

October 20, 2005

Mr. Paul Gunter  
Nuclear Information and Resource Service  
1421 16<sup>th</sup> Street NW., Suite 404  
Washington, DC 20036

Dear Mr. Gunter:

Your petition dated May 12, 2005, submitted on behalf of Nuclear information and Resource Service, Citizens Awareness Network, Indian Point Safe Energy Coalition, North Carolina Waste Awareness and Reduction Network, Alliance for Affordable Energy, and Blue Ridge Environmental Defense League, and addressed to Mr. Luis A. Reyes, Executive Director for Operations of the Nuclear Regulatory Commission (NRC), has been reviewed by the NRC staff pursuant to Section 2.206 of Title 10 of the *Code of Federal Regulations*. The staff's proposed Director's Decision on the petition is enclosed. I request that you provide comments to me on any portions of the petition that you believe to be erroneous or any issues in the petition that you believe have not been fully addressed. The staff will then review your comments and consider them in the final version of the Director's Decision. You will have no further opportunity to comment.

Please provide your comments within 30 days of this letter. Comments should be submitted by letter or e-mail to the petition manager, Chandu Patel (Mailstop 0-8G9 or E-mail CPP@NRC.gov).

Sincerely,

*/RA/*

Ledyard B. Marsh, Director  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-244, 50-247, 50-271, 50-286,  
50-313, 50-333, 50-368, 50-369, 50-370,  
50-382, 50-400, 50-413, 50-414, and 50-261

Enclosures: Proposed Director's Decision

cc w/o encl: See next page

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Nuclear Information and Resource Service  
1421 16<sup>th</sup> Street NW., Suite 404  
Washington, DC 20036

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OFFICIAL RECORD COPY

Proposed Director's Decision - Paul Gunter, the Nuclear Information and Resource Service,  
Letter dated May 12, 2005, Re: 2.206 - Request for Emergency Enforcement Action  
under 2.206 to address inoperable Hemyc/MT fire protection systems at multiple plants

DATE: October 20, 2005

Distribution: **G20050379**

PUBLIC

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RidsNrrDlpmLpdi

RidsNrrDlpmLpdi2

RidsNrrDlpmLpdii

RidsNrrDlpmLpdiv

RidsNrrDlpm

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and DPR-64; Vermont Yankee, Docket No. 50-271, License No. DPR-28; Waterford Unit 3, Docket No. 50-382, License No. NPF-38; and Arkansas Nuclear One Units 1 and 2, Docket No. 50-313 and 50-368, License No. DPR-51 and NPF-6, with regard to potential violations of NRC regulations for fire protection under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50. Specifically, the petition requested emergency enforcement under 10 CFR 2.206 to include the following actions by the Commission:

- 1) Collect information through generic communication with nuclear industry and specifically with the named reactor sites to determine the extent of condition of the inoperable fire barriers; including the requirement that the licensees conduct a full inventory of the type Hemyc/MT to include the amount in linear and square footage, its specific applications, and the identification of safe shutdown systems, which are currently unprotected by the noncompliance and an assessment of the safety significance of each application;
- 2) the communication should require, at minimum that the above-named sites provide justification for operation in noncompliance with all applicable fire protection regulations; and
- 3) with the determination that any and/or all of the above-mentioned sites are operating in unanalyzed condition and/or that assurance of public health and safety is degraded, promptly order a suspension of the license or a power reduction of the affected reactors until such time as it can be demonstrated that the licensees are operating in conformance with all other applicable fire protection regulations.

As the basis for the requests, the petitioners cited a meeting on April 29, 2005, held by NRC with all stakeholders to discuss the performance of 1-hour (Hemyc) and 3-hour (MT) fire barriers for Electrical Raceways during full scale fire testing. In that meeting the NRC staff informed all stakeholders that the Hemyc/MT electrical raceway fire barrier system (ERFBS) failed to protect electrical cables for 1 hour/3 hours in fire tests that were performed to the

American Society of Testing and Materials (ASTM) Standard E119. The petitioners' request was also based on the following conclusions made by the petitioners: (1) The same Hemyc/MT fire barrier wrap systems as installed in the above nuclear plants fail to assure the protection of the control room operations for achieving safe shutdown of the reactor in the event of a significant fire, (2) NRC has not quantified the full extent of the amount of Hemyc/MT fire barrier material in terms of linear and/or square footage deployed per fire protection regulation, and NRC has not determined the safety significance of this deployment for safe shutdown systems that are not currently protected by these fire barriers, and (3) the petitioners believe that the above listed nuclear power stations are operating in violation of NRC fire protection requirements and in an unanalyzed condition resulting in a degradation of defense-in-depth fire protection and safe shut down in the event of a significant fire.

