



*MUDOGS*

**RESPONSE TO FREEDOM OF  
INFORMATION ACT (FOIA) REQUEST**

FOIA — 97-365

RESPONSE TYPE  
FINAL ☒ PARTIAL ☐ (4th)

DATE **JAN 13 1998**

DOCKET NUMBER(S) (if applicable)

REQUESTER

J. Patrick Hickey

**PART I.—AGENCY RECORDS RELEASED OR NOT LOCATED** (See checked boxes)

No agency records subject to the request have been located.

No additional agency records subject to the request have been located.

Requested records are available through another public distribution program. See Comments section.

Agency records subject to the request that are identified in Appendix(es) \_\_\_\_\_ are already available for public inspection and copying at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC.

☒ Agency records subject to the request that are identified in Appendix(es) D are being made available for public inspection and copying at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC, in a folder under this FOIA number.

The nonproprietary version of the proposal(s) that you agreed to accept in a telephone conversation with a member of my staff is now being made available for public inspection and copying at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC, in a folder under this FOIA number.

Agency records subject to the request that are identified in Appendix(es) \_\_\_\_\_ may be inspected and copied at the NRC Local Public Document Room identified in the Comments section.

Enclosed is information on how you may obtain access to and the charges for copying records located at the NRC Public Document Room, 2120 L Street, N.W., Washington, DC.

☒ Agency records subject to the request are enclosed. \*

Records subject to the request have been referred to another Federal agency(ies) for review and direct response to you.

Fees

You will be billed by the NRC for fees totaling \$ \_\_\_\_\_.

You will receive a refund from the NRC in the amount of \$ \_\_\_\_\_.

In view of NRC's response to this request, no further action is being taken on appeal letter dated \_\_\_\_\_, No. \_\_\_\_\_.

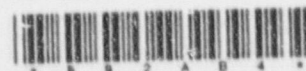
**PART II. A—INFORMATION WITHHELD FROM PUBLIC DISCLOSURE**

Certain information in the requested records is being withheld from public disclosure pursuant to the exemptions described in and for the reasons stated in Part II, B, C, and D. Any released portions of the documents for which only part of the record is being withheld are being made available for public inspection and copying in the NRC Public Document Room, 2120 L Street, N.W., Washington, DC in a folder under this FOIA number.

COMMENTS

\*Copies of the records identified on Appendix D are enclosed.

*FOIA 0/1*



SIGNATURE, DIRECTOR, DIVISION OF FREEDOM OF INFORMATION AND PUBLICATIONS SERVICES

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PDR FOIA  
HICKEY97-365 PDR

APPENDIX D  
RECORDS BEING RELEASED IN THEIR ENTIRETY

<u>NO.</u>	<u>DATE</u>	<u>DESCRIPTION/(PAGE COUNT)</u>
1.	5/3/96	Letter to D Reid, Vermont Yankee Nuclear Power Corp. from R. Conte (Exhibit 16) (14 pages)
2.	4/9/97	Letter to D Reid, Vermont Yankee Nuclear Power Corp. from R Conte (Exhibit 17) (7 pages)

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FOIA/PA REQUEST

Case No: 97-365  
Date Rec'd: 9-22-97  
Action Off: Powl  
Related Cases: \_\_\_\_\_

J. PATRICK HICKEY, P.C.  
(202) 663-8103

September 19, 1997

Mr. Russell A. Powell, Chief  
Freedom of Information Act/ Local Public Document Room Branch  
U.S. Nuclear Regulatory Commission  
Mail Stop T-6 D8  
Washington, D.C. 20555-0001

**Re: Freedom of Information Act (FOIA) Request**

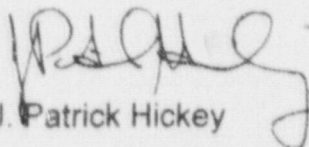
Dear Mr. Powell,

Pursuant to 5 U.S.C. § 552 (a)(3) and 10 C.F.R. § 9.23, I am requesting all documents relating to the investigation by the NRC Region I Office of Investigations of Case No. 1-96-005 (allegations related to Vermont Yankee).

I agree in advance to pay any reasonable fees associated with this request.

Thank you for your prompt attention to this request. I look forward to your response within ten (10) days, as required by NRC and FOIA regulations.

Sincerely,

  
J. Patrick Hickey



# EXHIBIT 16





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

May 3, 1996

Mr. Donald Reid  
Vice President, Operations  
Vermont Yankee Nuclear Power Corporation  
RD 5, Box 169  
Ferry Road  
Brattleboro, Vermont 05301

SUBJECT: NRC INSP CTION REPORT 50-271/96-03

Dear Mr. Reid:

On March 30, 1996, the NRC completed an inspection at your Vermont Yankee reactor facility. The enclosed report presents the results of that inspection.

During the 6-week period covered by this inspection period, the conduct of activities at the Vermont Yankee facility reflected safety conscious operations, sound engineering and maintenance practices, and proper implementation of radiological work controls. Collectively, the number of plant issues identified by the VY staff during this inspection period (for example, the torus water temperature and battery room block wall issues) reflected positively on your staff's renewed dedication to identifying and resolving problems. In view of the types and significance of issues being identified, we encourage the continued diligence of your staff in this area.

Also during this inspection period, we reviewed the current technical status of the advanced off-gas (AOG) system, as part of the verification process for your letter (No. BVY 96-17), dated February 26, 1996. The inspector found no engineering, operation, or maintenance indications in the last five years that the AOG system functionality was impaired in such a manner that led to degraded conditions that exceeded the Technical Specification requirements either for minimum channel availability, AOG-related instrumentation, or system operability.

