



Interrogatory No. 2

Question:

2. Provide an estimate per event of the man-hours and cost of complying with the surveillance requirements which are proposed to be deleted.

Response:

Vermont Yankee objects to this interrogatory on the ground that the information sought is irrelevant to the admitted contention in this proceeding.

Interrogatory No. 3

Question:

3. Provide an estimate of the man-hours and cost to effect the proposed amendment. Include, but do not limit, costs to:
  - a. Costs to respond completely to all regulatory agencies and satisfy completely all regulatory processes.
  - b. Costs of all analyses.
  - c. Costs for modification of all documents.
  - d. Costs for modification of all plant procedures.
  - e. Costs for retraining of all personnel for modifications.

Response:

Vermont Yankee objects to this interrogatory on the ground that the information sought is irrelevant to the admitted contention in this proceeding.

Interrogatory No. 4

Question:

4. Discuss the cost effectiveness of the proposed amendment for the balance of plant life. Do not assume as cost, any instance of planned inoperability of components where surveillance can be doubled for requirements other than those proposed to be deleted by proper scheduling. Neither assume as cost any outage or shutdown as a result of the testing proposed to be deleted since identification of a subsystem which is on the verge of failure, while its redundant subsystem is inoperable, can only be considered a benefit.

Response:

Vermont Yankee objects to this interrogatory on the ground that the information sought is irrelevant to the admitted contention in this proceeding.

Interrogatory No. 5

Question:

5. Provide a legible set of Piping and Instrumentation Diagrams (P&ID's) for each system or subsystem which is affected by the proposed amendment.

Response:

The requested documents will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 6

Question:

6. Provide a legible set of One-line Wiring Diagrams for Station One-line, 4160 V Auxiliary One-line, Emergency 4160 V Auxiliary One-line, BOP 4160 V

Auxiliary One-line, and Emergency 480 V Auxiliary One-Line.

Response:

The requested documents will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 7

Question:

7. For each system or subsystem affected by the proposed amendment, provide a failure mode analysis showing each potential failure mode (passive and active) which would prevent the system from performing its safety function, and the consequences of such failure.

Response:

Failure mode analyses for the Core Spray and Diesel Generator systems are contained in the report entitled "Impact of Alternate Testing on Component and System Availability" submitted by Vermont Yankee on July 15, 1988 (hereinafter, the "Report"). The Report also sets forth the basis for the judgment of Vermont Yankee that the components of the other systems affected by the proposed amendment are sufficiently similar as to warrant extrapolation of the conclusions of the detailed studies of these two systems to the balance of the affected systems. However, no detailed failure mode analyses of the balance of the affected systems was performed or is available to Vermont Yankee.

Insofar as this interrogatory might be construed as calling for the development of such studies, Vermont Yankee objects to it on the grounds that (i) calls for original research projects are impermissible discovery<sup>1</sup> and (ii) the request would be unduly burdensome. It has been estimated for Vermont Yankee that the additional detailed failure mode analyses called for would require approximately 2 man-years to prepare and cost approximately \$250,000.

Interrogatory No. 8

Question:

8. For each system or subsystem affected by the proposed amendment, identify each active component or device necessary to perform the safety function of the system (include by special note, each component or device which becomes active only during the testing which is proposed to be eliminated). For each identified device or component, provide a table or computer printout of the following:
  - a. Mark number of system identification
  - b. Component or device name or description
  - c. Manufacturer/Supplier
  - d. Model Number
  - e. Safety Classification
  - f. Applicable Manufacturing Code
  - g. Applicable Environmental Qualification (IEEE-323) Report
  - h. Qualified Service Life (in both time and number of demands)

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<sup>1</sup>See, e.g., Pennsylvania Power & Light Co. (Susquehanna Steam Electric Station, Units 1 and 2), ALAB-613, 12 NRC 317, 334 (1980); Houston Lighting & Power Co. (South Texas Project, Units 1 and 2), LBP-80-11, 11 NRC 477, 478 (198).