By teleconference on June 1, 2005, the petitioners provided information to the NRC's Petition Review Board as further explanation and support for their petition. The transcript of this teleconference was treated as a supplement to the petition and is available in the Agencywide Documents Access and Management System (ADAMS) for inspection (Accession No. ML051640452) at the Commission's Public Document Room (PDR), located at One White Flint North, Public File Area O1 F21, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible from the ADAMS Public Electronic Reading Room on the NRC Web site <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS, should contact the NRC PDR Reference staff by telephone at 1-800-397-4209, 301-415-4737, or by e-mail to [pdr@nrc.gov](mailto:pdr@nrc.gov).

During the teleconference, petitioners also requested that this petition be modified to consider this fire barrier material in context of an overall picture of the extent of condition for fire barrier protection under Section III.G.2 of Appendix R to 10 CFR Part 50 (i.e., not just the

Hemyc/MT ERFBS). As a basis for this request, the petitioners stated that they don't believe it is justifiable for NRC or industry to wait on a potential ruling with regard to operator manual action.

In a letter dated June 27, 2005, the NRC informed the petitioners that their request was received and that the issues in the petition were being referred to the Office of Nuclear Reactor Regulation for appropriate action. However, the petitioners' request for immediate action and the request to expand the scope to cover other fire barriers issues were denied by the NRC. When the Hemyc test results became available, the staff examined whether there was an immediate and significant risk to safety. Because fire detection, prevention, and suppression measures are already in place to minimize both the probability of occurrence and consequences of a fire that could prevent the performance of safe shutdown functions, the staff concluded that continued plant operation while corrective actions are implemented will not pose an undue risk to public health and safety.

## II. Discussion

NRC's concern with the performance of fire barriers at nuclear power plants began with the failure of Thermo-Lag to pass performance tests in October 1989 at Southwest Research Institute. The tests were done for the Gulf States Utilities Company after visually observing degradation of Thermo-Lag at River Bend Station.

Because of questions about the ability of 1-hour- and 3-hour-rated Thermo-Lag fire barrier material to perform its specified function, and because of the widespread use of Thermo-Lag in the nuclear industry, the NRC issued Generic Letter (GL) 92-08, "Thermo-Lag 330-1 Fire Barriers," December 17, 1992, to inform licensees of the Thermo-Lag test results and to request that licensees implement appropriate compensatory measures and develop plans to resolve any noncompliances with 10 CFR 50.48.

In response, the licensees reviewed their fire protection safe shutdown plans to determine if corrective actions were needed. Some licensees had made conservative commitments and installed Thermo-Lag in locations where it was not needed to satisfy NRC requirements, therefore, no corrective actions were required. Where fire barrier materials were required, licensees took one or a combination of the following corrective actions:

- Rerouted cables through other fire areas so that redundant safe shutdown trains were not located in the same fire area;
- Replaced Thermo-Lag, or the affected material, with an alternative rated fire barrier material;
- Upgraded the installed fire barriers to a rated configuration; or
- Concluded that certain Thermo-Lag barriers were no longer required.

Subsequently, deficiencies were also identified in other fire barrier materials. In 1993, for example, Kaowool installed as a 1-hour-rated fire barrier was found to be unable to pass fire endurance tests as a rated fire barrier. In response, the NRC reassessed previous staff reviews of Kaowool fire barriers and informed the industry and the Commission of the potential failure of Kaowool to perform as intended and suggested additional testing of Kaowool (SECY-99-204; ADAMS Accession No. ML992810028). To resolve the issue, the industry took voluntary corrective actions.