No reply to this report is necessary and your cooperation with us is appreciated.

Sincerely,

Richard J. Conte, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Docket No. 50-271

CASE NO. 1 - 96 - 005

EXHIBIT 16  
PAGE 1 OF 14 PAGE(S)

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in 5 R1

Enclosure 1: Executive Summary  
Enclosure 2: NRC Resident Inspection Report  
Enclosure 3: NRC Specialist Inspector AOG Review Report

cc w/encl:

R. Wanczyk, Plant Manager  
J. Thayer, Vice President, Vermont Yankee Nuclear Power Corporation  
J. Duffy, Licensing Engineer, Vermont Yankee Nuclear Power Corporation  
J. Gilroy, Director, Vermont Public Interest Research Group, Inc.  
D. Tefft, Administrator, Bureau of Radiological Health, State of New Hampshire  
Chief, Safety Unit, Office of the Attorney General, Commonwealth of  
Massachusetts  
R. Gad, Esquire  
G. Bisbee, Esquire  
R. Sedano, State of Vermont, SLO Designee  
T. Rapone, Massachusetts Executive Office of Public Safety  
State of New Hampshire, SLO Designee  
Commonwealth of Massachusetts, SLO Designee



## ENCLOSURE 1

### EXECUTIVE SUMMARY

Vermont Yankee Nuclear Power Station  
NRC Inspection Report 50-271/96-03

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection.

#### Operations

Overall, the conduct of plant operations was professional and safety conscious this inspection period. The Plant Operations Review committee (PORC) exhibited a clear and well defined safety focus during their examination of recent Inservice Testing and Appendix J Program discrepancies and during their review of a proposal for alternate Appendix R compensatory measures. Prompt and effective actions were taken by the VY staff to resolve the operability concern involving the loose valve operators on the manual isolation valves to both residual heat removal heat exchangers.

#### Maintenance

A number of maintenance and testing activities were observed and found to be well coordinated, with good pre-evolutionary briefings and good communications. Plant staff response to the March 26 recirculation pump trip was good, however, the apparent cause of the trip was identified to have been personnel error. An inspection follow-up item (IFI 96-03-01) was assigned to review VY's root cause evaluation and corrective actions.

The VY staff's approach to monitoring and understanding the scram solenoid pilot valve VITON diaphragm degradation issue has been and continues to be aggressive. However, VY's increased frequency of individual rod scram time testing may potentially conflict with Technical Specifications 4.3.C.2 if appropriate administrative controls are not instituted. Pending further VY staff and inspector review, this issue is unresolved (URI 96-03-02).

The VY staff's decision to postpone the reactor core isolation cooling system and the "B" emergency diesel generator (EDG) limiting condition for operation (LCO) maintenance outages, during this inspection period, demonstrated prudent decision making with safety benefits.

#### Engineering

Identification of the battery room masonry wall seismic qualification calculation errors demonstrated an excellent questioning attitude on the part of the individual engineer. The engineering and plant staff handling of this design non-conformance, with respect to promptly dispositioning the station batteries operability impact, was not timely. PORC's review of the station batteries operability determination was completed and, as referenced above, the PORC's decision to postpone the "B" EDG LCO maintenance outage was



prudent. The NRC staff review of this potentially degraded condition using the guidance of Generic Letter 91-18 was ongoing at the conclusion of the inspection period and was unresolved (URI 96-03-03).

VY engineering and operating staffs' have appropriately dealt with the torus water temperature limit concern, to date, by pursuing further design basis analyses and, in the interim, administratively restricting torus water temperature to 90 degrees F. Pending completion of formal analysis of this potential design basis conflict and NRC staff review, this issue is unresolved (URI 96-03-04).

Licensee identified and corrected discrepancies in the Inservice Testing and Appendix J Programs (reference LERs 96-001 and 90-004, respectively) were dispositioned as non-cited violations. These discrepancies were identified by the VY staff as a result of thorough corrective action for organizational problems identified via the Fire Protection and Appendix R Programs.

The inspector reviewed the current technical status of the advanced off-gas (AOG) system as part of the verification process for the licensee's letter (No. BVY 96-17), dated February 26, 1996. In particular, the inspector reviewed issues dealing with AOG system performance and with a system modification cancellation. The engineering staff's coordination with the plant staff, the quality of the consolidated as-built panel 9-50 electrical drawings, and the delineation and resolution of design issues for the planned AOG modification were generally very good. The inspector found no indication that the cancellation of the modification was driven by cost considerations other than the inherent cost risk associated with implementing a modification with possible incomplete documentation, such as installation and test instructions. The inspector found no engineering or maintenance indications in the last 5 years that AOG system functionality was impaired in such a manner that led to degraded conditions that exceeded the Technical Specification requirements. Recent initiatives including system-analyzed maintenance developed by the I&C engineering staff and reliability-based maintenance developed by the maintenance engineering staff were considered good.

#### Plant Support

VY's ongoing systematic re-examination of the entire Fire Protection and Appendix R Programs identified a number of improperly installed fire dampers and incomplete test data for the switchgear rooms carbon dioxide suppression systems. The compensatory measures for these discrepancies were promptly implemented and the proposed corrective actions deemed appropriate. Conclusive system test results to support a system operability determination are still pending and this issue remains unresolved (URI 96-03-06).

