

January 27, 2003

Mr. Michael Kansler  
Senior Vice President and  
Chief Operating Officer  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NO. 3 - ISSUANCE OF  
AMENDMENT RE: COMPONENT COOLING WATER SYSTEM DESIGN  
BASIS (TAC NO. MB1955)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 214 to Facility Operating License No. DPR-64 for the Indian Point Nuclear Generating Unit No. 3. The amendment consists of changes to the Final Safety Analysis Report (FSAR) in response to the your application transmitted by letter dated April 24, 2001, as supplemented on May 22, 2002.

The amendment revises information in the FSAR regarding the protection of the component cooling water (CCW) system from natural phenomena. The change addresses the fact that a portion of one safety-related loop of the CCW system is routed through the fuel storage building, where the structure was not designed to protect the CCW piping from the effects of natural phenomena.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

*/RA/*

Patrick D. Milano, Sr. Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-286

Enclosures: 1. Amendment No. 214 to DPR-64  
2. Safety Evaluation

cc w/encls: See next page

January 27, 2003

Mr. Michael R. Kansler  
Senior Vice President and  
Chief Operating Officer  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NO. 3 - ISSUANCE OF  
AMENDMENT RE: COMPONENT COOLING WATER SYSTEM DESIGN  
BASIS (TAC NO. MB1955)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 214 to Facility Operating License No. DPR-64 for the Indian Point Nuclear Generating Unit No. 3. The amendment consists of changes to the Final Safety Analysis Report (FSAR) in response to the your application transmitted by letter dated April 24, 2001, as supplemented on May 22, 2002.

The amendment revises information in the FSAR regarding the protection of the component cooling water (CCW) system from natural phenomena. The change addresses the fact that a portion of one safety-related loop of the CCW system is routed through the fuel storage building, where the structure was not designed to protect the CCW piping from the effects of natural phenomena.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

*/RA/*

Patrick D. Milano, Sr. Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-286

Enclosures: 1. Amendment No. 214 to DPR-64  
2. Safety Evaluation

cc w/encls: See next page

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML030240116.wpd

**Accession Number: ML030240116**

\*See previous concurrence

OFFICE	PDI-1\PM	PDI-1\LA	SPLB\SC*	EMEB\SC*	OGC	PDI-1\SC
NAME	PMilano	SLittle	SWeerakkody	KManoly	RWeisman	RLaufer
DATE	1/7/03	1/7/03	12/17/02	12/19/02	1/22/03	1/23/03

**Official Record Copy**

DATED: January 27, 2003

AMENDMENT NO. 214 TO FACILITY OPERATING LICENSE NO. DPR-64 INDIAN POINT  
UNIT 3

PUBLIC

PDI R/F

R. Laufer

S. Little

P. Milano

W. Beckner

S. Weerakkody

S. Jones

K. Manoly

B. P. Jain

ACRS

OGC

G. Hill (2)

B. Platchek, RI

cc: Plant Service list

Indian Point Nuclear Generating Unit No. 3

cc:

Mr. Jerry Yelverton  
Chief Executive Officer  
Entergy Operations  
1340 Echelon Parkway  
Jackson, MS 39213

Mr. Robert J. Barrett  
Vice President - Operations  
Entergy Nuclear Operations, Inc.  
Indian Point Nuclear Generating Unit 3  
295 Broadway, Suite 3  
P. O. Box 308  
Buchanan, NY 10511-0308

Mr. Dan Pace  
Vice President Engineering  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. James Knubel  
Vice President Operations Support  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. Joseph DeRoy  
General Manager Operations  
Entergy Nuclear Operations, Inc.  
Indian Point Nuclear Generating Unit 3  
295 Broadway, Suite 3  
P. O. Box 308  
Buchanan, NY 10511-0308

Mr. John Kelly  
Director - Licensing  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Ms. Charlene Faison  
Licensing  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. Harry P. Salmon, Jr.  
Director of Oversight  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. James Comiotes  
Director, Nuclear Safety Assurance  
Entergy Nuclear Operations, Inc.  
Indian Point Nuclear Generating Unit 3  
295 Broadway, Suite 3  
P.O. Box 308  
Buchanan, NY 10511-0308

Mr. John Donnelly  
Licensing Manager  
Entergy Nuclear Operations, Inc.  
Indian Point Nuclear Generating Unit 3  
295 Broadway, Suite 3  
P.O. Box 308  
Buchanan, NY 10511-0308

Mr. John McCann  
Manager, Licensing and Regulatory Affairs  
Entergy Nuclear Operations, Inc.  
Indian Point Nuclear Generating Unit 2  
295 Broadway, Suite 1  
P. O. Box 249  
Buchanan, NY 10511-0249

