August 19 answer as applicable to the Superseding Order as well as to the initial order).

The Licensing Board, through its Memorandum and Order (Granting Request for Hearing and Scheduling Prehearing Conference), dated September 11, 1997, treated the August 19, 1997 hearing request as applicable to the Superseding Order (which had replaced the initial order in its entirety), granted Dr. Ben-Haim's request for a hearing and scheduled a prehearing conference for September 18, 1997, in Newark, New Jersey, to hear oral argument on the rescission of immediate effectiveness and to establish certain hearing-related schedules.

At the conference, the Board ruled orally (Tr. 36) that it would not rescind the immediate effectiveness of the Superseding Order, leaving the detailed reasons for this determination to be explained in a written order. We now provide those reasons.

II. RESCISSION REQUEST

Our authority to consider Dr. Ben-Haim's rescission request is set forth in 10 C.F.R. § 2.202(c)(2)(i), which reads, in pertinent part:

The . . . person to whom the Commission has issued an immediately effective order may, in addition to demanding a hearing, at the time the answer is filed or sooner, move the presiding officer to set aside the immediate effectiveness of the order on the ground that the order, including the need for immediate effectiveness, is not based on adequate evidence but on mere suspicion, unfounded allegations, or error. The motion must state with particularity the reasons why the order is not based on adequate evidence and must be accompanied by affidavits or other evidence relied on. . . . The motion must be decided by the presiding officer expeditiously. During the pendency of the motion or at any other time, the presiding officer may not stay the immediate effectiveness of the order, either on its own motion, or upon motion of the [affected] person. The presiding officer will uphold the immediate effectiveness of the order if it finds that there is adequate evidence to support immediate effectiveness. An order upholding immediate effectiveness will constitute the final agency action on immediate effectiveness. An order setting aside immediate effectiveness will be referred promptly to the Commission itself and will not be effective pending further order of the Commission. [Emphasis supplied.]

Thus, to uphold the immediate effectiveness of the Superseding Order against Dr. Ben-Haim's challenge, we must find that the Staff's immediate-effectiveness determination was based on "adequate evidence." In that connection, the Statement of Considerations accompanying the enactment of the foregoing rule explained adequacy in terms of "the existence of facts and circumstances within the staff's knowledge, of which it has reasonably trustworthy information, sufficient to cause a person of reasonable caution to believe that the order is properly founded." 57 Fed. Reg. 20,194 (May 12, 1992). The Commission went

on to compare the adequate evidence test to "probable cause" necessary for an arrest, a search warrant, or a preliminary hearing — "less than must be shown at the trial but . . . more than uncorroborated suspicion or accusation." 57 Fed. Reg. at 20,196, citing *Horne Brothers, Inc. v. Laird*, 463 F.2d 1268, 1271 (D.C. Cir. 1972). See additional discussion in *Eastern Testing and Inspection, Inc.*, LBP-96-9, 43 NRC 211, 215-16 (1996).

As set forth in *Eastern Testing, supra*, at 216, the movant challenging the Staff's immediate-effectiveness order (here, Dr. Ben-Haim) bears the burden of going forward to demonstrate that the Staff's order is not founded on adequate evidence, but the Staff has the ultimate burden of persuasion on whether the requisite standard has been satisfied. To meet his burden, Dr. Ben-Haim relied primarily on his letter of August 19, 1997, supplemented by additional remarks of counsel at the prehearing conference. He did not present any affidavits.²

For its part, the Staff presented four affidavits from investigators, inspectors, and supervisory personnel participating with respect to the Superseding Order, together with background documentary evidence. They described, *inter alia*, the sources of information relied on by the Staff for its immediate-effectiveness determinations, together with policy reasons motivating such determinations.

Dr. Ben-Haim's August 19, 1997 letter attacks the Staff's initial order for relying on allegedly incorrect information furnished by a named informant, Dr. Gerard W. Moskowitz. Dr. Ben-Haim attacks Dr. Moskowitz' credibility, not that of the inspectors or investigator to whom Dr. Moskowitz provided his information. We have some question whether these statements of Dr. Ben-Haim make the evidence provided to the Staff inspectors and investigators by Dr. Moskowitz unreliable.

However, even assuming (for purposes of argument) the unreliability of Dr. Moskowitz, the Staff treats those statements as merely developing background information and not at the heart of the most serious charges against Dr. Ben-Haim (Tr. 16). According to the Staff, the most serious of the charges against Dr. Ben-Haim arise as a result of his "deliberate misconduct" in allegedly acting as a Radiation Safety Officer (RSO) and Authorized User without being qualified or certified to do so (Tr. 18).³ A Senior Special Agent of the Office of Investigations (OI), Region I, filed an affidavit declaring that, during an OI interview, Dr. Ben-Haim admitted that he acted as the "de facto RSO"

² Dr. Ben-Haim's failure to submit affidavits was explained as based on "advice of counsel because of possible criminal penalties" (Tr. 6). Although we could possibly deny Dr. Ben-Haim's rescission motion on the basis of lack of affidavits, we elect not to do so. We interpret the "other evidence relied on" referenced in 10 C.F.R. § 2.202(c)(2)(i) as arguably covering motions of this sort. Cf. *St. Joseph Radiology Associates, Inc.*, LBP-92-34, 36 NRC 317 (1992).

³ According to the Staff, the Commission's governing regulations do not recognize "implicit authority" as suggested by Dr. Ben-Haim. See 10 C.F.R. §§ 35.25, 35.32. Based on what Dr. Ben-Haim has provided thus far, we cannot say this Staff interpretation is "erroneous."

for Newark Medical Associates and authorized dose orders of Tc-99, without receiving delegated authority from the RSO. Dr. Ben-Haim's counsel made no attempt to demonstrate that this OI affidavit was unreliable evidence (Tr. 12), although he suggested that the piece of paper written by Dr. Ben-Haim and relied upon by OI as evidence of Dr. Ben-Haim's unauthorized action was not in fact properly characterized as a prescription (Tr. 31).

The claims of Dr. Ben-Haim may properly suggest the existence of factual disputes, but they are not sufficient to demonstrate that there is not probable cause for the Staff's charges. Furthermore, the circumstance that Dr. Ben-Haim has never been charged with violations with respect to other consulting arrangements with different facilities (Tr. 31-32) does not undercut the Staff's allegations with respect to his action at this facility, although it may have a bearing on the appropriateness of any particular sanction imposed. In these circumstances, the record compels us to deny the rescission motion and uphold the immediately effective order pending further adjudication.

III. SCHEDULES

The Board recognized that the immediately effective Superseding Order placed Dr. Ben-Haim under some hardship, and it urged that an expedited discovery and hearing schedule be adopted (Tr. 36-37, 51). In response to Board suggestions that the parties submit a joint proposed discovery and hearing schedule, the parties responded that they wished to review Dr. Ben-Haim's formal answer to the Superseding Order before considering appropriate schedules. The formal answer was scheduled (by prior agreement) to be filed by September 19, 1997 (and it was in fact filed by that date). The parties agreed to submit a proposed schedule by Tuesday, September 30, 1997, and the Board approved that agreement (Tr. 43).

* * *

Based on the foregoing, it is, this 25th day of September 1997, ORDERED:

1. Dr. Ben-Haim's motion to rescind the Staff's immediate-effectiveness order in this proceeding is hereby *denied*.
2. This denial constitutes final agency action on this matter and is not subject to Commission appeal.

3. The parties are *directed* jointly to submit a proposed discovery and hearing schedule by no later than September 30, 1997.

THE ATOMIC SAFETY AND
LICENSING BOARD

Charles Bechhoefer, Chairman
ADMINISTRATIVE JUDGE

Dr. Jerry R. Kline
ADMINISTRATIVE JUDGE

Dr. Peter S. Lam
ADMINISTRATIVE JUDGE

Rockville, Maryland
September 25, 1997

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judges:

G. Paul Bollwerk, III, Presiding Officer
Thomas D. Murphy, Special Assistant

In the Matter of

Docket No. 55-61425-SP
(ASLBP No. 97-725-02-SP)

FRANK J. CALABRESE JR.
(Denial of Senior Reactor Operator
License)

September 26, 1997

In this informal proceeding concerning a challenge by Frank J. Calabrese Jr. to the NRC Staff's proposed denial of his application for a senior reactor operator (SRO) license, the Presiding Officer concludes the Staff's action should be affirmed and the application denied because the applicant did not follow facility procedures regarding rapid depressurization during the simulator portion of his SRO examination operating test.

**RULES OF PRACTICE: WITNESSES (CREDIBILITY); INFORMAL
HEARINGS (CREDIBILITY OF AFFIANTS)**

When the credibility of various affiants is at the center of the parties' dispute, the presiding officer would have to convene an oral presentation session to receive testimony. *See* 10 C.F.R. § 2.1235.

REGULATORY GUIDES: APPLICATION; STATUS

Documents bearing the NUREG designation generally do not establish regulatory requirements. *See, e.g., General Public Utilities Nuclear Corp.* (Oyster

Creek Nuclear Generating Station), LBP-97-1, 45 NRC 7, 25 (1997) (citing cases).

REACTOR OPERATOR LICENSE: EXAMINER GUIDELINES (APPLICATION)

While heedful of the discretion afforded the Staff in making its reactor operator examination determinations, a presiding officer properly can look to NUREG-1021 as an important source in assessing whether the Staff has strayed too far afield of its stated twin goals of "equitable and consistent" examination administration. *Cf. Ralph L. Tetrick* (Denial of Application for Reactor Operator License), CLI-97-10, 46 NRC 26, 31-32 (1997) (because agency practice is one indicator of how agency interprets regulations, consistently held Staff view on operator testing policy matter will not be disturbed).

REACTOR OPERATOR LICENSE: EXAMINATION (SIMULATOR PORTION OF OPERATING TEST)

Given the "snapshot" nature of the simulator portion of the operating test process, the quality of an applicant's critical decisionmaking during a crucial test interval, no matter how brief in relation to the rest of the test, was an appropriate yardstick for taking the measure of the applicant's performance.

REACTOR OPERATOR LICENSE: EXAMINATION (SIMULATOR PORTION OF OPERATING TEST)

Although there may well be a difference between the Staff's assessment of the safety significance of "actual" and "potential" events at a functioning facility, in the simulator portion of the operator test process in which the Staff is assessing whether it should permit an applicant to be placed as a reactor operator at such a facility when his action (or inaction) can cause such an "actual" event, the distinction between "potential" and "actual" events is one that has significantly less resonance, particularly if the consequences of the applicant's activities ultimately can result in serious reactor core damage.

TECHNICAL ISSUE DISCUSSED

The following technical issue is discussed: Reactor operator testing.

INITIAL DECISION

This 10 C.F.R. Part 2, Subpart L informal adjudication was convened at the behest of Frank J. Calabrese Jr., who requested a hearing to challenge the NRC Staff's action denying his application for a senior reactor operator (SRO) license. Specifically, he seeks to have overturned the Staff's finding that during one of the simulator scenarios in the operating test portion of his SRO examination, he failed properly to use an emergency operating procedure (EOP) in responding to a major transient event, thereby meriting a score that is below the level needed to pass the examination.

For the reasons set forth below, the Presiding Officer concludes that applicant Calabrese has failed to meet his burden of showing that the Staff incorrectly scored the operating test portion of his SRO examination. *See* 10 C.F.R. § 2.1237(b). Accordingly, the Staff's determination that he did not pass the operating portion of the examination is affirmed and his application for an SRO license is denied.

I. BACKGROUND

A. Calabrese License Application and Hearing Request

Applicant Calabrese currently is employed by Pennsylvania Power and Light Company (PP&L) at its Susquehanna Steam Electric Station (SSES), which has two 3300 megawatt General Electric Mark II boiling water reactors. By application dated September 30, 1996, Mr. Calabrese requested an upgrade of his existing reactor operator (RO) license to an SRO license.¹ *See* Hearing File (May 8, 1997), item 1, at 2 (U.S. Nuclear Regulatory Commission (NRC), Personnel Qualification Statement-Licensee, Form 396) [hereinafter Hearing File]. An SRO examination, which consists of a written examination and an operating test, was administered to him over a 4-day period in late-October 1996. Initially, NRC examiners found applicant Calabrese failed both the written examination and operating test portions of the SRO examination and proposed denying his SRO license application. *See id.*, item 8, at 1 (Letter from Glenn W. Meyer, Chief, Operator Licensing and Human Performance Branch, Division of Reactor Safety, NRC Region I, to Frank J. Calabrese Jr. (Dec. 2, 1996)). Later, as a result of an informal review of his examination requested by applicant Calabrese, the Staff concluded he had passed the written portion of the examination. As

¹ As a licensed RO, Mr. Calabrese is authorized to manipulate the reactor controls at the SSES facility. As an SRO, Mr. Calabrese also would be authorized to direct the licensed activities of other ROs. *See* 10 C.F.R. § 55.4 (definitions of "operator" and "senior operator").

part of that same review, however, the Staff reaffirmed its finding that Mr. Calabrese had failed the operating test portion of the examination, in particular Competency 4, entitled "Compliance With and Use of Procedures." *See id.*, item 13, encl. at 4-5 (Letter from Bruce A. Boger, Director, Division of Reactor Controls and Human Factors, NRC Office of Nuclear Reactor Regulation, to Frank J. Calabrese Jr. (Mar. 3, 1997)). As a result, the Staff sustained its earlier proposed denial of his SRO license application.²

Applicant Calabrese then filed a timely request for an adjudicatory hearing regarding the Staff's determination. *See id.*, item 14, at 1 (Letter from F.J. Calabrese Jr. to NRC Secretary (Mar. 14, 1997)). His hearing petition was assigned to this Presiding Officer, who granted his request on April 8, 1997. *See* 62 Fed. Reg. 15,542, 15,542 (1997); 62 *id.* 18,155, 18,156 (1997). In accordance with 10 C.F.R. § 2.1231, on May 8, 1997, the Staff submitted the hearing file concerning its action on Mr. Calabrese's application. Thereafter, both applicant Calabrese and the Staff filed their written presentations setting forth their positions on why the Staff's denial action was, or was not, appropriate. *See* Presentation on Behalf of Frank J. Calabrese Jr. (June 4, 1997) [hereinafter Calabrese Written Presentation]; NRC Staff Presentation in Support of Denial of [SRO] License for Frank J. Calabrese Jr. (June 30, 1997) [hereinafter Staff Written Presentation]. In addition, in accordance with section 2.1233(a), Mr. Calabrese was afforded an opportunity to respond to the Staff's written presentation. *See* Reply Presentation on Behalf of Frank J. Calabrese Jr. (July 16, 1997) [hereinafter Calabrese Reply Presentation].

Finally, as part of the informal hearing process, the Presiding Officer asked for and received responses to a series of written questions directed to the Staff. *See* Presiding Officer Memorandum and Order (Presiding Officer Questions) (July 23, 1997) [hereinafter Presiding Officer Questions]; NRC Staff Response to Presiding Officer's Questions (Aug. 4, 1997) [hereinafter Staff Questions Response]. Applicant Calabrese was, in turn, provided with an opportunity to address the Staff's response.³ *See* Response on Behalf of Frank J. Calabrese Jr. to NRC Staff Answers (Aug. 18, 1997) [hereinafter Calabrese Questions Response].

The filings and documents described above constitute the record upon which this determination is based.

² Although applicant Calabrese also sought Staff review of a portion of his score on Competency 7, "Direct Shift Operations," the Staff did not consider that request because he received an overall passing grade regarding that competency. *See* Hearing File, item 13, encl. at 5.

³ As is described more fully below, in responding to the Staff's answers applicant Calabrese provided an affidavit from a former NRC employee with experience in the agency's operator licensing program. The Staff was given an opportunity to respond to that affidavit, which it declined to do. *See* Letter from Charles A. Barth, Staff Counsel, to Presiding Officer (Aug. 21, 1997).

B. The Operating Test Portion of the Examination

As described in NUREG-1021, the agency's operator licensing examiner standards manual, agency regulations mandate that the operating test portion of an SRO examination require that an applicant demonstrate he or she understands and can perform those actions needed to accomplish a representative sampling of thirteen qualification items. Those items, which are specified in 10 C.F.R. § 55.45(a), include performing prestartup procedures, identifying and responding to annunciator and condition-indicating signals, and demonstrating knowledge of significant radiation hazards and emergency plan procedures. *See* Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Operator Licensing Examiner Standards, NUREG-1021, Examiner Standard (ES)-301, at 2 of 26 (rev. 7 Jan. 1993 & Supp. 1 June 1994) [hereinafter NUREG-1021].⁴ And relative to these items, the operating test incorporates two formats — a facility walk-through and performance in a simulator.

The facility walk-through, in turn, is divided into two categories — administrative topics and control room and facility walk-through. The former is designed to cover the knowledge and abilities needed for administrative control of the plant in areas such as daily operations conduct, equipment management, radiation protection, and emergency plan execution. The latter, on the other hand, determines if the applicant's knowledge of plant system design is adequate and if he or she is able to operate those systems safely. Both walk-through categories are administered in a one-on-one, facility walk-through format. *See id.* at 3-4 of 26.

The simulator portion of the operating test, which is the most performance-based operating test category, is intended to evaluate the applicant's ability to operate the plant's systems safely under dynamic conditions. It is administered in a team format with as many as three applicants (or surrogates) filling the RO and SRO licensed positions on an operating crew. This enables the examiners to evaluate each applicant's ability to function as a member of the control room team in the appropriate position. Each team must contend with one or more scenarios, which are an integrated group of events that simulate a set of plant malfunctions and evolutions. These scenarios are designed to allow the examiners to evaluate each applicant individually on a range of applicable competencies. *See id.* at 1, 5 of 26.

⁴ One section of NUREG-1021, ES-303, was included as item 21 in the Hearing File. At the Presiding Officer's request, as an attachment to its June 30, 1997 written presentation the Staff provided a complete copy of the January 1993 version, as supplemented in June 1994, that was in effect at the time of applicant Calabrese's examination. *See* Staff Written Presentation at 5. The Presiding Officer has relied upon this January 1993 version of NUREG-1021 as an addendum to the hearing file.

SRO candidates are evaluated on as many as eight competency categories,⁵ each of which is broken down into three or four specific rating factors. Applicants are assigned weighted numerical grades under each of the particular rating factors that classify the applicant's performance under that factor. The assigned scores for each rating factor must result in a total score for each competency sufficient to demonstrate proficiency on his or her license level, which commonly is a score of greater than 1.8 out of a possible total of 3.0. Examiners generally can deny the operator license application of any individual who fails to demonstrate proficiency in every single competency.⁶ *See id.* ES-303, at 5 of 27.

In this instance, applicant Calabrese's problems arose in connection with the fourth competency category, "Compliance With and Use of Procedures." As set forth in the pertinent part of the examination report, applicant Calabrese's scores on this "Procedures" competency were as follows:

C. SENIOR REACTOR OPERATOR INTEGRATED PLANT OPERATIONS (SIMULATOR TEST) GRADING SUMMARY						
Competencies/ Rating Factors	Weight	3.0	2.0	1.0	Total	...
4. PROCEDURES						...
A. Reference	0.25	0.75	0.50	<u>0.25</u>		...
B. Correct Use	0.50	1.50	1.00	<u>0.50</u>		...
C. Crew Implementation	0.25	<u>0.75</u>	0.50	0.25	(1.5)	...

Hearing File, item 2, at 3 of 8 (NRC Operator License Examination Report Form ES-303-1 for Frank J. Calabrese (Nov. 26, 1996) (underscoring denotes original handwritten markings)).

C. The Operating Test Scenario at Issue

From the discussion in applicant Calabrese's written presentation, it is apparent that the portion of the operating test now in controversy is the sixth and final event of simulator scenario two, which was one of the two scenarios upon which he was tested. The summary of that scenario event prepared by the SSES Training Center states:

⁵ One competency area, "Control Board Operations," is optional for SRO upgrade applicants like Mr. Calabrese. If it is evaluated, however, that competency must be factored into the applicant's final grade. *See* NUREG-1021, ES-303, at 5 of 27. Mr. Calabrese was, in fact, graded in this area. *See* Hearing File, item 2, at 3 of 8.

⁶ A candidate can receive a score of less than 1.8 on Competency 6, "Communications and Crew Interactions," and still pass the operating test if he or she has a score of at least 1.0 on that competency and total grades for all other competencies that are 2.0 or greater. *See* NUREG-1021, ES-303, at 5 of 27.

Event Six. A steam line break in the common RCIC [(reactor core isolation cooling)] and HPIC [(high pressure coolant injection)] pipe routing area occurs requiring entry into EO-100-104, Secondary Containment Control. The crew will attempt to isolate RCIC but the outboard valve will not close. The crew will manually scram the reactor as temperatures continue to rise towards maximum safe values. The crew will implement EO-100-102, RPV [(reactor pressure vessel)] Control, and manually scram the reactor. Seven control rods will fail to insert requiring entry into EO-100-113, Level/Power Control. The CRD [(control rod drive)] north areas and remote shutdown panel area will rise above 10 R/hr [(rads per hour)], requiring the crew to enter EO-100-112, Rapid Depressurization. The crew will rapidly depressurize the reactor. Both PCOs [(reactor operators)] and the US [(unit supervisor)] will be actively involved in this *major transient and two component failures*.

Hearing File, item 5, at 3 of 21 (PP&L-SSES Training Center, Simulator Scenario No. 2, Flow Comparator Failure of APRM Upscale Trip, RCIC Pump Operability, Loss of Feedwater Heating, Loss of 1B246, Unisolable RCIC Steam Line Break (rev. 1 Oct. 8, 1996)). Moreover, the scenario indicates that during event six the SRO position occupied by Mr. Calabrese (also referred to as the Unit Supervisor or US) is to perform the following activities:

Enter and direct actions of EO-100-104, Secondary Containment Control

Directs starting emergency service water (ESW) and room coolers

Directs manual scram of reactor on approaching maximum safe temperature

Enters and directs EO-100-113, Level/Power Control

Enter and directs actions of EO-100-112, Rapid Depressurization

Directs preventing injection of low pressure systems

Directs opening automatic depressurization system (ADS) safety relief valves (SRVs)

See id. at 20 of 21.

1. Applicant Calabrese's Recounting of the Scenario

Applicant Calabrese described event six in his affidavit accompanying his written presentation, *see* Calabrese Written Presentation, Statement of Frank J. Calabrese Jr. (May 30, 1997) at 5-9 [hereinafter Calabrese Statement], and in a supplemental affidavit filed with his response to the Staff's written presentation, *see* Calabrese Reply Presentation, Supplemental Statement of Frank J. Calabrese Jr. (July 11, 1997) at 1-5. It began when the reactor operator (also referred to as the Plant Control Operator—Unit or PCOU) — a role being played by RO applicant Arnold J. Avery — reported a high radiation level in the RCIC area. Recognizing this as an unexplained area radiation level above maximum normal

level, applicant Calabrese declared an emergency, directed reactor building evacuation, and entered EO-100-104, Secondary Containment Control.

Implementing this emergency operating procedure, he directed efforts to have all systems discharging into the RCIC area isolated. He then declared a site area emergency and, because the isolation valve would not close, entered into EO-100-102, RPV Control. Following that procedure, he then attempted to shutdown or scram the reactor. Seven control rods remained partially withdrawn, however. Recognizing this as an anticipated transient without scram (ATWS), he then entered EO-100-113 and followed its alternate control rod insertion directions. This resulted in the control rods inserting further, although not completely, so that reactor power dropped to less than five percent.

At this point, applicant Calabrese recalled that the PCOU reported a high radiation level in the main steam line. Applicant Calabrese states he told the PCOU to continue to monitor radiation levels and he would back up the PCOU on level monitoring because the PCOU had other responsibilities, including reading secondary containment temperatures on a back panel that would require the PCOU to step behind and out of sight of the control room consoles. Applicant Calabrese also continued the EO-100-113 steps required for attempting to insert the seven still-partially withdrawn control rods.

While applicant Calabrese was doing this, the PCOU reported radiation levels that exceeded maximum safe levels in two areas. Under EO-100-104, this required implementation of EO-100-112, Rapid Depressurization, by which radioactive steam from the reactor core is directed into a suppression pool beneath the core to reduce reactor pressure and thereby minimize public radiation exposures. According to applicant Calabrese, the EOPs like EO-100-112, which are in the form of logic tree diagrams directing the operators to certain courses of action depending on plant conditions, are printed on thick boards stacked on edge in a rack in the control room. In this instance, he asserted he looked in the rack where EO-100-112 should have been but was unable to find it. Concerned about the importance of prompt depressurization in avoiding public exposures, he decided to depressurize immediately relying on his memory of what EO-100-112 required.

Toward that end, he called the PCOU and the balance of plant (BOP) operator (also referred to as the Plant Control Operator-Extra or PCOX) — a role being played by SRO candidate Gordon E. Robinson — for a "tailboard" conference. During this discussion, he informed them he planned to enter rapid depressurization and discussed their duties, including the PCOX's assignment to open the automatic depressurization system (ADS) and prevent low pressure emergency core cooling system (ECCS) injection. Thereafter, the PCOU and PCOX returned to their stations and applicant Calabrese went back to looking for EO-100-112, but was still unable to find it.

Applicant Calabrese then directed the PCOX to open the ADS valves to start depressurization. The PCOX acknowledged this direction and asked if he should prevent low pressure injection. Applicant Calabrese stated that he confirmed low pressure injection should be prevented.

After giving this direction, however, applicant Calabrese located the EO-100-112 board, which he previously overlooked because it was pushed to the back of the rack. According to Mr. Calabrese, he then quickly reviewed the procedure and saw its direction that, absent a determination the reactor will remain shutdown under all conditions without the addition of boron, all reactor pressure vessel injection must be stopped and prevented before opening the ADS valves. Recognizing this direction is to prevent a fuel-damaging power increase resulting from a reactivity insertion by the injection of cold water into the reactor, he checked the reactor pressure gauge to see if it had fallen below a level at which low pressure injection would occur. The pressure was at 350 pounds per square inch and falling. He then looked to see if low pressure injection was prevented, and found it was not because one residual heat removal (RHR) pump was still running. He directed the PCOX to turn off that pump, which the PCOX did promptly.

The PCOX then informed applicant Calabrese there may have been some injection. Mr. Calabrese stated he asked the PCOU to check the reactor power and water levels and the PCOU reported there was no change. The scenario then ended, applicant Calabrese declared, without cold water injection or a depressurization-related power excursion or fuel damage.

2. *Other Examination Participants' Descriptions of the Scenario*

As part of his reply to the Staff's written presentation, applicant Calabrese provided the affidavits of PCOX Gordon Robinson and PCOU Arnold Avery. See Calabrese Reply Presentation, Statement of Gordon Robinson (July 11, 1997) at 1-3; *id.* Statement of Arnold Avery (July 11, 1997) at 1.

a. *Mr. Robinson*

According to Mr. Robinson, near the end of the scenario Mr. Avery reported radiation exceeded the maximum safe levels in two areas. He recalled that Mr. Calabrese then told both operators that he wanted to hold a tailboard discussion. During this discussion, applicant Calabrese said that rapid reactor depressurization was necessary and Mr. Robinson would need to open the six ADS valves. Mr. Robinson also declared that they discussed the need to prevent low pressure injection, but did not discuss whether low pressure injection should be prevented before opening the ADS valves. Mr. Robinson also recollected

that applicant Calabrese told Mr. Avery he would have certain duties during depressurization, but cannot remember what those were.

Mr. Robinson further declared that after the tailboard discussion, Mr. Calabrese gave him the direction to open the six ADS valves, which he echoed and added "and inhibit low pressure ECCS." Mr. Calabrese then repeated what Mr. Robinson had said. Although Mr. Robinson stated he knew that the ECCS pumps should be inhibited before depressurization, he declared he understood Mr. Calabrese's recitation to be a direction that the ADS valves be opened first. He then complied with this direction without questioning Mr. Calabrese about the order of the two actions because of his concern about not infringing on the pretest directive that the applicants not prompt each other during the test.

Thereafter, according to Mr. Robinson, he placed the ADS hand switches in the open position, looked at the control board indicator to confirm the valves were open, and looked at the reactor pressure indicator to verify pressure was decreasing. He recalled noticing the reactor pressure was about 700 pounds per square inch and decreasing. He reported the ADS valves open status and the decreasing pressure to applicant Calabrese. Mr. Robinson then told Mr. Calabrese he was starting ECCS pump inhibition, which Mr. Calabrese confirmed he should.

Prior to ECCS pump inhibition, Mr. Robinson stated, the "A" Loop Residual Heat Removal (RHR) pump was running in alignment for suppression pool cooling, which sends the pump flow into the pool rather than the reactor. Just before Mr. Robinson turned off the "A" RHR, which was the last pump running, applicant Calabrese directed him "insistently and urgently" to turn that pump off. When he shut it off, he looked at the flow indication for that loop and saw what appeared to be a small "bounce" from zero to approximately 2500 gallons per minute and then back to zero. Mr. Robinson reported to Mr. Calabrese that all low pressure ECCS was inhibited and there might have been some injection based on that flow indication, which Mr. Robinson now believes was a minor simulator response rather than a real flow indicator.

Mr. Robinson also recalled a discussion among all three applicants that took place after completing this scenario and leaving the simulator in which Mr. Avery indicated he had been monitoring the water and power level change indicators when Mr. Robinson was preventing the low pressure ECCS injection and had seen no change in either one. Mr. Robinson also recollected that during this discussion Mr. Calabrese stated that prior to the depressurization sequence he had tried and failed to find the procedure board, but did find it while Mr. Robinson was opening the ADS valves and marked it up to catch up to where they were in the procedure.

b. Mr. Avery

As the PCOU, Mr. Avery recalled that during the test he was monitoring rising radiation levels that were approaching maximum safe levels. After going behind the main control panels to perform a back panel task, he returned to find radiation levels had risen above maximum safe levels. He reported this to Mr. Calabrese. Thereafter, Mr. Calabrese held a tailboard discussion during which he told Mr. Avery and Mr. Robinson he was going to initiate rapid depressurization. Mr. Avery remembered monitoring reactor power and water levels while this was happening and, although he does not remember any specific details, he recalled he did not see any significant change in either level.

3. Staff Description of the Scenario

The Staff has a somewhat different recollection of the circumstances surrounding event six of the second scenario, which it provided in an affidavit filed with the Staff's written presentation. See Staff Written Presentation, Staff Response to Mr. Calabrese's Written Presentation in the Form of an Affidavit by Siegfried Guenther, John G. Caruso, Tracy E. Walker, and Carl E. Sisco (June 19, 1997) at 13-16 [hereinafter Staff Written Presentation Affidavit].

Staff license examiners John G. Caruso and Tracy E. Walker, both of whom were present during the scenario and observed it,⁷ stated that Mr. Calabrese failed to refer to or comply with the procedures in EO-100-112. Neither examiner recalled, nor do their notes reflect, any attempt by Mr. Calabrese to locate the procedure before Mr. Robinson mentioned the low pressure ECCS pumps after Mr. Calabrese gave the order to open the ADS valves. According to the affidavits, Mr. Caruso, who was monitoring Mr. Calabrese during the scenario, did not note that Mr. Calabrese was having any problems locating this procedure. These Staff affidavits also declared that Mr. Calabrese made no mention of a problem with locating the procedure either when Mr. Caruso questioned him about the scenario after the examination or in any of his submissions during his informal Staff appeal. The Staff examiners further stated they have no recollection of a formal tailboard discussion nor do their notes reflect such a discussion taking place. Both, however, did note Mr. Robinson's observation

⁷The other principal Staff affiant, senior reactor engineer Siegfried Guenther, is an examiner familiar with the agency's "examination procedures and expectation regarding operator performance." Staff Questions Response, Staff Response to Presiding Officer Questions in the Form of an Affidavit by Siegfried Guenther, John G. Caruso, and Tracy E. Walker (Aug. 4, 1997) at 2 [hereinafter Staff Questions Response Affidavit]. He did not, however, become involved with Mr. Calabrese's application until he was given the task of assembling the hearing file for this adjudication. Although he asserts he "has no reason to doubt" the truthfulness and accuracy of the Staff's June 30 written presentation, *id.* at 3, he apparently has no direct knowledge of what happened during the scenario. His "support" of those portions of the Staff's affidavits that describe events during the scenario at issue thus provides little, if any, corroboration for the Staff's version of what transpired.

that the "A" loop RHR pump had begun to inject water in the RPV before that activity was overridden.

II. THE PARTIES' POSITIONS

As the description above makes apparent, applicant Calabrese and the Staff have outlined some serious disagreements about the sequence and significance of events that occurred during event six of scenario two of the simulator portion of his operating test. Not unexpectedly, each party also asserts that events during this portion of scenario two support its position that Mr. Calabrese's application should or should not be granted.

A. Parties' Written Presentations

I. Applicant Calabrese's Position

Mr. Calabrese emphasizes that he received fully satisfactory ratings on twenty-three of the twenty-seven individual rating factors under the eight competencies that were evaluated in the two simulator scenarios. He declares, however, that his "uniformly" good performance was overshadowed by the unsatisfactory rating value of "1" he was assigned under rating factor 4.B, which concerns the correct use of procedures. Because of his score on this rating factor, which is one of the three rating factors under Competency 4, "Compliance With and Use of Procedures," he received an overall score of 1.5 on that competency.⁸ He observes that if he were given a fully satisfactory rating value of "3" or a middle range, marginal score of "2" on rating factor 4.B, he would have a total score above 1.8 for that competency and so would have qualified for an SRO license. *See* Calabrese Written Presentation at 6-7.

According to applicant Calabrese, each deficiency in an applicant's performance on a simulator test must be judged in light of the total knowledge and ability demonstrated by that applicant during the entire test. Asserting agency examiners found nothing in his performance to criticize other than taking one step in EO-100-112 out of order, he explains that he did look, albeit unsuccessfully, for that procedure. This, along with the fact his failure to refer to the procedure before ordering the ADS valves opened was prompted by his con-

⁸Initially, Mr. Calabrese also sought a Presiding Officer determination regarding the efficacy of the Staff's scoring of another of the three rating factors under Competency 4 — rating factor 4.A concerning reference to procedures. As part of his August 18, 1997 response to the Staff's answers to a series of questions posed by the Presiding Officer to the Staff, Mr. Calabrese included the sworn statement of former NRC employee Robert J. Pate. *See* Calabrese Questions Response, Statement of Robert J. Pate (Aug. 14, 1997). In that statement, Mr. Pate declared he agreed with the Staff's position on the scoring of this rating factor. *See id.* at unnumbered p. 2. As a consequence, Mr. Calabrese withdrew his challenge to the Staff's scoring on rating factor 4.A. *See* Calabrese Questions Response at 5-6.

cern about radioactive leaks, should not be considered to reflect adversely on his ability to understand and use procedures. Applicant Calabrese also asserts that, as the substance of the tailboard discussion makes apparent (and contrary to the Staff's assertion during his informal appeal), he was aware of the need to prevent low pressure injection in conjunction with opening the ADS valves. His action ordering the RHR pump turned off thus was not simply the result of prompting by Mr. Robinson. Nor did he misunderstand or ignore the procedural requirements, but rather "proceeded" when he should have "referred." *See id.* at 18 & n.9; *see also* Calabrese Reply Presentation at 9.

Mr. Calabrese also contends he demonstrated the necessary attributes for an SRO when, after authorizing ADS valve opening and RPV injection prevention, upon finding EO-100-112, he recognized the need to perform the latter before the former and took prompt action to prevent injection before reactor pressure dropped below the low pressure ECCS pumps' shutoff head. Because the grading worksheet indicates an applicant who makes minor errors and timely corrections should be considered marginally satisfactory, his action once he found EO-100-112 to verify the status of low pressure injection prevention and to shut down the "A" loop RHR pump shows that he knows how to use procedures properly. *See* Calabrese Written Presentation at 18-19; *see also* Calabrese Reply Presentation at 10.

At the same time, applicant Calabrese maintains, by taking this action, no significant error occurred that led to plant degradation warranting an unsatisfactory rating in the use of procedures. Acknowledging the Staff's assertion his actions resulted in low pressure injection that could have caused a power spike and core damage, he explains this claim is based on Mr. Robinson's statement after the PCOX turned off the "A" loop RHR pump. He declares, however, that by reason of Mr. Avery's checks on reactor power and water levels, Mr. Robinson subsequently was shown to be incorrect. There was, therefore, no injection or resulting power spike or fuel damage. Mr. Calabrese thus concludes his performance on this scenario does not merit an unsatisfactory rating on the use of procedures. *See* Calabrese Written Presentation at 19-20; *see also* Calabrese Reply Presentation at 11-13.

2. The Staff's Position

According to the Staff, its decision not to pass applicant Calabrese based on his performance in event six of scenario two is rooted in his failure to comply with several different regulatory and facility requirements. The Staff notes that under items (6), (8), and (13) in 10 C.F.R. § 55.45(a), an applicant is to be able to "[p]erform control manipulations required to obtain desired operating results during normal, abnormal, and emergency situations," "[s]afely operate the facility's auxiliary and emergency systems, including operation of

those controls associated with plant equipment that could affect reactivity or the release of radioactive materials to the environment,” and demonstrate the “ability to function within the control room team as appropriate to the assigned position, in such a way that the facility licensee’s procedures are adhered to and that the limitations in its license and amendments are not violated.” Moreover, in connection with the Staff-developed competencies for evaluating an applicant’s performance in simulator operating tests, under Competency 4 SRO applicants are expected to “USE PROCEDURES CORRECTLY, including following procedural steps in correct sequence [and] abiding by procedural cautions and limitations,” and “[e]nsure the safe, efficient IMPLEMENTATION of procedures BY THE CREW.” NUREG-1021, ES-303, at 23 of 27 (Form ES-303-4). There is also, according to the Staff, the specific requirement in each operator license that the holder “observe the operating procedures and other conditions specified in the facility license authorizing operation of the facility.” *See* Staff Written Presentation, Staff Written Presentation Affidavit at 8-9.

