Mr. Donald A. Reid
Vice President, Operations
Vermont Yankee Nuclear Power Corporation
Ferry Road
Brattleboro, VT 05301

December 12, 1996

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - VERMONT YANKEE REQUEST FOR EXEMPTION FROM 10 CFR PART 50, APPENDIX R, SECTION III.G, "FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY" AND SECTION III.L, "ALTERNATIVE AND DEDICATED SAFE SHUTDOWN CAPABILITY" (TAC NOS. M95149 AND M95442)

Dear Mr. Reid:

By letters dated April 4, 1996, and May 21, 1996, Vermont Yankee Nuclear Power Corporation (VYNPC) requested exemption from the requirements of Sections III.G. and III.L. of Appendix R to 10 CFR Part 50 of the Code of Federal Regulations to (1) permit use of an existing ac power source (Vernon Tie Line) in an alternate shutdown mode as an alternative to an onsite emergency diesel generator for fires where offsite power is not available, and (2) permit use of automatic depressurization system (ADS) safety relief valves (SRVs) in conjunction with either the core spray (CS) or residual heat removal (RHR) system in the low-pressure coolant injection (LPCI) mode to achieve and maintain safe shutdown for fires where high pressure injection systems may not remain free of fire damage.

As a result of questions and concerns identified during review of the April 4 and May 21, 1996, submittals, the NRC staff issued a request for additional information (RAI) to VYNPC on September 20, 1996. By letter dated November 4, 1996, VYNPC provided a response to the RAI. Based on review of the response to the RAI, the staff requests additional information, as discussed in the enclosure, in order to complete its review. An early copy of these questions was faxed to you on December 5, 1996, to facilitate a prompt response. We request that you respond to these questions as quickly as possible so that the staff may complete its review in a timely manner.

If you have any questions on this matter, please call me at (301) 415-3045.

Sincerely,

/S/

Vernon L. Rooney, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure: Request for Additional Information
cc w/encl: See next page
DISTRIBUTION:
See next page

NRC FILE CENTER COPY

DFO1

DOCUMENT NAME: G:\VERMONT\95149.RAI
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	PM:PDI-1	LA:PDI-1	D:PDI-1		
NAME	VRooney/rsl	SLittle	SBajwa		
DATE	12/12/96	12/12/96	12/12/96	12/ /96	12/ /96

Official Record Copy

9612160294 961212
PDR ADOCK 05000271
F PDR

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 12, 1996

Mr. Donald A. Reid
Vice President, Operations
Vermont Yankee Nuclear Power Corporation
Ferry Road
Brattleboro, VT 05301

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - VERMONT YANKEE REQUEST FOR EXEMPTION FROM 10 CFR PART 50, APPENDIX R, SECTION III.G, "FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY" AND SECTION III.L, "ALTERNATIVE AND DEDICATED SAFE SHUTDOWN CAPABILITY" (TAC NOS. M95149 AND M95442)

Dear Mr. Reid:

By letters dated April 4, 1996, and May 21, 1996, Vermont Yankee Nuclear Power Corporation (VYNPC) requested exemption from the requirements of Sections III.G. and III.L. of Appendix R to 10 CFR Part 50 of the Code of Federal Regulations to (1) permit use of an existing ac power source (Vernon Tie Line) in an alternate shutdown mode as an alternative to an onsite emergency diesel generator for fires where offsite power is not available, and (2) permit use of automatic depressurization system (ADS) safety relief valves (SRVs) in conjunction with either the core spray (CS) or residual heat removal (RHR) system in the low-pressure coolant injection (LPCI) mode to achieve and maintain safe shutdown for fires where high pressure injection systems may not remain free of fire damage.

As a result of questions and concerns identified during review of the April 4 and May 21, 1996, submittals, the NRC staff issued a request for additional information (RAI) to VYNPC on September 20, 1996. By letter dated November 4, 1996, VYNPC provided a response to the RAI. Based on review of the response to the RAI, the staff requests additional information, as discussed in the enclosure, in order to complete its review. An early copy of these questions was faxed to you on December 5, 1996, to facilitate a prompt response. We request that you respond to these questions as quickly as possible so that the staff may complete its review in a timely manner.

If you have any questions on this matter, please call me at (301) 415-3045.