VY staff review of plant refueling practices identified that preceding the 1990 and 1992 refuel outages all three layers of reactor vessel shield blocks were removed while at power. This condition was determined to have been in conflict with the plant design basis. The apparent root cause of this problem was inadequate procedural guidance, but further evaluation was ongoing. Pending VY completion and inspector review of the final root cause evaluation, this issue is unresolved (URI 96-03-05).

ENCLOSURE 3

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

DOCKET/REPORT NO. 50-271/96-93  
LICENSEE: Vermont Yankee Nuclear Power Corporation  
FACILITY: Vermont Yankee  
DATES: March 3 - 8, 1996 thru April 10 - 11, 1996  
LOCATION: Vernon, VT

INSPECTOR:

John A. Calvert  
John Calvert, Reactor Engineer  
Electrical Engineering Branch  
Division of Reactor Safety

4/25/96  
Date

APPROVED:

William H. Ruland  
William Ruland, Chief  
Electrical Engineering Branch  
Division of Reactor Safety

4/25/96  
Date



**REPORT DETAILS FOR VERMONT YANKEE  
INSPECTION REPORT NO. 96-03**

**1.0 ADVANCED OFFGAS SYSTEM MODIFICATION REVIEW**

This inspection was conducted on March 3 - 8, 1996, at the Vermont Yankee site, and April 10 - 11, 1996, by telecon from the NRC Region 1 offices.

**1.1 Scope and Background (IP37700)**

**a. Scope**

The inspector reviewed the current technical status of the advanced off-gas (AOG) system, as part of the verification process for the licensee's letter to the NRC (No. BNY 96-17), dated February 26, 1996. The inspector reviewed those issues dealing with system performance deterioration and a modification cancellation. The radiation aspects of the AOG system are covered, in part, in reports 50-271/95-25, Section 5.1, and 50-271/95-24. The hydrogen analyzer aspects of the AOG system are covered in inspection reports 50-271/96-02, Section 3.2 and 50-271/95-25, Section 3.2.4.

The inspector interviewed personnel associated with the AOG system and/or modification such as the design engineer, electrical engineer, I&C engineer, maintenance engineer, project engineering manager, and operations support engineer. The former project manager for the AOG modification declined to be interviewed by the inspector for this inspection.

The inspector reviewed pertinent licensee documents associated with the AOG system and modification such as the UFSAR, LERs, licensee safety evaluation, I&C work orders list, I&C procedures list, I&C system-analyzed maintenance (SAM), operator rounds procedures, reliability-based maintenance (RBM), system specifications/drawings, modification drawings, drawing modification job file, design engineering memorandums, and project engineering memorandums.

The inspector performed walkdowns of the control room AOG panel and accessible equipment in the AOG building.

**b. Background**

The AOG system was added to the Vermont Yankee plant in 1973. The purpose of the system is to process noncondensable gases removed from the main condenser to limit radioactive gaseous release to as low as reasonably achievable. The guard bed, adsorbers and associated system components are safety Class 3 (processes or houses radioactive waste) in the licensee's classification criteria. All other parts of the system are classified as non-nuclear safety.

The system performs six processes on the main condenser gases before release to the plant stack: hydrogen dilution; hydrogen recombination; preliminary delay for decay of radioactive gases; moisture removal; charcoal adsorption; and final delay for decay of radioactive gases. Except for the passive delay pipes and charcoal adsorbers, the AOG consists of two trains of equipment with cross connection capabilities for certain equipment.



A bypass line is installed downstream of the hydrogen dilution/recombiner trains and the preliminary delay pipe. The bypass does not include bypass of the hydrogen dilution/recombiner trains. The bypass permits continued reactor operation if portions of both trains of the moisture removal and the charcoal adsorbers were to become inoperable during normal operations. The bypass line is joined to the input of the final delay pipe for transport to the plant stack.

The radiation is redundantly monitored after the bypass line, just before the final delay pipe. If the radiation monitoring levels of the monitors exceed a preset level, automatic action occurs to shut off flow to the stack from the AOG system. The plant stack has additional radiation monitoring, but no automatic control function.

## 2.0 OBSERVATIONS AND FINDINGS

### 2.1 Review of 10 CFR 50.59 Safety Evaluation for the Planned Modification

The inspector reviewed the document, "EDCR 94-02 Enclosure (A) Safety Evaluation." The equipment involved in the modification was classified non-nuclear safety. The evaluation arrived at the appropriate conclusions and showed that neither the functions of any safety-related system would be degraded, nor would the margin of safety be degraded as defined in the Technical Specification for the AOG system.

### 2.2 Review of Modification Planning

The modification, EDCR 94-402, was designed by the licensee to improve the reliability operations and maintainability of the system. The modification was originally scheduled for the 1995 and 1996 refueling outages, but has since been planned to be separated into a set of smaller tasks that could be performed as minor modifications for the 1995 and 1996 outages.

An initial licensee engineering evaluation was made at the beginning of the modification design in 1992 to identify problems in the areas of reliability, operation, and performance of maintenance activities. The major areas listed below were identified as needing improvement.

- (1) Provide a verified, unified set of drawings for operations, maintenance, and I&C activities. Perform field verification of the as-built wiring. Revise the AOG control panel drawings, especially the electrical independence and wiring areas.