So too, the Staff makes note of the provisions of PP&L’s operating procedures for the SSES facility. *See id.* at 9-10. It points out that under the heading “Procedure Compliance,” the licensee’s procedural directives state “[p]rocedures represent Management’s expectations and bounds of authorization to operate plant systems and equipment. Procedures form the basis [from] which individual operator actions will be evaluated and judged for adequacy. Procedure compliance is our standard to operate the plant safely and efficiently.” Hearing File, item 16, at 30 of 75 (PP&L, Nuclear Department Procedure OP-AD-001, ¶6.18.1 (rev. 9 Jan. 29, 1997)).⁹ In addition, the facility operating procedures declare that an “EOP flowchart shall be present and continuously referred to while being executed.” *Id.* at 34 of 75 (¶6.18.6.f).

Concerning the specifics of event six of scenario two, the Staff asserts there were three EOPs of potential importance to Mr. Calabrese’s successful completion of that portion of the simulation. EO-100-104, “Secondary Containment Control,” indicates in Step SC/R-6 that if rapid depressurization becomes necessary, which it did under this scenario, then the operator must look to EO-100-113, “Level/Power Control.” According to the Staff, using EO-100-113 would have provided Mr. Calabrese with the proper procedural steps in two ways.

One, upon which the Staff placed principal reliance in its proposed license denial action, is that under EO-100-113 in the circumstances that existed in event six of scenario two, the operator must to look at Step RD-3 of EO-100-112, “Rapid Depressurization.” *See* Hearing File, item 15, at unnumbered

⁹In referring to this SSES operating procedure, the Staff has indicated that it has attempted to obtain from the licensee the version in effect at the time of Mr. Calabrese’s examination, but has been unable to do so. *See* Staff Written Presentation at 5. Mr. Calabrese has not sought to show there is any material difference between this version and the one in effect at the time of the examination.

p. 1 (SSES Emergency Operating Procedure EO-100-113, Level/Power Control). This step in EO-100-112 then requires the operator to determine whether the reactor will remain shutdown under all conditions without boron. *See id.* at unnumbered p. 2 (SSES Emergency Operating Procedure EO-100-112, Rapid Depressurization). According to the basis document on this procedure prepared by the facility licensee, such a determination is necessary because, if reactor shutdown cannot be assured, injection of large volumes of cold, unborated water into the RPV during rapid depressurization could result in serious core damage.¹⁰ The basis document also states that reactor shutdown confirmation can best be obtained by observing that all control rods are fully inserted, which did not happen in event six. *See id.*, item 19, at 3 of 15 (PP&L, Nuclear Department Procedure EO-100-112, Rapid Depressurization (rev. 6 May 16, 1994)). And if, as was the case in this simulator exercise, that determination cannot be made, the basis document indicates that precautionary steps must be taken to control RPV injection. Those actions are mandated by Step RD-5, which refers the operator to either Step LQ/L-19 in EO-100-113 or Step RF-13 in EO-100-114, both of which direct the operator to continue with rapid depressurization only after it is confirmed all RPV injection is stopped and prevented. *See id.* at 5 of 15.

According to the Staff, contrary to Step 6.18.6.f of PP&L Nuclear Department Procedure OP-AD-001 quoted above, Mr. Calabrese did not keep the EO-100-112 flowchart present or refer to it continuously while it was being executed. Further, the Staff asserts, nothing provided by Mr. Calabrese adequately explains his clear failure to follow the required procedures. At the end of scenario two, when NRC examiner Caruso specifically questioned Mr. Calabrese regarding his use of EO-100-112, Mr. Calabrese acknowledged he did not take the procedure out and start marking it up until after he had given the order to terminate and prevent low pressure ECCS injection. The examiner also did not note, and Mr. Calabrese did not mention, any problem with locating the flowchart nor did the examiners recall any tailboard discussion at which issue of preventing low pressure injection was discussed. Yet, both Mr. Caruso and Ms. Taylor, the chief examiner, did note Mr. Robinson's observation that the "A" loop RHR pump has begun to inject water into the RPV before it was overridden. *See* Staff Written Presentation, Staff Written Presentation Affidavit at 11-16.

¹⁰ As it is more specifically described in the basis document, if injection is not prevented, as RPV pressure decreases to and below the shutoff head set points of the low pressure ECCS injection system pumps, those pumps may inject large quantities of cold, unborated water into the RPV that would quickly dilute in-core boron concentration and reduce core region water temperature. This, in turn, may result in the addition of positive reactivity sufficient to induce a reactor power excursion large enough to damage the core severely. *See* Hearing File, item 19, at 5 of 15 (PP&L, Nuclear Department Procedure EO-100-112, Rapid Depressurization (rev. 6 May 16, 1994)).

The other EO-100-113 avenue referred to by the Staff is under Step LQ/L-9 of that procedure. According to the Staff, this procedure, which Mr. Calabrese entered when he determined the reactor would not remain shutdown under all conditions without boron, directs the operator to Step LQ/L-19 if rapid depressurization is required. And, as was noted above, this step, which is the same one referred to in Step RD-5 of EO-100-112, directs the operator to prevent low pressure injection into the RPV before initiating rapid depressurization. The Staff, however, did not mention this alleged failure during its review process on the proposed denial of Mr. Calabrese's license application. *See id.* at 18.

In light of these alleged procedural missteps, the Staff does not agree with Mr. Calabrese's assertions that he deserved a higher grade under rating factor 4.B regarding use of procedures. A higher grade under this rating factor was inappropriate because the consequences of the error — severe core damage — rose above the level of what could reasonably be classified as "minor." The fact he performed well during most of the simulator exercise, the Staff asserts, is not sufficient to outweigh the safety-significant procedural error for which he was responsible in what was clearly the most critical portion of his operating test. His failure to comply with both EO-100-112 and EO-100-113 provides adequate justification for his low score on rating factor 4.B. *See id.* at 21-23.

Moreover, recognizing applicant Calabrese's assertions that proper grading of rating factor 4.B should take into account the fact he subsequently found and used the procedure to make timely corrections to prevent RPV injection, the Staff asserts that neither the examiner's notes nor their recollection of events support the notion Mr. Calabrese made any attempt to locate the procedure until Mr. Robinson prompted him concerning preventing injection after Mr. Robinson was given the order to open the ADS valves. Further, the Staff declares that the fact no reactor power or water level increases were detected does not negate Mr. Robinson's observation that the RHR injection valves opened and some injection occurred given such increases could have been masked by the increased reactor water level and might not have caused a measurable power increase. Because there is no way to anticipate or control the pressure rate decrease once the ADS valve is opened, the Staff maintains it is "imperative" the low pressure ECCS pumps be disabled by preventing their injection before rapid depressurization begins. *See id.* at 24-25.

Finally, according to the Staff, although the agency's simulator operating test grading procedure in ES-303 of NUREG-1021 is competency rather than task based, successful reactor depressurization without reactor fuel damage does not necessarily mean an applicant has mastered the eight SRO competencies. Testing necessarily uses scenarios containing a cross-section of events that the Staff evaluates to draw inferences regarding an applicant's ability and compliance with facility procedures and license conditions. The Staff concludes that because of the significance of Mr. Calabrese's errors, it is not confident of his ability

to comply with those procedures in other emergency situations. As a result, the Staff concludes that its denial of his license should be sustained. *See id.* at 25-26.

B. Parties' Responses to Presiding Officer's Questions

After reviewing the parties' written presentations, pursuant to 10 C.F.R. § 2.1233(a), the Presiding Officer posed a series of written questions to the Staff regarding, among other things, its information retention policies relative to the October 1996 operating test and the issues of whether (1) a tailboard discussion was held, and (2) low pressure injection took place.¹¹ Further, in connection with the tailboard and injection issues, the Staff was asked to explain the impact, if any, on Mr. Calabrese's score if it is assumed the matter at issue was found to be as Mr. Calabrese presented it. *See* Presiding Officer Questions at 2-7. The Staff's responses, and Mr. Calabrese replies to the Staff's responses, were as follows:

1. Tailboard Discussion

In response to a Presiding Officer question on whether Staff examiners listen in on tailboard discussions, the Staff states that they do. The Staff also declares that if such a discussion between Mr. Calabrese, Mr. Robinson, and Mr. Avery is assumed to have taken place as described in those individuals' affidavits, Staff knowledge of that discussion would not have affected Mr. Calabrese's score. His score on rating factor 4.B, the Staff asserts, was based on the Staff's analysis that his performance most closely matched the description of a grade "1" on the three-point rating scale in ES-303 in that the consequence of his error — possible severe core damage — rose above the level of what could reasonably be classified as "minor" under the higher grade "2." *See* Staff Questions Response, Staff Questions Response Affidavit at 6-7, 10-11.

Relative to rating factor 4.B, the Staff again maintains applicant Calabrese failed to comply with Step RD-5 of EO-100-112 and Step LQ/L-19 of EO-100-113. As another ground for asserting noncompliance with Step LQ/L-19, the Staff relies on Mr. Avery's failure in his affidavit to indicate Mr. Calabrese ever directed him to take action to prevent further injection from the condensate system or confirm that injection was prevented as that step requires. The Staff

¹¹ The Presiding Officer also asked a question regarding Mr. Calabrese's purported difficulty locating the EO-100-112 procedure board. *See* Presiding Officer Questions at 2-3. It was in responding to the Staff's answer to this question Mr. Calabrese declared, based on the response in his own witness' affidavit, that he was abandoning the issue of the Staff's scoring of whether he properly "referred" to procedures under rating factor 4.A. *See supra* note 8.

also declares that even if Mr. Calabrese stated to Mr. Robinson it would be necessary to prevent low pressure injection during any discussion, Mr. Calabrese nonetheless failed to direct that action be performed in the proper sequence. Finally, the Staff declares that if it had taken issue with Mr. Calabrese's conduct of the tailboard discussion, this would have been reflected in connection with the scoring of Competency 6, "Communicate and Interact with the Crew and Other Personnel," or Competency 7, "Direct Shift Operations." In both, however, Mr. Calabrese had overall scores that were satisfactory. *See id.* at 12-13.

In response to the Staff's answer to this question, Mr. Calabrese declares the tailboard discussion was important to the scoring of his exam because it showed he was aware of the need to inhibit low pressure injection. It also is evidence that, contrary to the Staff's assertions during the informal review process, his order directing Mr. Robinson to inhibit low pressure injection was not the result of "prompting" by Mr. Robinson. Further, on the issue of the need to prevent condensate injection, Mr. Calabrese provides another affidavit from Mr. Avery, who explains that his silence on this point in his first affidavit was no indication that this subject was or was not discussed. Mr. Calabrese also declares in his own affidavit that there was no indication in the examiners' notes or in a followup question that there was a problem with condensate injection. Mr. Calabrese also provides an affidavit in which he asserts that no direction to Mr. Avery was required because he could have verified there was no risk of an uncontrolled condensate injection by looking at the control board. *See Calabrese Questions Response* at 11-12.

2. Injection

In discussing the Presiding Officer's question whether Mr. Calabrese's score would have been different if it is assumed that low pressure injection did not occur,¹² the Staff maintains that a significant fact has not been addressed by Mr. Calabrese: the effect of Mr. Robinson depressing the initiation buttons for the RHR systems. According to the Staff, pressing these buttons also sends a message to open the RHR RPV injection valves. Thereafter, injection can occur as soon as reactor pressure drops below the RHR pump shutoff head discharge pressure. Because there is no way to anticipate or control the rate of pressure decrease once the ADS valves were opened, it was imperative the low pressure ECCS pumps be disabled by initiating the systems and then preventing injection before rapid depressurization was begun. *See Staff Questions Response, Staff Questions Response Affidavit* at 16-17.

¹² In responding to that question, however, the Staff now states that it believes Mr. Robinson's suggestion that the change in RHR flow indication may have been a simulator response "has merit and is consistent with the [Staff] examiners' notes." *Staff Questions Response, Staff Questions Response Affidavit* at 16.

The Staff also addresses a related Presiding Officer inquiry regarding the applicability of a statement in ES-303, which concerns the Category B "Control Room Systems/Facility Walk-through" portion of the operating test part of the examination. This examiner standard declares that "[i]f the applicant missed a critical step but later performed it correctly and accomplished the task standard without degrading the condition of the system or the plant, the applicant's performance on that [job performance measure (JPM)] should be graded as satisfactory." NUREG-1021, ES-303, at 4 of 27. According to the Staff, this guidance applies to situations in which an applicant corrects an error that does not represent an unsafe practice, such as starting or stopping the wrong equipment component when the mistake has little consequence and is not an unsafe practice. In Mr. Calabrese's case, however, his error in not consulting and following the proper procedure represented an unsafe practice and thus could not have been graded as satisfactory. *See* Staff Questions Response, Staff Questions Response Affidavit at 17-18.

In responding to this Staff answer, applicant Calabrese points out that the Staff's position that the occurrence of injection is irrelevant to his score is inconsistent with its reliance throughout the Staff scoring and appeal process on the fact that injection did occur. In addition, its position that his error in failing to follow the appropriate procedure merits an unsatisfactory score, notwithstanding the fact that no injection took place, is inconsistent with longstanding Staff practice. *See* Calabrese Questions Response at 14-17. In support of this point, Mr. Calabrese relies upon the affidavit of Robert J. Pate, a former agency employee who for some six years in the late 1980s was involved with the agency's operator licensing program. In his affidavit, Mr. Pate declares:

I reviewed the failure of Mr. Calabrese to perform the lockout of the L.P. ECCS pumps in the proper sequence against the anchor statements of ES-303 Rating Factor 4.B. I concluded that the performance of Mr. Calabrese most closely matches the description of a grade of "2" on the 3-point rating scale. Although the term "minor error" does not fit well, it is a better description than a grade of "1" because the action was not a significant error that impeded or slowed recovery or significantly degraded the plant unnecessarily. There was minor degradation of the plant over a two minute period and there was no safety significance as long as the L.P. ECCS pumps were locked out in time to prevent injection.

... Over the 21 years that I was employed by the NRC, an actual event was consistently considered much more safety significant than a potential event. In this case, if there was no injection, which from the record appears to be the most probable case, there is no potential damage to the core. If there was an injection, there was a potential for core damage. If the failure to follow procedures had resulted in an injection, I would agree with the Staff that there was a significant degradation and Mr. Calabrese's performance should be graded appropriately.

Id., Statement of Robert J. Pate (Aug. 14, 1997) at unnumbered pp. 4-5 [hereinafter Pate Statement].

Admitting he made a "procedural misstep" by not locating EO-100-112 and then transposing the procedure's steps relative to depressurization and inhibiting injection, Mr. Calabrese nonetheless declares that by continuing to look for the procedure, finding it, and properly using it, he took the immediate actions necessary to rectify his error in a timely manner that prevented significant plant degradation. Because there was no core injection and so no damage to the reactor fuel, he declares he demonstrated he understood the situation and possessed the requisite skill to prevent any negative consequences. As a consequence, he argues he should be given a grade of "2" on rating factor 4.B, which would result in his passing the examination. *See* Calabrese Questions Response at 17-18.

III. ANALYSIS

As the recitation above makes apparent, the dispute between Mr. Calabrese and the Staff over his application has come down to the question whether his score on rating factor 4.B under Competency 4, "Compliance With and Use of Procedures," was appropriate. Relative to this dispute, it is clear the parties are in agreement that Mr. Calabrese did not follow procedure EO-100-112 when he allowed the PCOX to initiate depressurization before inhibiting low pressure system injection. *See* Calabrese Written Presentation, Calabrese Statement at 8, 9; Calabrese Questions Response, Second Supplemental Statement of Frank J. Calabrese Jr. (Aug. 12, 1997) at 4. It is equally apparent, based on the affidavits and other information submitted by both parties, that the applicant and the Staff have various other disagreements about what transpired during event six of scenario two of the simulator test. Principal among these are whether applicant Calabrese and the other two candidates involved in the exam held a tailboard discussion and whether low pressure system injection occurred.

Because the credibility of various of the affiants appears to be at the center of these disputes, if it is necessary to resolve these discrepancies to decide the rating factor 4.B issue, the Presiding Officer would have to convene an oral presentation session to receive testimony. *See* 10 C.F.R. § 2.1235. This is not necessary, however, because the Presiding Officer has decided that, regardless of the outcome of these disputes, the existing record establishes the Staff's

determination to award the lowest score on rating factor 4.B was justified and should be sustained.¹³

As both parties have emphasized, in resolving this matter a focal point is NUREG-1021, Form ES-303-4, the worksheet used by the Staff for grading the competency of SRO candidates in the simulator portion of their test. Of course, the materials in documents bearing the NUREG designation, such as NUREG-1021, generally do not establish regulatory requirements. *See, e.g., General Public Utilities Nuclear Corp.* (Oyster Creek Nuclear Generating Station), LBP-97-1, 45 NRC 7, 25 (1997) (citing cases). NUREG-1021 itself echoes this theme, declaring the examiner standards it contains are intended to "provide policy and guidance to NRC examiners and establish the procedures and practices for examining licensees and applicants for [RO] and [SRO] licenses at power reactor facilities pursuant to [10 C.F.R. Part 55]." NUREG-1021, at iii.

The document, however, goes on to state it is intended to "assist NRC examiners and facility licensees to better understand the initial and requalification examination processes and to ensure the equitable and consistent administration of examinations to all applicants." *Id.* What this suggests is that, while heedful of the discretion afforded the Staff in making its examination determinations, a presiding officer properly can look to NUREG-1021 as an important source in assessing whether the Staff has strayed too far afield of the stated twin goals of "equitable and consistent" examination administration. *Cf. Ralph L. Tetrick* (Denial of Application for Reactor Operator License), CLI-97-10, 46 NRC 26, 31-32 (1997) (because agency practice is one indicator of how agency interprets regulations, consistently held Staff view on operator testing policy matter will not be disturbed).

¹³ The Presiding Officer's conclusion that he is able to reach a decision in this case based on the existing written record does not gainsay the fact, as the parties' written presentations and the Presiding Officer's followup written questions have revealed, *see* Presiding Officer Questions at 2, 5-6, that in several circumstances potentially relevant information was not available because the Staff did not retain certain examination-related materials.

For instance, one of the three Staff examiners who observed the simulator scenario in controversy destroyed his notes while this matter was still pending before the Staff. He did this, he asserts, because he was only responsible for testing one of the other applicants who passed the examination and was issued a license, so that his action was consistent with the policy guidance in NUREG-1021, ES-501, at 2 of 24, that states "[o]nce the licensing decisions are complete, the examiners should discard any marked up documentation or rough notes for those applicants receiving licenses" *See* Staff Questions Response, Response of Carl E. Sisco to Presiding Officer Question Dated July 23, 1997 (July 24, 1997) at 1. In another instance, which was noted by a three-member appeal panel acting as part of the Staff's informal review process, *see* Hearing File, item 12, attach. at 4-5, Staff examiners did not ask facility officials to retain simulator chart recordings concerning the scenario that could have established whether injection did or did not occur, notwithstanding guidance in NUREG-1021, ES-302, at 5 of 11, indicating that "[p]arameter readings should be collected at meaningful intervals . . . [and t]he chief examiner should retain the recordings as backup documentation to augment the notes taken by the examiners during the simulator test." *See* Staff Questions Response, Staff Questions Response Affidavit at 14-15.

Given the possible negative inference that can be applied to missing or destroyed evidence, *see* 2 James H. Wigmore, *Evidence* § 291 (3d ed. 1940), additional Staff review of these policies and their application in the context of simulator tests involving multiple applicants seems warranted.

With the above in mind, the Presiding Officer turns to Form ES-303-4, which relative to rating factor 4.B provides:

4. COMPLIANCE WITH AND USE OF PROCEDURES

DID THE APPLICANT:

- (b) USE PROCEDURES CORRECTLY, including following procedural steps in correct sequence, abiding by procedural cautions and limitations, selecting correct paths on decisions blocks, and correctly transitioning between procedures?

3	2	1
Accurately and promptly executed procedural steps	Minor errors, but made necessary corrections in a timely fashion	Significant errors impeded or slowed recovery or degraded plant unnecessarily

NUREG-1021, ES-303, at 23 of 27 (Form ES-303-4, at 4). Because the award of an integral rating value of "2" would give Mr. Calabrese a passing score on the SRO examination, the parties' dispute comes down to the question whether the "behavioral anchor" under that value or integral rating value "1" more accurately reflects Mr. Calabrese's performance.

As they are set forth above, neither rating value appears to be a perfect fit as a measure of Mr. Calabrese's performance. As the Staff argues, the error Mr. Calabrese admits he made — not following a clear procedure when failure to do so could have resulted in serious damage to the fuel in the reactor core — can hardly be described as "minor" under rating value "2." When Mr. Calabrese ordered depressurization before inhibiting low pressure system injection in violation of a specific facility procedure, as well as NRC and facility requirements that this procedure (and others) must be followed,¹⁴ the Staff is correct in its assertion he placed the facility at significant risk. On the other hand, assuming (as Mr. Calabrese has argued) that his mistake did not cause injection to occur or result in fuel damage, the degree to which Mr. Calabrese's error "impeded or slowed recovery or degraded [the] plant unnecessarily" under rating value "1" is problematic if that rating value is intended to reflect only "actual" plant impedance or degradation.

The Presiding Officer concludes that, even accepting Mr. Calabrese's assertions about the tailboard discussion and the lack of injection, the Staff's judgment applying rating value "1" was correct. By any objective measure, event

¹⁴ In this regard, PP&L procedures also state that "[i]f an existing procedure addresses the evolution to be performed and the current circumstances, the procedure shall be used." Hearing File, item 16, at 31 of 75 (¶16.18.3.a).

six of scenario two was intended to test the ability of each applicant, and in particular the SRO candidate, to deal with a significant emergency situation.¹⁵ This portion of the scenario, albeit brief, provided a vital opportunity for the Staff to judge how the candidates reacted when faced with a high-stress situation requiring the exercise of critical decisionmaking skills to reach a safe shutdown of the facility. When faced with this situation, notwithstanding explicit agency and facility requirements that emergency operating procedures be referred to and followed, responding from memory based on an apparently mistaken belief about the time sensitivity of his actions,¹⁶ Mr. Calabrese failed to follow crucial procedure EO-100-112 and thereby unnecessarily put the facility at substantial risk.¹⁷ Not surprisingly, the Staff responded with a score in the lowest range under the rating factor intended to measure such procedure-related activities.

Mr. Calabrese's attempt to downplay the significance of his error by emphasizing his overall performance is not convincing. While the several minutes in which the scenario event at issue occurred were proportionately a small part of the entire operating test, they loomed large in terms of the operator skills and abilities that the examination was designed to test. Given the "snapshot" nature of the operating test process, the quality of Mr. Calabrese's critical decision-making during this crucial interval, no matter how brief in relation to the rest of his test, was an appropriate yardstick for taking the measure of his performance.

At the same time, even accepting Mr. Calabrese's contention that his admitted error did not result in injection or actually impede recovery at or degrade the facility, the Presiding Officer finds equally unpersuasive his argument, which Mr. Pate's affidavit emphasizes, that there is a distinction between "actual" and "potential" events in terms of safety significance that was not reflected in the

¹⁵ The Staff observes in its response to the Presiding Officer's July 23 questions that event six was added to scenario two with the intent of creating a more severe event. This was done at the behest of Staff operator license examiner Tracy, who was chief examiner for Mr. Calabrese's October 1996 examination. She apparently took this step as a corollary to a April 1996 Staff inspection report in which she criticized the SSES facility's simulator examinations for not having a control rod insert failure that would mandate operator actions beyond those generally being required under the ATWS scenarios being used for SSES operator licensing applicants. *See* Staff Questions Response, Staff Questions Response Affidavit at 9.

¹⁶ In his initial written presentation, Mr. Calabrese declared that the reason he did not continue to hunt for the board containing procedure EO-100-112 was his desire to minimize public radiation exposure. *See* Calabrese Written Presentation, Calabrese Statement at 7. In its August 4, 1997 response to the Presiding Officer's questions, the Staff asserts, without being contradicted by Mr. Calabrese in his August 18 reply, that delaying depressurization by another minute to find the board would not have made a significant difference in radiation levels because the maximum safe levels in two areas already had been exceeded. *See* Staff Questions Response, Staff Questions Response Affidavit at 4; *see also* Calabrese Questions Response, Pate Statement at unnumbered p. 2 (Mr. Calabrese should have known terminating releases does not demand action in terms of minutes or priority attention over proper execution of emergency procedures).

¹⁷ As was described earlier, the Staff also asserts Mr. Calabrese violated procedure EO-100-113 by his actions. *See supra* pp. 81, 82-83. Its reliance on those purported missteps for the first time before the Presiding Officer raises the troubling question of the extent to which, in defending its actions before a presiding officer, the Staff for the first time may rely on grounds that it arguably could have asserted, but did not, as a basis for its own decision to deny an operator license application. Given Mr. Calabrese's clear admission that he did not follow EO-100-112, the Presiding Officer need not reach this issue, however.

Staff's decision to give Mr. Calabrese the lowest score on rating factor 4.B. Mr. Pate may well be correct there is such a difference in terms of the Staff's assessment of "actual" events that take place at a functioning facility. Here, however, what the Staff is assessing is whether it should permit an applicant like Mr. Calabrese to be placed in the position of responsibility at such a facility as a senior reactor operator when his action (or inaction) can be the cause of such an "actual" event. In the context of this testing process, the distinction between "potential" and "actual" events is one that has significantly less resonance, particularly when, as with event six, the consequences ultimately can result in serious core damage.

Under these circumstances, the Staff's decision to assign the lowest rating factor was an entirely reasonable exercise of its decisionmaking authority in such examination scoring matters, and, in any event, not arbitrary or an abuse of the discretion afforded it in such matters. The Presiding Officer thus concludes the Staff acted appropriately in proposing to deny Mr. Calabrese's senior operator license application and, affirming that decision, concludes his application must be denied.

IV. CONCLUSION

When viewed against the backdrop of the extensive SRO testing regime, Mr. Calabrese's decision to proceed to depressurization without first obtaining and reviewing procedure EO-100-112 may, at first blush, seem a rather harmless deviation, particularly if one assumes (as the Presiding Officer has done for the purposes of deciding this case) that no direct harm could be attributed to the facility as a result of his admitted misstep. Nonetheless, as both the agency's and the licensee's requirements make clear, in undertaking the crucial responsibility of operating, and directing others in the operation of, a nuclear power reactor, individuals like Mr. Calabrese are expected to follow the procedures that have been established to ensure the safe operation of the facility. Based on Mr. Calabrese's failure to follow a crucial procedure during his simulator test, the Staff acted properly in assigning him an integral rating value of "1" on rating factor B of competency category four, "Compliance With and Use of Procedures."

With this score as an appropriate measure of his performance in that competency category, Mr. Calabrese's grade on the operating portion of the SRO examination falls below the level needed to pass. Accordingly, his application for an SRO license must be denied.

For the foregoing reasons, it is this 26th day of September 1997, ORDERED that:

1. The Staff's proposed denial of the September 30, 1996 application of Frank J. Calabrese Jr., for an SRO license is *affirmed* and his SRO license application is *denied*.

2. Pursuant to 10 C.F.R. § 2.1251(a), this initial decision shall constitute final action of the Commission 30 days from the date on which it is issued, or on *Monday, October 27, 1997*, unless a party petitions for Commission review in accordance with sections 2.786 and 2.1253, or the Commission directs otherwise.

3. In accordance with 10 C.F.R. §§ 2.786, 2.1253, within 15 days after service of this initial decision, or on or before *Thursday, October 16, 1997*, any party may file a petition for review with the Commission on the grounds specified in section 2.786(b)(4). The filing of a petition for review is mandatory in order for a party to have exhausted its administrative remedies before seeking judicial review. Within 10 days after service of a petition for review, any party to the proceeding may file an answer supporting or opposing Commission review. The petition for review and any answers shall conform to the requirements of section 2.786(b)(2)-(3).

G. Paul Bollwerk, III
ADMINISTRATIVE JUDGE

Rockville, Maryland
September 26, 1997

**Directors'
Decisions
Under
10 CFR 2.206**

DIRECTORS' DECISIONS

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Samuel J. Collins, Director

In the Matter of

Docket No. 50-213

CONNECTICUT YANKEE ATOMIC
POWER COMPANY
(Haddam Neck Plant)

September 3, 1997

By letter dated March 11, 1997, Ms. Rosemary Bassilakis submitted a petition on behalf of the Citizens Awareness Network and the Nuclear Information and Resource Service (Petitioners) pursuant to 10 C.F.R. § 2.206, requesting that the NRC (1) issue a large civil penalty against the Connecticut Yankee Atomic Power Company (CY) to ensure its compliance with safety-based radiological control routines; (2) modify CY's license for the Haddam Neck facility to prohibit any decommissioning activity at the facility until a 6-month period passes without any contamination events occurring; and (3) place the Haddam Neck facility on the NRC Watch List.

In a Director's Decision dated September 3, 1997, the Director of Nuclear Reactor Regulation respectively deferred and denied Petitioners' requests. The Director concluded that it would be premature at this time to rule on Petitioners' first request, as the NRC is currently considering enforcement action with regard to failed radiation program controls at the Haddam Neck facility. Petitioners' second request was denied on the basis of past environmental and exposure reports, as well as the presence of an onsite NRC Senior Resident Inspector and certain measures memorialized in a Confirmatory Action Letter. Similarly, the Director denied Petitioners' third request, due both to the Haddam Neck facility being permanently shut down as well as other actions taken in response to identified deficiencies at the facility.

PARTIAL DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

On March 11, 1997, Ms. Rosemary Bassilakis submitted a petition pursuant to Title 10 of the *Code of Federal Regulations* section 2.206 (10 C.F.R. § 2.206) on behalf of the Citizens Awareness Network and the Nuclear Information and Resource Service (Petitioners) requesting that the NRC (1) commence enforcement action against the Connecticut Yankee Atomic Power Company (CY) by means of a large civil penalty to ensure compliance with safety-based radiological control routines; (2) modify CY's license for the Haddam Neck Plant, pursuant to 10 C.F.R. 2.202, to prohibit any decommissioning activity, which would include decontamination or dismantling, until CY manages to conduct routine maintenance at the facility without any contamination events occurring for at least 6 months; and (3) place the Haddam Neck Plant on the NRC Watch List.

In support of their requests, the Petitioners claimed that of particular concern was Northeast Utilities' inability to maintain proper radiological controls at the Connecticut Yankee (Haddam Neck) nuclear reactor. The Petitioners quoted an NRC press release describing continuing problems at the Haddam Neck facility, and stated that in their view the facility's management was making empty verbal assurances to the NRC that contamination problems were being properly controlled. The Petitioners also alleged that the NRC Confirmatory Action Letter (CAL) of March 4, 1997, discussing radiological controls at the Haddam Neck Plant, is clearly insufficient.

II. BACKGROUND

The NRC Staff shares the Petitioners' concerns regarding the failures of the Haddam Neck radiological controls program and has detailed these concerns in Inspection Reports 50-213/96-12 (Dec. 19, 1996) and 50-213/97-02 (Mar. 21, 1997), and in the aforementioned CAL (discussed in more detail below). In summary, these failures resulted in the unplanned exposure of two individuals, longstanding discrepancies in the calibration of several radiation monitors that are used to monitor and control radiological effluent releases, and the inadequate control of radioactive material that resulted in the undetected release of contaminated equipment to a nonlicensed vendor.

In response, the NRC has taken comprehensive and significant actions to resolve its concerns in the area of radiological controls, including the aforementioned CAL, a required Licensee response to the findings in Inspection Reports

96-12 and 97-02, a management meeting with the former CY management held at the NRC Region I office, and a second management meeting with the new CY management held on May 28, 1997, in the NRC Region I offices on these same issues. This second management meeting gave NRC regional and headquarters staff an opportunity to meet the new Haddam Neck management and confirm their commitment to resolve the above problems. The meetings were open to public observation. As indicated by the CAL, another meeting between the Region I Administrator and CY management will be held before any NRC determination that the issues noted in the CAL have been resolved. Meanwhile, under the CAL, the Licensee has agreed not to perform any radiological work except that required to maintain the plant in a safe configuration.

The CAL identifies four significant activities to which the Licensee has committed to bring its management and implementation of radiation control programs up to a standard acceptable to the NRC, as follows:

- (1) Identify, in writing, specific compensatory measures that CY will put in place to ensure sufficient management control and oversight of ongoing or planned activities that require radiological controls.
- (2) Hire an independent assessor to assess the quality and performance of the CY radiological control programs and their implementation.
- (3) By May 30, 1997, on the basis of the results of the independent assessment, (a) identify problems, determine root causes, and develop broad-based and specific corrective actions; (b) identify performance measures that may be used to determine the effectiveness of radiological control programs; and (c) submit a plan and schedule to the Regional Administrator, NRC Region I, for implementing improvements in the radiological control programs.
- (4) Before eliminating any interim compensatory measures (as committed to in the response to Item 1, above), meet with the Region I Administrator to describe program implementation and performance improvements achieved or planned.

With regard to CAL Item 1, above, the Licensee has identified and implemented compensatory measures (a) by limiting work in radiologically controlled areas to only work that is considered necessary, (b) requiring specific radiation work permits (RWPs) for more limited ranges of radiological work, and (c) placing additional controls on work requiring a specific RWP. CY also hired an independent assessor, Millennium Services Incorporated, to perform the required assessments, therefore completing CAL Item 2. The Licensee has most recently submitted a response in accordance with CAL Item 3, regarding improvements to its radiation protection program.

The primary objective of the Licensee's Radiation Protection Improvement Plan is to institute near- and long-term permanent improvements to the site Radiation Protection Program by establishing processes to:

- identify problems, root causes, improvement items/initiatives and associated corrective actions using site programs and processes;
- establish responsibility for corrective action implementation;
- prioritize and implement corrective actions using a logic scheme based on potential risk and/or critical facility decommissioning milestones (e.g., reactor coolant system decontamination, major component removal);
- track, trend, and report corrective action implementation using site programs and processes;
- verify corrective action adequacy and completeness in addressing the initial improvement initiative through monitoring and feedback;
- verify that completion of one or more identified corrective actions resolves the identified root cause; and
- document problem resolution, from identification through corrective action closure, using site programs and process.

The Licensee has scheduled completion of its plan to occur by the end of 1997.

A meeting with the Regional Administrator (CAL Item 4) is expected to occur before the end of 1997.

III. DISCUSSION OF PETITIONERS' REQUESTS

The first request was for a large civil penalty to ensure compliance with safety-based radiological control routines.

The NRC is currently considering enforcement action in regard to failed radiation program controls at the Haddam Neck Plant. Therefore, this request is deferred pending a decision on NRC action in this area.¹ After the NRC resolves these issues, the Petitioners will be informed through a future Director's Decision.

The Petitioners also requested that the NRC impose a 6-month moratorium on any decommissioning activities at Haddam Neck until the Licensee demonstrates its competence in avoiding contamination events while conducting necessary maintenance. This request is denied for the following reasons. Although contamination events may occur in the future, there is no reason to believe, based on previous semiannual environmental reports and annual exposure reports of plant workers, that 10 C.F.R. Part 20 dose limits will be exceeded at the Haddam Neck Plant. Additionally, an NRC Senior Resident Inspector is currently on site

¹ In a letter dated May 12, 1997, the NRC proposed a \$650,000 civil penalty against CY (EA-96-001 et al.) for violations found during inspections conducted between November 21, 1995, and November 22, 1996; the Licensee paid the civil penalty on June 11, 1997. Although the violations on which this civil penalty were based do not involve radiological controls, the May 12 action clearly demonstrates the NRC's resolve to impose significant civil penalties on a licensee when appropriate.

to monitor and inspect the Licensee's day-to-day performance. Furthermore, the CAL addresses the radiation protection program at Haddam Neck by focusing on the needed improvements in the Licensee's radiation control program and by ensuring NRC approval before any of the interim measures in Item 1 of the CAL are withdrawn.

The Petitioner's third request was that the NRC place Haddam Neck on the NRC Watch List. As a general policy, an operating plant is placed on the Watch List when a licensee's performance warrants NRC monitoring beyond that normally required by the NRC inspection program. In this case, the Haddam Neck Plant is permanently shut down and will not be returning to operation. Additionally, the NRC's inspection program has led to several actions being taken to respond to the deficiencies identified at Haddam Neck. As described above, these actions include the CAL, meetings with Licensee management to emphasize NRC expectations, a requirement to improve the radiation protection program, and retention of an onsite senior inspector to monitor Licensee performance. The NRC believes that, under these circumstances, the actions taken adequately protect public health and safety and that the current inspection program can appropriately monitor Licensee performance. Therefore, this request is denied.

IV. DECISION

For the reasons stated above, the petition is deferred in part and denied in part. The Decision and the documents cited in the Decision are available for public inspection and copying in the Commission's Public Document Room, the Gelman Building, 2210 L Street NW, Washington, DC.

In accordance with 10 C.F.R. § 2.206(c), a copy of the Decision will be filed with the Secretary of the Commission for the Commission's review. As provided by this regulation, the Decision will constitute the final action of the Commission 25 days after issuance, unless the Commission, on its own motion, institutes a review of the Decision within that time.

