U.S. NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. <u>50-271/80-04</u>	
Docket No	
License No. DPR-28 Priority	CategoryC
Licensee: Vermont Yankee Nuclear Power Corporation	
77 Grove Street	
Rutland, Vermont	
Facility Name: Vermont Yankee Nuclear Power Plant	
Inspection at: Vernon, Vermont	
Inspection conducted: March 13-14 and 17-19, 1980	1 1
Inspectors: W. J. Raymond, Reactor Inspector	4/22/80 date signed
T. Foley, Reactor Inspector	date signed

Approved by:

. T. Martin, Chief, Reactor Projects Section No. 3, RO&NS Branch

Inspection Summary:

Inspection on March 13-14 and 17-19, 1980 (Report No. 50-271/80-04) Areas Inspected: Routine, unannounced inspection by two regional based inspectors of Small Break LOCA Operator Guidelines, including Emergency Procedure preparation and review for technical adequacy, operator training and interviews with operators on emergency procedure response; and, followup on a reportable occurrence, LER 80-11/1P, potential for safeguard bus degradation on VY electrical power system. The inspection involved 41 inspector hours onsite by two inspectors.

date signed

date signed

Results: No items of noncompliance were identified.

Region I Form 12 (Rev. April 77) 8006190308

DETAILS

1. Persons Contacted

Mr. E. Bowles, Operations Training Supervisor
*Mr. R. Branch, Assistant Operations Supervisor
*Mr. R. Burke, Engineering Support Supervisor
Mr. R. Lopriore, Engineering Assistant
Mr. M. Lyster, Shift Supervisor
*Mr. W. Murphy, Plant Superintendent
*Mr. J. Pelletier, Assistant Plant Superintendent
Mr. R. Sojka, Operations Supervisor

The inspector also interviewed other plant personnel during the course of the inspection including members of the operations and general office staff.

*denotes those present at the exit interview.

<u>Reportable Occurrence LER 80-11/1P - Potential for Safeguard Bus</u> Degradation

The licensee reported on March 12, 1980, the results of an engineering review of the VY onsite electric distribution system which indicated the potential existed for safeguard bus degradation under certain conditions. The engineering review revealed that, under worst case loading conditions, the voltage for continuous operation of some 480 volt system loads would be slightly below the minimum required voltage. The low voltage condition could occur during an accident sequence if the transmission grid voltage is at its minimum expected value and the plant is in the closed cycle cooling mode of operation (circulating water booster pumps and cooling towers in use). The engineering review also showed that for extreme transmission grid high voltage conditions, coincident with light loading conditions in the plant (as would exit with the plant in cold shutdown), the 4160 volt system voltage is slightly higher than allowable by equipment voltage ratings.

The inspector reviewed the current plant status, the assumptions used in the engineering analysis of the onsite electric system and the analysis results for each condition studied, as given in the preliminary version of the YAEC NSD report "Auxiliary Power System Voltage Study for VYNPS." The inspector noted that with the plant currently on-line and in the open cycle mode of operation, the conditions necessary to cause a safeguard bus undervoltage condition do not exist. Further, the single most limiting plant loads assumed to be in operation for the case giving the undervoltage condition, the circulating water booster pumps, will not be put into operation until May 15, 1980 or as otherwise required by the plant Technical Specifications. Similarly, the present plant status precludes the occurrence of a 4160 volt bus overvoltage condition. Based on the above, no immediate corrective actions were deemed necessary.

The licensee is investigating a transformer tap change as a hardware fix to preclude the development of either a high or low voltage condition. The change would involve taking 4160V transformer T3B and T3A taps from 112KV to 115KV and 480V transformer T8 and T9 taps from 4264V to 4056V. The licensee proposes to make the tap changes during a rod swap outage now scheduled for April 12, 1980.