The original 1973 contractor drawings were difficult to read because of layout, lettering, lack of detail, and reproduction quality. The drawings and the actual electrical installation did not incorporate VV engineering standards, for example, redundancy and instrument fusing. The revision control of the drawings was poor. In the case of the piping and instrumentation diagrams (P&ID), there were two identical sets of drawings done by two different contractors.

An example of the wiring problems was that some of the neutral wires were connected from different power supplies than the hot wires. This was viewed by the licensee as a condition that could cause erratic operation of the instruments. This is further discussed in the Section on "Status of the Modification."

The major weakness the licensee engineering identified was that, if a postulated failure of a single link in the instrument ac bus occurred, it could cause extensive failure of the AOG instrumentation. This is further discussed in Section on "Status of the Modification."

The licensee stated that the functionality of the system was not hampered by these discrepancies. Maintenance could be performed, but not efficiently. Over the years, as minor changes were made, the confidence in the accuracy and completeness of the electrical drawings was questioned by operations and maintenance personnel.

- (2) Change the level control and pumping system for the AOG condensate drain tank, TK-104-1. This is an interfacing system to the AOG that is used during normal operations.

The tank receives extracted moisture from the AOG process lines. The water is then pumped to the main condenser. The tank level provides a water barrier between the condenser vacuum and the AOG process lines.

During start-ups from extended outages or in cold weather, a large volume of condensate is produced and AOG system startup times are increased. During normal plant operation, a low level of condensate is produced. There were instances when the tank was pumped dry, which the licensee found the root cause to be regulating valve controller failure.

The licensee's focus of this item was availability, rather than functionality, of the system. The modification was to replace the level control system with a type that integrated pump control and protection.

- (3) Upgrade the pressure rating for the steam jet air ejector (SJAE) inter-condenser.

This system operating pressure upgrade would increase the design margin to absorb pressure transients associated with the isolation of the AOG recombiner inlet valves. An installed rupture disc downstream of the inter-condenser currently prevents AOG system damage due to inadvertent system isolation and/or hydrogen detonations. Over the past several years, this rupture disc has actuated due to over-pressure conditions approximately eight times, necessitating a unit shutdown to replace the disc. With the increased inter-condenser pressure rating, the setpoint of the rupture disc could likewise be increased. The inspector determined that system availability, rather than system functionality, was the focus of this item.

The inspector notes that the potential radiological release consequences of a rupture of the AOG rupture disc has been the subject of previous



NRC staff review and follow-up (reference inspection reports 92-01, 92-15, 93-25, and 94-27). As documented in these reports, the licensee modified the turbine building ventilation system to exhaust to the main stack to ensure proper filtering and monitoring of gaseous radiological releases. Until this modification was completed in the Fall of 1993, the licensee took appropriate interim measures to monitor potential releases via the turbine building ventilation system pathway. The inspector also reviewed the applicable off-normal operating procedure (No. ON-3151, Off Gas Explosion/Rupture Disc Failure) and verified that appropriate procedural guidance was in place to ensure prompt actions are taken should this event occur.

In addition to the above items, eight other areas addressed in the modification package similarly focused on system availability, maintainability and routine operations. Examples were the replacement of analog recorders with digital chartless type recorders, replacement of analog controllers with digital controllers, circuit changes to eliminate spurious AOG annunciator alarms, and re-configuration of the instrument air supply to valves to prevent unnecessary loss of recombiner heat exchangers due to loss of instrument air.

### 2.3 Review of Modification Design

The design engineering coordination with the operations, I&C, and maintenance functions to identify concerns, analyze the concerns, evaluate the alternatives, and document the design bases was performed well. This was indicated by the depth of the design analyses and the active engineering participation in site walkdowns.

The consolidation and updating of the as-built drawings of the AOG control room panel 9-50 was performed well. The licensee performed a detailed point-to-point walkdown and verification of the 9-50 panel as-built drawings and found only one minor difference, which was corrected on the drawings.

The licensee review at the site identified wiring discrepancies with the planned modification drawings that could have potentially complicated the installation process. This indicated good performance of the overall drawing review process, but indicated weakness in the engineering drawing check procedures for the modification.

The licensee checked the electrical wiring in the AOG building to confirm conformance with the original system installation drawings. Several discrepancies were found and corrected. None of the discrepancies affected proper functioning of the system, according to the licensee.

### 2.4 Status of the Modification

The licensee management made a decision to not include the modification in the April 1995 refueling outage. The inspector reviewed two internal VY documents, "AOG Mods Design Change," December 22, 1994, (VY Vice President, Engineering to VY Department Manager and Project Manager), and "AOG Design Changes," January 24, 1995, (VY Vice President, Engineering to VY Department Manager) for reasons why the decision was made. The inspector found from the



review, supplemented by personnel interviews, information to suggest that the main reason for the management decision was because all the documentation necessary for the modification package had slipped schedule milestones.

The modification design drawings were completed and put under drawing control, but the modification was cancelled and not implemented as part of the 1995 refueling outage. The inspector noted that the 9-50 panel wiring, where the neutral wires were from different power supplies than the hot wires, was changed as a task during the 1995 refueling outage.

The change of the postulated failure of a single link in the instrument AC electrical bus and the effect on the instrumentation was not implemented as a separate task during the 1995 outage. The licensee has this task under review for future implementation. The inspector noted that if this postulated failure of a single link were to occur and if all AOG instrumentation would consequently fail, it would be covered by the Limiting Condition for Operation (LCO) in the requirements for minimum number of channels operable of Technical Specification (TS) Table 3.9.2 (2a,b,c), Gaseous Effluent Monitoring Instrumentation, which covers radiation monitoring, flow rate, and hydrogen monitors. This TS would permit continued plant operation and release of off-gas effluents via this pathway for up to seven days provided one stack radiation monitoring system was operable and off-gas temperatures and pressures were continuously monitored.