FOR THE NUCLEAR
REGULATORY COMMISSION

Samuel J. Collins, Director
Office of Nuclear Reactor
Regulation

Dated at Rockville, Maryland,
this 3d day of September 1997.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Samuel J. Collins, Director

In the Matter of

Docket Nos. 50-250

50-251

50-335

50-389

FLORIDA POWER & LIGHT
COMPANY(St. Lucie Nuclear Power Plant,
Units 1 and 2; Turkey Point Nuclear
Generating Plant, Units 3 and 4)

September 8, 1997

The Director of the Office of Nuclear Reactor Regulation has granted in part and denied in part a petition filed by Thomas J. Saporito, Jr., on behalf of himself and the National Litigation Consultants. The Petitioners requested that the NRC take certain actions with regard to Florida Power & Light Company (FPL), including taking escalated enforcement action against FPL and certain of its employees, granting the Petitioners an interview, and taking various other actions. As grounds for their request, the Petitioners asserted that the NRC's failure to take enforcement action against FPL on the basis of a Secretary of Labor's finding that FPL violated the Energy Reorganization Act (ERA) when it retaliated against Mr. Saporito for raising nuclear safety concerns has resulted in a "chilling effect" and continued discrimination against other FPL employees, that FPL and its managers are liable for creating a hostile work environment at FPL's Turkey Point facility and have failed to stop harassment of and discrimination against Mr. Saporito, and that the record in this case shows the direct participation of Mr. Saporito's "chain of command" in the retaliation against Mr. Saporito. With regard to the Petitioners' request for an interview, this has been granted; in all other respects the petition is denied.

ENERGY REORGANIZATION ACT: PROTECTED ACTIVITY

An employee may not be discriminated against by an employer for coming directly to the NRC with safety concerns. Nonetheless, an employee may also be required by the employer to bring these same concerns to the employee's management. Whether an employee must bring issues to licensee management is dependent on the facts of each specific case.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

By petition dated April 23, 1997 (as supplemented May 11 and May 17, 1997), pursuant to section 2.206 of Title 10 of the *Code of Federal Regulations* (10 C.F.R. § 2.206), Thomas J. Saporito, Jr., on behalf of himself and the National Litigation Consultants (Petitioners), requested that the Nuclear Regulatory Commission (Commission or NRC) take action with regard to operations at the Florida Power & Light Company's (FPL's or Licensee's) Turkey Point Station, Units 3 and 4, and St. Lucie Plant, Units 1 and 2. Specifically, the Petitioners requested that the Commission: (1) take enforcement action to modify, suspend, or revoke FPL's operating licenses for these facilities until FPL can sufficiently demonstrate that employees at FPL nuclear facilities are exposed to a work environment that encourages employees to freely raise safety concerns directly to the NRC without being required to first identify their safety concerns to the Licensee; (2) take escalated enforcement action in accordance with 10 C.F.R. § 2.202, because of discriminatory practices of the Licensee in violation of 10 C.F.R. § 50.7 and/or other NRC regulations, and that the enforcement action be retroactive to the initial occurrence of the violation by the Licensee; (3) conduct a public hearing through the Atomic Safety and Licensing Board and permit Petitioners leave to intervene to perfect an evidentiary record in consideration of whether the Licensee has violated NRC requirements and/or regulations; (4) require the Licensee to post a written notice alongside each NRC Form 3 currently posted at the Licensee's nuclear facilities that alerts employees that they can directly contact the NRC about nuclear safety concerns without first identifying the safety concerns to the Licensee; (5) require the Licensee to provide a copy of the posted communication to all employees and ensure that all employees are made aware of those communications through the Licensee's General Employee Training Program; and (6) require the Licensee to provide the NRC with written documents authored by Licensee officers under affirmation that the requirements described in items 4 and 5 have been fully complied with.

In the supplement of May 11, 1997, the Petitioners requested the imposition of a civil penalty in the amount of \$100,000 against each of three former FPL managers and that the NRC refer the matter of the conduct of these managers to the U.S. Department of Justice (DOJ) for consideration of invoking criminal proceedings.

In the supplement of May 17, 1997, the Petitioners requested imposition of a civil penalty in the amount of \$100,000 against each of six FPL employees and restriction of the licensed activities of these employees and revocation of their unescorted access to nuclear facilities; the imposition of a civil penalty in the amount of \$100,000 against the International Brotherhood of Electrical Workers (IBEW), and that the IBEW be required to inform its members in writing that they have the right to report safety concerns directly to the NRC without fear of retribution and that the IBEW encourages and supports such action at the discretion of its members; and the imposition of a civil penalty in the amount of \$100,000 against two named individuals characterized in the petition as Licensee agents or representatives of the Licensee. The Petitioners also requested investigations of "willful falsification" of a company business record and the cause of "transcripts found missing" in a Department of Labor (DOL) proceeding, and the referral of the matter of the conduct of the individuals and "entities" to the DOJ so that it can consider invoking criminal proceedings. Finally, it was requested that the NRC conduct an interview with the Petitioners regarding the substance of their section 2.206 petition.

By letter dated June 14, 1997, I informed the Petitioners that, pursuant to section 2.206 of the Commission's regulations, the petition, as supplemented, had been referred to me and that action on their requests would be taken in a reasonable amount of time. I further informed the Petitioners that, with regard to their request for a meeting with the NRC Staff, they could call to arrange a suitable day and time for such a meeting.

On May 27, 1997, FPL responded to the petition. In its response, the Licensee maintained that it was strongly committed to maintaining a work environment in which employees are free to raise nuclear safety concerns directly to the NRC and that the petition lacked any factual basis and should be denied.

In response to the Petitioners' request for an "interview" regarding their petition, the NRC Staff held a public meeting with Mr. Saporito on July 14, 1997. During the meeting, Mr. Saporito elaborated upon the bases for the petition and stated his concerns about reporting nuclear safety issues at the St. Lucie plant should the DOL Administrative Law Judge (ALJ) order his reinstatement

as an employee of FPL.¹ During the meeting, Mr. Saporito also raised what he asserted were certain improprieties that occurred during the DOL hearing and specifically requested that the NRC investigate an additional concern that the Licensee or its attorneys may have "whited out" a page of a document he had requested during the DOL proceeding. Mr. Saporito stated that he was adding this request to the petition.

On August 13, 1997, FPL submitted an additional response to the petition. In this response, FPL stated that it was responding in opposition to the supplemental petitions filed by the Petitioners dated May 11 and May 17, 1997, and to assertions made by Mr. Saporito during the July 14, 1997 public meeting.

II. BACKGROUND

As a basis for the requests described above, the Petitioners asserted in their Petition of April 23, 1997, that the NRC's failure to take enforcement action against the Licensee on the basis of the Secretary of Labor's finding that FPL violated the Energy Reorganization Act (ERA) when it discharged an employee (i.e., Mr. Saporito) for raising safety concerns has resulted in a "chilling effect" at FPL and continued discrimination against employees by FPL in violation of section 50.7.² In addition, in the Petitioners' Supplement of May 11, 1997, to their petition, they asserted that Mr. Saporito's "Damages Brief" in the DOL proceeding mentioned above established that the Licensee and its managers are liable for creating a hostile work environment at Turkey Point and have failed to

¹In response to this concern, the Staff referred Mr. Saporito to 10 C.F.R. § 50.7 and various NRC policy statements and other documents that describe the protection to individuals who raise nuclear safety concerns to the NRC or to their employers, and offered to provide Mr. Saporito copies of relevant documents. The Staff provided Mr. Saporito these documents by letter dated July 28, 1997.

²This proceeding, DOL Case 89-ERA-7 and 89-ERA-17 (hereafter 89-ERA-7/17), involved two complaints by Mr. Saporito in which he alleged, respectively, that he was disciplined and harassed in retaliation for engaging in protected activity and that he was discharged for engaging in protected activity. On June 30, 1989, a DOL ALJ issued a Recommended Decision and Order Denying Complaint, which dismissed both cases. Among other things, the ALJ found that FPL had legitimately terminated Mr. Saporito for acts of insubordination, which included Mr. Saporito's refusal to reveal safety concerns to the Licensee and his insistence that he raise them to the NRC instead. In a Decision and Remand Order issued June 3, 1994, the Secretary held that an employee who refuses to reveal his safety concerns to management and asserts his right to bypass the "chain of command" to speak directly with the NRC is engaging in protected activity and remanded the case to the ALJ to review the record in light of this decision and submit a new recommendation to the Secretary as to whether FPL would have discharged Mr. Saporito for unprotected aspects of his conduct. By letter to the Secretary of Labor from then NRC Chairman Ivan Selin, the NRC expressed concern about the Secretary's broad statement, noting that licensees, not the NRC, are in the best position to deal effectively with safety concerns. In a subsequent order issued February 16, 1995, denying reconsideration of his June 3 decision, the Secretary clarified his June 3 decision by stating that it would not be accurate to interpret the decision as providing an employee an "absolute right" to refuse to report safety concerns to the plant operator. Rather, the Secretary stated that the right of an employee to protection for bringing information directly to the NRC and his duty to inform management of safety concerns are independent and do not conflict but that the employer's motivation should be reviewed on a case-by-case basis, pursuant to a "dual-motive" analysis, to ensure that the employer would have taken the same action regardless of whether an employee insisted on his right to speak first to the NRC. The Secretary specifically noted that his June 3 Order had not decided the ultimate question regarding the appropriate outcome of the dual-motive analysis to the facts of this case.

stop harassment and discrimination against Mr. Saporito. The Petitioners further stated that the record in this case contains evidence showing direct participation of Mr. Saporito's "chain of command" in the retaliatory actions taken against Mr. Saporito.

In their Supplement of May 17, 1997, to the petition, the Petitioners asserted that certain pleadings and transcripts in this DOL proceeding set out a chronology of events surrounding missing record transcripts and the falsification of a Licensee company business record and establish that Licensee employees and union members played a role in discriminating against Mr. Saporito. The Petitioners further stated that additional evidence exists that necessitated a meeting between the NRC and the Petitioners.

III. DISCUSSION

Because of the numerous requests and interrelated nature of the issues raised and the bases provided by the Petitioners, the requests in the petition and supplements previously described have been considered together and are categorized as follows: (1) NRC should take escalated enforcement action against the Licensee and certain individuals employed by the Licensee and refer this matter to the DOJ; (2) NRC should take escalated enforcement and other action against the IBEW; (3) NRC should initiate investigations into matters regarding the DOL proceeding, including willful falsification of a company business record, willful falsification of the DOL transcript, and alleged "whiting out" of a page of a document by the Licensee's attorneys; and (4) miscellaneous requests.

1. Petitioners' Request for Enforcement Action Against the Licensee and Certain Employees of the Licensee

As previously stated, the Petitioners request that the NRC take enforcement action to modify, suspend, or revoke FPL's operating licenses until FPL can sufficiently demonstrate that employees at FPL's nuclear facilities are "exposed to a work environment" that encourages these employees to freely raise safety concerns directly to the NRC without being required to first identify their safety concerns to the Licensee. In addition, the Petitioners request that the NRC take escalated enforcement action against the Licensee because of the Licensee's discriminatory practices in violation of section 50.7 and that this enforcement action be retroactive to the initial occurrence of the violation by the Licensee.

As a basis for this request, the Petitioners assert that the Secretary of Labor found in 89-ERA-7/17 that FPL violated the ERA when it discharged Mr. Saporito but that the NRC failed to take any enforcement action against the

Licensee for this violation, and that as a direct result of the NRC's failure to take such action, a "chilling effect" was instilled at the Licensee's facilities that continues to dissuade employees from raising safety concerns. The Petitioners cite numerous cases in support of their assertion that the Licensee has continued to discriminate against employees who engage in protected activity.

This request is similar to a request made by Mr. Saporito in an earlier petition, which was addressed in a Director's Decision issued on May 11, 1995 (DD-95-7, 41 NRC 339). As previously described herein, and as explained in DD-95-7, contrary to the Petitioners' assertion, the Secretary of Labor has not yet made a finding on the merits in 89-ERA-7/17 as to whether the Licensee violated the ERA in discharging Mr. Saporito. Rather, in an order issued on June 3, 1994, the Secretary directed the ALJ to submit a new recommendation on whether FPL would have discharged Mr. Saporito absent his engaging in protected activities. Therefore, the Order of June 3, 1994, does not constitute a final decision by the Secretary of Labor, and because there is no DOL finding of discrimination, there is no basis to justify enforcement action by the NRC at this time.³ As further explained in that Director's Decision, the NRC will monitor the DOL proceeding and determine on the basis of further DOL findings and rulings whether enforcement action against the Licensee is warranted.

With regard to the Petitioners' assertion that the NRC's failure to take enforcement action has resulted in a "chilling effect" at the Licensee's facilities, the Petitioners have offered no evidence to substantiate this claim. Over the past 2 years (July 1995-June 1997), eighty-nine allegations from FPL employees or contractors have been submitted to the NRC, of which six have been allegations related to discrimination. Of these allegations, the Staff was unable to evaluate two allegations because the alleged would not reveal his or her identity. With regard to the remaining allegations, in two cases, discrimination was not substantiated. The remaining two allegations are still being evaluated. Should these allegations be substantiated, the NRC will determine at that time whether enforcement action against the Licensee is warranted. Nonetheless, even if these allegations are substantiated, there is presently no indication that there has been a "chilling effect" at the Licensee's facilities. The NRC Staff has conducted inspections of FPL's Nuclear Safety Speakout Program (Employees Concerns Program) and has examined the safety-conscious work environment at FPL's nuclear facilities. The results of the last two inspections, conducted in April-May 1996 and June 1997,⁴ indicate that the Speakout Program has been effective in handling and resolving individuals' concerns. The Speakout

³ As of this date, the ALJ has not issued a new Recommended Decision.

⁴ NRC Inspection Reports 50-250/96-05, 50-251/96-05, 50-335/96-07, and 50-389/96-07, dated May 31, 1996, and 50-335/97-08 and 50-389/97-08, dated July 16, 1997.

Program has been readily accessible, and employees are familiar with the various avenues available by which to express their concerns.

The Petitioners have relied upon 89-ERA-7/17 and eight additional cases to demonstrate both widespread discrimination by FPL against its employees and a lack of NRC enforcement action to deal with this alleged discrimination.⁵ With regard to 89-ERA-7/17, as previously stated, no final determination that discrimination occurred has yet been made by DOL. A close examination of the remaining cases does not support Petitioners' assertion that the NRC's "lax attitude" caused a pattern and practice of discrimination at FPL's nuclear facilities. All of the cases cited by the Petitioners, except for two cases (*Pillow v. Bechtel*, 87-ERA-35, and *Diaz-Robainas v. FPL*, 92-ERA-10), were either settled, voluntarily dismissed at the request of the complainant, or otherwise dismissed by DOL before a final determination was made by the Secretary of Labor. Two of the cases relied upon by the Petitioners did not involve FPL, but other companies (and one of these cases did not involve matters under NRC

⁵ The other eight cases and their disposition are as follows:

(1) *Pillow v. Bechtel*, 87-ERA-35: The Secretary found that discrimination by Bechtel had occurred and ordered compensation for damages. The NRC issued Notices of Violation on February 11, 1994, to FPL and Bechtel, for violations that occurred in 1987 and that were based on both 87-ERA-35 and 87-ERA-44 (EA 93-199 and EA 93-200).

(2) *Diaz-Robainas v. FPL*, 92-ERA-10: Although the Secretary of Labor found that discrimination occurred, he remanded the case to the ALJ for a determination of the appropriate remedy, so that the Secretary's decision was not a final decision by DOL. The case settled before the ALJ issued his decision. The NRC issued a Notice of Violation and Proposed Civil Penalty of \$100,000 against FPL for the violation, which occurred in 1992 (EA 96-051). The Licensee paid the civil penalty on December 3, 1996.

(3) *Phipps v. FPL*, 95-ERA-53: The DOL Wage and Hour Assistant Area Director concluded that Mr. Phipps' engaging in protected activities was a factor in FPL's decision to prohibit him from working during plant outages. FPL appealed the decision, and a hearing was scheduled before a DOL ALJ. Before the hearing, the parties entered into a settlement agreement. A final DOL Order, dated February 21, 1996, dismissed the case with prejudice on the basis of a voluntary stipulation by the parties. There was no finding for discrimination by DOL.

(4) *Dysert v. FPL*, 92-ERA-26: The DOL Wage and Hour Area Director determined that there was no discrimination. The complainant appealed, but then requested that the case be dismissed prior to a determination by an ALJ as to whether discrimination occurred. A final order affirming the dismissal of the complaint was issued by the Secretary on June 28, 1993.

(5) *Kleiman v. FPL*, 91-ERA-50: The DOL Wage and Hour Area Director determined that there was no discrimination. The complainant appealed, but then requested that the case be dismissed prior to a determination by an ALJ as to whether discrimination occurred. A final order affirming the dismissal of the complaint was issued by the Secretary on February 21, 1992.

(6) *Young v. FPL*, 93-ERA-30: The DOL Wage and Hour Area Director determined that there was no discrimination. The complainant appealed, but then requested that the case be dismissed prior to a determination by an ALJ as to whether discrimination occurred. A final order affirming the dismissal of the complaint was issued by the Secretary on July 13, 1995.

(7) *Fry v. Atlantic Construction Fabrics, Inc.*, 96-STA-7: This case did not involve FPL or any NRC licensee, did not involve the raising of nuclear safety concerns or any other matters under NRC jurisdiction, and did not arise under the Energy Reorganization Act, but under the Surface Transportation Act.

(8) *Collins v. FPL*, 91-ERA-47 (actually *Collins v. FPC*): The Secretary of Labor issued an order on May 15, 1995, finding that no discrimination occurred. In addition, the respondent in this case was actually Florida Power Corporation, not FPL.

jurisdiction). With regard to *Pillow*, the discrimination that was the subject of this case occurred before the case involving Mr. Saporito. Therefore, such discrimination is neither indicative of FPL's current performance nor could it have resulted from the lack of NRC's enforcement action in the present case.⁶ The only additional cases cited by the Petitioners in which any finding was made by DOL that discrimination occurred were *Phipps v. FPL*, 95-ERA-53, and *Diaz-Robainas*. In *Phipps*, the DOL Wage and Hour Assistant Area Director concluded that Mr. Phipps' engaging in protected activities was a factor in FPL's decision to prohibit him from working during plant outages. FPL appealed the decision; however, the case was dismissed on the basis of a voluntary stipulation by the parties prior to a hearing before an ALJ. The NRC Office of Investigations investigated this case and did not substantiate that discrimination had occurred. In the *Diaz-Robainas* case, the Secretary of Labor did determine that discrimination had occurred. This one example, however, for which the NRC took appropriate enforcement action,⁷ does not support the Petitioners' assertion that the NRC has a "lax attitude" which has caused a pattern or practice of discrimination at FPL's facilities.

For all of these reasons, the Petitioners have not set forth a sufficient basis that would warrant that the NRC take escalated enforcement action against the Licensee at this time. Therefore, this request by the Petitioners is denied.

The Petitioners also request that the NRC impose a civil penalty in the amount of \$100,000 against each of three former FPL managers; a civil penalty in the amount of \$100,000 against six current FPL employees and restriction of the licensed activities of these employees and revocation of their unescorted access to nuclear facilities; and a civil penalty in the amount of \$100,000 against two named individuals characterized in the petition as Licensee "agents" or "representatives." As a basis for this request, the Petitioners allege that these individuals were involved in the discrimination against Mr. Saporito, which is the subject of DOL Case 89-ERA-7/17. Because a final determination has not been made by DOL or NRC that discrimination occurred against Mr. Saporito, the requested enforcement action against these individuals is not warranted at this time.

In addition, the Petitioners request that the NRC refer the matter of the conduct of various FPL managers and other individuals and "entities" (i.e., the Licensee and the IBEW) to the DOJ so that it can consider invoking criminal

⁶ In addition, the NRC has taken enforcement action in the *Pillow* case. See note 5.

⁷ As noted in note 5, the NRC issued a Notice of Violation and Proposed Civil Penalty of \$100,000 to FPL for this violation.

proceedings against these persons and entities.⁸ As discussed in this section, DOL has not made a final determination in this case as to whether discrimination occurred. Therefore, the Petitioners' request is denied pending a final decision by DOL as to whether discrimination occurred in DOL Case 89-ERA-7/17. The NRC will monitor the DOL proceeding on remand to the ALJ and determine on the basis of further DOL findings and rulings in this case whether a violation of NRC requirements has occurred, whether enforcement action against the Licensee or its employees is warranted, and whether this matter warrants referral to the DOJ.

2. Petitioners' Request for Action Against the IBEW

The Petitioners request that the NRC impose a civil penalty in the amount of \$100,000 against the IBEW and that the IBEW be required to inform its members in writing that they have the right to report safety concerns directly to the NRC without fear of retribution and that the IBEW encourages and supports such action at the discretion of its members.

The Petitioners request that the NRC take such action because they allege that IBEW officials conspired with FPL management to have Mr. Saporito's site access revoked at Turkey Point Station. The basis for this request was clarified at the meeting between Mr. Saporito and the NRC Staff on July 14, 1997. During that meeting, Mr. Saporito stated that two Licensee officials testified during the DOL hearing that a comment was made by union officials to Licensee management that Mr. Saporito could potentially sabotage the plant, and that, as a result of that comment, his access to the site was revoked.

The testimony of these Licensee officials is a part of the record that is currently before the DOL ALJ. As previously stated, the NRC will monitor the DOL proceeding on remand to the ALJ and determine on the basis of further DOL findings and rulings in this case whether any violation of NRC requirements has occurred that would warrant enforcement action by the NRC. For this reason, this request by the Petitioners is denied.

3. Petitioners' Request for Initiation of NRC Investigations

The Petitioners request that the NRC investigate the "willful falsification" of a company business record and the cause of "transcripts found missing" in the

⁸The Petitioners assert as a basis for their request that enforcement action be taken against Licensee employees and union officials that certain pleadings they have filed in the DOL case, as well as transcript records, provide evidence of retaliation by these individuals. It should be noted that the pleadings and transcripts in a DOL proceeding are not, by themselves, conclusive that discrimination occurred.

DOL proceeding.⁹ During the meeting held with the NRC on July 14, 1997, Mr. Saporito also raised what he asserted were certain improprieties that occurred during the DOL hearing and specifically requested that the NRC investigate an additional concern that the Licensee or its attorneys may have "whited out" a page of a document he had requested during the DOL proceeding. Mr. Saporito stated that he was adding this request to his petition.

This matter relates solely to the conduct of a DOL proceeding. The NRC Staff has, therefore, referred these issues to DOL. The Petitioners' request that the NRC investigate these matters is denied.

4. Other Petition Issues

The Petitioners request that the NRC require the Licensee to post a written notice alongside each NRC Form 3 currently posted at the Licensee's nuclear facilities that alerts employees that they can directly contact the NRC about nuclear safety concerns without first identifying the safety concerns to the Licensee. In addition, the Petitioners request that the NRC require the Licensee to provide a copy of this posted communication to all employees and ensure that all employees are made aware of those communications through the Licensee's General Employee Training Program. Finally, the Petitioners request that the NRC require the Licensee to provide the Commission with documents authored by an officer of the Licensee under affirmation affirming that the Licensee has complied with these requests.

This request is similar to a request made by Mr. Saporito in a petition filed on March 8, 1995, and responded to in a Director's Decision issued on May 25, 1995 (DD-95-8, 41 NRC 346 (1995)). In that petition, Mr. Saporito requested that each Licensee be required to report to the Commission under oath or affirmation that it had completed a review of its station operating procedures to determine whether those procedures included restrictions that would prevent an employee from bringing safety concerns directly to the NRC and that it had communicated to its employees that they were free to bring concerns directly to the NRC without following the normal chain of command. As explained in that Director's Decision, the Secretary of Labor did not hold in his Decision of June 3, 1994, that employees have an "absolute right" to refuse to inform licensee management of public health and safety concerns and to bypass the licensee's

⁹ Mr. Saporito elaborated on these alleged falsifications at the meeting held on July 14, 1997. Specifically, Mr. Saporito asserted, with regard to the missing transcript pages, that 20 pages containing testimony by the Licensee's vice president were missing from the initial copy of the transcript that he was provided (although the record was eventually amended to contain these pages). With regard to the falsification of a business record, he asserted that minutes of a meeting held between him and Licensee officials did not accurately reflect the real reason that his site access was being revoked; that is, that union officials had told Licensee management officials that he might sabotage the plant.

management in order to bring safety concerns directly to the NRC. Although an employee may not be discriminated against by the employer for coming directly to the NRC with safety concerns, an employee may also be required by the employer to bring these same concerns to the employee's management. Whether an employee must bring issues to licensee management is dependent on the facts of each specific case.

As further explained in DD-95-8, the NRC requires in 10 C.F.R. § 19.11(c) that all licensees and applicants for a specific license post NRC Form 3, "Notice to Employees," which describes employee rights and protections. In addition, section 50.7 and associated regulations were amended in 1990 to prohibit agreements and/or conditions of employment that would restrict, prohibit, or otherwise discourage employees from engaging in protected activity. Finally, in November 1996, the NRC issued a brochure, "Reporting Safety Concerns to the NRC" (NUREG/BR-0240), which provided information to nuclear workers on how to report safety concerns to the NRC, the degree of protection that was afforded the worker's identity, and the NRC process for handling a worker's allegations of discrimination. These measures are sufficient to (1) alert employees in the nuclear industry that they may take their concerns to the NRC and (2) alert licensees that they shall not take adverse action against an employee who exercises the right to take concerns directly to the NRC.

The NRC Staff believes that these existing requirements for posting and making other information available to workers are adequate. The Petitioners have not provided a sufficient basis for requiring their suggested additional measures. Therefore, Petitioners' requests related to a supplemental posting are denied.

As previously stated, a public meeting was held with Mr. Saporito enabling him to fully present information regarding the issues raised in the petition. In addition, the NRC will monitor the DOL proceeding referenced in the petition to determine whether there has been a violation of NRC regulations. In view of these facts, there is no basis to hold any hearing at this time. Therefore, the Petitioners' requests related to a public hearing are denied.

III. CONCLUSION

For the reasons discussed above, no basis exists for taking the enforcement actions requested in the petition and its supplements. Nonetheless, as previously described, on July 14, 1997, a public meeting was held between Mr. Saporito and representatives of the NRC Staff, the purpose of which was to provide Mr. Saporito with the opportunity to provide additional information regarding the substance of this petition. Therefore, to the extent that the Petitioners have requested that the NRC conduct an interview with the Petitioners regarding the

substance of their section 2.206 petition, the petition has been granted. With regard to all other aspects of the petition, the petition has been denied.

A copy of this Decision will be filed with the Secretary of the Commission for the Commission to review in accordance with 10 C.F.R. § 2.206(c). As provided by that regulation, the Decision will constitute the final action of the Commission 25 days after issuance, unless the Commission, on its own motion, institutes a review of the Decision within that time.

FOR THE NUCLEAR
REGULATORY COMMISSION

Samuel J. Collins, Director
Office of Nuclear Reactor
Regulation

Dated at Rockville, Maryland,
this 8th day of September 1997.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Samuel J. Collins, Director

In the Matter of

Docket Nos. 50-245

50-336

50-423

50-213

(License Nos. DPR-21

DPR-65

NPF-49

DPR-61)

NORTHEAST UTILITIES

(Millstone Nuclear Power Station,

Units 1, 2, and 3;

Haddam Neck Plant)

September 12, 1997

The Director, Office of Nuclear Reactor Regulation, issues a Partial Director's Decision, responding to a variety of requests made in a petition filed by the Citizens Awareness Network (CAN) and the Nuclear Information and Resource Service (NIBS), hereinafter referred to as Petitioners. Petitioners' requests were directed at Northeast Utilities (NU) and specifically its operation of its nuclear facilities in Connecticut. Petitioners' requests for relief included immediate suspension or revocation of NU's licenses, continued shutdown of NU facilities, continued listing of NU facilities on the NRC's Watch List, limitations on precommissioning or decommissioning of any NU facility, and investigations by the NRC into asserted wrongdoing on the part of NU.

The Director deferred Petitioners' requests concerning asserted NU wrongdoing until NRC Staff consideration of this issue is completed. A Final Director's Decision will then be issued. With regard to Petitioners' remaining requests, those requests were granted or denied in whole or in part as set forth in the Partial Director's Decision.

PARTIAL DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

On November 25, 1996, as amended on December 23, 1996, Ms. Deborah Katz and Mr. Paul Gunter filed a petition on behalf of the Citizens Awareness Network (CAN) and the Nuclear Information and Resource Service (NIRS), hereafter referred to as Petitioners. These two submittals will hereafter be referred to as the petition. The petition was filed with the U.S. Nuclear Regulatory Commission (NRC) and the NRC Executive Director for Operations pursuant to section 2.206 of Title 10 of the *Code of Federal Regulations* (10 C.F.R. § 2.206).

The Petitioners requested that the NRC take the following actions: (1) immediate suspension or revocation of Northeast Utilities' (NU's or Licensee's) licenses to operate its nuclear facilities in Connecticut; (2) investigation of possible NU material misrepresentations to the NRC; (3) continued shutdown of the NU facilities until the Department of Justice completes its investigation and the results are reviewed by the NRC; (4) continued shutdown until the NRC evaluates and approves NU remedial actions; (5) continued listing of the NU facilities on the NRC's Watch List should any facility resume operation; (6) prohibition of any predecommissioning or decommissioning activity at any NU nuclear facility in Connecticut until NU and the NRC take certain identified steps to ensure that such activities can be safely conducted; (7) initiation of an investigation into how the NRC allowed the asserted illegal situation at NU's nuclear facilities in Connecticut to exist and continue for more than a decade; and (8) an immediate investigation of the need for enforcement action for alleged violation of 10 C.F.R. Part 50, Appendix B.¹

The bases for the Petitioners' assertions are NU and NRC inspection findings and NU documents referred to in the petition and a VHS videotape, Exhibit A, which accompanied the petition. No new information regarding Licensee activities was provided by the Petitioners except for the alleged violation referred to in Request 8. The Petitioners assert, in Request 8, that NU relied partly on draft calculations in its presentation at a public predecisional enforcement conference with the NRC Staff, which included a discussion of an event at the Haddam Neck Plant. The Petitioners further assert that the calculations had not

¹ Petitioners requested copies of the Licensee's calculations performed in response to the event at the Haddam Neck Plant that resulted in the introduction of a nitrogen bubble into the reactor vessel. The calculations requested were discussed during a predecisional enforcement conference held on December 4, 1996. The calculations were provided to the Petitioners on July 21, 1997.

been reviewed and approved in accordance with the requirements of Part 50, Appendix B.

The areas of concern identified in the petition include inadequate surveillance testing, operation outside the design as specified in the updated Final Safety Analysis Report (UFSAR), inadequate radiological controls, failed corrective action processes, and the degraded material condition of the plants. The Petitioners also assert that this information demonstrates that there are inadequate quality assurance programs at NU's nuclear facilities in Connecticut, that NU has made material false statements regarding its Millstone units, and that safe decommissioning of the Haddam Neck Plant is not possible given the defective nature of the design and licensing bases for the facility. The videotape records an August 29, 1996 Citizens Regulatory Commission televised interview of a former Millstone Station employee expressing his views on NU management. The tape has been transcribed and placed on the dockets of the facilities cited. The videotape interview included the former employee's views relating to NU's poor management in allowing degradation of the material condition of the plant; poor radwaste practices resulting in potential radiation exposure to employees; and harassment, intimidation, and subsequent illegal termination of employees raising safety concerns.

On January 23, 1997, the NRC acknowledged receipt of the petition and informed the Petitioners that the petition had been assigned to the Office of Nuclear Reactor Regulation to prepare a response and that action would be taken within a reasonable time regarding the specific concerns raised in the petition. The Petitioners were also informed that the requests for immediate action were denied. The Petitioners were further informed that copies of the petition and videotape were sent to the NRC's Office of the Inspector General (OIG) in response to Petitioners' Request 7 and parts of Requests 5, 6, and 8.

II. DISCUSSION

The NRC Staff has reviewed the petition and, with the exception of Request 8, has not identified any new information regarding either the Millstone or the Haddam Neck facilities. Both of the facilities have been the subject of close NRC scrutiny for several years.

A. Millstone Facility

With regard to the Millstone units, the NRC Staff has been concerned for the last several years about the number and duration of violations at the Millstone site in the broad programmatic areas of design and licensing bases, testing, and radiological controls. Programmatic concerns in these areas, along with

concerns in other areas, were major contributors to the decline in performance at the Millstone site. In the most recent systematic assessment of licensee performance (SALP) report of August 26, 1994, the NRC Staff stated in the cover letter that it had noted several performance weaknesses, common to all three Millstone units. Among these were continuing problems with procedure quality and implementation, the informality in several maintenance and engineering programs (contributing to instances of poor performance), and the failure to resolve several longstanding problems at the site. In addition to these programmatic problems, the Licensee has had significant problems in dealing with employee concerns involving safety issues at the site.

On November 4, 1995, the Licensee shut down Millstone Unit 1 for a scheduled refueling outage. The NRC sent a letter to the Licensee on December 13, 1995, requiring the Licensee, before restarting Millstone Unit 1, to inform the NRC, pursuant to section 182a of the Atomic Energy Act of 1954, as amended (the Act), and 10 C.F.R. § 50.54(f), of the actions taken to ensure that in the future the Licensee would operate that facility according to the terms and conditions of the unit's operating license, the Commission's regulations, and the unit's FSAR.

In January 1996, the NRC designated the three Millstone units as Category 2 on the NRC's Watch List. Plants on the Watch List in this category have weaknesses that warrant increased NRC attention until the licensees demonstrate improved performance for an extended period of time.

On February 20, 1996, the Licensee shut down Millstone Unit 2 when it declared both trains of the high-pressure safety injection (HPSI) system inoperable because of a design issue. There was a potential that the HPSI throttle valves could become plugged with debris when taking suction from the sump during recirculation mode.

On March 30, 1996, the Licensee shut down Millstone Unit 3 after finding that containment isolation valves for the auxiliary feedwater turbine-driven pump were inoperable because the valves did not meet NRC requirements. In response to a Licensee root-cause analysis of inaccuracies in the Millstone Unit 1 FSAR, identifying the potential for similar configuration control problems at Millstone Units 2 and 3 and the existing design configuration issues identified at these units, the NRC issued section 50.54(f) letters to the Licensee on March 7 and April 4, 1996. These letters required that the Licensee inform the NRC of the corrective actions taken regarding design configuration issues at Millstone Units 2 and 3 before the restart of each unit.

In June 1996, the NRC designated the three units at Millstone as Category 3 on the NRC's Watch List. Plants in this category have significant weaknesses that warrant maintaining them in a shutdown condition until the Licensee can demonstrate to the NRC that it has both established and implemented adequate

corrective actions to ensure substantial improvement. This category also requires Commission approval before operations can be resumed.

On August 14, 1996, the NRC issued a Confirmatory Order directing the Licensee to contract with a third party to implement an Independent Corrective Action Verification Program (ICAVP) to confirm the adequacy of its efforts to reestablish the design basis and configuration controls for each of the three Millstone units. The ICAVP is intended to provide additional assurance, before a unit restart, that the Licensee has identified and corrected existing problems in the design and configuration control processes for that unit.

On April 16, 1997, the NRC issued another section 50.54(f) letter, which superseded the previously mentioned section 50.54(f) letters and consolidated its requests for information and periodic updates. The information requested included: (1) the identification of significant items needed to be accomplished before restart; (2) identification of items to be deferred until after restart; (3) NU's process and rationale for deferring items; and (4) a description of the actions taken by NU to ensure that future operation will be conducted in accordance with the terms and conditions of the operating licenses, the Commission's regulations, and the FSARs. The Licensee provided the initial information requested by letter dated May 29, 1997. Additional information and updates will be provided in accordance with the time intervals specified in the section 50.54(f) letter.

During eight NRC inspections conducted between October 1995 and August 1996, more than sixty apparent violations of NRC requirements were identified at the Millstone site. These apparent violations were discussed at a public predecisional enforcement conference held at the Millstone site on December 5, 1996. During the meeting, the Licensee stated that management failed to provide clear direction and oversight, performance standards were low, management expectations were weak, and station priorities were inappropriate. The NRC Staff is nearing completion of its evaluation of potential enforcement action to address these apparent violations and their overall impact on the safe operation of the Millstone units.

Additionally, the Licensee has had a chronic problem of not dealing effectively with employee concerns at the Millstone site. On December 12, 1995, the NRC established a review group to conduct an independent evaluation of the history of the Licensee's handling of employee concerns related to licensed activities at the Millstone facility. The review group determined that, in general, an unhealthy work environment, which did not tolerate dissenting views and did not welcome or promote questioning attitudes, has existed at the Millstone facility for the last several years. To address this problem, the NRC issued an order on October 24, 1996, that directed NU to devise and implement a comprehensive plan for handling safety concerns raised by Millstone employees and to ensure an environment free from retaliation or discrimination. In addition,

the order required NU to have an independent third party oversee its employee concerns program. The third party is responsible for providing periodic reports to NU and the NRC detailing its findings and recommendations. The third-party findings and the NU responses to them will be assessed by the NRC Staff for any restart issues.