In August 1993, the Nuclear Energy Institute (NEI) formed a Fire Barrier Review Ad Hoc Advisory Committee to address the adequacy of fire barrier materials other than Thermo-Lag. The Committee reviewed the original testing of the fire barrier, Hemyc (performed in the early 1980s in Spain), and concluded that Hemyc was differently constructed than Thermo-Lag 330-1, and therefore was not subject to the same failure modes as Thermo-Lag 330-1. In May 1994, this review was documented in the NEI report, "Documentation of the Adequacy of Fire

Barrier Materials in Raceway Applications Vis-à-vis Failure Characteristics Inherent to the Thermo-Lag 330-1.”

However, beginning in late 1999, three plant-specific findings by the NRC staff raised concerns about the performance of Hemyc and MT fire barriers. Hemyc and MT, manufactured by Promatec, Inc., were installed at Nuclear Power Plants (NPPs) to protect circuits and instrumentation cables in order to meet regulatory requirements and in accordance with plant-specific commitments. In June 2001, the NRC initiated confirmatory fire tests in response to Task Interface Agreement 99-028 (ADAMS Accession No. ML003736721), after concluding that existing testing was likely insufficient to qualify Hemyc or MT as rated fire barriers. In March/April 2005, the NRC conducted confirmatory testing of both materials at the Omega Point Laboratories in San Antonio, Texas. The NRC tests were based on ASTM E119 Standard time-temperature conditions and the current NRC guidance in GL 86-10, Supplement 1, for typical Hemyc and MT arrangements used in NPPs. The test results indicated that when tested to GL 86-10, Supplement 1, criteria, neither Hemyc nor the MT fire barrier systems would provide their rated fire barrier protection for the configurations tested.

On April 1, 2005, the NRC issued Information Notice (IN) 2005-07, “Results of Hemyc Electrical Raceway Fire Barrier System Full Scale Fire Testing.” This IN describes the results of the NRC-sponsored confirmatory testing of Hemyc. However, the staff recognized that additional evaluations would be needed to determine whether regulatory compliance exists in light of the concerns identified in IN 05-07. On April 29, 2005, the NRC staff held a public meeting with licensees and interested members of the public to discuss the Hemyc and MT test results and the staff’s intentions to take prompt additional regulatory action to ensure that appropriate measures are under way for compliance with 10 CFR 50.48 requirements at affected plants.

The NRC staff recognizes the concern expressed by the petitioners. The NRC staff is concerned that the Hemyc and MT fire barriers may not provide the level of fire endurance intended by licensees and that licensees that use Hemyc or MT may not be complying with NRC regulations or plant specific licensing bases. Section 50.48 of 10 CFR Part 50 requires that each operating NPP have a fire protection plan that satisfies General Design Criterion (GDC) 3, "Fire Protection," of 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants." GDC 3 requires that structures, systems, and components important to safety be designed and located to minimize, in a manner consistent with other requirements, the probability and effect of fires and explosions. Fire protection features required to satisfy 10 CFR 50.48 include features to limit fire damage to structures, systems or components important to safety so that the capability to shut down the plant safely is ensured.

The NRC has issued guidance on acceptable methods of satisfying the regulatory requirements of GDC 3 in the Branch Technical Position (BTP), Auxiliary and Power Conversion Systems Branch BTP 9.5-1, Standard Review Plan, Section 9.5-1, and GLs. GL 92-08 specifically included the staff's expectation that licensees would review existing fire barrier configurations credited for 10 CFR Part 50, Appendix R, compliance, based on earlier concerns with Thermo-Lag.

Licensees of plants licensed to operate before January 1, 1979, must comply with their fire protection requirements as specified in 10 CFR 50, Appendix R, and licensees of plants licensed to operate after January 1, 1979, must comply with the approved fire protection program incorporated into their operating license. The staff expects licensees to reevaluate their fire protection programs in light of information provided in IN 05-07 and other guidance, and to implement appropriate compensatory measures and develop plans to resolve any noncompliances within a reasonable timeframe. All licensees should consider the impact of fire

barrier degradation on the operability of affected equipment and assess the impact on plant safety.