Response:

The response to this interrogatory is presented in Attachment A to these answers.

Interrogatory No. 9

Question:

9. The Vermont Yankee submittal of December 7, 1987, proposes to amend the Bases of the Technical Specification by removing the present daily testing Basis and replacing it with:

"Assurance of the availability of the remaining systems is demonstrated by testing performed in accordance with the requirements of ASME Section XI. . ."

For each component or device tabulated in Interrogatory No. 7 above, identify the ASME Section XI reference which establishes test requirements.

Response:

This information is contained in, and can be extracted from, the document entitled "Inservice Testing Program, Revision 9" transmitted to the NRC Staff by letter of Vermont Yankee dated July 28, 1988 (FVY 88-63) and a copy of which was served upon the Board and parties to this proceeding by letter of counsel dated August 4, 1988.

Interrogatory No. 10

Question:

10. For each deleted or amended surveillance requirement proposed in the Vermont Yankee submittal dated December 7, 1987, provide the following "before and after" tabulation. A tabulation should be made for each Technical Specification Surveillance Section proposed for revision.
- a. Each component or device responsible for providing safety function (from Interrogatory No.

7 above) for this specific surveillance requirement.

- b. Surveillance frequency for each component listed in a. above which is proposed to be deleted.
- c. Surveillance frequency for each component in a. above without the surveillance requirement which is proposed to be deleted.
- d. Reference for the surveillance identified for c. above (Technical Specification Section, ASME XI IST Program Section).

Response:

The information requested by this interrogatory is contained in, and can be extracted from, the document referred to in the response to Interrogatory No. 9, together with the table contained in the application for the license amendment that is the subject of this proceeding (submitted by the letter of Vermont Yankee to the NRC dated December 7, 1988 (FVY 87-112) (hereinafter, the "Application")), together with the Vermont Yankee Technical Specifications sections referred to in the Application.

Interrogatory No. 11

Question:

11. Describe the availability of Manufacturer and Model Specific failure rate information for the components and devices affected by the proposed amendments. Identify any applicable industry reports. Provide copies of your correspondence with the suppliers identified in Interrogatory No. 7 above requesting Manufacturer and Model Specific failure rates, and their responses.

Response:

Vermont Yankee is not aware of any manufacturer and model-specific failure rate information for the components and devices affected by the proposed amendment that is in the public domain. Vermont Yankee does not possess or have access to any such proprietary information from individual manufacturers.

Some information can be gleaned from the Nuclear Plant Reliability Data System maintained by INPO. The information used in preparing The Report will be made available for inspection and copying at the offices of Yankee Atomic Electric Company, 580 Main Street, Bolton, Massachusetts, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 12

Question:

12. Identify any I&E Bulletins, Circulars and Information Notices, and any NRC Generic letter which are applicable to components and devices identified in Interrogatory No. 7 above (Manufacturer and Model Number, or similar models). Provide Vermont Yankee responses to identified items.

Response:

Vermont Yankee does not possess records listing closed I&E Bulletins, Circulars and Information Notices (i.e., such documents as to which Vermont Yankee's review, assessment and response (if any) has been completed) by the component affected. Consequently, compiling the information requested by this interrogatory would require original research among the set of I&E Bulletins, Circulars and Information Notices,



which documents are available to the Intervenor as public documents, and the burden of compiling which information would be essentially the same for the Vermont Yankee as for the Intervenor. (See Fed. R. Civ. P. 33(c).) Consequently, Vermont Yankee objects to this interrogatory for the reasons set forth supra at note 1.

The response submitted by Vermont Yankee to any I&E Bulletin, Circular or Information Notice will, upon the identification by the State of Vermont of any particular I&E Bulletin, Circular or Information Notice for which it wishes to inspect the response, be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 13

Question:

13. Provide a chronological identification of failures or reportable events in any of the systems or subsystems affected by this proposed amendment. For each item identified, provide the following:
  - a. Date of the Event
  - b. System
  - c. Event Report Number
  - d. Component or device (by mark number) responsible or affected by the event
  - e. Repair/Replacement time for the component or device responsible for the event

Provide a copy of each event report identified above.