The NRC regards compliance with regulations, license conditions, and Technical Specifications (TSs) as mandatory. However, the NRC also recognizes that plants will not operate trouble-free.² This is clearly articulated in Criterion XVI, Appendix B, Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." Criterion XVI states that "[m]easures shall be established to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

The appropriate response to an identified deficiency can and should vary, depending on the safety significance of the deficiency. For example, for rapidly developing situations, when prompt action is required to ensure that plants are not in an unsafe condition, automatic safety systems are in place to shut down the reactor. In other, less time-critical situations, TSs relating to structures, systems, and components (SSCs) vital to the safe operation of a nuclear plant require that specific actions be taken within a predetermined time period when the SSC is determined to be inoperable. The time period is dependent on the safety significance of the SSC. NRC Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," provides guidance for licensees to determine what actions are required and when they need to be taken for identified degraded or nonconforming conditions.

The conduct of NRC regulatory oversight at the Millstone site is based on the recognition that it is the Licensee's primary responsibility to demonstrate that corrective actions have been effectively implemented. Thus, the Licensee must determine that a unit is in conformance with applicable NRC regulations, its license conditions, and its FSAR and that applicable licensing commitments have

² The NRC's approach to protecting public health and safety includes the philosophy of defense-in-depth, which supports the identification and correction of degraded or nonconforming conditions discussed above. Briefly stated, this philosophy (1) requires the application of conservative codes and standards, to establish substantial safety margins in the design of nuclear plants; (2) requires high quality in the design, construction, and operation of nuclear plants to reduce the likelihood of malfunctions, and promotes the use of automatic safety system actuation features; (3) recognizes that equipment can fail and operators can make mistakes and therefore requires redundancy in safety systems and components to reduce the chances that malfunctions or mistakes will lead to accidents that release fission products from the fuel; and (4) recognizes that, in spite of these precautions, serious fuel-damage accidents can happen and therefore requires containment structures and safety features to prevent the release of fission products. In the unlikely event of an offsite fission-product release, emergency plans are in place to provide reasonable assurance that protective actions can and will be taken to protect the population around nuclear power plants. These emergency plans are coordinated with local and state officials and the Federal Emergency Management Agency.

been met before the NRC Staff can recommend that the Commission approve the restart of any unit. The Licensee's conformance with NRC regulations, license conditions, and licensing commitments is fundamental to NRC's confidence in the safety of licensed activities. In short, the Licensee has the primary responsibility for the safe operation of its facilities.

In a June 20, 1996 letter to the NRC, the Licensee described its Configuration Management Plan (CMP), which is its principal program to provide reasonable assurance that weaknesses at the Millstone units have been effectively corrected. The CMP includes efforts to understand and correct the licensing and design-bases issues that led the NRC to issue the section 50.54(f) letters and order actions to prevent recurrence of those issues. The Licensee stated that the objective of the CMP was to document and meet the licensing and design-bases requirements of each unit and to ensure that adequate programs and processes are in place to maintain control of these requirements.

The Licensee's CMP must either correct each FSAR deficiency or evaluate it to ensure that the change to the facility does not involve any unreviewed safety question or change to the facility TSs. NU has documented a large number of deficiencies, which vary in scope and safety significance for each unit. These lists contain significant deficiencies that must be corrected before restart and others that the Licensee is planning to correct after the restart. In its continuing reviews of the deficiency lists, the NRC Staff will determine whether the Licensee has appropriately scheduled safety-significant items for completion before restart and whether those items that the Licensee will defer until after restart are appropriate for each unit. The results of these efforts will be documented in NRC inspection reports.

The NRC's regulatory oversight of the Licensee's corrective actions requires extensive planning and program integration. To focus more regulatory attention on all of the restart issues related to the Millstone units, the NRC has established a Special Projects Office (SPO) within the Office of Nuclear Reactor Regulation to oversee these activities. The SPO has developed a comprehensive and multifaceted oversight program to verify the adequacy of NU's corrective actions, programs, and processes. The breadth and significance of the problems identified at the Millstone site require this program. The SPO has developed a Restart Assessment Plan (Assessment Plan) for each of the Millstone units, which includes: (1) the appropriate aspects of NRC Inspection Manual, Manual Chapter (MC) 0350, "Staff Guidelines for Restart Approval"; (2) oversight of NU's ICAVP; and (3) oversight of NU's corrective actions relating to employee concerns involving safety issues. The activities associated with the Assessment Plan are in addition to the normal inspection and licensing activities being carried out at the Millstone site.

MC 0350 establishes the guidelines for approving the restart of a nuclear power plant after a shutdown resulting from a significant event, a complex

hardware problem, or serious management deficiencies. The primary objective of the guidelines in MC 0350 is to ensure that NRC's restart review efforts are appropriate for the individual circumstances, are reviewed and approved by the appropriate NRC management levels, and provide objective measures of restart readiness.

The Assessment Plan for each unit includes those issues listed in MC 0350 that the NRC Staff has identified as relevant to the shutdown of the unit. Each Assessment Plan also includes additional issues determined to be applicable to the specific situation. The Assessment Plans include all actions the NRC expects NU to take before the NRC Staff recommends to the Commission that a unit be permitted to restart. Accordingly, the Staff will use the Assessment Plan for each Millstone unit to track and monitor all significant actions necessary to support a decision on restart approval of the unit.

The Assessment Plan for each Millstone unit includes the requirement to review the NU Operational Readiness Plan, the deficiency lists associated with the Assessment Plan, including restart and deferred items, the corrective action program, work planning and controls, the procedure upgrade program, the nuclear oversight function (quality assurance), outstanding enforcement items, and a Significant Issues List (SIL), which includes issues identified by both NU and the NRC as issues requiring resolution before restart. NRC MC 93802, "Operational Safety Team Inspection" (OSTI), provides the framework for a team inspection to be performed during the later stages of the restart process. The inspection will be structured to focus on the pertinent issues at each of the Millstone units.

Within the SPO, a Millstone Restart Assessment Panel (RAP) has been formed in accordance with MC 0350. The RAP meets to assess the Licensee's performance and its progress in completing the designated restart activities. The RAP is composed of the Director, SPO (chairman); the Deputy Directors of Licensing, Inspections, and Independent Corrective Action Verification Program Oversight; the Project Managers for the three Millstone units; the Inspection Branch Chief; the Senior Resident Inspectors for the three Millstone units; and the appointed Division of Reactor Safety representative. The RAP holds periodic meetings with the Licensee to discuss the Licensee's corrective actions and schedules of each Millstone unit. These meetings are noticed and are open to the public. An additional meeting with the public is usually held that same day in the evening to summarize the meeting with the Licensee, provide an update on NRC activities, and address comments from the public.

The purpose of the ICAVP, as stated in the Confirmatory Order, is to confirm that the plant's physical and functional characteristics are in conformance with its licensing and design bases. The ICAVP audit required by the NRC is expected to provide independent verification, beyond NU's quality assurance and management oversight, that the Licensee has identified and satisfactorily resolved

existing nonconformances with the design and licensing bases; documented and utilized the licensing and design bases to resolve nonconformances; and established programs, processes, and procedures for effective configuration management in the future. NU has started programs to identify and understand the root causes of the licensing and design-bases issues that led to NRC issuance of the section 50.54(f) letters to NU and to implement corrective actions that will ensure that NU maintains the design configuration and that each unit is in conformance with its licensing basis. NU has indicated that the scope of its corrective programs will include those systems that it has categorized as either Group 1 (safety-related *and* risk-significant) or Group 2 (safety-related *or* risk-significant). The ICAVP audit must provide insights into the effectiveness of NU's programs so that the results can be reasonably extrapolated to the structures, systems, and components that were not reviewed in the audit.

As a practical matter, the NRC cannot do a 100% verification of the Licensee's corrective actions, processes, and programs for each Millstone unit. However, a comprehensive and multifaceted oversight process has been developed by the NRC Staff to provide a high level of confidence that the Licensee has implemented required corrective actions and that all of the issues on the SILs have been resolved. The independent third-party evaluations required by the NRC will be used to enhance NRC confidence that the Licensee's corrective action programs have been effectively implemented at each unit.

NRC activities (including oversight of the ICAVP) to ensure that effective corrective actions are being taken by the Licensee will provide additional assurance that the Licensee's corrective action programs have been effectively implemented. These activities will include in-process reviews of the ICAVP contractor's activities, reviews of the ICAVP results, and additional independent reviews of compliance with the design and licensing bases of selected systems. The State of Connecticut's Nuclear Energy Advisory Council has provided input to the NRC Staff for selecting the systems that will be reviewed by the ICAVP contractor and has been invited to observe the NRC Staff's ICAVP inspections.

When the restart review process has identified, corrected, and reviewed relevant issues regarding each Millstone unit, a restart authorization process will be initiated for that unit. Upon receipt of a Staff recommendation and a briefing on any ongoing investigations, the Commission will meet to assess the recommendation and vote on whether to allow the restart of the unit. The same process will be followed for the remaining units.

B. Haddam Neck Facility

With regard to the Haddam Neck Plant, the Licensee shut down the plant on July 22, 1996, as required by the facility's TSs, because of concerns that the containment air recirculation fans service-water piping may exceed design

loads during certain accident scenarios. The Licensee determined that these concerns and other hardware and programmatic problems identified before and during the forced outage should be resolved before restarting the plant. Thus, the Licensee decided to begin Refueling Outage 19 on August 17, 1996. On October 9, 1996, the owners of the Haddam Neck Plant stated that a permanent shutdown of the plant was being considered by the Board of Trustees based on an economic analysis of operations, expenses, and the cost of replacement power. Subsequently, all fuel assemblies were removed from the reactor and placed in the spent fuel pool.

From November 21, 1995, to November 22, 1996, the NRC conducted numerous inspections at the Haddam Neck Plant to review several facets of plant performance. These inspections included a Special Team inspection by NRC headquarters staff focused on engineering performance, a special Augmented Inspection Team (AIT) inspection of a reactor vessel nitrogen intrusion event in late August and early September 1996 that lowered the reactor vessel water level, a special radiation protection inspection of a significant contamination event in November 1996, an emergency preparedness inspection to observe the Licensee's response during an emergency exercise held in August 1996, and several resident inspections. Numerous violations, as well as several significant regulatory concerns, were identified during these inspections. Most of the violations were discussed at a transcribed public predecisional enforcement conference at the Millstone training building in Waterford, Connecticut, on December 4, 1996. The December 4 conference was open to the public and focused on the broader programmatic deficiencies underlying the violations that contributed to the problems at Haddam Neck. A Notice of Violation and Proposed Imposition of Civil Penalties in the amount of \$650,000 was issued on May 12, 1997, and subsequently paid by the Licensee.

The restart process described for the three Millstone units is not applicable to the Haddam Neck Plant. By letter dated December 5, 1996, the Licensee certified to the NRC, pursuant to 10 C.F.R. § 50.82(a)(1)(i) and (ii), that it had decided to permanently cease operations at the Haddam Neck Plant and had permanently removed the fuel from the reactor. The Licensee further noted that a Post-Shutdown Decommissioning Activities Report (PSDAR) and a site-specific decommissioning cost estimate would be submitted in accordance with 10 C.F.R. § 50.82, "Termination of License."

It is important to note that the NRC continues to identify problems at both the Millstone site and the Haddam Neck Plant, as documented in inspection reports issued after this petition was filed. These findings indicate that the corrective actions required to restart the Millstone units have not yet been fully implemented. The NRC Staff will not recommend that the Commission allow the restart of a Millstone unit until the Commission has determined, in

accordance with the Assessment Plan, that the necessary corrective actions have been effectively implemented for the unit.

As for Haddam Neck, a Confirmatory Action Letter (CAL) was issued to the Licensee on March 4, 1997, concerning radiological-control problems at the Haddam Neck Plant. This CAL is an example of the type of action that the NRC takes to ensure that the limited activities at the site will be conducted in a safe manner and in accordance with regulatory requirements. The CAL prohibits the Licensee from performing any radiological work except that required to maintain the plant in a safe configuration until the corrective actions identified in the CAL have been implemented.

III. NRC RESPONSE TO REQUESTED ACTIONS

In summary, the Licensee's implementation of its Configuration Management Plan (CMP) for each Millstone unit, response to the elements in the NRC Staff's Restart Assessment Plan (Assessment Plan) for each Millstone unit, implementation of actions to improve programs to address employee concerns at the Millstone site, and the implementation of the decommissioning process specified in section 50.82 for the Haddam Neck Plant, as discussed above, are the bases for the NRC Staff's responses discussed in this Partial Director's Decision to the specific actions that the Petitioners requested be taken against NU. The Petitioners' requested actions and the NRC Staff's responses are discussed below.³

1. Petitioners request that the NRC immediately suspend or revoke NU's license to operate Connecticut Yankee (Haddam Neck) and the Millstone Nuclear reactors due to chronic, negligent management of the reactors which, for over a decade, has endangered and continues to endanger occupational and public health and safety and the environment due to resultant and cumulative major safety problems and violation of NRC regulations.

The Petitioners base their request to suspend or revoke the operating licenses of Haddam Neck and the three Millstone units on NU reports and NRC inspection findings referred to in the petition and on a videotape in which a former Millstone Station employee expresses his views on NU management and plant conditions. As previously noted, based on the NRC Staff review of these materials, the Petitioners have identified no new information.

With regard to the Millstone units, the units are currently in an extended shutdown and significant management changes at NU have been made in the

³ In this Partial Director's Decision, Petitioners' requests have been identified as Requests 1 through 8. These requests correspond to Requests A.1 through A.5, B, and C in the initial petition, and Request II.A in the amendment to the petition.

past year. The NRC's focus is on evaluating improved performance, hardware and programmatic upgrades, and corrective actions. Specifically, NRC review and inspection emphasis will be directed toward the results of NU's actions to correct identified weaknesses in areas such as design controls, radiological controls, quality assurance, work control practices, corrective action processes, and the handling of employee concerns.

The previous discussion provides an overview of the Assessment Plans that the SPO has developed for assessing the adequacy of NU's corrective actions being taken prior to Commission approval of restart for any of the Millstone units. The NRC Staff will have to reach a determination that the corrective actions taken by NU provide reasonable assurance that future operation will be conducted in accordance with the terms and conditions of the operating license, the Commission's regulations, and the design basis, as documented in the FSAR, of each unit before recommending that the Commission approve the restart of any one of the units. Upon receipt of an NRC Staff recommendation and a briefing on ongoing investigations, the Commission will hold a meeting to assess the recommendation and then vote on whether to approve the restart of each unit.

The restart process discussed for the Millstone units does not apply to Haddam Neck. The Licensee has certified to the NRC that operations at the facility have permanently ceased and that fuel has been permanently removed from the reactor.

The Petitioners' request to take immediate action was denied in the letter of January 23, 1997, which acknowledged receipt of the petition. The request to suspend or revoke the licenses for the three Millstone units is denied based on the NRC Staff's conclusion that such action is not warranted by the facts. Programmatic and review efforts are in place. If these efforts are successful, the NRC would allow the Millstone units to resume operation. The request to suspend or revoke the license to operate the Haddam Neck Plant is moot since the Licensee has certified to the NRC that the plant has permanently ceased operation and the fuel has been permanently removed from the reactor.

2. The Petitioners request that the NRC investigate the possibility that NU made material misrepresentations to the NRC concerning engineering calculations and other information or actions relied upon to ensure the adequacy of safety systems at the Haddam Neck and Millstone reactors. The Petitioners said NU made possible material misstatements either through lack of rigor and thoroughness or by providing intentionally misleading information.

The NRC has ongoing investigations related to alleged wrongdoing by NU personnel. The investigative results will be reviewed for possible enforcement action. Depending on the results of the ongoing evaluations of inspections and investigations, both NU as an organization and NU employees found to have engaged in deliberate misconduct will be subject to appropriate enforcement action.

Consistent with the General Statement of Policy and Procedures for NRC Enforcement Actions (NUREG-1600), some enforcement action is normally taken against a licensee for violations caused by significant acts of wrongdoing by its employees. Such action could include a civil penalty or an order. In deciding whether to also take action directly against the responsible employees, the NRC considers a number of factors such as the employee's level in the organization, the employee's training and experience, the degree of supervision, the employee's attitude, and the degree of management responsibility or culpability. A decision to take action directly against an individual is significant and normally will be taken only when the NRC is satisfied that the individual has engaged in deliberate misconduct. The action taken could include prohibiting the individual from involvement in licensed activities for a period of years.

As the NRC is currently evaluating alleged wrongdoing by NU personnel, the Petitioners' request is granted.

3. Petitioners request that the NRC revoke NU's operating licenses for the Haddam Neck and the Millstone Unit 1, 2, and 3 reactors if an investigation determines that NU deliberately provided insufficient and/or false or misleading information to the NRC. If the NRC chooses not to revoke NU's licenses, the Petitioners specifically request that the reactors remain offline until a United States Department of Justice (DOJ) independent investigation is complete and the NRC reviews the conclusions and recommendations contained therein for potential consequences to the Licensee and its agents under NRC regulations. The Petitioners note in a footnote that a DOJ report will likely produce information essential to the NRC's evaluation of NU's management problems. The Petitioners further stated that such information should influence any NRC decision concerning NU's future operation of nuclear reactors in Connecticut.

Since the NRC investigations are ongoing, the NRC cannot respond to the first portion of the request to revoke the licenses of the three Millstone units at this time.

The response to the Petitioners' Request 1 applies to the part of Request 3 asking that the reactors remain offline until the investigations are complete. As noted, the Commission will consider the status of all ongoing investigations, including any referrals to DOJ, in its deliberations before voting on the restart of any of the Millstone units.

The part of the request relating to revoking the licenses of the three Millstone units is deferred until all investigations are complete. The request that the reactors remain offline until the investigations are complete is denied.

This request does not apply to the Haddam Neck Plant, which has already permanently ceased operation.

4. The Petitioners request that, if NRC chooses not to revoke NU's licenses to operate the Haddam Neck Plant and the Millstone Unit 1, 2, and 3 reactors and allows the reactors to return to operation, the reactors remain on the NRC's

Watch List to oversee reactor operations until NU management demonstrates to the NRC that:

- a. NU is able to fulfill NRC regulatory requirements;
- b. NU has met all prior commitments concerning the repair, modification, maintenance, and documentation of the nuclear power stations;
- c. NU has retrained all staff in the application and interpretation of NRC's regulations; and
- d. NU has removed from any positions of responsibility for operation and/or management of the reactors all persons whom DOJ, NRC, or other government investigators and/or civil or criminal prosecutions find to have made material misrepresentations to the NRC during the past decade of mismanagement.

Due to the significance and programmatic nature of the concerns evolving from the various NRC reviews and inspections at the Millstone Station and the fact that each unit is shut down pending resolution of these issues, the Commission put the Millstone units in Category 3 of the Watch List. Accordingly, restart of any of the units is subject to Commission approval. SIL issues, which require resolution for safe operation, will have been addressed and a process will be in place to resolve any deferred items. If the Commission approves restart of any unit, that unit will be placed in Category 2 of the Watch List, where it will remain until the Licensee has demonstrated that satisfactory operational performance can be sustained at the unit.

The restart process, as previously discussed, will ensure that the management attributes identified by the Petitioners in Requests 4.a, 4.b, and 4.c, will be adequately considered within the context of the SPO's Assessment Plans before the NRC Staff recommends that the Commission allow the restart of any unit. Request 4.d will be considered in the restart process when the Commission is briefed regarding investigation efforts and recommendations.

The request to retain the Millstone units on the NRC's Watch List, if the Commission approves restart, is granted. Any unit permitted to restart will be placed in Category 2 of the Watch List, where it will remain until the Licensee has demonstrated that satisfactory performance can be sustained at the unit. Requests 4.a, 4.b, 4.c, and 4.d will be considered as set forth above.

This request does not apply to the Haddam Neck Plant because the Haddam Neck Plant has permanently ceased operation. The NRC will continue its oversight of the defueled facility.

5. Petitioners request that, as a minimum, the NRC keep Haddam Neck and the Millstone Unit 1, 2, and 3 nuclear reactors offline until NU's chronic mismanagement has been analyzed, remedial management programs have been implemented, and the NRC has evaluated and approved the effectiveness of the Licensee's actions. As a minimum, NU should:

- a. thoroughly analyze root causes for deficiencies in NU's FSARs, its documentation of licensing and design bases, its safety analysis, its engineering, its quality assurance, its as low as reasonably achievable (ALARA) programs, and other necessary or required documentation;
- b. create a complete, accurate FSAR — mere "reform" is impossible when the basic document is inadequate and inaccurate;
- c. reevaluate any of its activities initiated under (or which NU should have initiated under) section 50.59 in order to confirm the validity of such activities, particularly to determine the extent to which the FSAR does not match "as-built" configurations. This reevaluation requires more than a paper audit; it requires checking actual physical plant against the existing documentation, component by component and system by system and creating correct documentation where it is lacking and/or inadequate;
- d. institute and document an effective ALARA review of all operational and nonoperational activities that expose workers and/or the public to radiation;
- e. thoroughly document the root causes of NU's chronic and systemic mismanagement, including documentation of the NRC Region I inspection program's staff and management failures over the past decade to detect and deal with this problem;
- f. demonstrate, over a substantial period of time to the satisfaction of the NRC, NU's commitment to respect NRC regulatory requirements and consistently follow them;
- g. retrain all personnel involved in day-to-day operations so that they are thoroughly conversant with NRC regulations; and
- h. update and document Plant Design Change Requests (PDCRs) to include all changes to the reactor's design, and verification by the NRC Staff of these design changes, with closeouts of PDCRs receiving the highest priority.

As previously noted, NRC regulatory oversight programs at the Millstone Station are based on the recognition that the Licensee is primarily responsible for demonstrating that corrective actions have been effectively implemented. Before the NRC Staff can recommend that the Commission approve the restart of a Millstone unit, the Licensee must determine that the unit conforms with applicable NRC regulations, license conditions, and the FSARs and that applicable licensing commitments have been met. The Licensee's conformance with NRC regulations, license conditions, and licensing commitments is fundamental to the NRC's confidence in the safety of licensed activities.

The significant actions that the NRC is taking to monitor the Licensee's activities have been discussed in detail earlier in this Decision. Based on that discussion, the actions requested in Requests 5.a through 5.h, with the exception

of the part of 5.e relating to NRC Staff performance, will be adequately addressed within the context of the SPO's Assessment Plan for each of the Millstone units.

With regard to Request 5.e, the part of 5.e relating to the performance of the NRC Staff is beyond the scope of the 2.206 process and will not be addressed in the Director's Decision relating to this petition. This issue has been referred to the NRC's OIG for action as appropriate.

The request to keep the Millstone units offline until the items identified in Requests 5.a through 5.h, with the exception of the part of Request 5.e relating to NRC's previous actions in dealing with the Licensee, is granted to the extent that the issues will be considered within the SPO's Assessment Plan for each of the units.

This request does not apply to the Haddam Neck facility, which has permanently ceased operation.

6. Petitioners request that, if NU decides to shut down any or all of the nuclear power reactors at issue herein with the intent to commence the decommissioning process, the NRC not permit any decommissioning or predecommissioning activity to take place until:

- a. all the documentation mentioned in earlier requests is available to the NRC and on site at the reactors;
- b. all personnel involved in the decommissioning process have been retrained (or trained) in the use and interpretation of the applicable NRC regulations in Title 10 of the *Code of Federal Regulations*;
- c. the NRC has appropriately evaluated and replaced personnel and has restructured the NRC Region I inspection program, its management, and the supervising NRC directorate to eliminate the regulatory anarchy that plagued the Connecticut nuclear reactors during the past 10 years; and
- d. the NRC makes certain that NU does not employ any persons in management or operations who made material misrepresentations to the NRC about the status of operations, repairs, modifications, or maintenance of NU's Connecticut reactors.

On October 9, 1996, the owners of the Haddam Neck Plant stated that the Board of Trustees was considering a permanent shutdown of the plant, based on an economic analysis of operations, expenses, and the cost of replacement power. All fuel assemblies were removed from the reactor and placed in the spent fuel pool for temporary storage. By letter dated December 5, 1996, the Licensee certified to the NRC, pursuant to section 50.82(a)(1)(i) and (ii), that it had determined to permanently cease operations at the Haddam Neck Plant and that the fuel had been permanently removed from the reactor. The Licensee further noted that a Post-Shutdown Decommissioning Activities Report (PSDAR) and the site-specific decommissioning cost estimate would be submitted in accordance with section 50.82, "Termination of License." The

PSDAR will be submitted to the NRC and a copy sent to the affected state(s) within 2 years after operations have permanently ceased. The report must include, among other things, a description of the planned decommissioning activities and a schedule for their implementation. No major decommissioning activities may be performed until 90 days after the NRC receives the PSDAR.

The current activities at the site include the operation, monitoring, and maintenance of the spent fuel pool; radioactive waste management; radiological protection; and fire protection. These activities, including any activities relating to decommissioning, must be in compliance with the current license requirements, which apply when the reactor is defueled.

The degree of regulatory oversight required during decommissioning of a nuclear power reactor is considerably less than during its operational phase. When the reactor is operating, the fuel in the reactor core undergoes a controlled nuclear fission reaction that generates a high neutron flux and large amounts of heat. Safe control of the nuclear reaction involves the use and operation of many complex systems, adherence to operational limits, testing of components and systems to ensure their operability, specified procedure adherence, and operator actions. Once the fuel has been permanently removed and temporarily stored in the spent fuel pool, the fuel is still highly radioactive and generates heat caused by radioactive decay. However, no neutron flux is generated and the fuel slowly cools as its energetic decay products diminish. Since the spent fuel is stored in a configuration that precludes the nuclear fission, no generation of new radioactivity can occur. However, the same areas of the facility contain radioactive contamination and those areas must still be controlled to minimize radiation exposure to personnel and to control the spread of radioactive material.

The NRC Staff continues to be concerned about the failures of the Haddam Neck radiological controls program (which recently resulted in the unplanned exposure of two individuals), long-standing discrepancies in the calibration of several radiation monitors that are used to monitor and control radiological effluent releases, and the inadequate control of radioactive material that resulted in the undetected release of contaminated equipment to a nonlicensed vendor.

In response, the NRC has taken comprehensive and significant actions to resolve concerns in the area of radiological controls, including the issuance of a CAL on March 4, 1997, confirming the Licensee's commitment to respond to the findings in Inspection Reports 50-213/96-12, dated December 19, 1996, and 50-213/97-02, dated March 21, 1997. The CAL restricts the Licensee from performing any radiological work except that required to maintain the plant in a safe configuration. The CAL identifies four significant activities required of the Licensee to bring its management and implementation of radiation control programs up to a standard acceptable to the NRC. The activities are to (1) identify, in writing, specific compensatory measures that the Licensee will establish to ensure sufficient management control and oversight of ongoing or

planned activities that require radiological controls; (2) engage the services of an independent assessor to assess the quality and performance of the Licensee's radiological control programs and their implementation; (3) by May 30, 1997, based on the results of that independent assessment, (a) identify problems, determine root causes, and develop broad-based and specific corrective actions, (b) identify performance measures that may be used to determine the effectiveness of radiological control programs, and (c) submit a plan and schedule to the Regional Administrator, NRC Region I, for implementing improvements in the radiological control programs; and (4) before eliminating any interim compensatory measures, meet with the Region I Administrator to describe program implementation and performance improvements achieved or planned.

In summary, the NRC is following the decommissioning process as specified in section 50.82, which requires that no major activities may be performed until 90 days after the NRC receives the PSDAR. The Licensee must comply with all the applicable operating license requirements in effect for the defueled reactor relating to activities currently being performed at the Haddam Neck Plant. Further, the NRC will take appropriate actions for any defueled reactor to ensure compliance with its license and license conditions, such as the actions described above for the failure of adequate radiological controls at Haddam Neck. The Haddam Neck Plant is the only reactor that the Licensee has determined to permanently shut down and decommission.

The request to forbid decommissioning activities or predecommissioning activity at any NU nuclear power reactor until all the requested actions identified in the petition, including items a, b, and d of Request 6, have been completed is denied for the reasons stated above. The NRC Staff has determined that the NRC requirements that govern decommissioning and the activities being undertaken by the Licensee in response to the CAL are sufficient to ensure that the activities at the Haddam Neck facility are being conducted in a safe manner. Request 6.c, relating to the performance of the NRC Staff, is beyond the scope of the 2.206 process and will not be addressed in the Director's Decision relating to this petition. This issue has been referred to the NRC's OIG.

7. The Petitioners request that the NRC commence an investigation into how it allowed the illegal situation at NU's Connecticut reactors to exist and to continue over a decade. Particularly, Petitioners request that the Commission order its staff (directors of the responsible directorates, managers, and Region I management and staff) to answer the following questions, and hold these persons accountable for their answers and actions regarding the past 10 years at NU's Connecticut nuclear power reactors:

- a. What documents did Region I inspectors, their supervisors, and NRC Project Directors and Project Managers review during 10 years of NU's out-of-compliance operation?

- b. If NU provided documents that somehow deceived the Region I inspector, how does the information in these documents relate to the everyday workings and activities conducted during the otherwise undocumented decade of operations at the Millstone and Haddam Neck plants?
- c. How did Region I inspectors, their supervisors, and NRC Project Directorates and Managers find that NU was conducting operations in a way that keeps worker and public exposures to radiation ALARA when NU was not adequately documenting either its licensing basis or the basis of reactor operations?
- d. Knowing, as Region I inspectors must have known, of excessive worker exposures (for example, due to a longstanding problem with leaking pipes as documented by an NU worker in the videotape provided with this petition Exhibit A), how did the Region I inspectors certify that operations at the Millstone and Haddam Neck plants were being conducted ALARA? How did the supervisors, and those in the NRC Project Directorate, make the same certifications?
- e. During the undocumented decade, how did Region I inspectors, their supervisors, and NRC Project Directors and Managers manage to track NU's activities at the Millstone and Haddam Neck plants under section 50.59?
- f. To what extent have NRC Region I inspectors, their supervisors, and NRC Project Directors and Managers allowed the same type of problems to develop at other nuclear power reactors in New England (i.e., Maine Yankee, Pilgrim, Seabrook, Vermont Yankee, and Yankee Rowe)?
- g. Is there any connection between licensees employing Yankee Atomic Electric Company's consulting and engineering services and the serious problems with documentation and lack of compliance with the licensing and design bases at nuclear power stations in New England or in other parts of the country?

This request is beyond the scope of the 2.206 process. It concerns the performance of the NRC Staff and will not be addressed in the Director's Decision relating to this petition. This request has been referred to the NRC's OIG.

8. In the amendment to the petition, the Petitioners request that the NRC take the following actions to enforce its regulations against NU. As part of the 2.206 process, the NRC should provide copies of Haddam Neck's nitrogen calculations to the Petitioners and conduct an independent review to see if the calculations meet the requirements of Part 50, Appendix B. If Appendix B requirements were violated, the Petitioners are concerned that the Licensee cannot safely decommission the Haddam Neck Plant. Accordingly, NU's operating licenses for its Connecticut reactors should be revoked, and NU should not be permitted to commence decommissioning

until it has complied with the conditions outlined in the main body of the original petition. Finally, the Commission should inquire into the NRC Staff's failure to discern this situation and its continuing failure to enforce the terms and conditions of NU's license and NRC regulations.

As noted above, the assertion by the Petitioners that the calculations performed by the Licensee violated NRC requirements is a new issue not previously considered by the NRC Staff.

The subject calculations were performed subsequent to an event at the Haddam Neck Plant that resulted in the formulation of a nitrogen bubble in the reactor vessel. The results of the calculations, which were one of several methods used to confirm the water level during the event, were discussed by the Licensee during a public predecisional enforcement conference held on December 4, 1996.

By letter dated July 3, 1997, the Licensee provided information, including the requested calculations, relating to the different methods used for determining the reactor vessel water level resulting from the nitrogen intrusion event. This information has been placed in the NRC's Public Document Room and the Local Public Document Rooms. The Petitioners were provided a copy of the calculations as an enclosure to a petition status letter dated July 21, 1997, since the calculations are relevant to the Petitioners' concern, are not proprietary, and are in the public domain.

On September 5, 1996, while investigating the root cause of the undetected accumulation of nitrogen gas in the reactor vessel, the Licensee performed a special test (ST 11.7-197, "Determination of Reactor Vessel Level") to verify reactor vessel level. This test was necessary because the reactor vessel level indication system and the core exit thermocouples had been removed from service in accordance with the Licensee's refueling procedures. The reactor level measurement problem had been exacerbated by the nitrogen gas intrusion, which displaced water from the reactor vessel into the pressurizer, resulting in an unquantified decrease in reactor vessel inventory. During the course of the event, the shift manager had requested that the worst-case (lowest) reactor vessel level achieved during the event be determined. As noted in NRC Inspection Report No. 50-213/96-80, "NRC Augmented Inspection Team Review of the Undetected Introduction of Nitrogen Gas into the Reactor Vessel During Plant Shutdown," the plant staff completed a preliminary analysis on September 4, 1996. It was further noted that, at the end of the onsite inspection activities, the Licensee had yet to complete a final volumetric inventory balance calculation. In the Notice of Violation and Proposed Imposition of Civil Penalties in the amount of \$650,000 issued on May 12, 1997, the Licensee was cited for failure to take timely corrective actions following the nitrogen intrusion event, including

the failure to timely establish the actual lowest reactor vessel level resulting from the event.

Subsequently, the Licensee completed two calculations: (1) Calculation 96-MDE-1515-MY, "Reactor Vessel Level Determination," prepared on October 2, 1996, independently reviewed on November 1, 1996, and approved on November 5, 1996; and (2) Calculation 96-MDE-1536-MY, "Reactor Vessel Level Determination," prepared on October 4, 1996, independently reviewed on November 22, 1996, and approved on December 1, 1996. These calculations were performed consistent with the requirements of Part 50, Appendix B.

Also, during the December 4, 1996 predecisional enforcement conference, the Licensee presented the results of reactor vessel water level simulations, which were calculated using the RELAP5/MOD3 code. These simulation results were presented by the Licensee to corroborate, with a diverse methodology, the lowest reactor vessel water level determined by Calculations 96-MDE-1515-MY and 96-MDE-1536-MY. The results of the RELAP5/MOD3 reactor vessel water level simulations presented by the Licensee during the predecisional enforcement conference were only used to corroborate and provide additional insight into the reactor vessel water level that had been determined through Calculations 96-MDE-1515-MY and 96-MDE-1536-MY. These two calculations had been independently reviewed and performed consistent with the applicable provisions in the Licensee's Part 50, Appendix B, "Quality Assurance Program," and are considered by the NRC Staff to suffice to demonstrate the reactor vessel water level.

Under these circumstances, the RELAP5/MOD3 simulations were not required to have been independently verified.

Thus, the assertion by the Petitioners that the calculations discussed during the predecisional enforcement conference violated 10 C.F.R. Part 50, Appendix B requirements is unfounded and no further actions by the NRC are required. The part of Request 8 relating to the performance of the NRC Staff is beyond the scope of the 2.206 process and will not be addressed in the Director's Decision relating to this petition. This part of Request 8 has been referred to the NRC's OIG.

IV. CONCLUSION

The NRC Staff has determined, for the reasons provided in the above discussion, that: Request 2 is granted for both the Millstone units and the Haddam Neck Plant; Requests 4 and 5 are partially granted for the Millstone units; Request 1 and parts of Requests 3, 4, 6, and 8 are denied for the three Millstone units; Requests 6 and 8 are partially denied for the Haddam Neck

Plant; Request 3 is partially deferred for the three Millstone units; Requests 1, 3, 4, and parts of Request 5 are not applicable to Haddam Neck; and Request 7 and parts of Requests 5, 6, and 8 are beyond the scope of the 2.206 process and are not addressed. The deferred parts of Request 3 will be addressed in a Final Director's Decision after any possible wrongdoing is fully considered by the NRC Staff.

As provided for in 10 C.F.R. § 2.206(c), a copy of this Partial Decision will be filed with the Secretary of the Commission for the Commission's review. This Partial Decision will constitute the final action of the Commission (for Petitioners' Requests 1, 2, 5, 6, and 8) 25 days after issuance unless the Commission, on its own motion, institutes review of the Decision in that time.

FOR THE NUCLEAR
REGULATORY COMMISSION

Frank J. Miraglia Jr., Deputy
Director
Office of Nuclear Reactor
Regulation

Dated at Rockville, Maryland,
this 12th day of September 1997.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Carl J. Paperiello, Director

In the Matter of

Docket No. 030-01786
(License No. 19-00296-10)NATIONAL INSTITUTES OF HEALTH
(Bethesda, Maryland)

September 17, 1997

The Director of the Office of Nuclear Material Safety and Safeguards grants in part and denies in part a petition dated October 10, 1995, submitted to the Nuclear Regulatory Commission (NRC) by Maryann Wenli Ma, M.D., Ph.D., and Bill Wenling Zheng, M.D., Ph.D (Petitioners). The petition requests that NRC suspend or revoke the materials license of the National Institutes of Health (NIH) pending resolution of the issues raised by the petition, and that NRC take other appropriate enforcement action, including the imposition of civil penalties against NIH for willful and reckless violations of 10 C.F.R. Part 20. Broadly stated, the Petitioners assert that, as the direct and proximate result of NIH's (1) deliberate failure to control and secure radioactive materials in violation of 10 C.F.R. §§ 20.1801 and 20.1802, (2) failure to maintain an effective bioassay program, and (3) failure to otherwise adhere to the requirements of Part 20, Dr. Ma was contaminated with phosphorus-32 (P-32), resulting in both her and her unborn fetus receiving intakes of radioactive material significantly in excess of regulatory limits, additional NIH employees also being internally contaminated with P-32, and failure of NIH to take proper actions to assess accurately the level of Dr. Ma's internal contamination or provide appropriate medical care and followup treatment.