Resident Inspector's Office  
U.S. Nuclear Regulatory Commission  
295 Broadway, Suite 3  
P.O. Box 337  
Buchanan, NY 10511-0337

Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. John M. Fulton  
Assistant General Counsel  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Indian Point Nuclear Generating Unit No. 3

cc:

Ms. Stacey Lousteau  
Treasury Department  
Entergy Services, Inc.  
639 Loyola Avenue  
Mail Stop: L-ENT-15E  
New Orleans, LA 70113

Mr. William M. Flynn, President  
New York State Energy, Research, and  
Development Authority  
17 Columbia Circle  
Albany, NY 12203-6399

Mr. J. Spath, Program Director  
New York State Energy, Research, and  
Development Authority  
17 Columbia Circle  
Albany, NY 12203-6399

Mr. Paul Eddy  
Electric Division  
New York State Department  
of Public Service  
3 Empire State Plaza, 10<sup>th</sup> Floor  
Albany, NY 12223

Mr. Charles Donaldson, Esquire  
Assistant Attorney General  
New York Department of Law  
120 Broadway  
New York, NY 10271

Mayor, Village of Buchanan  
236 Tate Avenue  
Buchanan, NY 10511

Mr. Ray Albanese  
Executive Chair  
Four County Nuclear Safety Committee  
Westchester County Fire Training Center  
4 Dana Road  
Valhalla, NY 10592

Mr. Ronald Schwartz  
SRC Consultant  
64 Walnut Drive  
Spring Lake Heights, NJ 07762

Mr. Ronald J. Toole  
SRC Consultant  
Toole Insight  
605 West Horner Street  
Ebensburg, PA 15931

Mr. Charles W. Hehl  
SRC Consultant  
Charles Hehl, Inc.  
1486 Matthew Lane  
Pottstown, PA 19465

Mr. Alex Matthiessen  
Executive Director  
Riverkeeper, Inc.  
25 Wing & Wing  
Garrison, NY 10524

Mr. Paul Leventhal  
The Nuclear Control Institute  
1000 Connecticut Avenue NW  
Suite 410  
Washington, DC, 20036

Mr. Karl Copeland  
Pace Environmental Litigation Clinic  
78 No. Broadway  
White Plains, NY 10603

Jim Riccio  
Greenpeace  
702 H Street, NW  
Suite 300  
Washington, DC 20001

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-286

INDIAN POINT NUCLEAR GENERATING UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 214  
License No. DPR-64

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Entergy Nuclear Operations, Inc. (the licensee) dated April 24, 2001, as supplemented on May 22, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the licensee is authorize to change the design for the component cooling water (CCW) system, as described in the Final Safety Analysis Report (FSAR), regarding protection from natural phenomena. Specifically, this amendment accepts the original as-built routing of a portion of one safety-related loop of the CCW system through the non-safety related fuel storage building, where the structure is not designed to protect the CCW piping from the effects of natural phenomena.

3. This license amendment is effective as of the date of its issuance. In the next update of the FSAR required by 10 CFR 50.71(c), the licensee will implement this amendment by incorporating into the FSAR the revisions as submitted in its April 24, 2001, application, as supplemented on May 22, 2002, and evaluated in the staff's Safety Evaluation dated January 27, 2003.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Richard J. Laufer, Chief, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: January 27, 2003

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 214 TO FACILITY OPERATING LICENSE NO. DPR-64  
ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3  
DOCKET NO. 50-286

## 1.0 INTRODUCTION

By letter dated April 24, 2001, as supplemented on May 22, 2002, Entergy Nuclear Operations, Inc. (the licensee) submitted a request for changes to the Indian Point Nuclear Generating Unit No. 3 (IP3) Final Safety Analysis Report (FSAR). The requested changes would revise the FSAR regarding the protection of the component cooling water (CCW) system from natural phenomena. The proposed change accepts the original routing of a portion of one safety-related loop of the CCW system through the non-safety related fuel storage building, where the structure was not designed to protect the CCW piping from the effects of natural phenomena. The May 22, 2002, letter provided clarifying information that did not change the scope of the proposed amendment or the initial proposed no significant hazards consideration determination.