Sincerely,

Vernon L. Rooney, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosure: Request for Additional Information

cc w/encl: See next page

DISTRIBUTION:
Docket File
PUBLIC
PDI-1 Reading
SVarga
JZwolinski
SBajwa
SLittle
VRooney
OGC
ACRS
RConte, RGN-I

D. Reid
Vermont Yankee Nuclear Power
Corporation

cc:

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

R. K. Gad, III
Ropes & Gray
One International Place
Boston, MA 02110-2624

Mr. Richard P. Sedano, Commissioner
Vermont Department of Public Service
120 State Street, 3rd Floor
Montpelier, VT 05602

Public Service Board
State of Vermont
120 State Street
Montpelier, VT 05602

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

Mr. Richard E. McCullough
Operating Experience Coordinator
Vermont Yankee Nuclear Power Station
P.O. Box 157
Governor Hunt Road
Vernon, VT 05354

Mr. Robert J. Wanczyk, Plant Manager
Vermont Yankee Nuclear Power Station
P.O. Box 157, Governor Hunt Road
Vernon, VT 05354

Mr. Ross B. Barkhurst, President
Vermont Yankee Nuclear Power Corporation
Ferry Road
Brattleboro, VT 05301

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

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

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

Mr. David Rodham, Director
ATTN: James Muckerheide
Massachusetts Civil Defense Agency
400 Worcester Rd.
P.O. Box 1496
Framingham, MA 01701-0317

Mr. Raymond N. McCandless
Vermont Division of Occupational
and Radiological Health
Administration Building
Montpelier, VT 05602

Mr. J. J. Duffy
Licensing Engineer
Vermont Yankee Nuclear Power
Corporation
580 Main Street
Bolton, MA 01740-1398

REQUEST FOR ADDITIONAL INFORMATION
VERMONT YANKEE NUCLEAR POWER STATION

1.0 BACKGROUND

1.1 Use of Existing AC Power Source (Vernon Tie Line)

The Vermont Yankee Nuclear Power Corporation (VYNPC) analysis of the effects of fire in the Main Control Room and Cable Spreading Room has determined that suitable protection of redundant trains of equipment necessary to achieve and maintain hot shutdown conditions cannot be assured for these areas. Accordingly, VYNPC has developed an alternative shutdown capability which is physically and electrically independent of the Control Room and Cable Spreading Room. With regard to this approach Section III.L, "Alternative and Dedicated Shutdown Capability," of Appendix R to 10 CFR Part 50 requires, in part, that the alternative shutdown capability accommodate postfire conditions where offsite power is not available for up to 72 hours.

The alternate shutdown methodology developed by VYNPC currently credits the use of one of the two onsite emergency diesel generators (EDGs) to provide a source of ac power. However, as a result of an Appendix R design verification, VYNPC has determined that additional margin is necessary in the amount of time available for operator actions necessary to initiate alternate shutdown systems. To reduce the operator timeline for initiating alternate shutdown systems and facilitate the restoration of ac power to safe shutdown equipment, VYNPC has proposed the use of the Vernon Tie Line as a means of providing ac power to required shutdown loads. However, since the Vernon Tie Line originates from the adjacent Vernon Hydroelectric Station, it is also considered as an offsite power source and an exemption from the specific technical requirement of Section III.L.3 is, therefore, necessary.

By letter dated April 4, 1996, VYNPC submitted a request for exemption from Section III.L.3 of Appendix R to 10 CFR Part 50, to allow the use of the Vernon Tie Line as an alternative to an EDG for control room and cable spreading room fire events where offsite power is not available.

1.2 Use of Low-Pressure Injection Systems (LPIS) to Achieve Safe Shutdown Conditions

From an analysis of the effects of fire in Reactor Building Fire Zones RB-1, RB-2, RB-3, and RB-4, VYNPC has determined that redundant trains of the normally preferred means of providing the post-fire safe shutdown function of reactor coolant makeup (i.e., high-pressure injection systems) may be susceptible to damage. As an alternative to the preferred approach, VYNPC has proposed the use of the automatic depressurization system (ADS) safety relief valves (SRVs) in conjunction with either the core spray (CS) system or

the residual heat removal system (RHR) in the low-pressure coolant injection (LPCI) mode as a means of achieving safe shutdown in the event of fire in these areas. The use of LPIS does not satisfy certain shutdown system performance criteria specified in the regulation. Specifically, this approach:

(a) Is not capable of achieving and maintaining hot-shutdown conditions, as specified in Section III.G of Appendix R to 10 CFR Part 50; and

(b) Is not capable of maintaining the reactor coolant level above the top of the core, as required by Section III.L of Appendix R to 10 CFR Part 50.