The Director denies Petitioners' requests for enforcement action against NIH: for the exposure of Dr. Ma beyond regulatory limits, for the exposure of Dr. Ma's fetus, and for the contamination of the water cooler; regarding notification to Dr. Ma of her level of contamination; regarding Dr. Ma's declaration of pregnancy; regarding the conduct of surveys after Dr. Ma's contamination; and

for the failure to accurately calculate Dr. Ma's occupational radiation dose. The Director denies these requests, as well as the request to suspend or revoke the NIH license, because Petitioners did not provide sufficient bases to warrant such actions. The Director granted in part Petitioners' request for enforcement action against NIH for violations of NRC security and control requirements and for violation of NRC requirements related to radiation safety training, ordering radioactive materials, inventory control of radioactive materials, monitoring, and the issuance, use, and collection of dosimetry. The Director granted Petitioners' request for NRC action to ensure adequate procedures and instructions to exposed persons for sample collection as described below.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

By a petition addressed to the Director, Office of Nuclear Material Safety and Safeguards (NMSS), dated October 10, 1995, Maryann Wenli Ma, M.D., Ph.D., and Bill Wenling Zheng, M.D., Ph.D. (Dr. Ma and Dr. Zheng or Petitioners) requested that the Nuclear Regulatory Commission (NRC) take action with respect to the National Institutes of Health (NIH or the Licensee).

Petitioners request that NRC suspend or revoke the materials license of NIH, NRC License No. 19-00296-10, pending resolution of the issues raised by the petition, and that NRC take other appropriate enforcement action, including the imposition of civil penalties against NIH for willful and reckless violations of 10 C.F.R. Part 20.

As a basis for their requests, the Petitioners assert that NIH has willfully and recklessly committed numerous violations of Part 20. Broadly stated, the Petitioners assert that, as the direct and proximate result of NIH's (1) deliberate failure to control and secure radioactive materials in violation of 10 C.F.R. §§ 20.1801 and 20.1802, (2) failure to maintain an effective bioassay program, and (3) failure to otherwise adhere to the requirements of Part 20, Dr. Ma was contaminated with phosphorus-32 (P-32), resulting in both her and her unborn fetus receiving intakes of radioactive material significantly in excess of regulatory limits; additional NIH employees also being internally contaminated with P-32; and failure of NIH to take proper actions to assess accurately the level of Dr. Ma's internal contamination or provide appropriate medical care and followup treatment. A more detailed description of the concerns raised by Petitioners appears in Section III, below.

By letter dated October 30, 1995, Carl J. Paperiello, Director, NMSS, acknowledged receipt of the petition and denied Petitioners' request for immediate

suspension or revocation of the NIH license because, although certain weaknesses had been identified in the 1995 inspections of NIH, these weaknesses were not sufficiently widespread or egregious as to warrant suspension or revocation of the license.

On November 2, 1995, NRC issued a Demand for Information (EA 95-240) to NIH, requesting that NIH respond to the concerns raised in the petition. On December 11, 1995, NIH submitted its "Response to Demand for Information (EA-95-240)." John N. Weinstein, M.D., Ph.D. (Dr. Weinstein), submitted a response to the petition, dated December 15, 1995.

On March 25, 1996, Petitioners supplemented their petition in a written reply to the Licensee's December 11, 1995, "Response to Demand for Information (EA-95-240)." In their supplemental petition, Petitioners contend that NIH's repeated denials that it has any problem with its security over radioactive materials suggest that the NIH radioactive materials license should be suspended or revoked, because the Licensee poses a threat to public health and safety, the Licensee has not responded adequately to other enforcement actions, and is unwilling or unable to comply with NRC requirements. On July 10, 1997, Petitioners submitted another supplement to their petition, requesting immediate revocation or suspension of the NIH license on the grounds that NIH continues in its failure to implement and maintain a program to oversee licensed radioactive materials sufficiently securely to prevent another contamination incident of the type Dr. Ma experienced in 1995. By letter dated August 5, 1997, the supplemental petition was acknowledged and the request for immediate action was denied because NIH has made continuing progress in improving the security and control of licensed radioactive material since the 1995 contamination event. By letter dated September 10, 1997, NIH responded to the July 10, 1997 supplement to the petition.

II. BACKGROUND

NRC license No. 19-00296-10 is a broad-scope license that authorizes possession and use of radioactive material for medical diagnosis, therapy, and research in humans, as well as nonhuman research and development, at facilities in Bethesda, Rockville, Baltimore, and Poolesville, Maryland. The NIH main campus in Bethesda has 21 buildings housing nearly 3000 biomedical research laboratories. There are more than 800 Authorized Users and more than 5000 Supervised Users of radioactive material under NIH's licensed program. NIH's Materials License No. 19-00296-10, originally issued on December 7, 1956, was renewed on June 16, 1997, and will expire on June 30, 2002.

The internal contamination of Dr. Ma was discovered by Dr. Zheng (Dr. Ma's husband) during a survey of the NIH laboratory in which they both worked, on

the evening of June 29, 1995. At 5:58 p.m., Dr. Zheng reported the internal contamination of his wife to the NIH emergency number, and then to their immediate supervisor, Dr. Weinstein, who was on the premises at the time. Dr. Weinstein notified the NIH Radiation Safety Branch (RSB) of Dr. Ma's contamination.

Shortly after 6:00 p.m., an NIH ambulance with two emergency medical technicians responded to the scene, and at approximately 6:40 p.m., two personnel from the NIH RSB responded to the scene. Petitioners told RSB personnel that they believed Dr. Ma had been internally contaminated as a result of eating leftovers she had stored in a conference room refrigerator. The RSB performed surveys with portable radiation detection instruments to determine whether radioactive contamination was present in the laboratory, the adjacent hallways and corridors, and in the conference room. The RSB took smears of Dr. Ma's hands, neck and face to determine if any of the contamination was removable and then had Dr. Ma change out of her clothes into clean scrubs to see if her clothing was radioactive. None of the smears, clothing, or surveys of Dr. Ma showed external contamination. The RSB asked Dr. Ma to submit a urine sample. The sample was surveyed by the RSB and found to contain radioactivity (later determined to be P-32), indicating that Dr. Ma's contamination was internal. Shortly after 8:00 p.m., the NIH ambulance departed with Dr. Ma en route to Holy Cross Hospital (Holy Cross).

NIH RSB staff contacted the on-call physician from the Radiation Emergency Assistance Center/Training Site (REAC/TS)¹ in Oak Ridge, Tennessee, and had the REAC/TS physician speak directly with the emergency room (ER) physician at Holy Cross. The REAC/TS physician stated that he discussed with the Holy Cross ER physician the possibility of administering a phosphate solution for dilution and displacement of the P-32, but that the ER physician chose not to follow this suggestion. The REAC/TS physician also advised the ER physician of the need to collect 24-hour urine samples for determination of Dr. Ma's occupational radiation dose. After consultation with REAC/TS and the NIH Radiation Safety Officer (RSO), the Holy Cross ER physician ordered intravenous infusions of fluids (hydration) in order to dilute Dr. Ma's internal contamination.

The Petitioners did not return to work in the NIH Laboratory of Molecular Pharmacology after the discovery of Dr. Ma's contamination, but eventually returned to work at other laboratories at NIH.

¹REACTS is a Department of Energy response asset that maintains a radiological emergency response team consisting of physicians, nurses, health physicists, and other support personnel. It is on 24-hour call to provide first-line responders with consultative or direct medical and radiological assistance at the REAC/TS facility, accident site, or attending hospital.

On June 30, 1995, NIH informed an NRC inspector on site at the time that Dr. Ma had been internally contaminated with P-32. On June 30, 1995, NRC initiated an Augmented Inspection Team (AIT) evaluation of the event and presented its preliminary findings to NIH on August 8, 1995. During October 23-24, 1995, and November 6-10, 1995, the NRC Staff conducted two special team inspections of NIH. On December 21, 1995, NRC Inspection Report No. 030-01786/95-203 was issued describing the results of those inspections. The AIT issued a redacted version of its report on January 29, 1996, and, upon completion of NRC's investigation, issued the full, unredacted report on January 13, 1997. NRC's Office of Investigations (OI) began an investigation on June 30, 1995. Additionally, the Federal Bureau of Investigation began an investigation, as did the Department of Health and Human Services Office of the Inspector General, and the NIH Police Department. These investigative groups worked in cooperation with each other and shared their findings on an ongoing basis. On January 24, 1997, NRC's OI issued its report, "National Institutes of Health: Wrongful Administration of P-32, Case No. 1-95-033." That report and its associated exhibits are being publicly released concurrent with issuance of this Director's Decision.

NIH performed an assessment of Dr. Ma's intake of P-32, the resultant radiation exposure received by Dr. Ma, and the radiation exposure received by her fetus. In its initial notification to NRC on July 3, 1995, NIH indicated that its estimated ingestion for Dr. Ma was approximately 300 microcuries (μCi) or 11.1 megabecquerel (MBq) of P-32.² On August 29, 1995, NIH reassessed Dr. Ma's dose and calculated her effective dose equivalent to be 4.17 rem [41.7 millisievert (mSv)], based upon an intake of 500 μCi (18.5 MBq), and the dose to her fetus to be 3.2 rem (32 mSv). Most recently, on July 30, 1996, NIH revised its committed effective dose equivalent (CEDE) estimates for Dr. Ma to between 4.7 and 7.0 rem (47 and 70 mSv), corresponding to an intake range of between 570 and 840 μCi (21.1 and 31.1 MBq). The revised dose to the fetus was between 3.7 and 5.4 rem (37 and 54 mSv). Additional discussion of NIH's dose estimates appears in Section III.K, below.

NRC's estimates indicate that Dr. Ma ingested between 30.3 and 48.1 MBq (820 and 1300 μCi) of P-32. Based on these values, Dr. Ma's estimated internal CEDE was between 80 and 127 mSv (8.0 and 12.7 rem). The annual occupational exposure limit applicable to Dr. Ma was, however, 5 mSv (5 rem) total effective dose equivalent per 10 C.F.R. § 20.1201(a)(1)(i). The estimated dose received by Dr. Ma's fetus was between 51 and 81 mSv (5.1 and 8.1 rem).

²Because the system of units employed by NIH and the Petitioner's Consultant were nonmetric, the English unit is listed first, followed by its metric equivalent in brackets. However, for those instances where NRC has issued a report, metric units are listed first as primary units, followed by the English units in brackets, which is the usual NRC style.

NRC estimated that of the twenty-six other NIH employees who received P-32 contamination from a water cooler situated in a hallway near the Petitioner's laboratory, including Dr. Zheng, one individual who was not an occupational radiation worker received a dose of between 1.5 and 2.5 mSv (150 and 250 millirem), in excess of the applicable dose limit of 1.0 mSv (100 millirem) for members of the public specified by 10 C.F.R. § 20.1301.

NRC issued a series of Confirmatory Action Letters (CALs) to NIH between July 21, 1995, and June 7, 1996, addressing various measures to be taken by NIH, such as: (1) reduction of the possibility of further ingestion of radioactive material by NIH employees; (2) determination of the full scope of the personnel contaminations at NIH; (3) further enhancement and training of NIH staff regarding security of radioactive material; (4) documentation of corrective actions with respect to enforcement of a new NIH security policy; (5) modifications to the surveillance plan for NIH laboratories; and (6) other specific actions for inspections for NRC compliance.³

NRC continued its onsite inspection through July 28, 1995. The AIT conducted a technical debrief with NIH RSB management and staff on August 3, 1995, and with NIH senior management on August 8, 1995. Further NRC inspection activities, including assessment of radiation dose to the exposed individuals, and evaluation of a third-party independent dose assessment, continued through November 15, 1995.

On August 23, 1996, NRC issued a Notice of Violation (NOV) and Proposed Imposition of Civil Penalty of \$2500 (EA 96-027) to NIH for failure to physically secure licensed material or maintain surveillance over it to prevent unauthorized removal. Other violations of NRC requirements were also cited, involving: (1) workers not wearing extremity dosimetry, or returning dosimetry promptly each month, as required; (2) users obtaining radioactive materials without providing required information regarding the identity of the intended user(s) or the signature of the authorized investigator; (3) researchers performing licensed activities without first receiving the required training; and (4) failure to perform thyroid bioassay measurements of researchers who handled gigabecquerel [millicurie (mCi)] quantities of volatile iodine-125. On May 20, 1997, NRC issued an Order Imposing Civil Monetary Penalty in the amount of \$2500 (EA 96-027), which NIH paid on June 6, 1997.

³ CAL 1-95-011 (July 21, 1995); CAL 1-95-011, rev. 1 (July 21, 1995); CAL 1-95-018 (Oct. 27, 1995); CAL 1-95-018, Supp. 1 (Nov. 8, 1995); CAL 1-95-018, Supp. 2 (Dec. 1, 1995); and CAL 1-95-018, Supp. 3 (June 7, 1996).

III. DISCUSSION

A. Violations of NRC Requirements for Security and Control of Licensed Material

Petitioners assert that, as the direct and proximate result of NIH's deliberate failure to control and secure radioactive materials in violation of sections 20.1801 and 20.1802, and to otherwise adhere to the requirements of Part 20, Dr. Ma was contaminated with P-32, resulting in both her and her unborn fetus receiving an intake of radioactive material in excess of regulatory limits. In addition, Petitioners state that twenty-six other NIH employees, including Dr. Zheng, were also internally contaminated with P-32.

Petitioners state that NIH has been unwilling to comply with NRC safety requirements in accordance with Part 20. Specifically, Petitioners state that during the summer of 1994, NIH officials deliberately failed to lock up radioactive material as part of an experiment with a liberalized policy concerning security and use of radioactive materials, which effectively excused laboratories from locking up radioactive materials, in violation of section 20.1801. NIH requested a license amendment on October 31, 1994, to establish and permanently implement a previously submitted "Interim Security Policy," and an exemption from the requirements to secure (under lock and key), or maintain constant surveillance of, licensed radioactive materials not in excess of ten times the activity listed in Appendix C to 10 C.F.R. Part 20, on a per-container basis. Petitioners state that the resultant breakdown in security led to the issuance of CAL 1-95-018, on October 27, 1995, which required NIH to take immediate steps to secure radioactive materials. Petitioners state that NIH objected to complying with security regulations, and did not withdraw its application for an exemption from the security requirements until after the contamination of Petitioners.

Petitioners state that NRC's repeated discovery of unsecured radioactive materials and of absence of security controls in several NIH laboratories indicates a systemic failure of security rather than an isolated problem, and that NIH's lax control and security of radioactive materials created an environment where acts such as the deliberate contamination of Dr. Ma were bound to occur, given that the means to commit such an offense were readily available. Petitioners state that security over radioactive materials used in the Petitioners' laboratory was nonexistent. Specifically, the refrigerator and freezer used to store radioactive reagents were not locked, the lab was frequently left unattended during non-working hours, and there were no procedures to document individuals' access to the refrigerator or freezer, or to check to see if records were kept regarding the documented use of radioactive materials in that laboratory.

Petitioners state that despite NIH's reckless disregard of NRC requirements, since 1986 NRC has taken no enforcement action against NIH or the National

Cancer Institute (NCI)⁴ for repeated violations of Part 20 regulations related to security and control of radioactive material, occupational exposure, notification of exposure, incineration, surveys, monitoring, and dosimetry.

Contrary to the assertions in the petition, since 1986, and before the June 1995 contamination incident, NRC had taken enforcement action against NIH for violations of NRC requirements concerning security and control of radioactive materials, occupational overexposures, surveys, monitoring, and dosimetry.⁵ Although many of these enforcement actions involved Notices of Violation for SL IV violations and no civil penalty, they still constitute enforcement action taken by NRC.⁶

The requirements of sections 20.1801 and 20.1802 to secure and control licensed material are absolute in that the rules specify no radioactivity thresholds. NIH established a threshold amount for the security of radioactive materials located in laboratories based on Part 20, Appendix C quantities and NUREG/CR-6204, "Questions and Answers Based on Revised 10 C.F.R. Part 20" (January 1994). The answer to Question 129 indicates, in part, that the security requirements described in sections 20.1801 and 20.1802 will not be enforced

⁴ NIH and NCI are two different licensees. Science Applications International Corp. holds NRC broad-scope license for activities at the NCI-Frederick Cancer Research and Development Center facility located at Fort Detrick in Frederick, Maryland (NRC License No. 19-21091-01). Prior to March 1995, the license was held by Program Resources Incorporated (PRI). Since 1985, NRC has issued to PRI six NOVs associated with either cited severity level (SL) IV violations or a monetary civil penalty: (1) during a February 1995 inspection, three SL IV violations were cited for inadequate surveys for P-32 personnel contamination, failure to perform thyroid bioassays, and failure to perform proper package surveys; (2) during a January 1993 inspection, two SL IV violations were cited for failure to wipe test packages and perform thyroid bioassays; (3) during a February 1991 inspection, one SL IV violation was cited for failure to perform package surveys; (4) during a January 1989 inspection, one SL IV was cited for failure to perform survey instrument calibration; (5) a \$2500 Civil Penalty was issued on February 27, 1987, for an SL III violation from an inspection performed earlier that month; and (6) a December 1986 inspection resulted in five violations being cited for extremity overexposure, inadequate training, improper transfer and disposal of radioactive material, and exceedance of the license possession limits.

⁵ (1) The June 11-13, 1990 inspection resulted in an NOV categorized at an SL IV, for failure to obtain specific user estimates of solid radwaste generation, as well as other noncited violations for loss of radioactive material that was licensee-identified (Report No. 90-001). (2) The July 8-12, 1991 inspection resulted in an NOV categorized at an SL IV for failure to secure radioactive material (Report No. 91-001). (3) The July 20-24, 1992 inspection identified an inadequate dose assessment for a lutetium-177 contamination incident, and resulted in an NOV characterized as an SL IV (Report No. 92-001). (4) The January 13, 1993 inspection resulted in an escalated enforcement action (EA 93-009) categorized at two SL IVS and one SL III for failure to survey after use of radioactive material, a failure to supply dosimetry for a P-32 worker, and a P-32 contamination extremity overexposure, respectively (Report No. 93-001). (5) The April and May 1994 inspections resulted in enforcement action (EA 94-123) categorized as two SL IVS for failure to secure, as well as a failure to survey, after using radioactive material (Report No. 94-001). The security violations from the April-May 1994 inspections also resulted in the issuance of a CAL on May 5, 1994. On July 12, 1994, an additional security violation resulted in the loss of a package containing 2.6 MBq (70 µCi) of iodine-125. The 1994 security violations were discussed at an enforcement conference held with the Licensee on July 27, 1994, and subsequently were cited as an SL IV in an NOV issued to NIH on August 16, 1994. (6) During the April and May 1994 inspections, an apparent violation was identified for incinerator operations (Report No. 94-001). On August 10, 1994, however, NIH informed NRC that it had permanently discontinued incineration operations at NIH in May 1994. Consequently, no enforcement action regarding incineration was taken.

⁶ See "General Statement of Policy and Procedures for NRC Enforcement Actions," 10 C.F.R. Part 2, Appendix C (1986-1995), and NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions" (July 1995), § VI.

for quantities of radioactive material described in Part 20, Appendix C, which are exempt from labeling by 10 C.F.R. § 20.1905(a). By an amendment request dated October 31, 1994, NIH asked for permission to store up to ten times Appendix C quantities of radioactive material per container in posted radioactive material use areas without the requirement for direct oversight or lock and key. In March 1995, NIH requested an exemption from the requirements of sections 20.1801 and 20.1802 to store less than Appendix C quantities in unlocked (and unattended) refrigerators or freezers in corridors. NRC approved the NIH request in June 1995 because these quantities did not require labeling.⁷ In response to the event of June 1995, NIH revised its security policy for radioactive materials to require that all licensed material must be in locked storage, or in a locked room, if otherwise unattended, effective October 26, 1995. On January 19, 1996, NIH submitted a license amendment to, among other things, permit licensed material that is exempt from the labeling requirements of section 20.1905(a) to be exempted from the revised October 26, 1995 NIH security policy. NRC renewed the NIH license on June 13, 1997, but did not authorize any exemptions to the security and control requirements of sections 20.1801 and 20.1802.

Petitioners are correct in stating that there have been security and control problems at NIH that required amelioration. In particular, the failure to secure refrigerators and freezers used to store radioactive reagents, and the failure to secure or maintain surveillance over laboratories, formed the basis for a series of NRC enforcement actions. Several CALs were issued to address security and control of radioactive material after the June 1995 contamination of Dr. Ma.⁸ On August 23, 1996, NRC issued an NOV and Proposed Imposition of Civil Penalty of \$2500 (EA 96-027) to NIH for failure to physically secure licensed material or maintain surveillance over it to prevent unauthorized removal. On May 20, 1997, NRC issued an Order Imposing Civil Monetary Penalty in the amount of \$2500 (EA 96-027), which NIH paid on June 6, 1997. Based on the inspections and the investigation, the NRC Staff does not conclude that these

⁷ See NMSS Technical Assistance Request dated June 19, 1995, from L. Camper, NRC Headquarters, to R. Bellamy, NRC Region I.

⁸ On July 21, 1995, CAL 1-95-011 was issued, which described the actions that NIH would take to reduce the possibility of further ingestion of radioactive material and to determine that the full scope of the personnel contaminations was known. On July 21, 1995, CAL 1-95-011, rev. 1, was issued to clarify certain points in the first CAL. On October 27, 1995, NRC issued CAL 1-95-018, which described the actions that NIH would take following an NRC special inspection on October 23 and 24, 1995, to further enhance and train NIH staff regarding security of radioactive material. On November 8, 1995, NRC issued CAL 1-95-018, Supp. 1, to further document the corrective actions that NIH took with respect to enforcement of the new NIH security policy, modifications to the surveillance plan for NIH laboratories, and other specific actions for inspections for NRC compliance. On December 1, 1995, NRC issued CAL 1-95-018, Supp. 2, to adjust each deadline within CAL 1-95-018 and its supplement. This supplement described the ongoing upgrades, to the radioactive material security program, that required that any posted room or area that contained radioactive materials in use, radioactive waste, or radioactive materials in unsecured storage, would be required to be locked when unoccupied. On June 7, 1996, NRC issued CAL 1-95-018, Supp. 3, to further clarify issues with regard to security and control of licensed radioactive material in building corridors and laboratory freezers at NIH.

violations were willful, contrary to the assertions of Petitioners. Moreover, although the AIT Report stated that the Licensee's violations of NRC security and control requirements could have been a contributing factor, after review of the various inspection and investigative results, the NRC Staff concludes that the violations of NRC security and control requirements did not contribute to the internal contamination of Dr. Ma, her fetus, or the other twenty-six NIH employees, including Dr. Zheng.

Since the 1995 contamination event at NIH, NRC performed several inspections of NIH. Additionally, over this period, NIH performed 90,857 laboratory audits. The most recent NRC inspection report in July 1997 found that NIH has made continuing and significant progress in improving the security and control of licensed radioactive material since the 1995 contamination event. For example, the average rate of noncompliance with NRC security and control requirements has declined to 0.25% of laboratories surveyed, from an average rate of 0.57% since the last NRC inspection of September 1996. *See* NRC Inspection Report No. 030-01786/97-001 (July 29, 1997). Additional enforcement action for security and control violations is not warranted.

In view of the above, Petitioners presented valid concerns regarding security and control of licensed material at NIH, and their request for enforcement action with respect to violations of NRC security and control requirements was granted in part as described above.

B. Dosimetry, Radiation Safety Training, and Ordering Radioactive Materials

Petitioners state that Dr. Weinstein, the Senior Investigator in the Laboratory of Molecular Pharmacology and the former supervisor of Petitioners, insisted that the Petitioners begin working with radioactive materials before they were given radiation safety training and, on two occasions, directed the Petitioners to use Dr. Weinstein's and another Authorized User's identification number to order radioactive material before Petitioners were assigned their own identification numbers. Petitioners state that the AIT found that during the first 3 months of their research, the Petitioners were given radioactive materials that had been ordered by a researcher who had since left NIH, which was not reported by the Authorized User, Dr. Weinstein, as required on NIH Form 88-1; and that in November 1994, Petitioners were using phosphorus-33 (P-33), a low-energy beta-emitting isotope requiring whole-body dosimetry (or whole-body badges) during its use, but that Petitioners had not been trained to use radioactive material. In addition, Petitioners state that an NRC interview of a former researcher revealed that she had ordered radioactive materials for herself and

shared them with other researchers, although these users were not listed on NIH's Form 88-1.⁹

NIH worker training, use of identification numbers for procurement of licensed materials with NIH Form 88-1, and dosimetry issuance and collection were reviewed during the October 23-24 and November 6-10, 1995 NRC inspections. As a result of those inspections, NRC cited NIH for several violations. Specifically, the Licensee was cited for allowing users to order radioactive materials electronically between October 3 and November 20, 1995, without the signature of the authorized investigator. This violation was cited as an SL IV (EA 96-027). Additionally, NIH was cited for permitting the use of sulfur-35, P-32, and P-33 by two researchers in October 1994, before providing the researchers with the training course entitled, "Radiation Safety in the Laboratory," on November 29, 1994. This violation was also cited as an SL IV (EA-96-027). NIH was not cited for Petitioners' use of P-33 without the use of whole-body dosimetry because neither the NIH License nor NRC regulations require such dosimetry for low-dose material. See Section III.C and note 12, below. NIH was cited, however, for violations of license requirements to use extremity dosimetry when using more than 185 MBq (0.5 mCi) of P-32 (EA 96-027).

Accordingly, Petitioners' request for enforcement action against NIH for violations of dosimetry, training, and ordering radioactive materials requirements was granted in part as described above.

C. NIH Routine Monitoring of, and Dosimetry for, Petitioners

Petitioners state that Dr. Ma was internally contaminated, in part as a result of NIH's failure to document Dr. Ma's exposure history at NIH, and failed to properly assess Dr. Ma's internal radiation doses, in violation of 10 C.F.R. §§ 20.1202, 20.1204, 20.1501, and 20.1502. Petitioners state that NIH did not routinely monitor Petitioners' exposure to radiation and radioactive material through use of an appropriate dosimetry program. Specifically, the dosimetry given to Petitioners when they first arrived at NIH was never collected or analyzed, no dosimetry was assigned to them at the time of Dr. Ma's contamination, and as a result Petitioners were not wearing dosimetry at the time of Dr. Ma's contamination. Petitioners state that in November 1994, Petitioners were using P-33, a beta-emitting isotope requiring whole-body dosimetry during its use, but Petitioners were not wearing required dosimetry, and Petitioners had never been issued dosimetry by Dr. Weinstein although they used P-32 in December 1994, and until March 1995.

⁹ These facts do not constitute a violation of NRC regulations or the NIH license.

NIH was not required to routinely monitor Petitioners' occupational exposure to radiation, or to document their occupational exposure history. Section 20.2106(a) of 10 C.F.R., "Records of individual monitoring results," provides, in part, that "[e]ach licensee shall maintain records of doses received by all individuals *for whom monitoring was required pursuant to § 20.1502 . . .*" (emphasis added). Section 20.1502(a) provides that "[e]ach licensee shall monitor occupational exposure to radiation and shall supply and require the use of individual monitoring devices by — (1) Adults *likely to receive*, in 1 year from sources external to the body, a dose in excess of 10 percent of the limits in § 20.1201(a)" (emphasis added). Based on NRC's review of information maintained by NIH for the past 10 years regarding occupational exposures at NIH, it is evident that it is not *likely* that any NIH user of NRC-licensed radioactive materials would exceed 10% of the applicable occupational standard in 10 C.F.R. § 20.1201.¹⁰ Accordingly, issuance of personnel dosimetry monitoring, although done by NIH as a prudent measure in operating its Radiation Safety Program, was not required by section 20.1502. Since monitoring of Petitioners was not required, the recording requirements of 10 C.F.R. § 20.2106 were not applicable to Petitioners.¹¹

Condition 29 of the NIH License required the use of extremity (wrist or finger) monitors by occupational workers using P-32 in quantities greater than 0.5 mCi (185 MBq), but did not require the use of whole-body dosimetry by persons using P-32 or P-33.¹² Based on a review of the Petitioner's laboratory notebooks, it appears that Dr. Ma did not use P-32. Additionally, Dr. Ma states that she advised her obstetrician that she had previously been working with low-dosage material (P-33) and, upon learning of her pregnancy, stopped handling radioactive isotopes altogether. Nonetheless, NIH internal documents demonstrate that NIH provided whole-body dosimetry to Petitioners on October 28, 1994.¹³ Although Petitioners' laboratory notebooks indicate that Dr. Zheng used P-32 on October 17, 1994, 11 days before receipt of a whole-body

¹⁰ In addition, during 1995, 6374 individuals at NIH were issued monitoring devices. Only one individual (other than Dr. Ma) using NRC-licensed materials exceeded 10% of the applicable occupational external dose standard [the total deep dose equivalent to this individual was reported as 550 millirem (5.5 mSv)].

¹¹ In addition, Regulatory Guide 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," addresses the applicability of the dose recording requirements when monitoring is not required. Regulatory Guide 8.34, ¶ 1.4, states that "[w]hile the results of required monitoring are subject to the dose recording requirements of § 20.2106, the results of monitoring provided when not required by § 20.1502 are not subject to the dose recording requirements."

¹² License Condition 29 requires conduct of the NIH program in accordance with the NIH license application dated July 28, 1986. Attachment 10-D of the July 28, 1986 application states that persons using or in close proximity to persons using gamma emitters, P-32, or radiation-producing machines "should wear body film badges." This is a recommendation, not a requirement, regarding whole-body dosimetry for only P-32. P-33 usage does not require any dosimetry. In addition, Attachment 10-D states that the "license requires extremity monitors for P-32 > 0.5 mCi." See *id.* at 35.

¹³ NIH "Response to Apparent Violations in Inspection Report Nos. 030-01786/95-002 (Redacted) and 030-01786/95-203" (May 23, 1996), Exhibit AIT-AV2-1.

dosimeter, this was not a violation of NIH License Condition 29. Moreover, because Petitioners never worked with more than 185 MBq (0.5 mCi) of P-32, they were not required to wear extremity dosimetry. Additionally, since the monitoring required by License Condition 29 is not required pursuant to section 20.1502, the results of that monitoring would not be subject to NRC dose recording requirements, contrary to the Petitioners' assertion. See note 11, *supra*.

NRC conducted two special-team inspections on October 23-24, 1995, and November 6-10, 1995, in which NIH personnel dosimetry issuance and collection were evaluated. Although review of exposure records during this inspection indicated that occupational doses to individuals from exposure to licensed materials were well below NRC limits, NIH was cited for one SL IV violation involving the failure to issue, wear, and return individual monitoring devices (EA 96-027).

Accordingly, Petitioners' request for enforcement action against NIH for violations of monitoring and dosimetry requirements was granted, in part, as described above.

D. Inventory Control of Radioactive Materials

Petitioners assert that NIH exercised poor inventory control of radioactive materials. Specifically, if NIH had accurately monitored the use and disposal of radioactive materials, particularly P-32, it might be possible to ascertain who had ordered, but not used, the requisite amounts of P-32 within the time frame of Petitioners' contamination, and possibly assist law enforcement officials to ascertain who contaminated Petitioners. Petitioners relied on the findings of the AIT that: (1) the accuracy of inventory records is questionable because researchers only estimate the amount of material removed from each vial, radioactive decay is rarely accounted for, and if the vial is not emptied (because the expiration date has passed), the users do not check the balance before disposal; and (2) the computerized inventory system NIH used to replace Form 88-1 does not comply with the NIH license because the electronic document does not include the signature of the Authorized User, and has no mechanism to reasonably verify that an Authorized User had placed an order for radioactive materials and had received those materials.

NIH places ultimate responsibility for the proper use of radioactive material on the Authorized User who orders the material. Authorized Users are permitted by NIH policy to order and share radioactive material with other users, and a Supervised User may work under more than one Authorized User. If an Authorized User wishes to transfer responsibility for material ordered under her/his authorization, an NIH 88-1 form must be completed transferring responsibility to another Authorized User. The RSO stated that routine laboratory audits

include checks to see who is using radioactive material and that unauthorized use is dealt with severely.

NIH License Condition 29 makes Authorized Users responsible for maintaining a record of the receipt, use, and disposal of radioactive materials under their authorization by use of Form NIH-88-16, "Isotope Receipt, Utilization, and Disposal Record" or equivalent. In addition, the RSO, in a memorandum dated October 3, 1995, reminded Authorized Users that transfers among other Authorized Users must be documented by completion of the same form and submittal of the form to the RSB before the transfer. During NRC inspections conducted October 23-24 and November 6-10, 1995, the inspectors were informed, during discussions with Authorized Users and RSB staff, that each shipment of radioactive material delivered has normally been accompanied by Form NIH 88-1. Authorized Users stated that they knew that they were required to keep records of the material currently on hand after loss by decay or disposal of material, and all those interviewed used the Form NIH 88-1. The inspectors did not identify any instances in which the inventory was not being kept current.

Regarding the Petitioner's concern about the accuracy of inventory records, NIH has recognized a need to review its radioactive material accountability portion of the Radiation Safety Program. Accordingly, the NIH RSO directed a complete and thorough physical inventory for radioactive materials during the latter half of 1996.¹⁴ As of June 23, 1997, this inventory was completed, and now serves as the baseline for an online, real-time tracking of all radioactive materials within the RSB's centralized database system. Each Authorized User receives a complete inventory of his/her materials from the centralized database each month and is requested by the RSB to adjust records consistent with his/her use and disposal of radioactive materials.

For the NIH Authorized User to track the use of individual items of NRC-licensed materials, a new computer-generated inventory and disposal form was developed and is currently in use at NIH. This system permits Authorized Users to make changes in users, if required, and to report disposal and other inventory changes to RSB for update in the centralized database. This system, not present before 1996, substantially enhances NIH's accountability for radioactive material. Increased accountability has received NIH senior management attention and is considered by NRC Staff to be a potential deterrent to the use of licensed radioactive materials for unauthorized purposes.

Initial use of the computerized inventory system, however, involved violation of NRC requirements. NIH License Condition 29 requires that the radiation safety identification number and name of all persons who will use the radioactive material, the name and signature of the Authorized User, be entered on form

¹⁴ See Letter from M. Gottesman, NIH, to R. Blough, NRC Region I, dated June 23, 1997.

NIH 88-1.¹⁵ Between October 3 and November 20, 1995, however, the Licensee allowed users to order radioactive materials electronically, without the signature of the Authorized User. In addition, an NIH 88-1, submitted for order and use of radioactive materials received on September 9, 1994, did not include the radiation safety identification numbers and names of all persons who would use the radioactive material. NIH was cited for these irregularities as an SL IV violation (EA 96-027).

Accordingly, Petitioners' request for enforcement action against NIH for poor inventory control of radioactive materials was granted in part as described above.

E. Timeliness of NIH Emergency Personnel Response to Contamination Incident

Petitioners contend that NIH personnel responding to the scene of the incident failed to respond in a timely manner to the contamination event, resulting in Dr. Ma's transport to Holy Cross Hospital more than 3 hours after discovery of her contamination. Petitioners state that after RSB officials confirmed Dr. Ma's contamination, they took 1 hour searching for a shower to decontaminate her, that RSB officials surveyed the conference room and refrigerator, and that RSB officials directed Dr. Ma to provide a urine sample, which confirmed that her contamination was internal.

Dr. Zheng reported the internal contamination of Dr. Ma to the NIH emergency number at approximately 5:58 p.m., shortly after discovery of her contamination. The first NIH personnel (two emergency medical technicians) responded immediately and arrived on the scene with an ambulance at approximately 6:00 p.m. Dr. Zheng also notified Petitioners' immediate supervisor, Dr. Weinstein, who was on the premises at the time. Dr. Weinstein, the Authorized User, contacted the RSB at 6:00 p.m. and notified the Chief of the Radiation Safety Operations Section about the contamination incident. In addition, the NIH Fire Department independently notified the Deputy RSO, at approximately the same time, of a possible radioactive material contamination event involving an "injection of radioactive material." (The Deputy RSO is at the top of the emergency call list for response to incidents involving radioactive materials). The Deputy RSO advised the RSO of the report at approximately 6:00 p.m. and contacted the NIH Occupational Medical Service (OMS) for information on the incident.

¹⁵ License Condition 29 requires conduct of the NIH program in accordance with the NIH license application dated July 28, 1986. Item 10.6 of the July 28, 1986 application required, in part, that the Authorized User provide to the Radiation Safety organization a completed Form NIH 88-1, "Request for Purchase and Use of Radioactive Materials," for each incoming shipment before the materials are released to the investigator. Form NIH 88-1 was provided as Attachment 10-F to the July 28, 1986 application. Form NIH 88-1 requires, in part, that the radiation safety identification numbers and names of all persons who will use the radioactive material, the name of the authorized investigator, and the signature of the authorized investigator, be entered on the form.

At approximately 6:15 p.m., the first of two responding RSB health physicists was notified by the RSB receptionist that a second health physicist was on the phone with the RSB Section Chief talking about a possible contamination event in Building 37. The two responding RSB health physicists picked up spill and skin decontamination kits (which is a routine and necessary event response function) and responded to Building 37. Both health physicists met the Deputy RSO in the RSB parking lot at Building 21, and were informed that Dr. Ma was being transported to OMS at Building 10. The health physicists responded directly to OMS and were advised by the physician on duty that Dr. Ma was still in Building 37. The health physicists then responded to the fifth floor of Building 37, arriving at approximately 6:40 p.m.