## 2.5 Review of Maintenance Engineering

### a. Instrument and Controls (I&C)

The I&C engineering group started a system-analyzed maintenance (SAM) project for the AOG system in 1992. The inspector reviewed the document "VY I&C Preventative Maintenance, System Analyzed Maintenance Project (SAM)," Revision 2, dated February 6, 1996, that described the purpose, objectives, and methodology of the project.

The document described the method for classifying the instruments of a system according to designed function, safety class, importance to function, vendor recommendations, maintenance history, operating experience. An appropriate maintenance task with an associated interval is then assigned.

The AOG system has 370 instruments, 318 of which have been classified to date and are planned for final engineering review. Approximately 85% of the instruments were classified as functionally important. The inspector reviewed a sample of ten completed worksheets for the functionally important equipment and noted that the function was clearly described, and the general requirements for the maintenance task was delineated.

### b. Mechanical

The maintenance engineering group had a project similar to the I&C SAM project called reliability-based maintenance (RBM). The AOG mechanical components had all been classified and had been reviewed. The inspector selected a valve in the recombiner drain (H0-06-587) and reviewed the basis of classification, and

noted that the functional importance basis and maintenance actions were appropriate for the valve service.

## 2.6 Review of Maintenance Status

The inspector reviewed a listing of work orders on the AOG system from 1991 to the present. The listing showed that the operators were alert to the identification of off-normal conditions, such as motor bearings making noise, pump cycling, air fitting leaking, and valve packing leaking that could lead to degraded conditions. The inspector determined that the listing showed no indication that functional problems occurred that were not addressed by corrective actions.

The inspector determined that there were I&C instrument calibration procedures for the system instrumentation. Additionally, there were functional/calibration procedures for the AOG hydrogen monitors, radiation monitors, trip system, moisture detectors. The work order status showed that instrument calibration and functional checks had been performed.

The inspector reviewed the document "Advanced Off-Gas Hydrogen Analyzer and Recombiner Catalyst," memo number VYI-2/96, dated January 5, 1996. The document stated that the licensee performed an analysis of temperature indications across a recombiner from actual plant data covering the period from 1980 to 1995. The trend of temperature showed that the recombiner was operable, but indicated a loss of catalyst efficiency. The outlet temperature data was lower than expected, which could indicate higher output hydrogen concentration. The licensee performed a grab sample check of the output that showed that the hydrogen concentration was well within the normal plant operating band. Engineering recommended that the inside and outside surfaces of the thermocouple wells be cleaned and the thermocouples be checked as the corrective action for the low outlet temperatures.

Engineering also found that the design specification for the catalyst life was for 18 months to 5 years, so they conservatively recommended replacement of the catalysts at the next refueling outage, even though the data showed that the recombiners are properly performing their function. This recommendation is being reviewed by licensee management. Further discussion of the catalyst life is found in Section 3.0.

## 2.7 System Walkdown

The AOG building was very well laid out and the inspector considered redundancy, physical separation, shielding, and maintainability. The material condition was generally very good.

The AOG control room panel CRP 9-50 arrangement provided the necessary readouts, recorders, system mimics, and controls to operate and determine system status. The inspector verified that the following indications were within normal operating ranges: radiation level at the SJAE; the recombiner inlet/outlet temperatures; recombiner outlet flow; hydrogen analyzer percent of combustible limit; guard bed inlet radiation; first section adsorber outlet radiation; and system outlet flow. The panel had an extensive temperature



monitoring panel for indication of system temperatures at heat exchangers, for example. Additionally, the panel had pressure indications for key points in the system.

### 3.0 REVIEW OF UFSAR AND COMMITMENTS

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR descriptions.

While performing the inspections discussed in this report, the inspectors reviewed Section 9.4, "Gaseous Radwaste System," of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording for the AOG system was consistent with the observed plant practices, procedures and/or parameters. The modifications of EDCR 94-402 were not checked versus the UFSAR because the EDCR was cancelled and planned to be implemented at a later date.

As a result of their follow-up of the AOG system hydrogen monitor issues, the licensee noted that in their licensing change request to the NRC for the AOG system of June 16, 1972, Attachment A, Appendix A, "Description of Offgas Processing System Components," page A-3, that the recombiner catalyst lifetime was estimated to be equivalent to plant lifetime when operating in the steam/offgas environment. They also noted inconsistent lifetime catalyst information in the proprietary Appendix C, page C-3 of Attachment A to the licensing change request, which described the catalyst expected life as less than plant lifetime. The licensee's resolution of the inconsistent recombiner catalyst lifetime in the AOG license change request documents and any impact on catalyst maintenance is an unresolved item (URI 50-271/96-03-07).

### 4.0 MANAGEMENT OVERSIGHT

Project engineering management initiated an independent engineering review of the design implementation process. Inspection information suggested that plant and engineering management made the decision to not include the modification in the 1995 shutdown because all the documentation necessary for the modification package had slipped schedule milestones. The inspector inferred from these actions that management was actively involved in the oversight of the modification.

The inspector found no indication that the cancellation of the modification was driven by cost considerations other than the inherent cost risk associated with implementing a modification with possible incomplete documentation.