If a nonconforming condition is identified, licensees can use at least two methods, individually or in combination, to restore compliance. One way is to make plant modifications such as replacing the Hemyc or MT fire barriers with an appropriately rated fire barrier material, upgrading the Hemyc or MT to a rated barrier, or rerouting cables or instrumentation lines through another fire area. Another way to address the issue is to perform a technical evaluation that considers defense-in-depth and safety margins as follows:

- Plants licensed to operate before January 1, 1979, may request an exemption from 10 CFR Part 50, Appendix R, in accordance with the requirements of 10 CFR 50.12, "Specific Exemptions."
- Plants licensed to operate after January 1, 1979, must meet the fire protection requirements in the operating license condition. The standard license condition allows a licensee to make changes to the approved fire protection program without prior staff approval "if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire." GL 86-10, "Implementation of Fire Protection Requirements," provides guidance on performing and documenting these changes. The plants that adopt a risk-informed approach should submit a license amendment in accordance with 10 CFR 50.90.

On July 25, 2005, the NRC staff issued a GL for comments in the *Federal Register*. The comment period expired on September 23, 2005. The NRC staff intends to issue the final GL by March 31, 2006. The GL will request all licensees who credit Hemyc or MT for compliance to provide information regarding the extent of the installation; whether the material is degraded or nonconforming; and any compensatory actions in place to provide equivalent protection and maintain the safe shutdown function of affected areas of the plant in light of the recent findings

of potential degradation of Hemyc and MT. Licensees will be requested to provide evaluations to support conclusions that they are in compliance with regulatory requirements for the Hemyc and MT applications. Licensees that cannot justify their continued reliance on Hemyc or MT are requested to provide a description of corrective actions taken or planned and a schedule for milestones including when full compliance will be achieved. In addition, licensees will be requested to identify and discuss all applications that are considered degraded but operable, including a basis for this conclusion.

It is expected that the compensatory and corrective actions shall be implemented in accordance with existing regulations commensurate with the safety significance of the degraded or nonconforming condition. The NRC expects that all licensees will fully restore compliance with 10 CFR 50.48, and submit the required documentation to the NRC, by December 1, 2007.

### III. Conclusion

The NRC staff shares the concerns identified by the petitioners. The NRC staff is addressing the Hemyc/MT material performance issues in an expeditious manner. In response to Request Nos. 1 and 2, the NRC staff has granted the petitioners' request through the generic communication process. Specifically, as discussed before, the staff is issuing a GL to all licensees asking them to provide detailed information about the use of Hemyc/MT in their NPPs. In response to Request No. 3, the NRC staff is planning to review all affected plants in detail and will take appropriate actions to resolve the issues with the use of Hemyc/MT material commensurate with the safety significance of the protected systems. The GL will be issued after the public comment period expires and after the NRC's internal review process is completed.

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

FOR THE NUCLEAR REGULATORY COMMISSION

J. E. Dyer, Director  
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,

this        day of        2005.

David T. Conley, Associate General  
Counsel II  
Legal Department  
Progress Energy Service Company, LLC  
Post Office Box 1551  
Raleigh, North Carolina 27602-1551

Ms. Margaret A. Force  
Assistant Attorney General  
State of North Carolina  
Post Office Box 629  
Raleigh, North Carolina 27602

U. S. Nuclear Regulatory Commission  
Resident Inspector's Office  
H. B. Robinson Steam Electric Plant  
Route 5, Box 413  
Hartsville, South Carolina 29550

Mr. William G. Noll, Director  
Site Operations  
H. B. Robinson Steam Electric Plant,  
Unit No. 2  
Carolina Power & Light Company  
3581 West Entrance Road  
Hartsville, South Carolina 29550

Ms. Beverly Hall, Section Chief  
N.C. Department of Environment  
and Natural Resources  
Division of Radiation Protection  
3825 Barrett Dr.  
Raleigh, North Carolina 27609-7721

Mr. Robert P. Gruber, Executive Director  
Public Staff  
N. C. Utilities Commission  
4326 Mail Service Center  
Raleigh, North Carolina 27699-4326

Mr. John H. O'Neill, Jr.  
Shaw, Pittman, Potts & Trowbridge  
2300 N Street, NW.  
Washington, DC 20037-1128