To determine if Dr. Ma's contamination was external or internal and to identify the source of the contamination, the RSB took several measures. The emergency medical technicians and the RSB both evaluated Dr. Ma's condition and questioned Petitioners about the source of her contamination. The RSB took smears of Dr. Ma's hands, neck, and face to determine if any of the contamination was removable and then had Dr. Ma change out of her clothes into clean scrubs to see if her clothing was radioactive. None of the smears, surveys, or clothes of Dr. Ma showed external contamination.¹⁶ The RSB asked Dr. Ma to submit a urine sample at approximately 7:00 p.m. The sample was surveyed by the RSB and found to contain radioactivity, indicating that the contamination was internal. The RSB health physicists performed surveys with portable radiation instruments to determine whether radioactive contamination was present in the laboratory, adjacent hallways and corridors, and in the conference room. Shortly after 8:00 p.m., NIH transported Dr. Ma to Holy Cross Hospital, where Dr. Ma arrived at approximately 8:20 p.m. Holy Cross was selected over Suburban Hospital, which was much closer, because Suburban Hospital did not have an obstetrics department.

Based on the inspections and the investigation, NRC Staff concludes that NIH personnel responded properly and in a timely fashion to the incident. The actions taken by NIH to determine whether Dr. Ma was externally or internally contaminated and to identify the source of her contamination are time-consuming steps that must be taken during event response to ensure that the spread of radioactive contamination is prevented, especially when the event involves the transfer of personnel off the Licensee's site and into a hospital setting. Moreover, because there were no signs of a life-threatening condition or immediate danger to Dr. Ma, which would have made immediate transport

¹⁶ Because Dr. Ma's clothing was not contaminated, there was no need for her to shower in order to remove external contamination. Petitioner's assertion that RSB took 1 hour searching for a shower to decontaminate Dr. Ma was not substantiated by the inspections or the investigation.

necessary, the Licensee's attention to these measures was eminently reasonable before transport of Dr. Ma to the hospital.

F. Defects in NIH Emergency Response to Dr. Ma's Contamination

Petitioners state that NIH's emergency response to Dr. Ma's contamination was defective in that NIH gave inappropriate and inadequate information and advice to Dr. Ma regarding her level of contamination, and failed to advise Dr. Ma concerning precautions to prevent spreading that contamination. Specifically, Petitioners state that one of the two RSB health physicists who responded to the event erroneously told Petitioners, before Dr. Ma's transport to Holy Cross Hospital and before any analysis concerning the extent of Dr. Ma's contamination, that the exposure Dr. Ma received was well within the allowable limits, that there was no risk to her, and, although it was not certain, that there appeared to be no problem posed to Dr. Ma's fetus. Additionally, Petitioners state that no one warned Dr. Ma about the possibility of vomiting as a consequence of her contamination, or instructed Dr. Ma as to appropriate steps to prevent contamination of her home as a result of vomiting. As a result, Dr. Ma contaminated her car and apartment.

The Petitioners are correct in stating that at the time that the two RSB staff responded to the event, there was no way (within the first few minutes) to determine if the radiation exposure that Dr. Ma received was within NRC regulatory limits, or if the dose received was harmful. Indeed, the only thing that could be determined at that time was whether or not the radioactive contamination was internal or external, which the RSB staff did effectively.

There are no NRC requirements concerning advice by licensees to their employees during emergencies concerning the possibility of further contamination of the employee's home and belongings. As occupational radiation safety workers at NIH, the Petitioners were required to, and did, complete formal radiation safety training on November 29, 1994. As part of that training, personnel protective procedures were described to limit the exposures from both external and internal sources of radiation. In addition, as part of their required daily radiation surveys, the Petitioners were aware of the potential hazards associated with contamination and radioactive material in their control and the need to isolate and remove any detected contamination.

On the evening that Dr. Ma became internally contaminated with P-32, the RSB staff at NIH and the hospital staff at Holy Cross informed Dr. Zheng that Dr. Ma's blood and urine were contaminated. The next day, the RSB staff surveyed the Petitioners' automobile because Dr. Ma had indicated that she had vomited in it earlier that morning. RSB staff found contamination inside the passenger's side of the car and decontaminated the affected area immediately. RSB staff also surveyed the Petitioners' apartment where contaminated areas

were cleaned up or physically removed material for radioactive decay. Effective communications during emergencies are difficult, at best, and might have been improved by reminding Dr. Ma of the *potential* for not only her excreta being contaminated, but also any other bodily fluids released as well. However, the failure to fully advise Dr. Ma of the potential spread of contamination via body fluids was not a violation of any NRC requirement.

Petitioners also state that the NIH response to Dr. Ma's contamination was defective because RSB officials failed to secure the area, thus providing an opportunity for NIH personnel to tamper with or contaminate evidence.¹⁷ In fact, before departing the scene of the event on June 29, 1995, NIH RSB personnel locked the conference room and marked it with security tape. The NIH RSB also asked Dr. Weinstein to secure the laboratory, which he did by locking it. On June 30, 1995, the NIH RSB changed the locks to the conference room, and again locked the laboratory and then secured it with police tape. Based on a review of the evidence, NRC concludes that NIH took all reasonable measures to secure the scene after responding to the event.

G. NIH Conduct of Surveys After Contamination Incident

Petitioners state that in violation of 10 C.F.R. § 20.201(b) and an October 14, 1992 commitment by NIH to emphasize to all users the importance of notifying Radiation Safety promptly of spills of radioactive materials when there is personnel contamination, NIH failed to conduct surveys reasonably necessary under the circumstances surrounding discovery of Dr. Ma's contamination on June 29, 1995, and thus failed to detect P-32 contamination of a water cooler until July 14, 1995, which caused an additional twenty-six people, including Dr. Zheng, to become internally contaminated.

NRC stated in its AIT report of January 13, 1997, that because NIH did not survey the water cooler in the corridor near Petitioners' laboratory until July 14, 1995, twenty-six other individuals (besides Dr. Ma) were internally contaminated with P-32 by drinking water from the cooler. After review of all the evidence, however, the Staff concludes that, although it would have led to a more desirable outcome to have identified the contaminated water cooler earlier, under the circumstances, NIH conducted all reasonably necessary surveys. When NIH safety response personnel were called to the scene, Dr. Ma and Dr. Zheng insisted that Dr. Ma had been contaminated by food that she

¹⁷ Petitioners assert that this provided Dr. Weinstein with an opportunity to "find" a coffee cup with a centrifuge tube, both contaminated, that RSB officials attest were not present when they surveyed the same area earlier, and that, on his own initiative, Dr. Weinstein put the items in a plastic bag and moved the items into his lab and locked the door. In fact, two NIH employees had seen the coffee cup and centrifuge tube in the hallway near Petitioners' lab over a period of 1 to 7 days before the event. Additionally, the NIH RSB directed Dr. Weinstein to put these items aside for the NIH RSB's later examination and to secure the laboratory.

had stored in the conference room refrigerator. Dr. Ma and Dr. Zheng also told RSB personnel that they brought all their own food and beverages to work with them. Immediately after the event, Dr. Ma and Dr. Zheng denied that they drank any liquid from Building 37, and stated that they brought all liquids from home. In the days after the incident, Dr. Zheng denied drinking water from the water cooler. Nonetheless, NIH sought to determine if other individuals also had been internally contaminated. After specimens provided by other NIH employees on July 13, 1995, demonstrated their internal contamination with P-32, and in an attempt to identify a common source of contamination, NIH surveyed the water coolers and coffee stations on the fifth floor of Building 37 on July 14, 1995, and identified contamination in a water cooler located in the hallway. Only later did Drs. Ma and Zheng tell the NIH RSB that they had drunk from the contaminated water cooler. Finally, although NRC's AIT inspection arrived at NIH on June 30, 1995, one day after the discovery of Dr. Ma's contamination, NRC Staff did not consider the possibility that Dr. Ma might have been contaminated by using a water cooler or suggest surveying water coolers.

Accordingly, the NRC Staff concludes that under the circumstances, NIH did not fail to conduct reasonably necessary surveys after discovery of Dr. Ma's contamination, in violation of 10 C.F.R. § 20.1501(b).¹⁸

H. Procedures for Collection of Samples in Contamination Events

Petitioners state that before Dr. Ma's internal contamination, NIH failed to have a procedure in place to provide clear instructions to Dr. Ma about sample collection. Petitioners note that John Glenn, Ph.D. (Dr. Glenn), Chief, Radiation Protection and Health Effects Branch, Office of Nuclear Regulatory Research, NRC, stated at the December 19, 1995 Commissioner briefing that NIH "lost information about early excretion of P-32 because clear instructions were not provided to the exposed individual about sample instruction [collection of samples]."¹⁹

The events and transcript from the December 19, 1995 Commissioner briefing on *The Generic Implications of Recent Events Involving Ingestion of Radioactive Material at Research Facilities* reveal a similarity between the NIH AIT and the Massachusetts Institute of Technology (MIT) Incident Investigation Team (IIT) events in that both licensees lost information about early excretion of P-32 because clear instructions had not been provided to the exposed individual about

¹⁸ At the time of the incident, 10 C.F.R. § 20.1501(a) required licensees to perform surveys that are reasonable under the circumstances. On January 1, 1993, 10 C.F.R. § 20.201, with a similar requirement, became extant.

¹⁹ Dr. Glenn's comment was made before full information was available regarding sample collection after the NIH event. With the benefit of all the evidence, it is now apparent that clear instructions were provided to Dr. Ma and that no information was lost. See Section III.K.2.

how to collect samples. Although there is a considerable amount of guidance in the scientific literature available on the management of contaminated persons, NRC Staff determined that it would be beneficial to provide guidance to licensees on the levels of intake that should be considered for medical evaluation, the available methods to reduce the committed dose resulting from an intake, as well as guidance for the collection of samples for analysis. Consequently, NRC Staff has completed its evaluation of current regulatory guidance on the collection of samples for analysis, as well as the analysis of intakes, and will revise the existing regulatory guidance to licensees.

Accordingly, the Petitioners' request for NRC action to ensure adequate procedures and instructions to exposed persons for sample collection is granted as described above.

I. Dr. Weinstein's Interactions with NIH Radiation Safety Response Personnel

Petitioners state that Dr. Weinstein interfered with the NIH radiation safety response to Dr. Ma's contamination, and delayed transport of Dr. Ma to the hospital for emergency treatment. Specifically, Petitioners state that Dr. Weinstein performed smear tests, directed Dr. Ma to drink a lot of water, argued with NIH RSB officials about how to save urine samples in order to get a correct determination of the amount of radiation Dr. Ma had ingested, attempted to interfere with RSB personnel efforts to question and counsel Dr. Ma about the biological effects of radioactive materials and her contamination, tried to answer questions asked of Dr. Ma by RSB personnel, and attempted to usurp RSB functions by conducting a survey of the NIH conference room where Dr. Ma had stored her food.

Based on the inspections and the investigation, NRC concludes that Dr. Weinstein did not interfere with the reasonable and necessary NIH radiation safety personnel measures in response to the contamination event, delay Dr. Ma's transport to the hospital, or usurp or attempt to usurp RSB functions. Both Dr. Weinstein and Dr. Zheng provided assistance to NIH RSB personnel in counting smears taken from Dr. Ma by RSB personnel. Dr. Weinstein reasonably asked Dr. Ma to drink liquids. (Dr. Weinstein recalled that the NIH RSB recommended over the phone that Dr. Ma drink liquids to stay hydrated.) The Holy Cross Hospital ER physician and the NIH RSO agreed that intravenous hydration of Dr. Ma was advisable. Petitioners state that Holy Cross Hospital issued instructions to Dr. Ma on her discharge to maintain good hydration. Additionally, the RSB directed Dr. Ma to provide a urine sample for immediate survey, a measure necessary for the NIH RSB to determine with certainty whether Dr. Ma was internally contaminated and thus whether to transport Dr. Ma to the hospital. The evidence does not corroborate the Petitioners' assertion that Dr. Weinstein

argued with RSB personnel about the proper procedure for saving specimens from Dr. Ma. NIH RSB personnel at the scene described Dr. Weinstein as urging Dr. Ma's immediate transport to the hospital, along with Dr. Zheng, and as being impatient. Dr. Weinstein was not the only non-RSB person to survey the conference room. Dr. Zheng told an NIH colleague that he had found radioactive contamination in the conference room by surveying it. That colleague and a second colleague then surveyed the conference room for contamination shortly before arrival of the RSB. Dr. Weinstein went to survey the conference room after a third and a fourth colleague had already begun surveying the room.

J. Medical Care of Dr. Ma and Treatment to Reduce Her Contamination

Petitioners state that NIH personnel gave conflicting and harmful directions to Holy Cross ER personnel which delayed Dr. Ma's treatment, that NIH provided inadequate medical treatment of Dr. Ma, which was completely ineffective to reduce her contamination, and that the only effort NIH made to hasten the removal of the ingested radioactivity was to give Dr. Ma intravenous infusions of fluid at Holy Cross Hospital. Petitioners state that the Holy Cross ER physician's attempt to consult with REAC/TS in Oak Ridge, Tennessee, was frustrated because the Holy Cross Hospital telefax machine was unable to receive information from REAC/TS. Petitioners believe that Dr. Ma should have been given phosphate orally as the buffered sodium salt, calcium intravenously, and parathyroid intramuscularly, but was only given intravenous infusions of fluid (hydration therapy), based on directions by NIH personnel, which resulted in no discernible enhancement of P-32 elimination.

Petitioners state that Dr. Weinstein's presence in Dr. Ma's treatment points up fundamental flaws in NIH medical intervention and investigative security protocols, and the fact that Dr. Ma was directed by the Holy Cross ER physician to follow up with Mr. Zoon, Dr. Weinstein, and Dr. Ma's personal obstetrician-gynecologist (OB-GYN) "demonstrate [s] that the ER physician looked to NIH officials, including Dr. Weinstein, to direct treatment of Dr. Ma for internal contamination."

Petitioners state that NIH provided inadequate medical care to and followup on Dr. Ma. Specifically, NIH had no plan in place to ensure that one single person was in charge of directing and coordinating a contaminated employee's medical care and followup. No one from NIH met with Dr. Ma to discuss her contamination levels, and what, if any, medical treatment might decrease her contamination levels, except for a copy of the early NIH contractor, Oak Ridge Institute for Science and Education (ORISE) intake calculation of 9.8 MBq (265 μ Ci), given to Dr. Ma in July 1995 by the NIH RSO. The NIH OMS failed to provide any medical care or followup treatment to remove the ingested

radioactivity. Petitioners state that Dr. Stansbury of OMS examined Dr. Ma on June 30, 1995, and that no services were provided by OMS after that date, except to request blood work results. Petitioners state that although Dr. Ma told Dr. Stansbury of her severe lower thoracic pain, Dr. Stansbury attributed the pain to Dr. Ma's pregnancy and recommended no followup other than for Dr. Ma to see her OB-GYN.

Petitioners state that on August 4, 1995, they visited OMS and reported that Dr. Ma was experiencing vomiting and severe pain in her lower right side, but that Dr. Ma was again referred to her OB-GYN. Petitioners state that on August 8, 1995, Dr. Ma again reported to OMS that she continued to experience frequent vomiting and nausea, and again no treatment or intervention was suggested. After the end of July 1995, no one from NIH requested additional urine samples from Dr. Ma, only blood samples. Dr. Ma states that subsequent tests revealed that the cause of Dr. Ma's lower thoracic pain was a significant liver function abnormality resulting from her contamination.²⁰

NIH took reasonable and appropriate measures to determine whether Dr. Ma's contamination presented a life-threatening condition or immediate danger to Dr. Ma and her fetus, and whether her contamination was external or internal, before transporting Dr. Ma to a hospital for treatment. *See* Section III.E, *supra*. NIH also contacted the on-call physician from REAC/TS and put the REAC/TS physician in direct contact with the ER physician at Holy Cross Hospital, thus making expert advice available to Holy Cross Hospital and expediting Dr. Ma's treatment by Holy Cross Hospital. The ER physician decided not to follow the recommendation of the REAC/TS physician to administer a phosphate solution for dilution and displacement of the P-32 because of Dr. Ma's pregnancy. After consultation with both the REAC/TS physician and the NIH RSO, the ER physician ordered intravenous infusions of fluids (hydration) in order to dilute Dr. Ma's internal contamination, as was his prerogative. Additionally, based on the inspections and the investigation, NRC cannot conclude that Dr. Weinstein influenced or interfered with the Holy Cross ER physician's treatment decision regarding Dr. Ma's contamination. Before he arrived at Holy Cross at approximately 11:15 p.m., Dr. Weinstein was aware that the NIH RSB recommended that Dr. Ma "push" fluids in order to maintain hydration. *See* Section III.I, *supra*. The IV hydration ordered for Dr. Ma was started around 9:00 p.m., long before Dr. Weinstein arrived at Holy Cross or spoke to the ER physician.

Moreover, based on the medical information made available by Petitioners to NRC's Medical Consultant, the NRC concludes that the symptoms reported by Dr. Ma were not related to her ingestion of P-32. The professional literature

²⁰ Medical data provided by Petitioners did not substantiate this assertion.

reveals three cases in which persons were inadvertently administered high levels of P-32.²¹ The intakes in these cases were approximately fifteen to thirty times greater than Dr. Ma's intake of between 30.3 and 48.1 MBq (820 to 1300 μ Ci) of P-32. The person with the highest intake reported symptoms that were consistent with low blood counts, an expected response to exposure to relatively high radiation doses. Blood count depressions, with no symptoms, were observed in the other two cases. NRC's Medical Consultant concluded that Dr. Ma's white blood cell count, white blood cell differential count, and her platelet count were all within normal limits, and that minor abnormalities in Dr. Ma's hematological profile, which did not include blood count depression, were consistent with typical plasma volume expansion during pregnancy. Additionally, radiation intakes sufficiently large to cause nausea and vomiting are accompanied by a depression or ablation of the bone marrow, which was not indicated by Dr. Ma's laboratory data. Finally, experience with intakes of P-32 much larger than Dr. Ma's intake, both accidental and as part of medical treatment, in which P-32 is frequently injected intravenously in doses seven to fifteen times greater than Dr. Ma's intake, has not been observed to produce clinical symptoms. Accordingly, the NRC concludes that any symptoms Dr. Ma may have experienced, such as nausea and vomiting,²² resulted from causes other than her ingestion of P-32.

NRC licensees are clearly required to determine the nature and extent of radiological overexposures to occupational workers and members of the public, to maintain records of such exposures, and to provide notifications to exposed individuals and reports to NRC. *See, for example*, 10 C.F.R. §§ 19.13, 20.1204, 20.1501, 20.1502, 20.2106, 20.2107, 20.2202, 20.2203, 20.2205, and 20.2206. NRC requirements, however, impose no additional obligations upon licensees to provide medical care and followup to individuals exposed to radioactive materials for the purpose of removing radioactive contamination or ameliorating the medical effects of contamination.

In view of the above, to the extent that Petitioners are dissatisfied with the medical treatment provided to Dr. Ma by Holy Cross Hospital, or with any medical care provided by NIH to Dr. Ma apart from dose assessment, dose recordkeeping, or notification and reporting of Dr. Ma's dose, Petitioners' remedies, if any, do not lie with NRC.

²¹ *Blood*, Vol. 61, No. 4 (1983), at 746-50; *Schweizerische Medizinische Wochenschrift (Journal Suisse de medecine)*, Vol. 124, No. 42 (Oct. 22, 1994), at 1848-51; and *American Journal of Medical Sciences*, Vol. 254, No. 4 (Oct. 1967), at 451-63. *See also* NUREG-1535, "Ingestion of P-32 at Massachusetts Institute of Technology, Cambridge, Massachusetts, Identified on August 19, 1995" (December 1995).

²² Dr. Ma's reported nausea and vomiting started long before her ingestion of P-32. An NIH technician observed Dr. Ma "always" vomiting at NIH for approximately 2 months prior to the contamination event.

K. Estimates of Internal Contamination of Dr. Ma and Her Fetus

Petitioners state that NIH failed to take proper actions to accurately assess, and as a result, greatly underestimated Dr. Ma's internal contamination, that NIH failed to consider all the relevant data in assessing Dr. Ma's internal contamination, demonstrating that NIH is not able or willing to impartially evaluate its worker's radiation exposure levels when exposures are in excess of federal limits, and that NIH lied to Dr. Ma, to federal regulators, and to the public, about the magnitude of the exposure and the likely harm to Dr. Ma and her fetus. Specifically, the Petitioners state the following:

- NIH failed to take suitable and timely measurements from Dr. Ma to accurately calculate her occupational dose, in violation of 10 C.F.R. § 20.1204(a). NIH should have taken a full 24-hour urine sample following detection of Dr. Ma's contamination. Over the first 2 days, urine was collected as spot samples at each void, rather than collecting the entire urinary excretion over a 24-hour period as recommended by NUREG/CR-4884, "Interpretation of Bioassay Measurements" (1987). Additionally, NIH should have continued 24-hour urine collections and analysis until the activity level of the samples no longer yielded useful results. Instead, the NIH dose evaluation was based solely on samples collected during the first month following the intake.
- NIH incorrectly suggests that Dr. Ma is responsible for NIH's inadequate urine analysis because she returned a weekend's collection of urine in one carboy (a container), rather than three, and failed to follow through with continuing urine collection despite urging by NIH personnel. Dr. Ma did everything requested of her by NIH until it became evident that NIH had little interest in her health or in providing her medical care. NIH OMS and RSB officials asked Dr. Ma to collect all of her urine over the weekend following her contamination. Dr. Ma returned a weekends' urine collection in one carboy rather than three because two of the three wide-mouthed containers provided by RSB officials were defective and leaked. Dr. Ma was asked to bring in urine samples for the couple of weeks following her contamination. Dr. Ma collected her urine voluntarily until the end of July 1995, and submitted urine samples through July 27, 1995. Dr. Ma stopped providing samples because she did not receive any assistance or information from NIH. NRC estimated a significantly greater dose than did NIH, using the same information available to NIH.
- Between June 29, 1995, and July 27, 1995, Holy Cross provided NIH with twenty-five urine samples collected by Dr. Ma.
- Based on a whole-body scan performed by NIH on June 30, 1995, Dr. Jorge Carrasquillo, Acting Chief, Nuclear Medicine Department, NIH,

estimated that Dr. Ma had still retained a total of 862 μCi (31.9 MBq) of P-32 on that date.

- NIH's preliminary estimate of Dr. Ma's ingestion of P-32 on July 3, 1995, was approximately 300 μCi (11.1 MBq), which was not based on a 24-hour sampling of standard systemic excreta data as recommended by NUREG/CR-4884 and the National Council on Radiation Protection and Measurements (NCRP) Report No. 87, "Use of Bioassay Procedures for Assessment of Internal Radionuclide Deposition" (1987). Additionally, the initial dose estimate relied entirely on analysis of urine samples and was not confirmed through analysis of fecal samples, which led to significant understatement of Dr. Ma's internal contamination.
- The July 5, 1995 NIH estimate of Dr. Ma's intake was 265 μCi (9.8 MBq) of P-32 and was not based on the total volume Dr. Ma excreted, but was based on a sample. When the NIH RSO provided Dr. Ma with a copy of the ORISE estimate, he told Dr. Ma that the NIH estimate was "more or less the same."
- By letter dated July 28, 1995, Mr. Zoon advised NRC's Region I Office that evaluation of the total intake of Dr. Ma was continuing and could result in an estimated intake potentially exceeding the 10 C.F.R. Part 20, Appendix B Annual Limit on Intake (ALI) for P-32 of 600 μCi (22.2 MBq).
- At NRC's request, NIH asked its first consultant, ORISE, to confirm isotopic analyses performed by the NIH RSB with four of the first fifteen urine specimens taken on June 29 and 30, 1995, and with three urine samples and one blood sample. None of the samples was taken from a full 24-hour period and NIH failed to take any fecal samples. The August 15, 1995 revised estimate of Dr. Ma's intake performed by ORISE for NIH was between 740 and 820 μCi (27.4 and 30.3 MBq), resulting in an effective dose equivalent to Dr. Ma of between 5.8 and 6.4 rem (58 and 64 mSv), and to her fetus a dose of between 4.6 and 5.1 rem (46 and 51 mSv).
- On August 29, 1995, NIH transmitted to NRC the "final" NIH assessment of Dr. Ma's effective dose equivalent as 4.17 rem (41.7 mSv), based upon an estimated intake of 500 μCi (18.5 MBq), and of the dose to her fetus as 3.2 rem (32 mSv). This analysis was not conducted in accordance with draft ANSI N13.30, "Performance Criteria for Bioassay" (1989). NIH also failed to continue the collection and analysis of excreta to ensure that Dr. Ma's excretion of P-32 followed the mathematical model NIH had used to predict her initial dose, and NIH failed to account for the effect of hydration therapy when initially evaluating the urine data. NIH's use of the "weighted least-squares fit" method to

assign its final dose is unacceptable because actual excretion does not follow the anticipated model.

- NRC's estimate of Dr. Ma's intake was between 30.3 and 48.1 MBq (820 and 1300 μ Ci) and of her internal committed effective dose equivalent (CEDE) was between 80 and 127 mSv (8.0 and 12.7 rem). Although both NRC and Petitioners' consultant excluded data from the first 2 days of urine collection as unreliable, NIH relied on those data primarily.
- The Petitioners' consultant estimated that Dr. Ma ingested 1000 μ Ci (37 MBq) of P-32 corresponding to a CEDE of 9.2 rem (92 mSv), and that her fetus received a dose of between 3 and 6.4 rem (30 and 64 mSv), based on an analysis of eleven urine specimens collected from Dr. Ma between June 29 and August 23, 1995.

Despite the inherent limitations in analysis based on excreta data and some differences in the assumptions used to evaluate the ingested activity and radiation dosimetry, the final estimates obtained by NIH, the Petitioners', and NRC are reasonably close. See Table 1, *infra*. Accordingly, the Petitioners' concerns that NIH did not accurately assess Dr. Ma's dose and the dose to her fetus are unsubstantiated.

Table 1. Final Estimates of Radiation Dose to Dr. Ma and Her Fetus					
		Dr. Ma's Dose Estimate		Dr. Ma's Fetal Dose Estimate	
Organization	Date	(rem)	(mSv)	(rem)	(mSv)
NIH	7/96	4.7-7.0	47-70	3.7-5.4	37-54
NRC	12/95	8.0-12.7	80-127	5.1-8.1	51-81
Petitioners' consultant	10/95	9.2	92	3.0-6.4	30-64

1. Petitioners' Estimates

Petitioners retained the services of David A. Dooley, Ph.D., a Certified Health Physicist with expertise in internal dose assessment, to perform an assessment of the radiation dose and its effects upon Dr. Ma and her fetus. Based upon radioanalysis conducted by TMA/Norcal Laboratory, of eleven urine specimens collected by Dr. Ma between June 29 and August 23, 1995, Dr. Dooley estimated that Dr. Ma received an exposure of 9.2 rem (92 mSv) and that her fetus received an exposure of 3.0 and 6.4 rem (30 and 64 mSv). Although Dr. Ma continued to submit urine samples to Dr. Dooley until October 4, 1995 analysis of those samples did not result in revision of Dr. Dooley's estimates.²³ Dr. Dooley estimated that, because of the P-32 intake, Dr. Ma would suffer an

²³ See Letter dated April 16, 1996, from Judith A. Wolfer, Esq., to Cynthia Jones, NRC.

increased lifetime excess cancer risk of approximately 30% to 83%, and her fetus would experience a risk of childhood cancer "30 to 150 times that of an unexposed child."²⁴

2. NIH Estimates

NIH performed an assessment of Dr. Ma's intake of P-32, the resultant radiation exposure received by Dr. Ma, and the radiation exposure received by her fetus based on urine specimens collected by Dr. Ma.

On June 29, 1995, the NIH RSB gave instructions to collect all of Dr. Ma's urine to Dr. Ma, to the paramedics who transferred her to the hospital, and to the Holy Cross ER physician. The Licensee also contacted radiation emergency medical professionals via telephone at REAC/TS and arranged for the REAC/TS physician to speak directly with the Holy Cross Hospital ER physician, to assist with the evaluation of Dr. Ma's P-32 intake and the radiation dose to Dr. Ma and to her fetus. Given the apparent level of P-32 internal contamination, Dr. Ma's pregnancy, and the ER physician's lack of experience in dealing with radioactive material internal contamination events, this was an eminently reasonable measure. The REAC/TS physician, who also happened to be an OB/GYN, believed that medical intervention at the hospital would not have been very effective in inhibiting phosphorus absorption from the gastrointestinal tract because, by the time Dr. Ma had arrived at Holy Cross, and based on discussion with the RSB, the REAC/TS physician understood that over 9 hours had elapsed since the suspected ingestion and the P-32 would have essentially been totally absorbed over this time period. The REAC/TS physician also asked the ER physician to instruct Dr. Ma to collect 24-hour urine samples for evaluation of P-32 kinetics."²⁵ The Holy Cross ER physician recalled that the NIH RSO requested that all of Dr. Ma's urine was to be measured, the volume for each void recorded, and then all of the urine to be placed in one container every 24 hours. In addition, Dr. Weinstein suggested to the ER physician that each urine void, at least during hospitalization, be saved separately, so that more time points would be available for modeling in determining the radiation exposure. He also suggested that the same could be accomplished by saving a small sample from each void (and recording the volume collected), separate from the continuing 24-hour collection. Dr. Weinstein believed that either procedure, if followed, would result in the availability of more information and no loss of urine.

The Holy Cross ER physician decided to develop his own method for collection of urine, and instructed his nurses that each time Dr. Ma voided, the

²⁴ See Letter from Dr. David Dooley, dated April 15, 1996, to Debra C. Katz, Esq.

²⁵ Letter from Ronald E. Goans, Ph.D., M.D., REAC/TS, dated November 8, 1995, to Shawn W. Goggins, NIH, and Memorandum from Ronald E. Goans, Ph.D., M.D., dated July 17, 1995, to Dr. Robert Ricks, REAC/TS.

amount would be measured, a small sample of each void would be maintained separately, and the rest would be put into one large container. The instructions given by the Holy Cross ER physician to Dr. Ma for collection of urine did not differ significantly from the recommendation of the REAC/TS physician, or of Dr. Weinstein, and were appropriate for proper assessment of Dr. Ma's intake and exposure, as well as that of her fetus. Holy Cross Hospital instructed Dr. Ma to collect urine on a 24-hour basis. When Dr. Ma reported to RSB on June 30, 1995, she brought the urine collected since departing Holy Cross, and was instructed to continue collecting urine on a 24-hour basis.

NIH states that when Drs. Ma and Zheng reported to the RSB for followup at 11:00 a.m. on June 30, 1995, they brought with them Dr. Ma's urine, in tubes and a container, and stated to RSB staff that was all the urine collected at the hospital and since discharge. Later that day, when Dr. Ma complained of back pain, she was escorted, at RSB's recommendation, to the NIH OMS where she was examined by a physician, and additional urine and blood samples were taken for radioanalysis. The results of the blood samples were within the expected range for a woman in her 17th week of pregnancy. Dr. Ma returned for a gamma camera scan at 5:00 p.m. at the NIH Clinical Center, and at that time was provided three carboys by RSB for the upcoming weekend and was advised to collect all her urine over the weekend using one carboy for each day. NIH states that on Monday, July 3, 1995, Dr. Ma returned only one carboy full of urine, stating to RSB staff that it was the urine from the evening of June 30 to July 1, 1995.

Based on NIH's preliminary notification, NRC issued PNO-I-95-025, "Internal Contamination of Researcher," on July 3, 1995, which stated that NIH had indicated that a 32-year-old female, who was in her fourth month of pregnancy, had received an estimated ingestion of approximately 11.1 MBq (300 μ Ci) of P-32.²⁶

Subsequent urine samples, when received from Dr. Ma, were analyzed promptly. NRC's AIT determined that the Licensee analyzed all samples accurately, as confirmed by the analyses performed for NRC by ORISE, and by NRC's Region I Laboratory. The periodic reanalysis of samples by the Licensee to ensure that the samples contained no additional radioactive contaminants was appropriate.

On August 29, 1995, based upon additional urine analysis, NIH performed another assessment of Dr. Ma's exposure. NIH calculated Dr. Ma's effective dose equivalent to be 4.17 rem (41.7 mSv), based upon an estimated intake of

²⁶ PNs constitute early notice of events of possible safety or public-interest significance. Information contained in PNs is received without any verification or evaluation, and is basically all that is known by the licensee and NRC Staff as of the date of issuance to the public. They are also known as preliminary notifications of occurrence (PNOs).

500 μCi (18.5 MBq), and the dose to Dr. Ma's fetus to be 3.2 rem (32 mSv). This reassessment was based on a total of twenty-six urine samples obtained from Holy Cross Hospital and Dr. Ma.

In 1996, NIH contracted with Skrable Enterprises, Inc., to perform a reassessment of all available urine data, as well as an evaluation of creatinine levels in the urine samples in order to confirm sample validity. This consultant suggested modification of the standard model parameters for the short-term retention compartments and use of creatinine-normalized data to improve the fit of the estimate to the sample data. These suggestions accounted for the varying time periods of sample collection. Based upon this reassessment, NIH revised its estimate of Dr. Ma's CEDE to between 4.7 and 7.0 rem (47 and 70 mSv), corresponding to an intake range of between 570 and 840 μCi (21.1 and 31.1 MBq). The revised dose to the fetus was calculated to be between 3.7 and 5.4 rem (37 and 54 mSv). Also on July 30, 1996, NIH RSB staff delivered its revised estimates entitled, "Report of 1995 Radiation Dose, NRC License 19-00296-10," to Dr. Ma at NIH, which summarized the doses described above and stated that the "levels (received by Dr. Ma) are considered to be safe and are not expected to result in a health impact."²⁷

Regarding the concerns of the Petitioners' that NIH failed to account for the effect of hydration therapy, NIH's report of its last estimate of Dr. Ma's 1995 occupational radiation dose states that NIH's consultant was not only aware of the large variation exhibited by the bioassay data as a result of hydration therapy, but accounted for these differences by using a modified biokinetic model and creatinine-normalized urine data to account for the large variances in the bioassay data. Moreover, the last NIH estimates are reasonably close to those of NRC and the Petitioners. Accordingly, the effects of hydration therapy upon the NIH dose estimates appear to raise no cause for concern.

As to the Petitioners' concerns that NIH's use of the weighted least-squares fit method was unacceptable because actual excretion does not follow the anticipated models, NRC's second consultant, Lawrence Livermore National Laboratory (LLNL), performed an independent assessment of the NIH data to determine if differences in the dose estimates may have been due to the use of the different internal dose assessment codes. When the first two data values were removed from the NIH data set, the unweighted least-squares intake assessment using the CINDY code was 30 MBq (810 μCi). Intake assessments from CINDY using the LLNL-treated data set ranged from 20.7 to 40.7 MBq (560 to 1100 μCi). This range of results is also consistent with the ORISE intake estimates of between 22.9 and 30.3 MBq (620 and 820 μCi). These results indicate that differences in correcting for 24-hour excretion also do not

²⁷ See NIH Memorandum from the NIH RSO, dated July 30, 1996, to Dr. Ma.

significantly influence the intake estimates. Therefore, the differences in the dose assessments between NIH's August 29, 1995 estimate and NRC's estimate were mainly due to differences in data handling. The major difference in these two dose estimates was the treatment of the sample data from the first few days post-intake. However, since the last NIH estimates now yield relatively close results with those of the Petitioners and NRC, NIH's use of the least-squares method in its earlier estimate is not cause for concern.

After the surveys and bioassays of persons who had access to the contaminated conference room, NIH determined that twenty-six individuals, including Dr. Zheng and in addition to Dr. Ma, were positive for P-32 contamination. All of the twenty-one individuals who were occupational workers as defined by 10 C.F.R. § 20.1003 received radiation exposures of less than 10% of NRC's annual occupational exposure limit of 50 mSv (5 rem) specified by section 20.1201(a)(1)(i). Of the five individuals who were members of the public, as defined by section 20.1003, one individual received a dose in excess of NRC's annual limit of 1 mSv (0.1 rem) for members of the public specified by 10 C.F.R. § 20.1301(a)(1). This individual's dose was estimated to be between 1.5 and 2.5 mSv (150 and 250 millirem).

Petitioners are correct in stating that the July 3, 1995 preliminary NIH estimates for Dr. Ma and her fetus' intake were not based upon full and complete data. NRC requires licensees to notify NRC within 24 hours of any event that may have caused, or threatens to cause, an individual to receive a dose exceeding 50 mSv (5 rem). 10 C.F.R. § 20.2202(b)(1)(i). Once information is reported to NRC, NRC issues a preliminary notification in accordance with NRC Inspection Manual Chapter 1120, §§ 1120-07 and 1120-08. These notifications promptly provide information to the Commissioners, as well as other NRC and Agreement State management, on matters that are of significant safety concern or have, or potentially could have, high public interest. These notifications, however, are not assumed to constitute final estimates.