Consequently, by letter dated May 21, 1996, VYNPC submitted a request for exemption from Sections III.G and III.L of Appendix R to 10 CFR Part 50, to allow the use of LPIS as a means of achieving post-fire safe shutdown conditions in the event of fire in Fire Zones RB-1, RB-2, RB-3, and RB-4 of the Reactor Building.

As a result of questions and concerns identified during review of the licensees initial submittals, a request for additional information (RAI) was issued to the licensee on September 20, 1996. By letter dated November 4, 1996, VYNPC provided its response. Based on review of that submittal, we request VYNPC to provide the information requested below.

2.0 REQUESTED INFORMATION

2.1 Use of the Vernon Tie Line as an Alternative to an EDG.

2.1.1 It is our understanding that the Vernon Tie will only be credited for use in the event of fire in the Control Room and Cable Spreading rooms with a concomitant loss of the normal sources of offsite power. Please confirm.

2.1.2 It is our understanding that the current design relies on Diesel Generator DG-1-1A, powering 4160V Bus 4 only. However, the Vernon Tie Line may be configured to power either 4160V Bus 3, via breakers 3V4 and 3V, or 4160V Bus 4, via breakers 3V4 and 4V. It is not clear whether the revised alternative shutdown methodology will rely on one or both of these buses being energized from the Vernon Tie Line. Please clarify.

2.1.3 The Vernon Tie Line originates at a 69/13.2kV transformer located offsite at the Vernon Switchyard which also provides power to the town of Vernon. The Vernon tie is protected by a circuit breaker and the feed to the town of Vernon is protected by a vacuum recloser. Both of these devices are also located offsite, in the Vernon Switchyard. Given this configuration, it appears that the Vernon Station will supply power to both the Vermont Yankee Plant and the town of Vernon during the analyzed fire event. Please provide the results of your analysis which demonstrates that disturbances or transients that may occur in the Vernon Town feed line will not affect the quality of power

(e.g., voltage regulation) supplied to the plant. Additionally, this response should address what affect, if any, spurious operation of the recloser, either in response to valid non-persistent transients on the Vernon feed line or other mechanisms, will have on the quality of electrical power supplied to the plant.

2.1.4 Do coordination studies bound the Vernon Tie Line protection devices?

2.1.5 Verify that procedures have been developed to implement the alternative shutdown capability when power is supplied from the Vernon Tie Line and when offsite power remains available.

2.1.6 Describe periodic surveillance tests and maintenance performed to verify the operational adequacy of the electrical power supplied by the Vernon Tie Line.

2.1.7 The Vernon Hydro Generation Station, the Vernon Switchyard, and certain components essential to operation of the Vernon Tie (e.g., the circuit breaker), appear to be under control of a separate, independent, entity the New England Power Company (NEPCo). Please explain the potential for impact, if any, from this apparent difference in jurisdiction or "ownership" may have on VYNPC's ability to assure the long-term availability and operability of this power source.

2.2 Use of LPIS to Achieve Post-fire Safe Shutdown Conditions

The post-fire safe shutdown criteria of Section III.G.1 and III.G.2 are directed at ensuring that at least one train of redundant systems, capable of achieving and maintaining hot shutdown conditions, will remain operable in the event of fire in any plant area. Where the protection of systems capable of satisfying the hot shutdown performance criteria of these paragraphs is not assured, Section III.G.3 requires an alternative or dedicated shutdown capability to be provided which is independent (physically and electrically) of the fire area, room, or zone under consideration.