### 5.0 CONCLUSIONS

The licensee's resolution of the inconsistent recombiner catalyst lifetime in the AOG license change request documents and any impact on catalyst maintenance is an unresolved item (URI 50-271/96-03-07).



The inspector found no engineering or maintenance indications in the last 5 years that AOG system functionality was impaired in such a manner that led to degraded conditions that exceeded the Technical Specification requirements either for minimum channel availability, or AOG system instrumentation, or AOG system operability.

The inspector found no indication that the cancellation of the modification was driven by cost considerations other than the inherent cost risk associated with implementing a modification with possible incomplete documentation, such as installation and test instructions.

The engineering coordination with the plant staff, the quality of the consolidated as-built panel 9-50 electrical drawings, and the delineation and resolution of design issues for the planned AOG modification were generally very good.

The I&C and maintenance engineering initiatives regarding AOG system analyzed I&C maintenance and reliability-based mechanical maintenance for components were good.

#### 6.0 EXIT MEETING

The findings of the inspection were presented and discussed with Mr. D. Reid, Vice President of Operations and members of the licensee's staff on March 8, 1996, as listed in Section 7.0. The licensee acknowledged the findings presented.

The inspector telephoned the licensee on April 10 and 11, 1996, for additional information on the maintenance for the hydrogen recombiner catalyst.

The inspector received and reviewed proprietary material during the inspection and used the material for technical reference. No proprietary information was knowingly included in the report.

#### 7.0 LIST OF PEOPLE CONTACTED

##### Vermont Yankee Nuclear Power Corporation

J. Bolvin	Manager, Technical Support
E. Bowman	Operations Engineer
B. Buteau	Manager, Engineering Reorganization Coordination
*D. Calsyn	Supervisor, Quality Assurance
L. Casey**	Design Engineer, YNSD
*R. Clark	Executive Director, Quality Assurance
*P. Corbett	Manager, Project Engineering
*J. DeVincenzo	Manager, Performance Engineering
F. Helin	Manager, Reactor Engineering
*S. Jefferson	Assistant to the Plant Manager
G. Maret	Superintendent, Operations
*D. McElwee**	State Liaison Engineer
*S. Miller**	Manager, Design Engineering, YNSD
*J. Pelletier	Executive Director, YNS
*D. Reid	Vice President, Operations

R. Routhier      Electrical Engineer  
\*J. Thayer      Vice President, Engineering  
J. Todd      Maintenance engineer  
R. Wanczyk      Plant Manager  
M. Watson\*\*      Manager, I&C

Vermont Department of Public Service

\*W. Sherman      State Nuclear Engineer

U.S.N.R.C.

\*J. Calvert      Reactor Engineer, Electrical Engineering Branch  
\*W. Cook      Senior Resident Inspector

\* Present at exit meeting on March 8, 1996

\*\* Contacted by telephone April 10 - 11, 1996



# EXHIBIT 17

D/2

April 9, 1997

Mr. Donald Reid  
Vice President, Operations  
Vermont Yankee Nuclear Power Corporation  
RD 5, Box 169  
Ferry Road  
Brattleboro, Vermont 05301

SUBJECT: NRC INTEGRATED INSPECTION REPORT 50-271/97-02  
NOTICE OF VIOLATION

Dear Mr. Reid:

On March 8, 1997, the NRC completed an inspection at your Vermont Yankee reactor facility. The enclosed report presents the results of that inspection.

As discussed in Section E1.2 of the enclosed report, a root cause evaluation of the mixing of electrical power supply neutral and ground wires in the advanced off-gas (AOG) system had not been completed during the on-site inspection by a representative of the Office of Nuclear Reactor Regulations. The neutral mixing problem and other wiring error problems appear to be limited to the AOG system, and they do not adversely impact AOG system operable. However, the full extent of this wiring control problem has yet to be determined and resolved. Without the completed root cause analysis, we are concerned that the identified non-safety related neutrals and grounds wiring problem may potentially involve safety related systems. Upon completion of your staff's evaluation of this issue, please provide us, in writing, your findings, corrective actions, and basis for assuring that those problems do not adversely impact safety related or important to safety systems. Also, we request that you provide us with a status of resolution of all of the AOG system wiring errors and, if not resolved, provide a date when these errors will be corrected.

Inspector review of the November 25, 1996 event involving the on-line de-energization of the 480V electrical bus No. 6 for preventive maintenance identified that your staff failed to implement the administrative control requirements for removing power supplies from service. This failure to implement the procedural requirements of Administration Procedure (AP)-0125 and Technical Specification 5.5 is a violation. Of particular concern to us was that this evolution was previously performed during unit outages and that more rigorous reviews were not conducted prior to conducting this planned activity at power. We viewed the shift supervisor's performance as the last line of defense which failed leading to this event and the maintenance and planning staff's failures as more programmatic.

This violation is cited in the enclosed Notice of Violation, and the circumstances surrounding the violation are described in detail in the enclosed report. Please note that you are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

CASE NO. 1 - 96 - 005

EXHIBIT 17  
PAGE 1 OF 7 PAGE(S)

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practices," a copy of this letter and the enclosed Notice will be placed in the NRC Public Document Room.