As far as the Petitioners' concern that the NIH bioassay program was faulty in not collecting and analyzing fecal samples, NRC-approved models and methods provide guidance for the use of either urine or fecal samples. *See* NUREG/CR-4884, "Interpretation of Bioassay Measurements" (1987). Based on descriptions in the International Commission on Radiological Protection Publication 30, the biokinetic model for phosphorus predicts that about 80% of the ingested phosphorus is absorbed from the gastrointestinal tract and enters the bloodstream. From there, 15% is assumed to go directly to excretion through urine and feces, with a half-life of 0.5 day; 15% goes to intracellular fluids; 40% is incorporated into soft tissue; and 30% is incorporated into the skeleton. The 15% that goes to early excretion is considered to enter directly into the kidney/bladder compartment, from which it is eliminated within a 4-hour retention time. Because the route of Dr. Ma's intake was via ingestion,

and because there is little excretion of P-32 from the systemic compartment into the feces, NIH's use of urinary excretion data and decision not to use fecal excretion data was entirely appropriate.

Although NIH did not follow ANSI N13.30, they were not required to do so. Not only was this guidance issued as a draft for public comment at the time of the event, but NRC had not endorsed its use in any NRC Regulatory Guide.²⁸ Moreover, ANSI N13.30 is industry-issued guidance only, and does not constitute a regulatory requirement.

Petitioners are correct in stating that early reports from NIH of July and August 1995 were not based upon full and complete data. In hindsight, the August 29, 1995 report of NIH should not have been referenced as "final" assessments of dose. As NRC's LLNL evaluation points out, documented intakes of P-32 demonstrate an increase in urinary output of radiation over the first few days after intake. Since the concentration of phosphorus in the systemic compartments of the body is reflected in the urine, it is reasonable to conclude that urine activity may establish an equilibrium within a few days after the intake. Therefore, the early NIH dose assessments during the first month after the incident tended to underestimate the dose because of the nature of phosphorus biokinetics and the limited usefulness of internationally accepted models derived primarily for standard setting. It is understandable, however, that an internal dosimetrist may have a strong desire to maintain and use the first few days of bioassay samples. Continued use of these early excretion values also provides more consistency with early dose estimates, since these early values have more statistical weight. However, at long times after an intake (i.e., 20 to 30 days for P-32), an evaluation of the entire set of data must be performed relative to the projected values. It is during this time that a reevaluation should be made regarding the validity, usability, and statistical weight of the early times after intake. NIH's last set of consultants, as well as the NRC's and Petitioners' consultants, had the advantage of retrospective insight into the data, and based on that insight, did not use the urinary excretion data from the first few days after intake.

3. *NRC Estimates*

ORISE, serving as a scientific consultant to NRC, and using bioassay data provided by NIH, performed an assessment for NRC of the intake by, and resultant P-32 radiation Dr. Ma was exposed to, and of the radiation exposure received by her fetus. One of the major differences between the early estimates

²⁸ ANSI N13.30, "Performance Criteria for Radiobioassay," was issued as a draft standard for comment in September 1989, and was finalized in May 1996. NRC has not yet endorsed it for licensee use in any NRC Regulatory Guides.

of the Licensee and NRC was NIH's use of the annual limit on intake (ALI) that was based on Reference Man [70 kilograms (kg)], versus NRC's use of an ALI based on Reference Woman (57 kg). NRC requires licensees to calculate doses to individuals in accordance with ALIs that are based on Reference Man. See 10 C.F.R. Part 20, Appendix B, notes to Table 1, "Occupational." Because NRC's understanding was that Dr. Ma weighed approximately 53 kg, the model to calculate the ALI that more appropriately represented the circumstances of Dr. Ma's contamination was Reference Woman, and consequently all NRC dose estimates were based upon that model.

Because of the differences in the results of the assessments performed by the Licensee (dated August 26, 1995) and by NRC's scientific consultant to the AIT, ORISE (dated August 9, 1995), NRC contracted with a third party, LLNL, to independently review the assessments performed by the Licensee, and by ORISE, for NRC.

Based on the work of its consultants, NRC estimates that Dr. Ma ingested between 30.3 and 48.1 MBq (820 and 1300 μ Ci) of P-32, an amount of P-32 in excess of the 22.2 MBq (600 μ Ci) annual limit specified by Part 20, Appendix B, Table 1, col. 1. Based on these values, NRC estimates that Dr. Ma's internal CEDE was between 80 and 127 mSv (8.0 and 12.7 rem). The estimated radiation exposure received by Dr. Ma's fetus was between 51 and 81 mSv (5.1 and 8.1 rem). A more detailed discussion of NRC's dose assessment can be found in the AIT final report of January 13, 1997.

NRC also contracted with one of its medical consultants to review and characterize the safety significance of the exposures to Dr. Ma and her fetus, summarized in his final report dated September 4, 1996. Based on NRC's estimated exposures to Dr. Ma and her fetus, NRC's medical consultant concluded that no deterministic or stochastic effects to Dr. Ma, and no deterministic effects to her fetus are expected. In regard to potential stochastic consequences to the fetus, although there is moderate uncertainty in the data used for cancer risk estimation as a result of *in utero* radiation exposure, in this case, an excess risk of 0.33% is estimated (for comparative purposes, the natural risk of childhood cancers is about 0.1%). Thus the probability that the exposed fetus will *not* develop a radiation-induced childhood cancer is 99.67% (range 99.60 to 99.74%). It is unknown whether this risk estimate should be reduced because of the low dose and low dose rate associated with this internal exposure from P-32.

NRC performed a review of both the NIH AIT and the MIT IIT contamination events in order to determine if NRC guidance to licensees regarding instructions for collection of excreta and analysis of fetal dose based upon maternal uptake is adequate. As a result of this review, the staff issued additional guidance to licensees on analysis of fetal doses, NUREG/CR-5631, rev. 2, "Contribution of Maternal Burdens to Prenatal Radiation Doses" (May 30, 1996).

One of NRC's scientific consultants reviewed and confirmed the NIH estimates of dose received by the twenty-six individuals who drank from the contaminated water cooler. NRC concluded that no deterministic or stochastic consequences are expected for any of the twenty-six individuals, including Dr. Zheng, who were internally contaminated with P-32.

L. Directions to Hospital Emergency Room Personnel Concerning Assessment of Dr. Ma's Level of Contamination

Petitioners state that NIH personnel gave conflicting and harmful directions to Holy Cross ER personnel, which interfered with efforts to properly assess Dr. Ma's contamination. Specifically, the NIH RSO directed the ER physician at Holy Cross to collect the total volume of urine for a 24-hour period, whereas Dr. Weinstein instructed the ER physician to aliquot a small part of the samples already taken and to discontinue efforts to collect urine over a 24-hour period, in conflict with NUREG/CR-4884, "Interpretation of the Bioassay Measurements" (1987). Petitioners also state that the Holy Cross ER physician did not know whose instructions to follow and so developed a compromise plan, and when Dr. Ma was released from Holy Cross, no instructions were given to her to collect her urine at any interval.

NRC concludes that the NIH RSB gave appropriate instructions, in view of the limited NRC guidance available to licensees at the time of this event regarding urine collection, *see* Section III.H, *supra*, to Dr. Ma, to the paramedics who transferred her to the hospital on June 29, 1995, and to the Holy Cross ER physician for urine collection. Additionally, the three methods for collection of Dr. Ma's urine recommended to the ER physician by the REAC/TS physician, the NIH RSO, and Dr. Weinstein were not significantly different from each other or conflicting, and the instructions given by the Holy Cross ER physician to Dr. Ma for collection of urine were appropriate for proper assessment of Dr. Ma's intake and exposure, as well as that of her fetus. *See* Section III.K.2, *supra*. Accordingly, NRC Staff cannot conclude that Dr. Ma was given inadequate or conflicting instructions.

M. NIH Notification to Dr. Ma of Her Radiation Exposure Level

Petitioners state that in violation of 10 C.F.R. § 19.13(d), NIH deliberately failed to notify Dr. Ma of her estimated radiation exposure level at the same time such notification was provided to NRC. Specifically, the only NIH notification provided to Dr. Ma was a copy of the August 1995 ORISE report estimating her contamination at 265 μCi (9.8 MBq), despite NRC direction to NIH to make notifications required by section 19.13(d). As a result, before NRC's actions to

estimate her intake, Dr. Ma had to learn of her exposure levels from indirect sources and consulted with an independent health physicist at great personal cost.

NRC notified NIH by letter dated December 1, 1995, from Thomas T. Martin, Regional Director for Region I, and by letter dated January 29, 1996, from Charles W. Hehl, Director, NRC Region I, Division of Nuclear Material Safety, that NIH was required to make notifications pursuant to section 19.13(d) regarding the estimated radiation exposure of Dr. Ma and her fetus. The December 1, 1995 letter notified NIH that Dr. Ma received a dose in excess of the applicable occupational regulatory limits, 10 C.F.R. § 20.1201(a)(1)(i), specifically that NRC estimates her internal CEDE was between 80 and 127 mSv (8.0 and 12.7 rem) and that NRC estimates the radiation exposure received by Dr. Ma's fetus was between 51 and 81 mSv (5.1 and 8.1 rem).

By letter and facsimile dated May 15, 1997, counsel for Petitioners notified NRC that NIH had revised its dose estimates for Dr. Ma and her fetus, and Petitioners' counsel provided a copy to NRC of an NIH memorandum dated July 30, 1996, containing the revised estimates. Although this document is addressed to Dr. Ma, Petitioners' counsel state that Dr. Ma never received this memorandum and that NIH never notified her directly of her radiation dose after the accident.

NIH revised its original dose estimates after engaging an independent expert on internal dose assessment and bioassay interpretation to perform an analysis of the dose to Dr. Ma and her fetus. NIH's independent consultant completed its analysis and prepared a report to NIH dated March 4, 1996. NIH provided its memorandum dated July 30, 1996, summarizing Dr. Ma's 1995 revised radiation dose estimates for her and her fetus, to NRC at its request, on April 4, 1997, by facsimile. Based on the NIH consultant's report, NIH revised its dose estimates to a CEDE of between 4.7 and 7.0 rem (47 and 70 mSv) to Dr. Ma, corresponding to an intake range of between 570 and 840 μ Ci (21.1 and 31.1 MBq), and a dose of between 3.7 and 5.4 rem (37 and 54 mSv) to Dr. Ma's fetus.

NRC regulations at section 19.13(d) require that NIH provide Dr. Ma with a report of her exposure data at a time not later than NIH's transmittal to NRC of NIH's report on Dr. Ma's exposure. NIH denies that it never provided Dr. Ma with the revised dose estimates. NIH states that its Area Health Physicist hand-delivered the July 30, 1996 memorandum to Dr. Ma on July 30, 1996. The Area Health Physicist states that, at that time, she explained the contents of the memorandum to both Dr. Ma and Dr. Zheng, asked if they had any questions, and identified NIH personnel to contact if Petitioners had any questions. The

Area Health Physicist states that Petitioners opened the envelope and read the memorandum in her presence.²⁹

Accordingly, NIH did violate 10 C.F.R. § 20.2203(a)(2)(i), because NIH did not submit a written report to NRC within 30 days after learning of the occupational dose to Dr. Ma in excess of the limits for adults in section 20.1201. A Notice of Violation is being issued concurrently with the issuance of this Director's Decision. However, NIH did inform Dr. Ma of its revised dose estimates on July 30, 1996, in accordance with section 19.13(d). Accordingly, Petitioners' request for enforcement action for violation of section 19.13(d) is denied.³⁰

N. Declaration of Pregnancy and Minimization of Radiation Exposure to Dr. Ma

Petitioners state that, in violation of 10 C.F.R. § 20.1208, their supervisor, Dr. Weinstein, coerced Dr. Ma to not submit a written declaration of pregnancy to the NIH RSB, even though it was her clear desire to receive maximum protection for her fetus from exposure to radiation and radioactive materials, and thus Dr. Weinstein constructively denied Dr. Ma her right to receive protection for her fetus from ionizing radiation in excess of 0.5 rem (5 mSv). Petitioners state that between June 19 and June 23, 1995, Dr. Weinstein withheld the NIH form used to file a declaration of pregnancy, and insisted that if Dr. Ma filled out the declaration form, it would "cause trouble for the lab." Petitioners also state that Dr. Weinstein disagreed with the steps proposed by Petitioners to minimize radiation exposure of Dr. Ma during her pregnancy.

As a related matter, Petitioners also state that because Dr. Weinstein was in a hurry to patent the results of their research (a novel method to display more efficiently the existence of expressed genes), which would have had significant scientific and commercial value, Dr. Weinstein urged Petitioners to work tirelessly, and over a period of several weeks before the contamination incident, repeatedly requested Petitioners to terminate Dr. Ma's pregnancy. Based on the several inspections and the investigation, NRC concludes that the evidence does not substantiate Petitioners' assertions that Dr. Weinstein urged Petitioners to work tirelessly, requested Petitioners to terminate Dr.

²⁹ See Letter dated August 15, 1997, from Robert A. Zoon, Radiation Safety Officer, NIH, to Carl J. Paperiello, NRC, and attached "Memorandum" dated August 14, 1997, from Beth Reed, NIH Area Health Physicist, to Robert A. Zoon.

³⁰ Although there is a dispute as to whether in fact NIH notified Dr. Ma of its revised dose estimates, Dr. Ma was in fact provided with the revised NIH dose estimates from another source.

Ma's pregnancy,³¹ and was in a hurry to patent the results of Petitioners' research,³² or that the research would have had significant scientific and commercial value.³³

Based on the inspections and investigation, NRC concludes that the evidence does not substantiate Petitioners' assertions that Dr. Weinstein, with coercion or otherwise, prevented or tried to prevent Dr. Ma from declaring, or interfered with Dr. Ma's declaration of, her pregnancy in writing,³⁴ or that Dr. Weinstein objected to or interfered with any measures proposed or taken by Petitioners to minimize exposure of Dr. Ma's fetus to radiation. Additionally, Petitioners both took the "NIH Radiation Safety in the Laboratory" training course on November 29, 1994. That training covered NIH procedures on written declarations of pregnancy for occupational workers and instructions for pregnant employees as to how to obtain the NIH form used to submit a written declaration of pregnancy. Although not required to do so, Dr. Weinstein obtained the NIH form for Petitioners and provided it to Petitioners on June 23, 1995. Dr. Ma, however, did not request the form, nor did she submit the formal declaration of her pregnancy to the NIH RSB, as provided in the materials covered in her training. In view of the above, Dr. Ma's failure to submit a written declaration of pregnancy was voluntary. Accordingly, the 5-mSv (0.5-rem) occupational exposure limit specified by 10 C.F.R. § 20.1208(a) for the fetus of a declared pregnant worker was not applicable to Dr. Ma.

Based on the above, Petitioners' request for enforcement action against NIH for violation of section 20.1208 is denied.

³¹ In addition to the lack of evidence corroborating this assertion, there are significant inconsistencies in Dr. Ma's account of how she learned of the alleged request. In the petition, Dr. Ma stated that in the evening, after returning from a meeting with Dr. Weinstein at NIH, Dr. Zheng informed Dr. Ma that Dr. Weinstein had made the alleged request earlier that day. Dr. Ma, however, told investigators that she learned of the alleged request during a meeting at NIH with Dr. Zheng and Dr. Weinstein, a week after Dr. Weinstein made the alleged request to Dr. Zheng, and that Dr. Zheng had not told Dr. Ma of the request.

³² In addition to the lack of evidence to corroborate this assertion, Petitioners made contradictory statements regarding Dr. Weinstein's plans for publication of the results of Petitioners' research. Several days after discovery of Dr. Ma's contamination, Dr. Ma told a colleague that the Petitioners wanted to publish their research paper before obtaining a patent application (contrary to usual procedures), but that Dr. Weinstein was trying to delay publication of the research paper. Dr. Ma told investigators shortly afterwards that Dr. Weinstein believed that her pregnancy would prevent her from handling radioactive materials, when Dr. Weinstein had applied for a patent and was trying to get the Petitioners' research paper published. A few days later, Dr. Zheng submitted a statement to investigators asserting that over the past 3 or 4 months Dr. Weinstein had been trying to delay publication of the research paper.

³³ The investigation indicates that the Petitioners' research, which was conducted to investigate a proposal of Dr. Weinstein, did not constitute a major scientific discovery and had little commercial value.

³⁴ Moreover, the investigation produced evidence that Dr. Ma was not eager to declare her pregnancy. Dr. Ma told an NIH colleague approximately 2 months before the contamination incident that she was reluctant to inform Dr. Weinstein of her pregnancy, because then she might have to stop conducting experiments involving radiation.

O. Responsibility for Contamination of Dr. Ma and Twenty-Six NIH Employees

Based on the inspections and the investigation, NRC concludes that Dr. Ma and twenty-six NIH employees were deliberately contaminated with P-32. Dr. Ma's exposure and the exposure of one of the twenty-six employees contaminated by the water cooler were beyond regulatory limits, in violation of 10 C.F.R. §§ 20.1201 and 20.1301, respectively. Neither the means of administering P-32 to Dr. Ma,³⁵ nor the person(s) responsible for the contamination of Dr. Ma³⁶ and of the water cooler, which was the source of contamination to the twenty-six NIH employees, however, was definitively identified. In the absence of any evidence to the contrary, NRC presumes that the violations were caused by an employee(s) of NIH and that the material belonged to NIH. As explained above, NRC also concludes that the contamination of Dr. Ma and of the water cooler was not a result of the Licensee's violations of NRC requirements for security and control of radioactive material. *See* Section III.A, "Violations of NRC Requirements for Security and Control of Licensed Material," *supra*. Normally, the exposures beyond regulatory limits in this case would be subject to significant enforcement action. However, under the circumstances of this case, the Commission has decided to exercise its enforcement discretion and not initiate formal enforcement action against NIH for these violations. Discretion is being exercised because NIH fully cooperated with the investigation, there is no evidence that NIH contributed directly or indirectly to the deliberate misuse of licensed material involved, and NIH could not reasonably foresee that an employee or employees would maliciously misuse radioactive material as was done in this case.

Accordingly, enforcement action against NIH, in addition to that already taken in the NOV and Proposed Imposition of Civil Penalty \$2500 (EA 96-027) and the Order Imposing Civil Penalty \$2500 (EA 96-027), is not warranted in this case

³⁵ Petitioners assert that Dr. Ma was contaminated at NIH on the evening of June 28, when she ate food that she had stored in an NIH conference room refrigerator the previous evening. Dr. Ma's contamination was discovered at approximately 6:00 p.m. on June 29. The evidence indicates that Dr. Ma was not contaminated by food she had stored in the NIH conference room refrigerator. In the evening of June 29, the NIH RSB found no radioactive contamination of the conference room refrigerator, the contents of the refrigerator, Dr. Ma's desk, the table at which Dr. Ma ate, the trash cans or containers or tables in the halls near Petitioners' lab, the lab, or Dr. Weinstein's office. On June 30, the microwave used by Dr. Ma to heat her food at NIH, and the plastic containers and the utensils used by Dr. Ma to eat the food she brought to NIH, were surveyed, and no contamination was found. Additionally, the evidence indicates that the P-32 contamination of the carpet in front of the conference room refrigerator occurred sometime after 5:00 p.m. on June 29. The AIT report states in the chronology that the NIH RSB initial estimated time of ingestion was noon on June 29, 1995. However, after review of the physical evidence and radiation surveys, NIH used 11:00 a.m., June 28, 1995, as the most probable initial ingestion time. NIH also used this initial ingestion time for the other twenty-six contaminated NIH individuals involved. NRC also used this initial time of ingestion in its dose estimates.

³⁶ The investigation produced no evidence to corroborate Petitioners' assertions that Dr. Weinstein had suggested to several people either that Petitioners already had a child in China, or that Petitioners deliberately contaminated themselves in order to terminate Dr. Ma's pregnancy.

for the occupational exposure of Dr. Ma beyond regulatory limits, the exposure of the member of the public beyond regulatory limits, or the contamination of the water cooler.³⁷

IV. CONCLUSIONS

The following requests of Petitioners are granted in part as described above: for enforcement action against NIH for violations of NRC security and control requirements and for violation of NRC requirements related to radiation safety training, ordering radioactive materials, inventory control of radioactive materials, monitoring, and the issuance, use, and collection of dosimetry. Petitioners' request for NRC action to ensure adequate procedures and instructions to exposed persons for sample collection is granted as described above. The following requests of Petitioners for enforcement action against NIH are denied: for the exposure of Dr. Ma beyond regulatory limits, for the exposure of Dr. Ma's fetus, and for the contamination of the water cooler; regarding notification to Dr. Ma of her level of contamination; regarding Dr. Ma's declaration of pregnancy; regarding the conduct of surveys after Dr. Ma's contamination; and for the failure to accurately calculate Dr. Ma's occupational radiation dose. Finally, Petitioners' request to suspend or revoke the NIH license is denied.

A copy of this Decision will be filed with the Secretary of the Commission for Commission review in accordance with 10 C.F.R. § 2.206(c) of the Commission's regulations. As provided by this regulation, the Decision will constitute the final action of the Commission 25 days after issuance, unless the Commission, on its own motion, institutes a review of the Decision within that time.

FOR THE NUCLEAR
REGULATORY COMMISSION

Carl J. Paperiello, Director
Office of Nuclear Material Safety
and Safeguards

Dated at Rockville, Maryland,
this 17th day of September 1997.

³⁷ See Letter from Ashok C. Thadani, Acting Deputy Executive Director for Regulatory Effectiveness, to Michael M. Gottesman, M.D., Deputy Director for Intramural Research, NIH, dated September 17, 1997.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Samuel J. Collins, Director

In the Matter of

Docket Nos. 50-361
50-362

SOUTHERN CALIFORNIA EDISON
COMPANY, *et al.*
(San Onofre Nuclear Generating
Station, Units 2 and 3)

September 19, 1997

The Director of the Office of Nuclear Reactor Regulation denies a petition filed pursuant to 10 C.F.R. § 2.206 by Stephen Dwyer on September 22, 1996, asking the Nuclear Regulatory Commission to shut down the San Onofre Nuclear Generating Station, Units 2 and 3, pending a complete review of the seismic risk based on new information gathered at the Landers and Northridge earthquakes.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

By petition dated September 22, 1996, Stephen Dwyer (Petitioner) requested that the Nuclear Regulatory Commission (NRC) take action with regard to San Onofre Nuclear Generating Station (SONGS). The Petitioner requested that the NRC shut down the SONGS facility "as soon as possible" pending a complete review of the "new seismic risk."¹ The Petitioner asserted as a basis for this request that a design criterion for the plant, which was "0.75 G's acceleration," is "fatally flawed" on the basis of new information gathered at the Landers

¹ In his e-mail dated March 26, 1997, supplementing his petition, the Petitioner also requested removal of "all spent fuel out of the southern California seismic zone."

and Northridge earthquakes. The Petitioner asserted (1) that the accelerations recorded at Northridge exceeded "1.8G's and it was only a Richter 7+ quake," (2) that there were horizontal offsets of up to 20 feet in the Landers quake, and (3) that the Northridge fault was a "Blind Thrust and not mapped or assessed." On November 22, 1996, the NRC Staff acknowledged receipt of the petition as a request pursuant to 10 C.F.R. § 2.206 and informed the Petitioner that there was insufficient evidence to conclude that the requested immediate action was warranted. Notice of the receipt of the petition indicating that a final decision with respect to the requested action would be forthcoming at a later date was published in the *Federal Register* on November 29, 1996 (61 Fed. Reg. 60,734).

The Petitioner provided supplemental information in support of his petition in a letter dated December 10, 1996, two e-mails dated March 26, 1997, and an e-mail dated May 28, 1997.² My Decision in this matter follows.

II. DISCUSSION

A. Regulatory Requirements Associated with Potential Earthquake Motion and the Licensing Basis for SONGS

The design bases for each nuclear power plant must take into account the potential effects of earthquake ground motion.³ The seismic design basis, called the safe-shutdown earthquake (SSE), defines the maximum ground motion that certain structures, systems, and components necessary for safe shutdown are designed to withstand.⁴ SONGS Units 2 and 3 seismic design basis is consistent with the siting criteria set forth in Title 10 of the *Code of Federal Regulations*, Part 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants." Appendix A describes the nature of the investigations required to obtain the geologic and seismic information necessary to determine site suitability and

² By letter dated June 26, 1997, the NRC Staff advised the Petitioner that his e-mail dated April 25, 1997, concerning the ability of the SONGS steam generators to withstand a major seismic event, would be treated as a separate section 2.206 petition.

³ See 10 C.F.R. Part 50, Appendix A, Criterion 2 and 10 C.F.R. § 50.34(a)(1)(i); see also 10 C.F.R. Part 100, Appendix A, § V(a) which provides, in part, that "the design of each nuclear power plant shall take into account the potential effects of vibratory ground motion caused by earthquakes." The investigative obligations of Part 100, Appendix A, which are only imposed explicitly on applicants for construction permits, were effective December 13, 1973 (38 Fed. Reg. 31,279 (Nov. 13, 1973)). The licensing board issued its decision regarding the SONGS Units 2 and 3 construction permits on October 15, 1973. However, the SONGS site was reviewed against the Appendix A criteria during the construction permit licensing review which was updated at the operating license review stage.

⁴ The SSE is defined, in part, as

that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material. It is that earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional.

See 10 C.F.R. Part 100, Appendix A, § III(c).

provide reasonable assurance that a nuclear power plant can be constructed and operated at a site without undue risk to health and safety of the public. Among other particulars, Appendix A requires⁵ —

- Determination of the lithologic, stratigraphic, hydrologic, and structural geologic conditions of the site and the region surrounding the site.
- Identification and evaluation of tectonic structures underlying the site and the region surrounding the site, whether buried or expressed at the surface.
- Evaluation of physical evidence concerning the behavior during prior earthquakes of the surficial geologic materials and substrata underlying the site.
- Determination of the static and dynamic engineering properties of the materials underlying the site, such as seismic wave velocities, density, water content, porosity, and strength.
- Listing of all historically reported earthquakes that affected or that could reasonably be expected to have affected the site.
- Correlation of epicenters of historically reported earthquakes, where possible, with tectonic structures, any part of which is located within 320 kilometers (200 miles) of the site. Epicenters that cannot be correlated with tectonic structures shall be identified with tectonic provinces, any part of which is located within 320 kilometers (200 miles) of the site.
- For capable faults⁶ that may be of significance in establishing the SSE or that are longer than 330 meters (1000 feet) and within 8 kilometers (5 miles) of the site, determination of the length of the fault; the relationship of the fault to the regional tectonics structures; and the nature, amount, and geologic history of displacements along the fault, including the estimated amount of maximum Quaternary displacement related to any one earthquake along the fault are required.

The information collected in these investigations is used to determine the vibratory ground motion at the site, assuming that the epicenters of the earthquakes are situated at the point on the tectonic structures or in the tectonic provinces nearest to the site. The earthquake that could cause the maximum vibratory ground motion at the site is designated the SSE. The vibratory ground motion produced by the SSE is defined by response spectra, which are smoothed design

⁵ See 10 C.F.R. Part 100, Appendix A, § IV.

⁶ A capable fault is a fault that has exhibited one or more of the following characteristics: (1) movement at or near the ground surface at least once within the past 35,000 years or movement of a recurring nature within the past 500,000 years; (2) macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault; and (3) a structural relationship to a capable fault according to characteristics (1) or (2), above, such that movement on one could be reasonably expected to be accompanied by movement on the other. See 10 C.F.R. Part 100, Appendix A, § III(g).

spectra developed from a set of vibratory ground motions caused by more than one earthquake.

SONGS was licensed consistent with the seismic and geologic siting criteria for nuclear power plants set forth in Part 100, Appendix A, described above. The site has undergone geologic, geophysical, geotechnical, and seismic investigations and reviews that are at least as thorough and comprehensive as those of any critical facility.⁷ The SONGS SSE is based on the assumed occurrence of a surface-wave (M_s)⁸ magnitude 7 earthquake on the offshore zone of deformation (OZD), a right lateral strike-slip fault zone, approximately 8 kilometers from the site at its closest approach. This magnitude 7 event is larger than any earthquake known to have occurred on the OZD, and the resulting ground motion estimate is larger than that which could reasonably be expected at the SONGS site from any other seismic source. The determination of the SSE was made in accordance with the criteria and procedures specified in Appendix A to Part 100 and using a multiple hypothesis approach in which several different methods were used to determine each parameter; sensitivity studies were performed to account for the uncertainties in the earth sciences.

In addition, the plant has design margins (capability) well beyond the demands of the SSE. The ability of a nuclear power plant to resist the forces generated by the ground motion during an earthquake is thoroughly incorporated in the design and construction of the plant. The codes that govern the construction of residential and commercial buildings are far less stringent than the requirements for nuclear power plants. As a result, nuclear power plants are able to resist earthquake ground motions well beyond their design basis, the SSE, and far above the ground motion that would result in damage to buildings designed and built to commercial codes.

⁷ The findings of these investigations were reviewed extensively by the Staff and were litigated in proceedings concerning the issuance of the construction permit and operating licenses for SONGS Units 2 and 3. See LBP-73-36, 6 AEC 929 (1973), ALAB-248, 8 AEC 957 (1974); and see LBP-82-3, 15 NRC 61 (1982), ALAB-673, 15 NRC 688 (1982), ALAB-717, 17 NRC 346 (1983); and see *Carstens v. NRC*, 742 F.2d 1546 (D.C. Cir. 1984), cert. denied, 471 U.S. 1136 (1985) (the Court of Appeals affirmed the Commission's granting of the operating licenses for SONGS Units 2 and 3, noting the voluminous record and substantial evidence supporting the seismic review).

⁸ In 1935, Charles Richter introduced the concept of magnitude to describe the size of earthquakes. His original formula was based on events in southern California recorded on torsion seismographs within 600 km of the epicenter. This is the magnitude labeled M_L . Over the years Richter and others developed formulas to compute magnitudes from body and surface waves (m_b and M_s) at distant (teleseismic) stations as well as other methods to compute magnitudes for local events in other areas of the world. Most of these methods of computing magnitude use as the measured variable the amplitude of one or more seismic waves. All of these magnitude procedures, including the moment magnitude M_w , have been developed to produce a number that represents the size of an earthquake, and each was shingled onto Richter's original procedure so that the formulas would produce similar values at particular places on the magnitude scale. Each computation procedure has its own magnitude or distance range over which it is valid. Surface wave magnitude is normally calculated from the amplitudes of waves with periods near 20 seconds. Moment magnitude is based on the seismic moment. Seismic moment is calculated from recordings on digital seismographs and compared to the waveform synthetic seismograms from numerical models of the fault rupture to determine the moment.

The geologic and seismic siting and the design of SONGS were reviewed by the NRC Staff, the U.S. Geologic Survey, the National Oceanic and Atmospheric Administration, the Advisory Committee on Reactor Safeguards and were litigated before the Atomic Safety Licensing Board before they were licensed by the Commission.⁹ The NRC continually monitors the adequacy of the design of nuclear power plants in order to protect the public health and safety. The SONGS Licensee performed an individual plant examination of external events (IPEEE).¹⁰ The IPEEE is a program that involves the evaluation of the capability of a nuclear power plant to withstand the effects of several natural phenomena such as earthquakes, fires, and floods, well beyond its design bases. The most recent geologic and seismic information for the southern California region was used in the probabilistic analysis to quantify the seismic hazard and the uncertainties for the SONGS site for this program.

The ground motion from an earthquake at a particular site is a function of the magnitude and focal mechanism (type of faulting, i.e., normal, reverse, strike slip) at the earthquake source. It is also a function of the distance of the facility from the fault and the geology immediately under the facility site. The estimates of SSE ground motion for the SONGS site conform with the procedures and criteria specified in Part 100, Appendix A, and the Standard Review Plan (SRP)¹¹ §§ 2.5.1 and 2.5.2 (NUREG-0800). As previously stated, the earthquake that was determined to control the design of SONGS is an $M_s = 7$ located on the OZD at a distance of 8 kilometers from the site. The appropriate level of conservatism for characterizing the ground motion through a site-specific spectrum as specified in SRP 2.5.2 is the 84th percentile. This level of conservatism was used in the design and licensing review of SONGS Units 2 and 3.

Since the SONGS plants were licensed, a new magnitude scale, moment magnitude (M_w), has come into common usage. The most recently published ground motion attenuation relationships¹² use M_w . An attenuation relationship is a relationship between sized earthquake, distance to fault, and the amplitude of the ground motion. Since magnitude 7 M_w is equal to magnitude 7 M_s ,¹³

⁹ See cases cited *supra* note 7.

¹⁰ See Response to Generic Letter 88-20, Supp. 4, Individual Plant Examination of External Events (IPEEE), dated December 15, 1995, discussed, *infra*, at pp. 184-85.

¹¹ The SRP is used as guidance for the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants.

¹² N.A. Abrahamson and W.J. Silva, "Empirical Response Spectral Attenuation Relations for Shallow Crustal Earthquakes," 68 *Seismological Research Letters* 94-127 (1997); David M. Boore, William B. Joyner, and Thomas E. Fumal, "Equations for Estimating Horizontal Response Spectra and Peak Acceleration from Western North American Earthquakes: A Summary of Recent Work," 68 *Seismological Research Letters* 128-53 (1997); K.W. Campbell, "Empirical Near-Source Attenuation Relationships for Horizontal and Vertical Components of Peak Ground Acceleration, Peak Ground Velocity and Pseudo-Absolute Acceleration Response Spectra," 68 *Seismological Research Letters* 154-79; K. Sadigh, C.Y. Chang, J.A. Egan, F. Makdisi, and R.R. Yongs, "Attenuation Relationships for Shallow Crustal Earthquakes Based on California Strong Motion Data," 68 *Seismological Research Letters* 180-89 (1997).

¹³ Thorne Lay and Terry C. Wallace, *Modern Global Seismology* (Academic Press 1995).

there is no need to make a conversion between M_w and M_s when comparing the ground motion estimates obtained using the recent attenuation relationships to the SONGS SSE ground motion.

B. Responses to the Petitioner's Concerns

1. Concern That SONGS Is in a High Seismic Hazard Area

In the enclosure to his letter,¹⁴ the Petitioner referenced "a recent paper by M.D. Petersen et al. (Seismic Hazard Analysis, AEG, 1-20-96)" and stated that it concludes that the entire Los Angeles, Ventura, and Orange Counties are high hazard areas. The Petitioner stated that the paper also concludes that accelerations of 0.4g (pga), 1.0g (0.3-second SA), and 0.5g (1-second SA) can occur nearly everywhere.

The NRC Staff attempted to find the reference mentioned by Mr. Dwyer but was unsuccessful. Mark D. Petersen of the California Division of Mines and Geology informed the Staff that the correct reference is an article that he and his coauthors published in the *Bulletin of the Seismological Society of America*.¹⁵ Dr. Petersen made a presentation at a workshop on seismic hazard in southern California in January 1996 and gave participants in the workshop preprints and reprints of some of his recent publications. The cited reference was one of these handouts.

In the section of the paper entitled "Hazard Maps," the authors state:

The DMG probabilistic seismic hazard maps (10% exceedance in 50 years) for peak ground acceleration (pga) and 5% damped spectral acceleration (SA) at 0.3- and 1-sec periods on alluvial site conditions are shown in Figures 3 through 5. These maps may be useful in characterizing regional variations in seismic hazard in southern California but should not be used as input for detailed site-specific estimates of ground shaking in the earthquake-resistant design of individual structures.¹⁶

The paper then states —

The three maps show similar hazard patterns that indicate high hazard over the entire tri-county area. The expected peak accelerations exceed 0.4g (pga), 1.0g (0.3 s SA), and 0.5g (1 s SA) nearly everywhere in the tri-county area."¹⁷

¹⁴ Stephen Dwyer, Letter to Dr. Shirley Jackson and Frank J. Miraglia, Jr., with enclosure, dated December 10, 1996.

¹⁵ Mark D. Petersen, Chris H. Cramer, William A. Bryant, Michael S. Reichle, and Tousson R. Topozada, "Preliminary Seismic Hazard Assessment for Los Angeles, Ventura, and Orange Counties, California, Affected by the 17 January 1994 Northridge Earthquake," 86 *Bulletin of the Seismological Society of America* S247-61 (1996).

¹⁶ *Id.*

¹⁷ *Id.*

To address the acceleration values mentioned by the Petitioner with respect to SONGS, the NRC Staff has produced Figure 1, which contains a plot of the SONGS SSE seismic response spectrum at 5% of critical damping and the values quoted from the Petersen paper. Since period in seconds is the reciprocal of frequency in Hertz, the 1-second-period spectral acceleration (0.5g) is plotted at a frequency of 1 Hertz, the 0.3-second-period acceleration (1.0g) is plotted at a frequency of 3.33 Hertz, and the peak ground acceleration (0.4g) is plotted at a frequency of 33 Hertz. Figure 1 demonstrates that the spectral accelerations (accelerations plotted in the response spectra) used in the design of SONGS are significantly higher than those from the Petersen paper, thus showing the conservatism of the design basis for SONGS.

2. *Concern About a Large Earthquake on the San Andreas Fault*

In the enclosure to his letter dated December 10, 1996, entitled "Uncertainty Factors Affecting Seismic Risk Modelling in Southern California," the Petitioner stated "We must prepare for a great event on the Southern San Andreas Fault." He also mentioned an earthquake on the San Andreas in his e-mail message.¹⁸

The NRC Staff agrees that there must be preparation for a large event on the San Andreas fault and finds that the SONGS seismic design is well able to withstand the demands of a large earthquake on the southern San Andreas fault. Although the geologic evidence appears to indicate that the largest event to have occurred on the southern San Andreas in the Quaternary Period (the last 2 million years) is estimated to have been in the moment magnitude (M_w) range of 7.5 to 8; to evaluate the potential ground motion at the SONGS site from a large earthquake on the southern San Andreas fault, the Staff made the very conservative assumption of a moment magnitude 8.25 strike-slip earthquake at the closest distance of the San Andreas fault to the site (90 kilometers). This assumption was made to calculate the effects of a large earthquake on the San Andreas fault. The results are plotted in Figure 2 which demonstrates that the design-basis (SSE) spectrum for SONGS is much higher than the ground motion estimates from the M_w 8.25 on the San Andreas fault using four recent attenuation relationships. These four empirical attenuation relationships were developed after the occurrence of the Northridge and Landers earthquakes, and include the recent strong ground motion from these events. They were performed by internationally known experts in earthquake ground

¹⁸Stephen Dwyer, e-mail message to Dr. Jackson, Subject: San Onofre Nuclear Power Plant Risk, dated September 22, 1996.