The inspector stated this item was unresolved pending further review by the NRC staff of the VY analyses and completion of the proposed corrective actions. (50-271/80-04-01)

3. Small Break LOCA Operator Guidelines

a. Purpose

The purpose of this inspection was to review revisions to small break LOCA emergency procedures based on followup action from NRC staff reviews of the Three Mile Island accident. Requirements to implement the procedure changes and provide the necessary operator training were imposed by the NRC as part of the "Lessons Learned" from Three Mile Island.

b. Scope

Inspection of this area consisted of a formally structured review of the plant systems, instrumentation, procedures and training necessary to terminate or mitigate the consequences of a small break LOCA. Revisions to the emergency procedures were developed by the licensee in conjunction with the GE Owners Group and approved by the NRC staff. The VY procedures were then reviewed for consistency with the guidelines, clarity in terms of individual actions and precautions, and viability with respect to timely initiation of operator actions. Finally, the system related aspects of the procedures were reviewed to ensure the operator actions can be performed. The specific criteria used during the review were as follows:

- (1) procedure implementation, including incorporation of accident symptoms, operator immediate actions, subsequent operator actions and equipment precautions consistent with the approved guidelines. The review verified sufficient diverse symptoms were provided to clearly distinguish between a break inside and outside the primary containment. Precaution statements were verified to be located at appropriate places throughout the procedure to be most effective in providing warnings to the operator to ensure plant safety.
- (2) implementation of operator training requirements, including formal classroom lectures on the NSSS analyses and the emergency procedures, and, a walk-through of each procedure in the control room by licensed operators.
- (3) a walk-through of the procedures in the control room was conducted by the inspector with selected individuals holding Reactor Operator and Senior Reactor Operator licenses to verify the operators were knowledgeable of the specified symptoms, automatic actions and immediate actions without reference to the procedures, as well as required subsequent actions, special precautions and recent facility changes resulting from the Short Term Lessons Learned requirements.
- (4) plant-system related aspects of the emergency procedures were reviewed to verify specified operator actions can be performed. Plant system considerations included, where applicable:
 - + instrumentation needed to complete certain actions, including restart of high pressure ECCS components; ADS actuation; reactor vessel level control; suppression pool temperature, pressure and level control; and RCIC suction switchover from the CST to the suppression pool. The instrumentation reviewed included considerations for environmental effects, redundancy provided in sensor and readout devices, and instrumentation power supply assuming a loss of offsite power and the failure of the ingle most limiting instrument bus;
 - precaution against use of loop isolation valves prior to achieving reactor depressurization and stable conditions;

- + actions required to assure ECCS loads are reenergized should offsite power be lost subsequent to a reset of ECCS actuation signals;
- + actions to assure isolation of non-essential cooling water lines penetrating the primary containment; and,
- + manual actions required to switch RCIC suction from the CST to the suppression pool.

c. References

- OP 3116, Loss of Reactor Coolant, Rev. 10, December 31, 1979
- (2) OP 3124, Loss of Reactor Coolant Outside of Primary Containment, Rev. 2, December 31, 1979
- (3) NRC letter to VYNPC, Followup Actions Resulting from NRC Staff Reviews Regarding the TMI-2 Accident, August 13, 1979
- (4) NRC letter to GE BWR Owners Group, Evaluation of Small Break LOCA Operator Guidelines, October 26, 1979
- (5) NRC letter to VYNPC, Discussion of Lessons Learned Short Term Requirements, October 30, 1979
- (6) NEDO-24708, General Electric Company BWR Small Break LOCA Guidelines, November 26, 1979
- (7) VYNPC letter, Modification to NEDO-24708 Small Break Operator Guidelines, October 18, 1979
- (8) VYNPC letter, Modifications to NEDO-24708 Small Break Operator Guidelines, October 23, 1979
- (9) Training Coordinator's Attendance Record of Period 1 Training received in 1979 by all licensed personnel (27 total)
- (10) Formal classroom training presentation materials, including OP 3116; OP 3124; Summary of NUREG 0578 requirements; directive MCO 79-5; AP 0150 Rev. 11 dated October 31, 1979; internal memorandum NED 79-7222 dated December 12, 1979; and NRC letter to VYNPC dated January 8, 1980