Response:

Vermont Yankee does not possess records containing the information requested by Interrogatories Nos. 13 and 14 in readily available form. The information is contained in, and can be compiled and extracted from, voluminous plant records (which records will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, or Vermont Yankee Nuclear Power Station, Governor Hunt Road, Vernon, Vermont, depending upon the location of the records in question, at a date and time mutually convenient to counsel for the parties), and the burden of compiling and extracting the information would be essentially the same for Vermont Yankee as for the Intervenor. (See Fed. R. Civ. P. 33(c).) Consequently, Vermont Yankee objects to this interrogatory on the grounds (i) set forth supra at note 1, and (ii) on the grounds that the effort required to research the information requested by this interrogatory would be unduly burdensome. Vermont Yankee has estimated that compiling and extracting the information called for by this interrogatory would require approximately 0.5-0.75 man-years of effort and cost approximately \$60,000-\$90,000.

Notwithstanding and without waiving this objection, Vermont Yankee has compiled the requested information for the past 5 years, which is presented in Attachment B to these interrogatories.

Interrogatory No. 14

Question:

14. Identify the following for each proposed deletion of testing requirements:
- a. Number of anticipated (planned maintenance or repairs, etc.) instances in the life of the plant in which this testing requirement has been invoked.
  - b. Number of unanticipated (unplanned events) instances in the life of the plant in which this testing requirement has been invoked.

Provide event reports and all related documentation for these unanticipated events. Provide documentation from plant records (operator's logs, procedure checklists) which demonstrate the results of invoking these testing requirements.

- c. Number of instances in either group a. or b. above in which testing of alternate systems produced a failure and caused power reduction. Identify the date of occurrence and Event Report Number. Provide all related documentation, such as operational logs, procedure checklists, repair records, etc.
- d. Number of instances in either group a. or b. above in which the Limited Condition of Operation (LCO) time limit expired, and power reduction occurred. Identify the date of occurrence and Event Report Number. Provide all related documentation, such as operational logs, procedure checklists, repair records, etc.

Response:

Vermont Yankee does not possess records containing the information requested by Interrogatories Nos. 13 and 14 in readily available form. The information is contained in, and can be compiled and extracted from, voluminous plant records (which records will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Cor-

poration, Ferry Road, Brattleboro, Vermont, or Vermont Yankee Nuclear Power Station, Governor Hunt Road, Vernon, Vermont, depending upon the location of the records in question, at a date and time mutually convenient to counsel for the parties), and the burden of compiling and extracting the information would be essentially the same for Vermont Yankee as for the Intervenor. (See Fed. R. Civ. P. 33(c).) Consequently, Vermont Yankee objects to this interrogatory on the grounds (i) set forth supra at note 1, and (ii) on the grounds that the effort required to research the information requested by this interrogatory would be unduly burdensome. Vermont Yankee has estimated that compiling and extracting the information called for by this interrogatory would require approximately .5-.75 man-years of effort and cost approximately \$60,000-\$90,000.

Notwithstanding and without waiving this objection, Vermont Yankee has researched the requested information for the past 5 years in connection with its preparation of Attachment B to these interrogatories and provides the following information:

a. + b. During the period covered, the records reviewed revealed that alternate testing has been invoked 175 times. Vermont Yankee is unable to supply the disaggregation of this total requested by sub-parts a. and b. because (i) the interrogatory fails to define the classification requested with sufficient precision, (ii) because, insofar as

alternate testing might (under the existing provisions) be required on account of a maintenance decision, maintenance decisions can be too subjective to be readily classifiable in the manner suggested by this interrogatory, and the records reviewed do not permit such classification.

c. Of the instances referred to in the response to sub-part a., alternate testing "produced a failure and caused [i.e., the failure required under applicable guidelines] power reduction" 6 times.

d. Of the instances referred to in the response to sub-part a., no instance was discovered in which the "Limit[ing] Condition of Operations (LCO) time limit expired".