Mr. J. W. Moyer, Vice President  
H. B. Robinson Steam Electric Plant,  
Unit No. 2  
Carolina Power & Light Company  
3581 West Entrance Road  
Hartsville, South Carolina 29550

Mr. Henry H. Porter, Assistant Director  
Division of Radioactive Waste Management  
South Carolina Department of Health  
and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Mr. Chris L. Burton, Manager  
Performance Evaluation and  
Regulatory Affairs, PEB 7  
Progress Energy  
Post Office Box 1551  
Raleigh, North Carolina 27602-1551

U. S. Nuclear Regulatory Commission  
Resident Inspector's Office  
Shearon Harris Nuclear Power Plant  
5421 Shearon Harris Road  
New Hill, North Carolina 27562-9998

Mr. James Scarola, Vice President  
Shearon Harris Nuclear Power Plant  
Carolina Power & Light Company  
Post Office Box 165  
New Hill, North Carolina 27562-0165

Mr. Robert J. Duncan II, Director  
Site Operations  
Shearon Harris Nuclear Power Plant  
Carolina Power & Light Company  
Post Office Box 165, Mail Zone 1  
New Hill, North Carolina 27562-0165

Public Service Commission  
State of South Carolina  
Post Office Drawer 11649  
Columbia, South Carolina 29211

Mr. Warren Lee  
Emergency Management Director  
New Hanover County Department  
of Emergency Management  
Post Office Box 1525  
Wilmington, North Carolina 28402-1525

Chairman of the North Carolina  
Utilities Commission  
Post Office Box 29510  
Raleigh, North Carolina 27626-0510

Mr. C. T. Baucom  
Supervisor, Licensing/Regulatory Programs  
H. B. Robinson Steam Electric Plant,  
Unit No. 2  
Carolina Power & Light Company  
3581 West Entrance Road  
Hartsville, South Carolina 29550

Mr. Herb Council, Chair  
Board of County Commissioners of  
Wake County  
P.O. Box 550  
Raleigh, North Carolina 27602

J. F. Lucas, Manager  
Support Services - Nuclear  
H. B. Robinson Steam Electric Plant,  
Unit No. 2  
Carolina Power & Light Company  
3581 West Entrance Road  
Hartsville, South Carolina 29550

Mr. Terry C. Morton, Manager  
Support Services  
Shearon Harris Nuclear Power Plant  
Carolina Power & Light Company  
Post Office Box 165, Mail Zone 1  
New Hill, North Carolina 27562-0165

Mr. David H. Corlett, Supervisor  
Licensing/Regulatory Programs  
Shearon Harris Nuclear Power Plant  
Carolina Power & Light Company  
Post Office Box 165, Mail Zone 1  
New Hill, North Carolina 27562-0165

Mr. Dan Stoddard, Plant General Manager  
H. B. Robinson Steam Electric Plant,  
Unit No. 2  
Carolina Power & Light Company  
3581 West Entrance Road  
Hartsville, South Carolina 29550

Mr. Tommy Emerson, Chair  
Board of County Commissioners  
of Chatham County  
Post Office Box 87  
Pittsboro, North Carolina 27312

Mr. C. S. Hinnant, Senior Vice President  
Nuclear Generation & Chief Nuclear Officer  
Progress Energy  
CPB 12  
Post Office Box 1551  
Raleigh, North Carolina 27602-1551

Ms. Lisa F. Vaughn  
Duke Energy Corporation  
526 South Church Street  
P. O. Box 1006  
Mail Code = EC07H  
Charlotte, North Carolina 28201-1006

County Manager of Mecklenburg County  
720 E. Fourth St.  
Charlotte, NC 28202

Mr. C. Jeffrey Thomas  
Manager Regulatory Compliance  
Duke Energy Corporation  
McGuire Nuclear Site  
12700 Hagers Ferry Road  
Huntersville, NC 28078

Senior Resident Inspector  
c/o U.S. Nuclear Regulatory Commission  
12700 Hagers Ferry Road  
Huntersville, NC 28078

Mr. Peter R. Harden, IV  
VP-Customer Relations and Sales  
Westinghouse Electric Company  
6000 Fairview Road  
12th Floor  
Charlotte, NC 28210