SONGS 2 & 3 SSE
Comparison with Petersen et al, 1996
5% of critical damping

Figure 1

Ground Motion Response Spectra

Figure 2

motion analysis and were published in the *Seismological Research Letters*,¹⁹ the peer-reviewed journal of the Seismological Society of America. The assumption of a moment magnitude 8.25 strike-slip earthquake and the SONGS site foundation geology were used as input parameters for these four earthquake ground motion attenuation relationships.²⁰ The ground motion estimates were made at the 84th percentile level recommended by SRP § 2.5.2. The plots of the results obtained from these four attenuation relationships and the SONGS Units 2 and 3 SSE design response spectrum are shown in Figure 2. The plotted information in the figure demonstrates that the SONGS design is well able to accommodate the demand of the ground motion of the large earthquake on the southern San Andreas fault since it envelopes the estimates of the four relationships at all frequencies.

3. *Concern About the SONGS Design Basis in Light of the Landers and Northridge Earthquakes*

In an e-mail message to Chairman Jackson, dated September 22, 1996, the Petitioner stated —

I am a geologist in Southern California, and I am deeply concerned by the current situation at San Onofre NPP. The design criteria for this old plant was 0.75 G's acceleration. With the new information gathered at the Landers and Northridge Quakes, this criteria is fatally flawed. The accelerations recorded at Northridge exceeded 1.8 G's!!! and it was only a Richter 7+ quake. Horizontal offsets of up to 20 feet in the Landers quake were also way beyond geologists and seismologists estimates. The whole science is in disarray. Also the Northridge fault was a Blind Thrust and not mapped or assessed. If we have a larger quake here on the San Andreas, or a smaller one closer to the plant, well I hate to imagine What's even worse is the fact that scientists are not able to give us the info we need to evaluate the situation.

The main points of the Petitioner's message appear to be —

- A peak ground acceleration recorded from the Northridge magnitude M_w 6.7 earthquake exceeded 1.8g.
- The Northridge earthquake occurred on a blind fault that had not been mapped or assessed.
- The maximum horizontal displacement of almost 20 feet due to the Landers magnitude 7.3 earthquake is much larger than would be estimated.
- Scientists are not able to provide the information to evaluate the situation.

The magnitude 6.7 Northridge earthquake of January 17, 1994, occurred on a buried thrust fault in the San Fernando Valley and was similar to the 1971

¹⁹ Abrahamson and Silva, *supra* note 12.

²⁰ *Id.*

San Fernando Valley earthquake. The distance from this earthquake epicenter to the SONGS site is about 130 kilometers (80 miles). The Northridge earthquake was felt at SONGS. A free-field seismic instrument at SONGS recorded a peak ground acceleration of 0.025g, which is significantly less than the SSE peak ground acceleration of 0.67g, thus indicating that an earthquake in the epicentral region of Northridge poses no threat to the plant.

The peak ground acceleration of 1.8g from the Northridge earthquake referred to by the Petitioner was recorded by the California Division of Mines and Geology station in Tarzana. The anomalous character of the seismic response at the Tarzana site is well known.²¹ The intense shaking at the Tarzana site is a condition of the site and is not characteristic of the Northridge earthquake. This fact is demonstrated by the unusually strong ground motion that was also observed there during the 1987 Whittier Narrows earthquake²² and during the aftershocks following both the Northridge and Whittier Narrows mainshocks. In recognition of the unusually high ground motion recordings at Tarzana, there have been a number of studies of this site²³ to try to determine the cause of the high recordings. These studies have attributed the high peak ground accelerations to the site's specific geology. The anomalous site effect was found to be confined to a small area 50 meters in radius around the station; beyond this area, the ground motion recordings were down to their normally expected values. It is, therefore, inappropriate to rely on data recorded at the unique Tarzana site to make judgments about ground motion estimates at other locations. The geologic formations under the SONGS site differ from those at the Tarzana site. The SONGS site does not anomalously amplify the earthquake ground motion as the Tarzana site does. During the evaluation of the site, no geologic formations under SONGS were identified that would result in exceptionally high earthquake ground motions. Further, recorded earthquakes at SONGS have not exhibited any unusual amplifications.

As a result of their studies of the near-field ground motions from thrust faults, Somerville et al.²⁴ found that the ground motions from the Northridge earthquake, in general, are within the 84th percentile when compared to previ-

²¹ J.A. Rial, "The Anomalous Seismic Response of the Ground Motion at the Tarzana Hill Site During the Northridge 1994 Southern California Earthquake: A Resonant, Sliding Block?" 86 *Bulletin of the Seismological Society of America* 1714-23 (1996).

²² A.M. Shakal, M. Huang, and T. Cao, "The Whittier Narrows, California, Earthquake of October 1, 1987: CSMIP Strong Motion Data," 4 *Earthquake Spectra* 75-100 (1988).

²³ R.D. Catchings and W.H.K. Lee, "Shallow Velocity Structure and Poisson's Ratio at the Tarzana, California Strong-Motion Accelerometer Site," 86 *Bulletin of the Seismological Society of America* 1704-13; Rial, loc. cit.; Paul Spudich, Margaret Hellweg, and W.H.K. Lee, "Directional Topographic Site Response at Tarzana Observed in Aftershocks of the 1994 Northridge, California, Earthquake: Implications for Mainshock Motions," 86 *Bulletin of the Seismological Society of America* S193-S208 (1996).

²⁴ Paul Somerville, Chandan Saikia, David Wald, and Rover Graves, "Implications of the Northridge Earthquake for Strong Ground Motions from Thrust Faults," 86 *Bulletin of the Seismological Society of America* S115-25 (1996).

ously developed empirical attenuation relations for thrust faults. This finding indicates that the Northridge ground motion data would not cause seismologists to revise ground motion estimates for thrust fault earthquakes. The data from this earthquake have been incorporated into the strong ground motion databases and have not significantly altered the results of the attenuation relationships. In addition, it is inappropriate to use the ground motions from thrust faults for estimates in a region in which there is no potential for this type of faulting, such as the South Coast Borderland where SONGS is located.

To address the issue of whether there is a potential for buried thrust faults at the SONGS site, the Staff referred to a book by Yeats et al.²⁵ that contains a list and a map of the regions of the world that have the potential for large reverse-fault earthquakes. Thrust faults are low-angle reverse faults. In California, the regions listed are the northern California coast, the Coast Ranges of central California, and the western Transverse Ranges. The 1994 Northridge earthquake and the 1971 San Fernando Valley earthquake are related to the western Transverse Ranges. There is no indication of reverse-fault earthquakes in the South Coast Borderland where SONGS is located.

In southern California, the mountain ranges flanking the "Big Bend" of the San Andreas fault (the Transverse Ranges) strike east-west and are bounded on the south by north-dipping range-front reverse faults, part of a discontinuous system of faults that extends from the Santa Barbara Channel eastward to the eastern end of the San Gabriel Mountains. Other important reverse faults in this region include the Pleito fault in the southern margin of the South San Joaquin Basin; the south-dipping Oak Ridge fault in the Ventura Basin which extends eastward to the San Fernando Valley as a blind thrust that produced the 1994 Northridge earthquake; and a blind reverse-fault system beneath the Santa Monica Mountains North of the Los Angeles basin. Major earthquakes generated by these reverse faults include the 1952 Kern County earthquake in the South San Joaquin Valley (M_s 7.7), the 1971 San Fernando earthquake at the eastern edge of the Ventura basin (M_w 6.7), the 1978 Santa Barbara earthquake in the western Ventura basin (M_L 5.9), the 1987 Whittier Narrows earthquake in the Los Angeles basin (M_L 5.9), the 1991 Sierra Madre earthquake at the southern edge of the San Gabriel Mountains northeast of Los Angeles (M_L 6.0), and the 1994 Northridge earthquake in the San Fernando Valley (M_L 6.7). Of these, only the 1952 and 1971 earthquakes produced surface rupture. Global Positioning System satellite geodesy confirms the high convergence rate as a result of reverse slip on these faults,²⁶ indicating this is an active thrust fault area. These indications were not seen in the SONGS area.

²⁵ Robert S. Yeats, Kerry Sieh, and Clarence R. Allen, *The Geology of Earthquakes* (Oxford University Press 1997).

²⁶ *Id.*

To state that the Northridge earthquake occurred on a blind fault that had not been mapped or assessed is an oversimplification. Blind thrust faults are recognized as significant sources of seismic hazard in areas of active folding, and the Transverse Ranges-Los Angeles basin has long been recognized as such an area. If, before the Northridge earthquake, such a fault had been sought as part of a siting investigation, it or the active folding indicative of such a fault would have been found and would have been considered in the seismic hazard estimate. In addition, the potential occurrence of an M_w 6.5 to 7 on a buried fault has been assumed in the commercial design and construction codes for the area where the Northridge earthquake occurred, so in effect, the potential for blind faults has been accounted for.

The types of site investigations, borehole drilling, and seismic survey profiles normally performed for critical facilities such as nuclear power plants are not used for normal residential or commercial structures because of the high costs of such work. For residences or commercial buildings, the codes rely on more generalized hazard estimates, such as those found in Petersen et al.²⁷ These hazard studies incorporate all the known geologic information in their ground motion estimates.

The most promising new data for the identification of areas of potential buried thrust faults comes from geodetic measurements of the satellite-based Global Positioning System, which is capable of determining convergence rates across folded terranes. Geomorphic studies are important in that the deformation of late Quaternary stream or coastal terraces provides quantitative data on the uplift rates or lack of uplift of postulated active folds over buried faults. In fact, the locale of the 1987 Whittier Narrows, California earthquake was identified more than 70 years ago²⁸ as an active anticline on the basis of warped geomorphic surfaces.

The SONGS site lies in a relatively stable structural block bounded by major northwest-southeast trending strike-slip faults. The relative motion between the Pacific plate and the North American plate is accommodated, in part, by dextral strike slip along the San Andreas fault system and faults in the borderlands, extension in the Gulf of California, and contraction in the Transverse Ranges and the Los Angeles basin region.²⁹

²⁷ Mark D. Peterson et al., *supra* note 15.

²⁸ F.F. Vickery, "The Interpretation of the Physiography of the Los Angeles Coastal Belt," 11 *Bulletin of the American Association of Petroleum Geologists* 417-24 (1927).

²⁹ M.L. Zoback and R.E. Anderson, "Cenozoic Evolution of the State of Stress and Style of Tectonism in Western United States," 300 *Philosophical Transactions of the Royal Society of London* 407-34 (1981); R. Weldon and E. Humphreys, "A Kinematic Model of Southern California," 5 *Tectonics* 38-48 (1986); D.F. Argus and R.G. Gordon, "Sierra Nevada-North America Motion From VLBI and Paleomagnetic Data — Implications for the Kinematics of the Basin and Range, Colorado Plateau, and California Coast Ranges," 69 *EOS Transactions, American Geophysical Union* 1418 (1988); R.S. Stein and R.S. Yeats, "Hidden Earthquakes," 260 *Scientific American* 48-57 (1989).

The tectonic setting of the SONGS site is significantly different from the complex regime of the Transverse Ranges and the Los Angeles basin. This difference is reflected in the higher seismicity in the Transverse Range and the Los Angeles basin than in the SONGS site area. The presence or absence of blind thrust faults in a region is indicated by the presence or absence of significant uplift and folding of late Quaternary period deposits and geomorphic surfaces³⁰ as evidenced in the Transverse Ranges and the Los Angeles basin region. Mapping of marine terraces along the western flank of the San Joaquin Hills to the north of the SONGS site indicates a uniform uplift rate for the past 80,000 to 120,000 years.³¹ Lajoie et al.³² reported on the coastal region between San Onofre Bluff and Torrey Pines north of Soledad Mountain in San Diego and noted that there has been no significant crustal tilt perpendicular to the coastline during much of the Quaternary Period. There is also no indication from the marine terrace studies of significant tilt parallel to the coastline during much of the Quaternary Period. The marine terrace data, along with other geological mapping and geophysical surveys, have not identified geologically young folds or blind thrust faults in the SONGS site vicinity. The closest capable fault to the site is the OZD 8 kilometers from the site, and it is the postulated earthquake on this fault that dominates the seismic hazard at SONGS. Therefore, the statement that the Northridge earthquake occurred on a blind fault that had not been mapped or assessed, and the implication that such a condition could also exist at the SONGS site, are not valid.

The Landers magnitude M_w 7.3 earthquake of June 28, 1992, was in the Eastern California Shear Zone (ECSZ) approximately 140 kilometers from the SONGS site. The ECSZ is a complex zone of predominantly right lateral strike-slip faulting. The earthquake was caused by strike-slip faulting on five fault segments with a total rupture length of about 70 kilometers.³³

Campbell and Bozorgnia³⁴ used 167 accelerograms recorded during the Landers earthquake to study the ground motions from this event. A comparison of these recordings with ground motions predicted by contemporary attenuation relationships indicated that relationships developed before the Landers earth-

³⁰ Stein and Yeats, *supra* notes 25 and 29.

³¹ D.T. Barrie, T. Totnall, and E. Gath, "Neotectonic Uplift and Ages of Pleistocene Marine Terraces, San Joaquin Hills, Orange County, California," *The Regressive Pleistocene Shoreline Coastal Southern California* 115-22 (E.G. Heath and W.L. Lewis eds., South Coast Geological Society, Inc., 1992 Annual Field Trip Guide Book No. 20, 1992).

³² K.R. Lajoie, D.J. Ponti, C.L. Powell II, S.A. Mathieson, and A.M. Sarna-Wojcicki, "Emergent Marine Strandlines and Associated Sediments, Coastal California: A Record of Quaternary Sea-Level Fluctuations, Vertical Tectonic Movements, Climatic Changes, and Coastal Processes," *The Regressive Pleistocene Shoreline Coastal Southern California* 81-104, (E.G. Heath and W.L. Lewis eds., South Coast Geological Society, Inc., 1992 Annual Field Trip Guide Book No. 20, 1992).

³³ Yeats, et al., *supra* note 25.

³⁴ K.W. Campbell and Y. Bozorgnia, "Empirical Analysis of Strong Ground Motion from the 1992 Landers, California, Earthquake," 84 *Bulletin of the Seismological Society of America* 573-88 (1997).

quake made a reasonable prediction of the Landers ground motions within 60 kilometers of the fault, and relationships developed after the Landers earthquake did a reasonably good job of predicting the Landers ground motions within the distance ranges for which they were applicable. This information shows that there was nothing extraordinary about the ground motions from the Landers earthquake that would challenge the adequacy of the near-field ground motion estimates made for the SONGS SSE. To demonstrate the adequacy of the SONGS SSE ground motion, Figure 3 contains a plot of the SSE response spectrum and the 84th percentile response spectra obtained from the four recent earthquake ground motion attenuation relationships to estimate the ground motion for a magnitude M_w 7 earthquake at a distance of 8 kilometers. The SONGS response spectrum envelopes the response spectra of all four relationships at all frequencies.

To address the issue of the 20 feet (6 meters) of fault displacement as a result of the Landers earthquake, the Staff has reviewed the work of researchers on this subject. Postearthquake investigations have found that slip on the Landers earthquake faults was extremely heterogeneous both along strike and down dip. The magnitude of the horizontal offset varied along the fault trace, but was typically 2 to 3 meters with maximum strike-slip offset of about 6 meters.³⁵ This offset is not unusual and is within the range of offsets for an earthquake of this size.³⁶ The U.S. Geological Survey, with NRC sponsorship, has conducted paleoseismic studies of the fault segments that ruptured during the Landers earthquake. Trenches across the faults provide clear evidence of the two most recent pre-1992 surface faulting events. The most recent faulting, Holocene age, has displacements essentially the same as the 1992 event. Evidence from the trenches also indicates that the segments that ruptured during the 1992 event had ruptured during the previous events.³⁷ If, before the Landers earthquake, these faults had been subjected to the type of investigations that nuclear power plant sites undergo, the earthquake and fault rupture potential would have been identified.

There are no faults at the SONGS site capable of surface offset. The fault nearest to the SONGS site capable of significant surface offset is the OZD, which is 8 kilometers from the site. Assuming that there were to be offsets on

³⁵ Carlos Lazarte, Jonathan D. Bray, Arvid M. Johnson, and Robert E. Lemmer, "Surface Breakage of the 1992 Landers Earthquake and Its Effects on Structures," 84 *Bulletin of the Seismological Society of America* 547-61 (1994).

³⁶ Donald L. Wells and Kevin J. Coppersmith, "New Empirical Relationships Among Magnitude, Rupture Length, Rupture Width, Rupture Area, and Surface Displacement," 84 *Bulletin of the Seismological Society of America* 974-1002 (1994).

³⁷ David P. Schwartz, personal communication to Dr. Robert Rothman, of the NRC Staff, June 1997. Dr. Schwartz is a senior geologist employed by the U.S. Geological Survey in Menlo Park, California, and an international authority on paleoseismology.

Ground Motion Response Spectra

Figure 3

the order of 6 meters or more on the OZD, they would have no detrimental effect on SONGS because of the distance of the fault, the orientation of the fault, and the potential ground motion to which the plant is designed.

With respect to the Petitioner's statement that scientists are not able to provide the information to evaluate the situation, the Staff notes that numerous papers have been published in the scientific literature and presentations made at national and international scientific meetings on these two earthquakes. In addition, the Seismological Society of America has devoted one issue of its *Bulletin*³⁸ to the Northridge earthquake and another issue to the Landers earthquake.³⁹ The information about these events is understood and is widely distributed in the professional community.

4. Concern About "Seismic Analysis Uncertainties"

In the enclosure to his letter dated December 10, 1996, the Petitioner provided a list of ten seismic analysis uncertainties⁴⁰ and implied that these must be addressed because new surprises will occur with each event.

The Petitioner appears to have compiled a list of uncertainties in estimating seismic hazards from the Petersen paper.⁴¹ There is nothing unique about this list. These are the types of issues a geologist or a seismologist performing earthquake hazard investigations must routinely confront. They are among the points that the NRC Seismic and Geologic Siting Criteria for Nuclear Power Plants and the NRC SRP were developed to address.

The geologic and seismic investigations and reviews that were performed for the licensing of SONGS Units 2 and 3 were deterministic in nature. In the deterministic method, the uncertainties were not explicitly quantified. Rather, a multimethod approach with sensitivity studies was used. For instance, to determine the maximum magnitude estimate for a fault empirical relationship, such as magnitude as a function of the parameter's slip rate, the fault length, the rupture length per event, the rupture area, and the historical seismicity were used. Also, various fault segmentation models were used in magnitude estimates. To

³⁸ *Bulletin of the Seismological Society of America*, Vol. 86, No. 1, Pt. B Supp. (February 1996).

³⁹ *Bulletin of the Seismological Society of America*, Vol. 84, No. 3, (June 1994).

⁴⁰ List of Seismic Analysis Uncertainties: (1) how to quantify slip rates and maximum magnitudes along with their uncertainties for all fault sources; (2) how to incorporate blind thrusts with appropriate weighting; (3) what seismogenic zone widths to use for various fault zones; (4) which magnitude distributions are most appropriate for various faults; (5) how to incorporate background seismicity and which "b" value is most appropriate for exponentially distributed earthquakes; (6) whether to use source zones or simple point sources in modelling background seismicity; (7) which alternative segmentation models are viable (including alternative cascades models for "A" zones); (8) how to incorporate geodetic data directly in the model; (9) which attenuation relations are most appropriate and how to model ground motion from large ($M > 8$) earthquakes; (10) how to resolve the discrepancy between the rate of earthquakes in this and other seismic hazard models and the historic earthquake record (especially in the Transverse Ranges).

⁴¹ Peterson et al., *supra* note 15.

determine the ground motion from a magnitude 7 earthquake at a distance of 8 kilometers, attenuation relationships from the statistical analysis of empirical ground motion data, theoretical numerical modeling studies, and the response spectra from magnitude 6.5 and larger earthquakes recorded at distances of 13 kilometers and less were used. The SSE for the SONGS site enveloped all of these estimates. The geology in the site region was investigated by geologic mapping, excavation of faults, offshore and onshore seismic reflection profiles, onshore refraction profiles, geophysical surveys, drill holes, well logs, trenching, geomorphic surveys, and geodetic studies. The information from these various studies was analyzed by experienced professional geologists and geophysicists, and the site characteristics were thus developed in a conservative manner. Independent studies and reviews were performed by the NRC Staff, the U.S. Geologic Survey, the National Oceanic and Atmospheric Administration, and the Advisory Committee on Reactor Safeguards. These studies and reviews confirmed the Licensee's determinations.

The uncertainties in seismic hazard estimates can be addressed quantitatively through a probabilistic seismic hazard analysis. In 1991, the NRC issued Supplement 4 to Generic Letter 80-20 requesting licensees of nuclear power plants to perform an IPEEE to identify plant-specific vulnerabilities to severe accidents. Among the events to be assessed were earthquakes, internal fires, high winds and tornadoes, external floods, and transportation and nearby facility accidents. As part of the SONGS IPEEE program, a state-of-the-art probabilistic seismic hazard analysis was performed. In response to an NRC request for information, Southern California Edison submitted its contractor's final report on the seismic hazard study.⁴²

In the seismic hazard study, ground motion exceedance probabilities were calculated using hypotheses about the causes and characteristics of earthquakes in the region. Scientific uncertainty about the causes of earthquakes and about the physical characteristics of potentially active tectonic features lead to uncertainty in the inputs to the seismic hazard calculations. These uncertainties were quantified using the tectonic interpretations developed by earth scientists knowledgeable about the region. These experts evaluated the likelihood associated with alternative tectonic features and with alternative characteristics of these potential sources. These and other uncertainties were propagated through the entire analysis. The result of the analysis is a spectrum of hazard curves and their associated weights. These curves quantify the seismic hazard at the site and its uncertainty.

The major components of the probabilistic seismic hazard analysis are the identification of the seismic sources, the determination of the earthquake

⁴² Risk Engineering, Inc., "Seismic Hazard at San Onofre Nuclear Generating Station," prepared for Southern California Edison Co., Final Report (1995).

magnitude distribution and rate of occurrence for each source, the estimation of the ground motion, and the incorporation of these factors by the probability analysis into the hazard curves. The Risk Engineering, Inc., report⁴³ more than adequately demonstrates how the uncertainties of the type the Petitioner listed in the enclosure to his letter were addressed. The comparison of the probabilistic seismic hazard results to the SSE indicates that the SSE response spectrum has an annual probability of being exceeded in the range of 5×10^{-6} to 4×10^{-4} , depending on the frequency. This estimate is similar to the probabilistic hazard estimates for other critical facilities in the western United States. The low frequency of exceedance of the SSE ground motion provides further assurance that the licensing basis for SONGS provides adequate protection of the health and safety of the public.

5. *Concern About the Failure of Welded-Steel Frames in Commercial Buildings During the Northridge Earthquake*

In an e-mail message to Dr. Shirley Jackson,⁴⁴ the Petitioner stated —

The breaking of welds in steel buildings in the San Fernando Valley is a warning that all sorts of steel welds and fittings are vulnerable. The number of such welds and fittings at SONGS is almost uncountable, and it's therefore unrealistic to believe that they will all be undamaged or broken at forces far below the Design Basis Event of 67%g.

It appears that the Petitioner is referring to the failure of welded-steel moment-resisting frames (WSMFs) in high-rise residential and commercial buildings during the 1994 Northridge earthquake. Following the Northridge earthquake, inspections of many otherwise intact buildings indicated structural damage to WSMFs. The WSMFs were specifically designed on the basis of the assumption that they would be capable of extensive yielding and plastic deformation. The deformation was assumed to be accomplished by the yielding of plastic hinges in the beams at their connections to the columns. Damage was expected to consist of moderate yielding at the connections and localized buckling of the steel elements. However, contrary to the design assumption, the WSMF failures were brittle fractures with unanticipated deformations in girders, cracking in column panel zones, and fractures in beam-to-column weld connections. A number of factors related to seismic analysis and design, materials, fabrication, and construction have been identified as contributing to the failure of the WSMFs

⁴³ *Id.*

⁴⁴ Stephen Dwyer, e-mail message to Dr. Shirley Jackson, Subject: 2.206 Petition Re SONGS Seismic Hazards, dated May 28, 1997.

and are the focus of research projects sponsored by the Federal Emergency Management Agency.⁴⁵

The method of computing seismic loads, their combination with other non-seismic loads, the acceptance criteria, and the quality assurance requirements for nuclear power plants are significantly more conservative than those for non-nuclear buildings designed using building codes for residential or commercial structures. For nuclear power plants, two levels of ground motion, based on very conservative siting criteria, are determined for designing the safety-related structures, systems, and components. For the lower level of vibratory motion, the operating-basis earthquake,⁴⁶ the load factors, and acceptable allowable stresses ensure that the stresses in plant structures remain at least 40% below the yield stress of the material. For the higher level vibratory motion, the SSE, the associated load factors, and allowable stresses ensure that the stresses in steel structures do not exceed the yield stress of the material. The NRC Staff design review guidance specified in SRP § 3.7.2 does not accept the use of inelastic deformation of any steel member or connection in nuclear power plants for design-basis seismic events. Also, the use of broadband design response spectra, conservatively defined structural damping values, consideration of amplified forces at higher elevations in the plants, and consideration of all three components of the design-basis vibratory motion in the dynamic analysis ensure that the loads and load paths of the seismic events are properly considered in the design, as opposed to the use of static shear forces in nonnuclear structures. For these reasons, the failure of WSMFs in residential and commercial buildings as a result of the Northridge earthquake is not relevant to nuclear power plants.

On the basis of its review of the Petitioner's request that the SONGS units be shut down due to inadequate protection against potential earthquake ground motion, the Staff has concluded that the Petitioner has not presented a basis for such an action.

III. CONCLUSION

On the basis of the above assessment, I have concluded that no substantial health and safety issues have been raised by the Petitioner that would require taking the action requested by the Petitioner. As explained above, the SONGS site has undergone extensive geologic, geophysical, geotechnical, and seismic investigations and reviews, including a recent analysis to quantify the seismic hazard and uncertainties for the SONGS site. Furthermore, SONGS was

⁴⁵ FEMA 267, "Interim Guidelines: Evaluation, Repair, Modification and Design of Welded Steel Moment Frame Structures, Program to Reduce the Earthquake Hazards of Steel Moment Frame Structures," Federal Emergency Management Agency, Washington, DC (1995).

⁴⁶ See 10 C.F.R. Part 100, Appendix A, § III(d).

licensed consistent with the seismic and geologic siting criteria for nuclear power plants set forth in Part 100, Appendix A. The Petitioner has not provided any information in support of his concerns and requested actions, including information regarding recent earthquakes, that the NRC Staff was not already aware. Accordingly, the Petitioner's requested action, pursuant to section 2.206, is denied.

A copy of this Decision will be filed with the Secretary of the Commission for the Commission to review in accordance with 10 C.F.R. § 2.206(c) of the Commission's regulations. As provided by this regulation, the Decision will constitute the final action of the Commission 25 days after issuance, unless the Commission, on its own motion, institutes a review of the Decision within that time.

FOR THE NUCLEAR
REGULATORY COMMISSION

Samuel J. Collins, Director
Office of Nuclear Reactor
Regulation

Dated at Rockville, Maryland,
this 19th day of September 1997.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Carl J. Paperiello, Director

In the Matter of

Docket No. 72-10

NORTHERN STATES POWER
COMPANY

(Goodhue County Independent Spent
Fuel Storage Facility)

September 26, 1997

The Director of the Office of Nuclear Material Safety and Safeguards denies a petition filed by Florence Township, Minnesota, on August 26, 1996. The Petitioner asked that the NRC find that Northern States Power Company (NSP) had violated NRC regulations by not permitting Lake City, Minnesota, the opportunity to comment on the emergency plan for a proposed independent spent fuel storage installation (ISFSI) before submitting the plan to the NRC. On that basis, Petitioner asked that a civil penalty be imposed. In addition, Petitioner asked that the NRC reject NSP's application and require NSP to take certain actions with regard to the ISFSI application.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

On August 26, 1996, Florence Township, Minnesota (Petitioner), filed a petition requesting that the Nuclear Regulatory Commission (NRC) institute a proceeding pursuant to 10 C.F.R. § 2.202 with regard to the application by Northern States Power Company (NSP), claiming that NSP violated the Commission's regulations by failing to provide Lake City, Minnesota, with an opportunity to comment on a proposed emergency plan for an independent spent fuel storage installation (ISFSI) before submission to the NRC. The Petitioner

requested that NRC: (1) determine that NSP violated the requirements of 10 C.F.R. § 72.32(a)(14) by refusing to allow Lake City, Minnesota, 60 days to comment on NSP's emergency plan before submitting it to NRC; (2) reject NSP's application as incomplete and inadequate and return it to the corporation; (3) require that NSP specifically name the local governments referred to in section 5.6 of the emergency plan that are expected to respond in case of an accident; (4) require that NSP allow 60 days to the named local governments to review and comment upon NSP's emergency plan prior to NSP's resubmission of the application; (5) impose a penalty in the amount of one million dollars and require NSP to compensate the Petitioner in the amount of \$7500.00 for time expended by its Board and attorney in attempting to obtain the emergency plan before its submission to the NRC; and (6) provide hearings on this petition at which the Petitioner and members of the public may participate.

The Petitioner asserts as the basis for this request the regulatory requirement found in section 72.32(a)(14) of Title 10 of the *Code of Federal Regulations* (10 C.F.R. § 72.32(a)(14)):

The licensee shall allow the offsite response organizations expected to respond in case of an accident 60 days to comment on the initial submittal of the licensee's emergency plan before submitting it to NRC. Subsequent plan changes need not have the offsite comment period unless the plan changes affect the offsite response organizations. The licensee shall provide any comments received within 60 days to NRC with the emergency plan.

The petition has been referred to me for a decision. For the reasons given below, I have concluded that the Petitioner's requests should be denied.

II. BACKGROUND

NSP has an onsite ISFSI at Prairie Island Nuclear Generating Plant (PINGP), which has a capacity to store 1920 spent fuel assemblies in 48 Transnuclear TN-40 casks. In 1994, the Minnesota legislature enacted statutes authorizing NSP to store spent nuclear fuel at the ISFSI. 1994 Minn. Laws ch. 641, arts. 1,6 (*codified at* Minn. Stat. §§ 116C.77-.80 (1996)). The legislation authorized the immediate use of five casks and allowed the use of four additional casks upon a determination that NSP had: (1) filed a license application with NRC for a separate dry-cask storage facility in Goodhue County; (2) continued a good-faith effort to implement the alternate site; and (3) arranged for the use of additional megawatts of wind power. The law also provided that NSP could not construct at the second site without first obtaining a Certificate of Site Compatibility from the Minnesota Environmental Quality Board (MEQB). The MEQB was authorized to certify that the alternative Goodhue County site was comparable to the independent spent fuel storage facility site located on Prairie Island.

NSP applied for a certificate from the MEQB in July 1995. It identified two possible sites for the Goodhue County spent fuel storage facility, both in Florence Township, south of the City of Red Wing.¹ On October 2, 1996, after receiving the report of a citizen Advisory Task Force, the MEQB determined that because of the additional risks it believed to be inherent in transporting spent nuclear fuel to a second site in Goodhue County away from PINGP, no other site in Goodhue County would be comparable to the Prairie Island facility and denied a certificate.

NSP's application to NRC included an emergency plan for the Goodhue County facility, which contained comments from the Minnesota Departments of Public Safety and Public Health, as well as the Goodhue County, Minnesota, Office of Emergency Management which coordinates emergency services within the county. NRC completed its acceptance review and docketed the NSP application on September 9, 1996. A "Notice of Consideration of Issuance of a Materials License for the Storage of Spent Fuel and Notice of Opportunity for Hearing" was published in the *Federal Register* on September 17, 1996. The Petitioner and several others sought a hearing as provided by 10 C.F.R. § 2.105. An Atomic Safety and Licensing Board (ASLB) was established on October 9, 1996. Among the issues raised in the petitions to intervene by the Petitioner and by Lake City, Minnesota, were issues associated with emergency planning, substantially similar to the issues raised by the Petitioner in the petition requesting that the NRC institute a proceeding pursuant to section 2.202. Consequently, the Staff deferred the response to the petition until completion of the ASLB hearing process.

Because of the physical proximity of its Reservation to PINGP, the Prairie Island Indian Community had been particularly interested in seeing the offsite ISFSI built. Since the MEQB decision effectively ended the possibility of that facility being developed, the Indian Community initiated litigation in the Minnesota State Courts in December 1996, seeking to overturn the MEQB decision. When the litigation began, NSP requested and was granted a suspension of both NRC Staff's review of the Goodhue County application and the ASLB proceeding, just prior to the prehearing conference that was scheduled for December 1996. State litigation ended in July 1997, when the Minnesota Supreme Court declined to hear an appeal of the Minnesota Court of Appeals ruling that affirmed the MEQB decision. Subsequently, in a letter dated July 22, 1997, NSP withdrew the Goodhue County application. NRC acknowledged the withdrawal in a letter dated August 4, 1997. The ASLB issued a Memorandum and Order

¹ One of these was the site chosen by NSP for inclusion in its application to NRC. It is described as being situated south of Frontenac Station, north of Wells Creek, and between Territorial Road and the CP Rail railroad tracks.

terminating its proceeding on July 30, 1997. However, a motion for reconsideration is currently under review by the Board.²

III. DISCUSSION

Section 72.32(a)(14) provides that the offsite response organizations *expected by the Licensee* to respond to an onsite emergency should be provided an opportunity to comment on an ISFSI emergency plan.³ As required by section 72.32(a)(14), NSP contacted the offsite response organizations it expected to respond to an onsite emergency at the proposed Goodhue County facility. NSP requested comments from the Minnesota Departments of Public Safety and Public Health and the Goodhue County, Minnesota, Office of Emergency Management. All three responded to NSP's request. Their comments were provided to NRC with the emergency plan.

The Petitioner claims that because the Lake City, Minnesota, Fire Department contracts with Florence Township to provide fire protection, it is one of the offsite response organizations that NSP would contact in case of an onsite emergency at the Goodhue County ISFSI. Lake City is not located in Goodhue County, however, and therefore is not expected by the applicant to respond to an onsite emergency.

The emergency plan appropriate for an ISFSI is an onsite emergency plan. The Staff has determined that there are no credible accidents at an ISFSI that have significance for offsite emergency preparedness.⁴ There is no specific requirement that any particular political jurisdiction be contacted to comment on an ISFSI emergency plan. Rather, the applicant is required to determine which services it will require from offsite providers and to seek comments from those organizations. NSP did not indicate in the emergency plan that Lake City, Minnesota, was expected to respond to an onsite emergency. Further, no

² On July 30, 1997, the Petitioner filed a response to NSP's July 24, 1997 Motion for Withdrawal of Application and Termination of Proceeding. In the response, the Petitioner requested that the ASLB dismiss the NSP application with prejudice, or alternatively, deny NSP's application, or impose a condition of withdrawal that the application for the Florence Township site shall not be resubmitted. The ASLB considered this Petitioner's June 30, 1997 submittal to be a motion for reconsideration. On August 29, 1997, the Staff responded that Florence Township's motion for reconsideration should be denied on the basis that the proceeding had not sufficiently progressed such that dismissal with prejudice is appropriate, and on the basis that Florence Township has not demonstrated legal harm warranting the relief it requests.

³ The regulatory requirements for comments on the emergency plans for ISFSIs, like the requirements for the emergency plans, are separate and quite different from those for nuclear reactors. The requirements for emergency plans for ISFSIs are for onsite emergencies only. Because offsite health effects have not been identified for accidents at ISFSIs, there is no requirement for neighboring jurisdictions to be involved in emergency response. There is, for instance, no requirement for evacuation planning and hence no need for the kinds of more elaborate plans associated with nuclear reactors.

⁴ See NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees."

evidence has been provided that NSP, at the time of the submittal of the license application, had plans to seek emergency planning assistance from Lake City, Minnesota. Thus, there is no violation of section 72.32(a)(14) to warrant any enforcement action.

The Petitioner raised several additional requests regarding NRC's review of NSP's Goodhue County application. These are matters that the NRC considers during the license review, not as part of a petition filed under section 2.206. Further, in light of the fact that NSP has now withdrawn the application, they are moot.

IV. CONCLUSION

I have concluded that NSP did not violate NRC regulations by failing to provide Lake City, Minnesota, with an opportunity to respond to the proposed emergency plan. As provided by 10 C.F.R. § 2.206(c), a copy of this Decision will be filed with the Secretary of the Commission for the Commission's review.

FOR THE NUCLEAR
REGULATORY COMMISSION

Carl J. Paperiello, Director
Office of Nuclear Material Safety
and Safeguards

Dated at Rockville, Maryland,
this 26th day of September 1997.