## 2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) staff finds that the licensee in its April 24, 2001, application addressed the applicable regulatory requirements. The regulatory requirements upon which the staff based its review of the application are as follows:

Title 10 of the *Code of Federal Regulations* (10 CFR) establishes the fundamental regulatory requirements with respect to reactivity control systems. Specifically, these requirements include several General Design Criteria (GDC) in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," namely:

- a. GDC-2, "Design bases for protection against natural phenomena," states in part that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena.
- b. GDC-4, "Environmental and dynamic effects design basis," states in part that structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions.
- c. GDC-44, "Cooling water," requires in part that the system be capable of transferring heat loads from safety-related structures, systems, and components, have component redundancy so that safety functions can be performed assuming a single active failure,



and be capable to isolate components and piping if required to prevent loss of safety function.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Background

The CCW system at IP3 consists of two main headers. Each main header is supported by one component cooling pump, one component cooling heat exchanger and one component cooling surge tank. A third component cooling pump can be aligned to either or both component cooling headers. Each header cools one residual heat removal pump, one residual heat removal heat exchanger, one recirculation pump, and at least one charging pump. The remaining components cooled by the CCW system are split between the normally cross-connected headers to equalize the heat load. Isolation valves are available so the headers can be separated and operated as independent loops. Either header, operating independently, provides adequate cooling to equipment necessary to support safe shutdown or post-accident recirculation for decay heat removal.

In addition to other functions, each component cooling surge tank provides a ready supply of makeup water that allows a period of continued system operation while actions to isolate a leaking component are implemented. The surge tanks are instrumented to provide a low level alarm at 46 percent level and indication of a low-low level at 5 percent. Makeup to the surge tanks is available from the primary water storage tank via the primary makeup water system.

One loop of CCW that cools the spent fuel pit heat exchanger is located in a seismic Class III section of the fuel storage building. This structure is not designed to protect the enclosed systems from the effects of natural phenomena. Therefore, this loop of CCW is potentially subject to damage by tornado related effects.

The design criteria applicable to the cooling water systems include the requirement that a tornado will not impair the ability to safely shut down the plant nor impair the long-term safety of the plant following a loss-of-coolant accident. Basic functions necessary for safe shutdown include residual heat removal, reactivity control, and pressurizer pressure and level control. Long term reactivity control and pressurizer pressure and level control involve the use of the charging system for addition of borated water to the reactor coolant system. The charging pumps are cooled by CCW. Although cooldown is not immediately necessary for safe shutdown following tornado damage, plant cooldown and residual heat removal in the cold shutdown operating condition involve the use of the CCW system. For post-accident recirculation, the CCW system performs a residual heat removal function.

#### 3.2 Current Licensing Basis

The current licensing basis for the CCW system includes several examples where redundant components and operator realignment of systems, rather than structural protection, are relied on to maintain function following tornados. These examples include the following components:

- (1) the vital 480 Volt electrical distribution system power sources
- (2) the redundant water supplies for steam generator emergency feed

- (3) the redundant water supplies for primary system makeup
- (4) the redundant service water supply piping and backup service water system

The FSAR currently states that the CCW system is contained within structures designed to withstand natural phenomena, including tornados and tornado-generated missiles. However, as a result of design basis verification activities, the licensee identified that the portion of the CCW system piping located within the fuel storage building was not located within a structure designed to withstand the effects of natural phenomena. The FSAR also describes that the functional capability of specific systems essential for safe shutdown of the unit is protected from the effects of tornados and tornado generated missiles by redundancy of components, but the CCW system was not included among those systems. As stated in the licensee's letter dated April 24, 2001, the proposed FSAR revision is intended to resolve this issue by crediting analyses demonstrating the capability of the CCW system to complete its required functions for safe shutdown following design basis seismic and tornado events.

### 3.3 Proposed FSAR Change

The licensee evaluated the effects of natural phenomena on the fuel storage building structure and the effects of potential tornado-generated missiles. The fuel storage building (FSB) was not originally analyzed as a seismic Class I structure because it was not completely designed as such.

The licensee performed a seismic re-evaluation of the FSB. A three dimensional mathematical model and a synthetic earthquake ground motion were developed for the entire FSB. A dynamic analysis for the mathematical model of the FSB was carried out by the computer code STARDYNE for 27 loading combinations. The loading combinations included dead, live, design-basis earthquake, and wind loads. The analysis results include member forces and element stresses. These member forces and elements stresses were compared with the allowable strengths or stresses in the applicable codes, i.e., the ACI code for concrete and the AISC code for steel, and established criteria for masonry. A separate analysis was performed for design-basis tornado loads. The analyses results indicated that the building structure masonry walls were adequate for seismic and wind loads, but were not adequate for tornado wind loads. The masonry walls can resist a 2x4 timber plank missile, but cannot resist a 12-foot long 4X12 wood plank missile. The staff finds the mathematical model, loads and loading combinations, input earthquake spectra, and analysis method adequate because they are in conformance with the FSAR. In particular, the STARDYNE computer program was bench-marked and its use is acceptable for structural analysis applications. Therefore the seismic Class I CCW system is adequately protected from the effects of design-basis seismic events.