Dr. John M. Barry  
Mecklenburg County  
Department of Environmental Protection  
700 N. Tryon Street  
Charlotte, NC 28202

Division of Radiation Protection  
NC Dept of Environment, Health, & Natural  
Resources  
3825 Barrett Dr.  
Raleigh, NC 27609-7721

Ms. Karen E. Long  
Asst Attorney General  
NC Dept of Justice  
P.O. Box 629  
Raleigh, NC 27602

Mr. R.L. Gill, Jr., Manager  
Nuclear Regulatory Issues & Industry  
Affairs  
Duke Energy Corporation  
526 S. Church St.  
Mail Stop EC05P  
Charlotte, NC 28202

NCEM REP Program Manager  
4713 Mail Service Center  
Raleigh, NC 27699-4713

Mr. T. Richard Puryear  
Owners Group (NCEMC)  
Duke Energy Corporation  
4800 Concord Road  
York, SC 29745

Lee Keller  
Regulatory Compliance Manager  
Duke Energy Corporation  
4800 Concord Road  
York, South Carolina 29745

NC Municipal Power Agency No. 1  
1427 Meadowwood Boulevard  
P.O. Box 29513  
Raleigh, NC 27626-0513

County Manager of York County  
York County Courthouse  
York, SC 29745

Piedmont Municipal Power Agency  
121 Village Dr.  
Greer, SC 29651

Saluda River Electric  
P.O. Box 929  
Laurens, SC 29360

Henry Porter, Assistant Director  
Division of Waste Management  
Bureau of Solid and Hazardous Waste  
Dept of Health & Environmental Control  
2600 Bull St.  
Columbia, SC 29201-1708

NC Electric Membership Corp.  
P.O. Box 27306  
Raleigh, NC 27611

Senior Resident Inspector  
4830 Concord Road  
York, SC 29745

Mr. Dhiaa Jamil  
Vice President  
Catawba Nuclear Station  
Duke Energy Corporation  
4800 Concord Road  
York, SC 29745

Mr. G.R. Peterson  
Vice President  
McGuire Nuclear Station  
Duke Energy Corporation  
12700 Hagers Ferry Road  
Huntersville, NC 28078

Henry Barron  
Group Vice President, Nuclear Generation  
and Chief Nuclear Officer  
P.O. Box 1006-EC07H  
Charlotte, NC 28201-1006  
Vermont Yankee Nuclear Power Station

Regional Administrator, Region I  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406-1415

Mr. David R. Lewis  
Pillsbury, Winthrop, Shaw, Pittman, LLP  
2300 N Street, N.W.  
Washington, DC 20037-1128

Ms. Christine S. Salembier, Commissioner  
Vermont Department of Public Service  
112 State Street  
Montpelier, VT 05620-2601

Mr. Michael H. Dworkin, Chairman  
Public Service Board  
State of Vermont  
112 State Street  
Montpelier, VT 05620-2701

Chairman, Board of Selectmen  
Town of Vernon  
P.O. Box 116  
Vernon, VT 05354-0116

Operating Experience Coordinator  
Vermont Yankee Nuclear Power Station  
320 Governor Hunt Road  
Vernon, VT 05354

G. Dana Bisbee, Esq.  
Deputy Attorney General  
33 Capitol Street  
Concord, NH 03301-6937

Chief, Safety Unit  
Office of the Attorney General  
One Ashburton Place, 19th Floor  
Boston, MA 02108

Ms. Carla A. White, RRPT, CHP  
Radiological Health  
Vermont Department of Health  
P.O. Box 70, Drawer #43  
108 Cherry Street  
Burlington, VT 05402-0070

Mr. James M. DeVincentis  
Manager, Licensing  
Vermont Yankee Nuclear Power Station  
P.O. Box 0500  
185 Old Ferry Road  
Brattleboro, VT 05302-0500

Resident Inspector  
Vermont Yankee Nuclear Power Station  
U. S. Nuclear Regulatory Commission  
P.O. Box 176  
Vernon, VT 05354

Director, Massachusetts Emergency  
Management Agency  
ATTN: James Muckerheide  
400 Worcester Rd.  
Framingham, MA 01702-5399