Sincerely,

**ORIGINAL SIGNED BY:**

Richard J. Conte, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 50-271/97-02

Docket No. 50-271

cc w/encl:

R. McCullough, Operating Experience Coordinator - Vermont Yankee  
R. Wanczyk, Director, Safety and Regulatory Affairs  
G. Maret, Plant Manager  
J. Duffy, Licensing Engineer, Vermont Yankee Nuclear Power Corporation  
J. Gilroy, Director, Vermont Public Interest Research Group, Inc.  
D. Tefft, Administrator, Bureau of Radiological Health, State of New Hampshire  
Chief, Safety Unit, Office of the Attorney General, Commonwealth of  
Massachusetts  
R. Gad, Esquire  
G. Bisbee, Esquire  
T. Rapone, Massachusetts Executive Office of Public Safety  
State of New Hampshire, SLO Designee  
State of Vermont, SLO Designee  
Commonwealth of Massachusetts, SLO Designee

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Docket No. 50-271  
Licensee No. DPR-28  
  
Report No. 97-02  
  
Licensee: Vermont Yankee Nuclear Power Corporation  
Facility: Vermont Yankee Nuclear Power Station  
Location: Vernon, Vermont  
Dates: January 19 - March 8, 1997  
Inspectors: William A. Cook, Senior Resident Inspector  
Edward C. Knutson, Resident Inspector  
Laurie A. Peluso, Radiation Physicist, Region I  
Thomas Koshy, Sr., Reactor Systems Engineer, NRR  
  
Approved by: Richard J. Conte, Chief, Projects Branch 5  
Division of Reactor Projects



The Operations department root cause evaluation for the November 25, 1996 electrical bus No. 6 on-line de-energization event was adequately self-critical and identified the principal causal factors for the event. The inspector concluded that the root cause of the event was a failure to follow AP-0125, Appendix B and cited this procedural non-compliance as a violation of regulatory requirements (VIO 97-02-04). Also, the inspector concluded, as did the licensee, that a weakness in the work planning process significantly contributed to this evolution not being reviewed more thoroughly, in advance.

Per the original inspector concern raised in inspection report 94-16, the licensee completed an appropriate representative sample of harsh environment susceptible instrument loop error calculations and confirmed that, although some instrument TS allowable values may be exceeded, the "analytical limits" did not compromise the bounding LOCA safety analyses. Accordingly, URI 94-16-02 is closed. However, the licensee's application of ISA-S67.04-1987 and basis for concluding that the instrument loop derived "analytical limit" may exceed the TS allowable value remain unresolved. This unresolved item, along with the NRC staff's review of the Instrument Setpoint Program results, will be examined in a future inspection (URI 97-02-09).

#### Engineering

The licensee has adequately addressed the issue regarding the absence of heaters for the motors of the HPCI and RCIC systems. The licensee's routine preventive maintenance program and the timeliness of any needed corrective maintenance provide reasonable assurance of continued operability of these components.

The NRR inspector concluded that there was no immediate safety concern involving the mixing of electrical neutrals and ground wires on this issue since only a narrow range of electrical fault protection is potentially degraded. An Unresolved Item (URI 97-02-05) will track future NRC reviews of VY staff actions to ensure resolution of any further electrical separation issues involving the AOG system, including an evaluation of the cause for this problem and an assessment of the adequacy of corrective actions. The performance history of the AOG system demonstrates the system's capability to comply with the applicable NRC and state effluent release regulations.

A number of plant design issues were identified during this inspection period requiring additional licensee action and inspector follow-up/verification of corrective action adequacy. Inspection follow items have been assigned to these issues, as annotated in the report.

#### Plant Support

Radiation worker and radiation protection staff performance associated with the free releasing of the Framatome bridge assembly was generally good, but some inattention with respect to the monitoring of the clean area boundary was noted.

On February 12, the licensee performed a practice emergency plan exercise for training purposes. The practice exercise involved participation by the local offsite emergency response organizations. The inspector observed the licensee's activities from the Technical

the rooms warmer whenever the plant is at power. (Reactor steam production is needed for these systems to operate). If condensation was to occur, it should be away from these rooms where the temperature is relatively lower.

Additionally, the licensee's preventive maintenance program includes the measuring of the insulation resistance for these affected motors. These measurements should provide an early detection of any insulation degradation. The test results and motor performance in the last seven years, after the space heaters were disconnected, have been acceptable. The motors that were part of the original plant equipment continued to function, as demonstrated in the surveillance tests, in its required service.

The primary safety function of the HPCI and RCIC systems is to mitigate a small break LOCA while the reactor coolant system pressure remains above the capability of low pressure safety injection systems. The HPCI and RCIC rooms should remain unchallenged during a design bases small break LOCA and therefore, these systems should be able to perform their prescribed safety function. In case of a large break LOCA, these systems are not credited and their contribution is insignificant in relation to the large volume low pressure safety systems required for accident mitigation.

In case of a HELB inside the reactor building, the credited systems are automatic depressurization, and "A" and "B" containment spray. More specifically, the HPCI and RCIC system motors are not relied on as the primary emergency core cooling systems when they are susceptible to degradation from the accident environment. Additionally, the demand for HPCI and RCIC is just after the accident and therefore the system should begin its function before any potential condensation could reach motor windings. This delay in environmental challenge to these motors would further reduce the possibility for condensation because of the motor heat-up from its operation. This is in agreement with the licensee's classification of these motors for equipment qualification.

The NRR inspector concurred with the prior regional assessment documented in inspection reports 96-09 and 96-06 that the motor heaters were not required for the HPCI and RCIC systems to perform their safety function.

c. Conclusions

The licensee has adequately addressed the issue regarding the absence of heaters for the motors of the HPCI and RCIC systems. The licensee's routine preventive maintenance program and the timeliness of any needed corrective maintenance provide reasonable assurance of continued operability of these components.

