



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, ILLINOIS 60532-4352

February 11, 2015

EA-14-168

Mr. Anthony Vitale
Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: REGULATORY CONFERENCE SUMMARY; PALISADES NUCLEAR PLANT

Dear Mr. Vitale:

On January 13, 2015, a regulatory conference was held between the NRC and Entergy. The conference was held to discuss an apparent failure to ensure that radiation worker dosimeters calibrated to the Deep Dose Equivalent (DDE) were located at the highest exposed portion of the respective compartment. This is a condition for using the NRC-approved method for determining effective dose equivalent external (EDEX).

During the meeting, you described your assessment of the significance of the finding and the corrective actions taken to resolve it, including the root cause evaluation of the finding. You attributed the root cause of the failure to inadequacies in an Entergy procedure and determined that deficiencies in planning and field oversight by the radiation protection staff contributed. You also provided a technical discussion regarding an alternate method to calculate the workers dose. Following the meeting, the NRC accepted questions related to the conference from the public in attendance or on the phone.

A copy of the Entergy presentation was placed into the NRC's Agencywide Documents Access and Management System (ADAMS) at accession number ML15012A368. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. A partial list of attendees and a list of questions received prior to the conference are enclosed.

The NRC is continuing to evaluate the information provided during the conference. A final determination letter will be sent to you once our evaluation is complete. Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the inspection finding and associated apparent violations at this time. Please be advised that the number and characterization of the apparent violations described during the regulatory conference may change as a result of further NRC review.

A. Vitale

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In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be made available electronically for public inspection in the NRC Public Document Room or from ADAMS.

Sincerely,

/RA/

Eric R. Duncan
Acting Chief, Enforcement and Investigation
Coordination Staff

Docket No. 50-255
License No. DPR-20

Enclosures:

1. Regulatory Conference List of Attendees
2. Public Questions

cc w/encls: Distribution via ListServ®

REGULATORY CONFERENCE
LIST OF ATTENDEES

Entergy Nuclear Operations

Anthony Vitale, Site Vice President
Anthony Williams, General Manager, Plant Operations
Otto Gustafson, Regulatory and Performance Improvement Director
Doug Watkins, Radiation Protection Manager
Jeff Hardy, Regulatory Assurance Manager
David Moore, Senior Manager, Fleet Radiation Protection
Jim Fontaine, Supervisor, Rad Support
David Smith, Certified Health Physicist
David Mannai, Senior Manager, Fleet Regulatory Assurance
Terry Davis, Sr. Licensing Specialist
John Solini, Entergy (via phone)
Lindsay Rose, Palisades Power Plant (via phone)
Barb Dotson, Palisades Regulatory Assurance (via phone)
John McCann, Entergy (via phone)
Dr. George Chabot, Professor Emeritus, UMass-Lowell (via phone)

U.S. Nuclear Regulatory Commission

Darrell Roberts, Deputy Regional Administrator
Mohammed Shuaibi, Deputy Director, Division of Reactor Safety (DRS)
Anne Boland, Director, Division of Reactor Projects (DRP)
Billy Dickson, Chief, Health Physics Branch, DRS
John Cassidy, Senior Health Physics Inspector, DRS
Eric Duncan, Acting Enforcement Officer
Roger Pederson, Senior Health Physicist, Radiation Protection and Consequences Branch
(ARCB), Office of Nuclear Reactor Regulation (NRR)
Cynthia Pederson, Regional Administrator, RIII
Kenneth O'Brien, Director, DRS, RIII
Mark Rubic, Acting Regional Counsel
Viktoria Mitlying, Public Affairs Officer
Patricia Lougheed, Senior Enforcement Coordinator
Dr. Peter Lee, Health Physicist
Jay Lennartz, Project Engineer, Branch 3, DRP
John Ellegood, Acting Chief, Branch 3, DRP
Kyle Hanley, Enforcement Coordinator, Office of Enforcement (via phone)
Alex Garmoe, Senior Resident Inspector (via phone)
April Scarbeary, Palisades Resident Inspector (via phone)
Undine Shoop, Chief, ARCB, NRR (via phone)
Steven Garry, Senior Health Physicist, ARCB, NRR (via phone)
Carolyn Kahler, Senior Liaison, Office of Congressional Affairs (via phone)

Members of the Public

Kevin Kamps, Beyond Nuclear and Don't Waste Michigan
William Reed, Don't Waste Michigan
Katherine Barnes, Don't Waste Michigan (via phone)
Corinne Carey, Don't Waste Michigan (via phone)

Regulatory Conference
List of Attendees

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Arnold Gundersen, Beyond Nuclear (via phone)
Michael Keegan, Don't Waste Michigan (via phone)
Linda Lewison, Sierra Club Nuclear Free Campaign (via phone)
Bette Pierman, Michigan Safe Energy Future; MSEF Sureline chapter (via phone)
Kenneth Richards, Michigan Safe Energy Future (via phone)
Mary Judnich, Senator Stabenow's Office (via phone)
Krystal Lattany, Senator Stabenow's Office (via phone)
Annie Caputo, Congressman Upton's Office (via phone)
Clay McCausland, Congressman Upton's Office (via phone)
Greg Gothard, MDEQ State of Michigan (via phone)
Joe Dixon, Cooper Station (via phone)
Michael McLain, Columbia Generating Station (via phone)
David Kraft, Nuclear Energy Information Service (via phone)
Jim Bacquet (via phone)
Francis Evan (via phone)
Rebecca Mandrell (via phone)
Michael Arney, WSJM News (via phone)
Amy Hibol, WWMT (via phone)
Lindsey Smith, Michigan Radio (via phone)

PUBLIC QUESTIONS
(Not Answered at the Conference)

1. May I please receive, or be directed to the appropriate specific sources to obtain, a list of all regulatory violations (real or alleged, including the current violations to be discussed at the 1/13 meeting relating to Section 20.1201 and Technical Spec 5.4 of 10CFR) associated with Palisades since they received their renewed operating license in 2007?