The documents reviewed for this project will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

#### Interrogatory No. 15

##### Question:

15. How are the testing requirements which are proposed to be deleted presently incorporated into plant procedures? Identify and provide copies of all operating, maintenance, emergency and/or other procedures incorporating these test requirements.

##### Response:

The VYNPS Technical Specifications, in their present form, dictate when alternate testing is required. The

procedures to be used for conducting the tests are contained in the appropriate test procedures, which, with the exception of diesel generators, are the same as the procedures employed for conducting routine surveillance tests. (For diesel generators, the alternate tests consist of one hour in lieu of eight hour runs.)

The documents requested by this interrogatory will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 16

Question:

16. Describe the anticipated surveillance and maintenance activities of the components affected by this proposed amendment. Specifically:
  - a. What is the maintenance frequency of each component?
  - b. How is the maintenance scheduled?
  - c. How often does the testing the alternate system requirement come into effect?
  - d. What, if any, verification and surveillance of the alternate system takes place before taking a component out of service for maintenance?
  - e. Is this pre-maintenance surveillance required by Technical Specifications? If so, identify the references.
  - f. Is this pre-maintenance surveillance covered in maintenance and operation procedures? If so, provide copies of the procedures and identify the applicable section(s).

- g. Provide all checklists and maintenance records since the last scheduled outage for the components and devices affected by this request.

Response:

a. + b. Maintenance frequency and schedule varies depending upon any one or more of the following factors:

Vendor recommendations.

Shift supervisor and plant management judgment.

Location of components.

Severity of the condition of components.

Time of the year (i.e., winter or summer).

Time into the operating cycle.

Other equipment out of service.

Scheduled outages.

Maintenance history of components.

Consequently, fixed answers by components cannot be given.

c. Alternate testing is performed whenever one of the components listed in the response to Interrogatory No. 8 is inoperable.

d. Per VYNPS Procedure AP-0025, the shift supervisor determines what verification or surveillance, if any, will be performed prior to a component or system being removed from service for maintenance. This decision is based on one or more of the following factors:

Shift supervisor evaluation of the situation.

When the last surveillance or testing was performed.

Duration of the maintenance.

Other Technical Specification equipment that may be out of service.

e. No.

f. + g. Procedure AP-0025 and the documents requested by sub-part g. will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 17

Question:

17. The Vermont Yankee submittal of December 7, 1987, proposes to amend the Bases of the Technical Specification by removing the present daily testing Basis and replacing it, in part, with:

Assurance of the availability of the remaining systems is demonstrated by . . . verifying the system is in an operable status."

- a. Describe the bypassed and inoperable status indications available to the control room operator for each system or subsystem affected by the proposed amendment.
- b. Describe the degree of compliance with Regulatory Guide 1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems."
- c. If manual operations or actions (movement of toggle switches, etc.) are necessary for the systems or subsystems affected by the proposed amendment, provide copies of procedures controlling those who must take those actions.
- d. Identify any instance in the life of the plant in which bypassed and inoperable status indication has not been set correctly. Provide all related documentation.
- e. The subject of bypassing safety systems is identified as an area of concern in NUREG-1251, "Implications of the Accident at Cher-



nobyl for Safety Regulation of Commercial Nuclear Power Plants in the United States," August 1987. In the report Section 1.3.2, it is stated,

"The current effort under way at NRC to revise RG 1.47 was recommended in NUREG/CR-3621 . . . [which] identifies some of the tasks associated with monitoring the status of bypassed safety systems (e.g., updating status boards and determining system status during all modes of operation) which are prone to human errors. These human factors considerations are being reviewed for possible inclusion in RG1.47."