**E1.2 Plant and Electrical Power System**

a. Inspection Scope (37700)

The NRR inspector reviewed the advanced off gas (AOG) system and its associated electrical power, control, and instrumentation power supplies to verify that electrical protection and signal separation was in compliance with the Updated Final Safety Analysis Report (UFSAR) commitments.



b. Observation and Findings

The inspector examined drawing revisions that addressed the failure to follow wiring practices that could degrade the performance of circuit protective devices to promptly isolate electrical faults.

The VY AOG system design is unique to the nuclear industry. The system was designed through a contractor. During design improvement reviews performed between 1994 and 1995, the plant staff noticed that the panel wiring did not agree with the drawings. In a May 1995 memorandum, the licensee documented the completion of as-built drawing reviews and the return of system wiring to sound electrical wiring practices. The licensee identified four wiring errors in control room panel 9-50, where the neutral of the plant's instrument AC system was used as an electrical return path for the AOG system power sources.

In an October 8, 1996 memorandum, VY requested a re-review of the grounding and neutral connections in response to additional questions raised in this area and an event at the Palo Verde Nuclear Power Station involving a short circuit causing smoke in two fire zones. From this review and as documented by memorandum dated January 8, 1997, one more wiring deficiency involving crossing the neutral connection was found, along with other minor drawing errors. This crossing error involved connecting a non-safety control circuit neutral to a different non-safety AOG motor control center located in the same room.

The wiring errors identified were two kinds: (1) neutral side of power cables connected to the instrument AC system, and (2) neutral of the control wire connected to the neutral of an adjacent motor control center. The first kind of error could cause electrical pulses to travel onto an instrument bus and cause interference to sensitive instrumentation. The first and the second kind of errors degrade the fault isolation capability. If the neutral connection for the respective power source is not in the direct wiring, but through a different MCC or instrument bus and then through the plant ground to the respective MCC, the impedance in the circuit is increased in proportion to the length of the wire. This added impedance would reduce the fault current and could prevent or delay the protective device from clearing the fault. The potential problem with the medium to high impedance faults, on the wires that run between field equipment and control room panels, is that they could remain uncleared. The inspector determined that the low impedance type fault should not be a problem in the deficiencies identified.

The UFSAR, Section 8.4.6.6, "Intermixing of Cables," revision 12, states that "low-level instrumentation cables are routed in separate trays from control cables." These low-level cables are defined as anything carrying less than 50 volts. The electrical connection of neutrals between instrumentation and control cables invalidates the intent of the FSAR commitment in physical separation. The NRR inspector reviewed the plant trip history for the last 3 years, and did not reveal any questionable association with AOG system problems.

The licensee's focus on this electrical neutrals-to-ground mixing problem was limited to the AOG system. A root cause evaluation of this concern was not done, but the licensee initiated an evaluation prior to the completion of the inspector's onsite visit. The NRR

inspector's review concluded that the primary cause was that the licensee's contractor lacked knowledge in good wiring practices. Good wiring practices are essential to circuit protection to prevent the spread of electrical faults. Based on the inspector's inquiry, the licensee agreed to look into any of this contractor's work and later confirmed that the contractor did not work on any other non-safety related or safety related systems. The inspector also determined that the problems associated with the AOG system were not tracked through the present problem resolution (Event Report) process. Accordingly, an Unresolved Item (URI 97-02-05) has been assigned to ensure NRC follow-up review of the VY staff's action to conduct a root cause evaluation for these AOG system grounding issues and to ensure mixed grounding is not a broader concern to other systems in the plant.

c. Conclusion

The NRR inspector concluded that there is no immediate safety concern on this issue since only a narrow range of electrical fault protection is potentially degraded. An Unresolved Item (URI 97-02-05) will track future NRC reviews of VY staff actions to ensure resolution of any further electrical separation issues involving the AOG system, including an evaluation of the cause for this problem and an assessment of the adequacy of corrective actions. The performance history of the AOG system demonstrates the system's capability to comply with the applicable NRC and state effluent release regulations.

**E7 Quality Assurance in Engineering Activities**

**E7.1 Design Basis Documentation/Technical Specification Improvement Projects Issues**

The licensee's Design Basis Documentation (DBD) and ITS projects have the potential for identifying inconsistencies between the design, licensing, and operating bases of plant structures, systems, and components. Such inconsistencies will be documented in this section of the report and tracked to resolution as inspection follow items.

During the inspection period, the licensee identified the following issues:

Event Report 97-177, Use of the main station batteries standby charger "CAB".

VY has two trains of emergency electrical power, Division I and Division II. Each division includes a 125VDC main station battery (A-1 and B-1) and a dedicated battery charger (CA-1 and CB-1) which receives power from the AC portion of the division. A standby battery charger, CAB, can be connected to either battery, in the event that the dedicated charger fails or requires maintenance. Technical Specification 3.10.A.2.b allows the standby charger to be used indefinitely in place of either of the dedicated chargers. However, the standby charger can only be powered from one source, motor control center MCC-8B, which is a Division I electrical power source. If the standby charger was being used in place of the Division II dedicated charger and a loss of Division I AC power occurred, loss of both division DC systems would eventually occur due to inability to recharge either of the batteries. In response to this finding, the licensee instituted administrative controls to restrict the use of the standby charger with the Division II battery. (IFI 97-02-06)