NRC Response: The mechanism the NRC uses to issue violations is via a transmittal letter with either a Notice of Violation or an inspection report. These documents are assigned a unique identifier (Inspection Report No.) A list of inspection reports issued since 2000 can be found at the following location:
http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/listofrpts_body.html. The NRC does not track alleged violations.

2. May I please receive, or be directed to the appropriate specific sources to obtain, NRC benchmark data to determine how the violations noted in #1 above compare to similar nuclear plants under the regulatory jurisdiction of the NRC during the same time period?

NRC Response: During the 8 year timeframe (from 2007 to 2015), Palisades had 163 violations (cited or non-cited), of which 4 were greater than green. This is above the average (123 of which 2 were greater than green) for all nuclear plants in the same time period (including plants that have not undergone license extension.) The highest number for the period was 260 violations, of which 3 were greater than green closely followed by 257 violations, of which 10 were greater than green.

3. Is there regulatory guidance (similar to that in IP 71124.01 03.05c) available to clarify when the dose gradient across the compartment would require relocation of a compartment dosimeter?

NRC Response: Regulatory Guides (RG) 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses," and 8.40, "Methods for Measuring Effective Dose Equivalent from External Exposure," provide guidance on where dosimetry should be placed and the use of more than one dosimeter. RG 8.40 supplements several Regulatory Information Summaries, as listed in the document. There is no specific information about dose gradients across a compartment, but NRC regulations (10 CFR 20.1201.c) require measurement at the highest exposed portion of the respective compartment.

4. Given the complex radiological conditions, hot spot locations both above and below the work platform, the constant movement of temporary shielding during the job, and the unlimited number of possible body positions, what was the potential gradient over the compartments and why does the NRC believe that the utility failed to ensure dosimeters were located at the highest exposed portion of the respective compartment?

NRC Response: The NRC does not know the potential gradient as this information was not measured by the licensee. Based on dosimetry records and radiological surveys, the NRC determined that the workers were primarily exposed to radiation from below. The licensee combined the abdominal and thorax compartments, considered separate by the NRC, into a single compartment. However, the licensee chose to place the dosimetry in the upper chest region, rather than lower in the combined compartment.

Therefore, the NRC determined that this location was not the highest exposed location of the combined compartments and thus underestimated the dose to the abdomen.

5. Had EDEX not been in use and only one WB [whole body] dosimeter was used to monitor the entire body, where would the regulator have recommended placing this dosimeter?

NRC Response: At the highest exposure point on the body as required by 10 CFR 20.1201.c. As the radiation source was primarily from below, this would indicate a lower body location than if the workers were in a uniform radiation field.

6. Since the workers were exposed to limits exceeding allowable radiation exposures, what will be done by Entergy for them to help them with health issues that may occur from the exposures?

NRC Response: No workers were exposed to doses exceeding the NRC allowable radiation exposure. After the NRC identified this issue, the licensee used a conservative calculational method to recalculate dose to each worker. The NRC determined that the dose received by each of the workers was within the NRC's allowable limits.

7. And will the NRC be monitoring the future health of the employees and any efforts of Entergy to insure that the employees are helped with extra health care needs?

NRC Response: No. The additional dose received by the workers was below a level where additional health monitoring is would be warranted. There has not been any observed health effects from radiation exposure within the NRC limits.

8. What does the NRC intend to do to help the employees in the future and how many of them have already expressed feeling of illness, disease and side effects from the exposure?

NRC Response: The NRC intends to ensure that all workers have the correct dose recorded. There have been no observed health effects from radiation dose exposure within the NRC limits.

9. Was Dr. Chabot paid for his services by Entergy?

NRC Response: This question was answered during the conference by Dr. Chabot who stated he was paid; however, he also stated that it did not influence his conclusions.

10. Were workers of child bearing age involved? Any women?

NRC Response: This question was answered during the conference by Entergy who stated that workers were primarily male; however, there were a few women. None of the workers was a declared pregnant worker.

11. Why weren't the reproductive organs better protected? What are the genetic damage risks?

NRC Response: These questions were answered during the conference. The NRC held the regulatory conference in part to address the concern about the dose to the reproductive organs. The NRC determined that the dose received by each of the workers was within the NRC's allowable limits.

12. Is Entergy aware of the recent research finding from BIER 7 that exposure to the same dosage as men have a much higher radiation effect on women's and children's organs and systems?

NRC Response: This question was addressed during the conference as "yes."

In accordance with Title 10 of the Code of Federal Regulations (10 CFR) Section 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be made available electronically for public inspection in the NRC Public Document Room or from ADAMS.

Sincerely,

/RA/

Eric R. Duncan
Acting Chief, Enforcement and Investigation
Coordination Staff

Docket No. 50-255
License No. DPR-20

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