With regard to determining whether a shutdown capability is "redundant" (per III.G.1 and III.G.2) or "alternative" (per III.G.3 and III.L), Generic Letter 86-10 provides the following guidance and staff positions:

(a) Response to Question 3.8.3:

"...If the system is being used in lieu of the preferred system because the redundant components of the preferred system do not meet the separation criteria of Section III.G.2, the system is considered an alternative shutdown capability." (emphasis added)

(b) Response to Question 5.1.2

"For the purpose of analysis to Section III.G.2 criteria, the safe shutdown capability is defined as one of the two <u>normal</u> safe shutdown trains..." (emphasis added).

(c) Response to Question 5.2.3

"The only requirement for post-fire operating procedures is for those areas where alternative shutdown is required. For other areas of the plant, shutdown would be achieved utilizing <u>one of the two normal trains</u> of shutdown systems." (emphasis added).

The normal, preferred, method of shutdown in the event of fire in a boiling-water reactor is through the use of high-pressure injection systems (e.g., HPCI or reactor core isolation cooling (RCIC). In its November 4, 1996, response to a staff RAI dated September 20, 1996, the licensee concurs with this position, and states that the proposed approach (i.e., LPIS) will only be used when all other means of shutting down the reactor are not available. Specifically, in response to Question 1 of the September 20, 1996, request, VYNPC states the following:

"When a fire results in a condition that requires entry into the Emergency Operating Procedures (EOPs), the operators take the actions specified to shutdown the reactor, control reactor pressure and water le control containment parameters, and sustain electrical power. The <u>EOPs contain a hierarchy of preferred systems</u> to perform each function (emphasis added)... If normal systems are not available the operators are directed to use high pressure emergency makeup sources first, if available, and then reactor depressurization and the use of low pressure systems."

The effect of fire on the availability of normal shutdown systems (i.e., Feedwater) has not been evaluated by VYNPC. Therefore, the licensee's safe shutdown analysis appropriately assumes that these systems would not be available. In the absence of this normal shutdown capability, the licensee recognizes that the <u>preferred</u> method of shutdown is through the use of RCIC or HPCI to accomplish the reactor coolant makeup control function.

The staff has approved the use of LPIS as a means of providing an <u>alternative shutdown capability</u> (Reference: NRC Memorandum, L. S. Rubenstein to R. J. Mattson, dated December 3, 1982, "Use of the Automatic Depressurization System (ADS) and Low Pressure Coolant Injection (LPCI) to Meet Appendix R, Alternate Shutdown Goals)." The basis for this acceptance rests, in part, with the established principles of defense-in-depth for fire protection. Specifically, when an "alternative" shutdown capability is provided for a specific fire area, room or zone, the regulation (Section III.G.3 of Appendix R) imposes an additional requirement of fire detection and fixed fire suppression systems in all areas where the alternative shutdown capability is credited for

accomplishing required shutdown functions. These additional fire safety features serve to limit the probability of fire growth and damage, thereby minimizing reliance on the "less-than-preferred" alternative capability to accomplish the required shutdown functions. Areas of the plant which do not require an alternate shutdown capability may not be provided with an equivalent level of fire protection.

Based on the above, the licensee's proposed use of LPIS to perform the reactor coolant make-up function does not appear to satisfy the hot shutdown performance criterion of Section III.G. Additionally, it appears the proposed approach LPIS is being used in lieu of preferred systems HPCI or RCIC because redundant components of the preferred system do not meet the separation criteria of Section III.G.2. Therefore, please address the following:

1. The proposed LPIS approach does not appear to satisfy the "hot shutdown" performance criterion of Section III.G.1, III.G.2, and III.G.3 of Appendix R to 10 CFR Part 50. Generic Letter 86-10 provides further clarification and staff positions with regard to defining "alternative" and "redundant" shutdown capabilities. In light of these requirements, it appears the proposed approach is providing an alternative shutdown capability for the identified fire areas. Please explain why the use of LPIS is not identified by VYNPC as providing an alternative shutdown capability for Fire Zones RB-1 through RB-4.

2. As described above, LPIS appears to be providing an alternative shutdown capability for Fire Zones RB-1 through RB-4. Therefore, please explain why these fire zones have not been designated as alternative shutdown fire areas.

3. Provide information which demonstrates that the fire protection features (detection and suppression) provided for the Reactor Building meet Section III.G.3 of the regulation, or provide technical justification for an exemption from Section III.G.3 of the regulation where this level of protection is not provided and LPIS is identified as the post-fire safe shutdown capability.