- (11) Shift Foreman's Log entries for January 10, January 13, February 7, February 9, February 10 and February 11, 1980
- (12) VY Plant System Flow Diagrams
- (13) VY Drawing No. G-191372, Sheets 1 and 2
- (14) VY Drawing B-191260, Sheet 112.6
- (15) Circuit Wiring Diagrams (CWDs), Series 100, 200, 500, 700, 800, 1000, 1100, 1200 and 1400
- d. Findings
 - Procedure Implementation Procedures OP 3116 and 3124 were found to be in conformance with the GE Small Break LOCA Operator Guidelines.
 - (2) Formal Training Formal classroom lectures were attended by each operating shift. The lectures covered the small break LOCA procedures as well as discussions on procedure background and development of the guidelines. A walkthrough of the procedures on the control board was also completed by each operating shift. However, the formal classroom lectures did not include presentations of NSSS vendor analyses in general, nor the specific vendor analyses of small break LOCA's or BWR loss of feedwater transients. The inspector did note during operator interviews that the individuals examined were knowledgeable of expected plant response during the subject transients as well as basic objectives to be achieved should the emergency procedures be implemented. Additionally, the licensee stated that NSSS transient analyses are part of general operator training.
 - (3) Operator Interviews Five licensed individuals (3 SROs and 2 ROs) filling both shift and staff positions were selected on a sampling basis to be interviewed. The interviews were conducted during a walk-through of the procedures in the control room to determine the following:
 - Adequacy of the emergency procedures from a functional standpoint;
 - Operator familiarity with OP 3116 and OP 3124 development, including an understanding of expected plant transient response;

- Effectiveness of training program;
- Operator knowledge and comprehension of procedures OP 3116 and OP 3124, including understanding of anticipated accident symptoms and automatic actions, and expected immediate actions, subsequent actions, equipment precautions and overall objectives;
- ability to differentiate between LOCAs occuring inside and outside primary containment;
- ability to recognize indications of inadequate core cooling; and ,
- operator familiarity with recently established STLL requirements, new installed plant equipment and existing plant indications and controls.

Specifics of the inspector's evaluation of individual and collective performance during the interviews were discussed with licensee management at the exit interview. Overall, the inspector found that those interviewed demonstrated satisfactory proficiency with and understanding of the procedures and other topics listed above. Specific areas where improvement could be realized with additional training were also discussed on an individual basis and included:

- familiarity with expected automatic and immediate actions associated with the accidents;
- familiarity with new equipment installed as a result of STLL requirements.

The licensee concurred that additional walk-through of the procedures in the control room would be beneficial and will be scheduled as part of the normal shift. The licensee will also re-evaluate the current methods used to disseminate information to shift personnel regarding changes to procedures/equipment and the establishment of new requirements.

(4) Systems Considerations - The procedures were reviewed in regard to the plant system considerations listed in paragraph 3.b above and were found to be acceptable. Except as noted below, no specific problems were identified between procedure, plant system and control board interfaces.

During the review of instrumentation required to implement the emergency procedures, the 120 VAC Vital and Instrument power supply buses were reviewed in detail to determine which supply was most limiting, assuming a loss of the bus along with it's associated instrumentation coincident with an accident. Assuming the loss of the single most limiting Instrument bus, the inspector determined that sufficient indications of key process parameters remained available in the control room, powered from other supplies, to allow implementation of the procedures. However, assuming the loss of the single most limiting Vital AC Bus (VAC A), the inspector determined that there will be no operable control room indications for Condensate Storage Tank (CST) level and Torus water level. The inspector noted, however, that the CST does have a local level indication that functions without electric power and that this indication could be used in conjunction with plant communications systems as a backup to the control board indicators. No such local indication of torus water level exists.

The licensee noted these findings and stated the item would be further reviewed. The inspector stated the item was unresolved pending further review by the NRC staff. (50-271/80-04-02)

4. Unresolved Items

Unresolved items are those items for which more information is required to determine whether the items are acceptable or items of noncompliance. Unresolved items are discussed in details 2 and 3 of this report.

5. Exit Interview

A management meeting was held with plant personnel (denoted in Paragraph 1) at the conclusion of the inspection on March 19, 1980. The purpose, scope and findings of the inspection were discussed as they appear in the details of this report.