Jonathan M. Block, Esq.  
Main Street  
P.O. Box 566  
Putney, VT 05346-0566

Mr. John F. McCann  
Director, Nuclear Safety Assurance  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. Gary J. Taylor  
Chief Executive Officer  
Entergy Operations  
1340 Echelon Parkway  
Jackson, MS 39213

Mr. John T. Herron  
Sr. VP and Chief Operating Officer  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

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

Mr. Brian O'Grady  
Vice President, Operations Support  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. Michael J. Colomb  
Director of Oversight  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

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

Mr. Jay K. Thayer  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
P.O. Box 0500  
185 Old Ferry Road  
Brattleboro, VT 05302-0500

Mr. Kenneth L. Graesser  
38832 N. Ashley Drive  
Lake Villa, IL 60046

Mr. James Sniezek  
5486 Nithsdale Drive  
Salisbury, MD 21801

Mr. Ronald Toole  
1282 Valley of Lakes  
Box R-10  
Hazelton, PA 18202

Ms. Stacey M. Lousteau  
Treasury Department  
Entergy Services, Inc.  
639 Loyola Avenue  
New Orleans, LA 70113

Mr. Raymond Shadis  
New England Coalition  
Post Office Box 98  
Edgecomb, ME 04556

Mr. James P. Matteau  
Executive Director  
Windham Regional Commission  
139 Main Street, Suite 505  
Brattleboro, VT 05301

Mr. William K. Sherman  
Vermont Department of Public Service  
112 State Street  
Drawer 20  
Montpelier, VT 05620-2601

Mr. Michael Kansler  
President  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. Theodore A. Sullivan  
Site Vice President  
Entergy Nuclear Operations, Inc.  
James A. FitzPatrick Nuclear Power Plant  
P.O. Box 110  
Lycoming, NY 13093

Mr. Kevin J. Mulligan  
General Manager, Plant Operations  
Entergy Nuclear Operations, Inc.  
James A. FitzPatrick Nuclear Power Plant  
P.O. Box 110  
Lycoming, NY 13093

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

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

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

Resident Inspector's Office  
James A. FitzPatrick Nuclear Power Plant  
U. S. Nuclear Regulatory Commission  
P.O. Box 136  
Lycoming, NY 13093

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

Mr. Michael J. Colomb  
Director of Oversight  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. David Wallace

Director, Nuclear Safety Assurance  
Entergy Nuclear Operations, Inc.  
James A. FitzPatrick Nuclear Power Plant  
P.O. Box 110  
Lycoming, NY 13093

Mr. Richard Plasse  
Manager, Regulatory Compliance  
Entergy Nuclear Operations, Inc.

James A. FitzPatrick Nuclear Power Plant  
P.O. Box 110  
Lycoming, NY 13093

Supervisor  
Town of Scriba  
Route 8, Box 382  
Oswego, NY 13126

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

Oswego County Administrator  
Mr. Steven Lyman  
46 East Bridge Street  
Oswego, NY 13126

Mr. Peter R. Smith, President  
New York State Energy, Research,  
and Development Authority  
17 Columbia Circle  
Albany, NY 12203-6399

Mr. Paul Eddy  
New York State Dept. of Public Service  
3 Empire State Plaza  
Albany, NY 12223-1350

Mr. Travis C. McCullough  
Assistant General Counsel  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Mr. Michael D. Lyster  
BWR SRC Consultant  
5931 Barclay Lane  
Naples, FL 34110-7306

Ms. Deb Katz, Executive Director  
Nuclear Security Coalition  
c/o Citizens Awareness Network  
P.O. Box 83  
Shelburne Falls, MA 01370

Mr. Michael J. Wallace  
President  
R.E. Ginna Nuclear Power Plant, LLC  
c/o Constellation Energy  
750 East Pratt Street  
Baltimore, MD 21202

Mr. John M. Heffley  
Senior Vice President and  
Chief Nuclear Officer  
Constellation Generation Group  
1997 Annapolis Exchange Parkway  
Suite 500  
Annapolis, MD 21401

Kenneth Kolaczyk, Sr. Resident Inspector  
R.E. Ginna Nuclear Power Plant  
U.S. Nuclear Regulatory Commission  
1503 Lake Road  
Ontario, NY 14519