Although the section of the fuel storage building that houses the CCW loop was not designed to protect that system from tornado effects and tornado generated missiles, surrounding seismic Class I structures provide credible protection from high winds associated with tornados and tornado generated missiles on three sides of the fuel storage building. These seismic Class I structures are: the plant auxiliary building to the south, the fan house and reactor containment building to the west, and the spent fuel pit in the north end of the fuel storage building. The design basis tornado pressure differential will not result in damage to the CCW piping because, above the 95-foot elevation, the fuel storage building is constructed of metal siding. The siding is expected to fail at a pressure of 60 pounds per square foot, which would preclude development of a larger differential pressure necessary to cause failure of other external fuel

storage building walls. Concrete slab floors at the 75- and 95-foot elevations protect the CCW piping on the 55-foot elevation from vertical missiles and falling structural material. Therefore, only tornado winds and tornado generated missiles originating from the east credibly threaten the integrity of the CCW piping in the fuel storage building.

Accordingly, the licensee evaluated the effects of tornado winds and tornado generated missiles originating from the east side of the fuel storage building. Block walls on the east side would collapse under the tornado wind load. However, the blocks would not fall onto CCW piping or the spent fuel pit heat exchanger because the equipment is outside the area where the blocks would fall. Staircase framing adjacent to the wall would provide additional protection. Accordingly, the wind effects would not cause damage to the CCW piping. Design basis horizontal tornado missiles for the site are: (1) a 4x12 inch plank 12 feet long traveling at 300 miles per hour and (2) a 4000 pound passenger car traveling at 50 miles per hour at less than 25 feet above the ground. The licensee evaluated the following cases:

- 1) Wood plank hitting 10 inch CCW piping at either of the two elbows above the heat exchanger.
- 2) Wood plank hitting the Class I (CCW) side of the heat exchanger.
- 3) Car hitting the stair framing, where it loses some of its energy, then hitting the CCW piping at an elbow above the heat exchanger.
- 4) Car hitting the Class I (CCW) side of the heat exchanger with full impact from a path that missed the stair framing.

The evaluation concluded that there would be plastic deformation but no penetration of the heat exchanger shell and no guillotine break of the 10" CCW piping, and that a break to a 3/4" vent is possible with a maximum of 1.95 gallons per second of cooling water leak rate. The evaluation used plastic analysis for steel structures with consideration of the natural frequency of the structure, weight and velocity of the missile, and steel ductility. The staff finds the evaluation method adequate because the STARDYNE program is acceptable as described above, and the inputs to the analyses are consistent with the FSAR.

With leakage of less than 2 gpm, at least 14 minutes would pass between receipt of a low CCW surge tank level alarm and the depletion of the surge tank inventory. This time is adequate for operators to identify the loss of CCW inventory and stop the operating CCW pumps in accordance with off-normal operating procedures to ensure protection of the pumps. Off-normal operating procedures also direct the repair or isolation of the leak and the restoration of CCW coolant inventory through makeup from the primary water storage tank. These actions would allow restoration of at least one CCW loop. Considering the availability of a spare CCW pump and the ability to separate CCW loops, even much more severe damage to the CCW piping in the fuel storage building would not preclude restoration of at least one loop within several hours.

The licensee evaluated the ability to complete essential functions for safe shutdown or long-term post-accident recirculation. The charging pumps would be available for the reactivity control and the pressurizer pressure and level control functions because: (1) these functions require only intermittent charging system operation, (2) the charging pumps can be operated for 30 minutes without cooling, and (3) city water via a temporary connection is available as a backup source of cooling for the charging pumps. Since the residual heat removal function of the CCW system is not immediately necessary for safe shutdown, restoration of the CCW

system function within several hours is adequate to complete this function. The residual heat removal requirements for the long-term post-accident recirculation function are sufficiently low that temporary interruption of residual heat removal would not adversely affect recirculation capability. Therefore, the capability to restore the CCW system following potential tornado damage through leak isolation and provision of makeup water from the primary water storage tank (PWST) adequately maintains required CCW system functions.

### 3.4 Staff Evaluation

The staff reviewed the licensee's proposed revision to the FSAR. The staff found that it adequately described the basis for the restoration of CCW following potential tornado missile damage as an acceptable alternative to protection of the CCW piping in the fuel storage building from tornado effects.

For the reasons set forth above, the staff concludes the potential for significant damage to the section of CCW piping located in the non-safety related portion of the fuel-handling building from tornado related effects is low. Although credible damage to the piping may cause temporary loss of the CCW system function, prompt restoration of the system function through isolation or repair of damaged piping and addition of makeup water from the PWST provides reasonable assurance that required functions will be completed. This capability is consistent with the existing licensing basis for sections of other safety-related systems that lack structural protection from potential tornado related effects. The proposed FSAR revision adequately describes these bases. Therefore, the proposed change to the FSAR regarding protection of the CCW system from tornado-related effects is acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official had no comments.

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (66 FR 50466). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

### 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the

Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Jones

Date: January 27, 2003