Peter R. Smith, President  
New York State Energy, Research,  
and Development Authority  
17 Columbia Circle  
Albany, NY 12203-6399

Carey W. Fleming, Esquire  
Senior Counsel - Nuclear Generation  
Constellation Generation Group, LLC  
750 East Pratt Street, 17th Floor  
Baltimore, MD 21202

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

Ms. Thelma Wideman, Director  
Wayne County Emergency Management  
Office  
Wayne County Emergency Operations  
Center  
7336 Route 31  
Lyons, NY 14489

Ms. Mary Louise Meisenzahl  
Administrator, Monroe County  
Office of Emergency Preparedness  
1190 Scottsville Road, Suite 200  
Rochester, NY 14624

Mrs. Mary G. Korsnick  
Vice President  
R.E. Ginna Nuclear Power Plant, LLC  
1503 Lake Road  
Ontario, NY 14519

Mr. Fred R. Dacimo  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
295 Broadway, Suite 1  
P.O. Box 249  
Buchanan, NY 10511-0249

Mr. Paul Rubin  
General Manager, Plant Operations  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
295 Broadway, Suite 2  
P.O. Box 249  
Buchanan, NY 10511-0249

Mr. James Comiotes  
Director, Nuclear Safety Assurance  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
295 Broadway, Suite 1  
P.O. Box 249  
Buchanan, NY 10511-0249

Mr. Patric Conroy  
Manager, Licensing  
Entergy Nuclear Operations, Inc.  
Indian Point Energy Center  
295 Broadway, Suite 1  
P. O. Box 249  
Buchanan, NY 10511-0249

Mr. Travis C. McCullough  
Assistant General Counsel  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

Senior Resident Inspector's Office  
Indian Point 2  
U. S. Nuclear Regulatory Commission  
P.O. Box 59  
Buchanan, NY 10511-0038

Senior Resident Inspector's Office  
Indian Point 3  
U. S. Nuclear Regulatory Commission  
P.O. Box 337  
Buchanan, NY 10511-0337

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. William DiProfio  
PWR SRC Consultant  
139 Depot Road  
East Kingston, NH 03827

Mr. Daniel C. Poole  
PWR SRC Consultant  
P.O. Box 579  
Inglis, FL 34449

Mr. William T. Russell  
PWR SRC Consultant  
400 Plantation Lane  
Stevensville, MD 21666-3232

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

Mr. Michael E. Henry, State Liaison Officer  
Department of Environmental Quality  
Permits Division  
P.O. Box 4313  
Baton Rouge, Louisiana 70821-4313

Vice President Operations Support  
Entergy Operations, Inc.  
P. O. Box 31995  
Jackson, MS 39286-1995

Director  
Nuclear Safety Assurance  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Wise, Carter, Child & Caraway  
P. O. Box 651  
Jackson, MS 39205

General Manager Plant Operations  
Waterford 3 SES  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Licensing Manager  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Winston & Strawn  
1700 K Street N.W.  
Washington, DC 20006-3817

Resident Inspector/Waterford NPS  
P.O. Box 822  
Killona, LA 70060-0751

Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011

Parish President Council  
St. Charles Parish  
P. O. Box 302  
Hahnville, LA 70057

Executive Vice President  
& Chief Operating Officer  
Entergy Operations, Inc.  
P.O. Box 31995  
Jackson, MS 39286-1995

Chairman  
Louisiana Public Services Commission  
P.O. Box 91154  
Baton Rouge, LA 70825-1697

Mr. Joseph E. Venable  
Vice President Operations  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Senior Vice President  
& Chief Operating Officer  
Entergy Operations, Inc.  
P. O. Box 31995  
Jackson, MS 39286-1995

Director, Division of Radiation  
Control and Emergency Management  
Arkansas Department of Health  
4815 West Markham Street, Slot 30  
Little Rock, AR 72205-3867

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
P. O. Box 310  
London, AR 72847

County Judge of Pope County  
Pope County Courthouse  
Russellville, AR 72801

Mr. Jeffrey S. Forbes  
Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 S. R. 333  
Russellville, AR 72801