Describe Vermont Yankee's awareness of and involvement with this NRC program.

- f. Discuss why Vermont Yankee believes it to be prudent to alter the present safety Basis of the plant to a Basis which is currently an NRC concern and being revised.

Why would it not be more prudent to withdraw the present request until the Bypassed and Inoperable Status Indication issue is resolved?

Response:

a. VYNPS control room operators have available for their use a number of indications for determining the bypassed and inoperable status of systems, sub-systems or components affected by the proposed amendment. These include:

1. Individual component status lights, which may be red, green or (in some cases) amber, located in the control room and providing information on position and power availability.

2. Automatic alarms sounding in the control room provide a wide range of indication, the bulk of which is used in determining operability status.
3. Procedure AP-0140 ("Switching and Tagging Procedure") is used, in conjunction with the requirement of shift supervisor permission, to control the system and component status and maintenance done on any VYNPS system. The tags employed give direct indication to control room operators of individual component status and the status of the system.
4. Procedural controls and operating practices require that the shift supervisor be informed and give permission for working on any plant equipment.
  - b. Regulatory Guide 1.47 has not been committed to by Vermont Yankee and is not part of its regulatory basis. Consequently, Vermont Yankee does not possess any readily available study of the degree to which, were it applicable, the guidelines of Reg. Guide 1.47 would be met. Vermont Yankee objects to this interrogatory to the extent that responding to it would require original research, for the reasons set forth at note 1, supra. The methods utilized to monitor the status of bypassed and inoperable equipment are described in the response to sub-part a.
  - c. Vermont Yankee does not comprehend what information is being requested by this interrogatory, and consequently cannot respond to it.

d. Vermont Yankee objects to this interrogatory on the same grounds as are stated above in response to Interrogatories Nos. 13 and 14, and on the further ground that the interrogatory does not provide a sufficiently precise engineering definition to permit a categorical response. Notwithstanding and without waiving this objection, Vermont Yankee has researched this information for the last 5 years during the process of preparing Attachment B to these interrogatories, and provides the following information:

1. While there have been instances involving calibration errors and literal non-compliance with tagging requirements, no instance where system unavailability could only have been determined by alternate testing was detected, and the answer to the question, as most likely intended, is therefore "None."
2. The documentation reviewed for this project is provided in a prior response.
3. The intervenor may wish to refer to LER's 83-32 and 84-05.

e. Vermont Yankee is generally aware of the on-going NRC program referred to. It is not involved in any way in that program.

f. Vermont Yankee objects to this interrogatory, on the grounds (i) that as phrased is it mere argument and not a request for information, and hence is not a proper use of the

discovery provisions of the Commission's Rules of Practice, and (ii) that the information called for is irrelevant, in that the standard for approving or disapproving this amendment is whether it conforms to the Commission's regulations, not whether it is "prudent." Notwithstanding and without waiving this objection, Vermont Yankee points out (i) that the basis for proposing this amendment is the fact that implementation of the amendment will eliminate testing that is both unnecessary and a contributor to the unavailability of the affected safety systems, and (ii) contrary to the implicit assumption of this interrogatory, reference to control room status indicators is not the only effort taken by Vermont Yankee to verify the operability of redundant systems in the event of the unavailability of a system train. As a consequence, the desirability of this amendment is, in Vermont Yankee's judgment, not dependent upon any outcome that might someday eventuate from Staff consideration of possible amendments to Reg. Guide 1.47.

Interrogatory No. 18

Question:

18. Why are the Surveillance Sections of the Technical Specifications which are proposed to be deleted not replaced with statements requiring operators to verify immediately the operability status of the redundant system?

Response:

Vermont Yankee believes that, perforce the provisions of the Technical Specifications establishing LCOs, the operators

are required to be continuously cognizant of the status of the systems referred to, whether or not an event that heretofore has triggered alternate testing requirements has occurred. Vermont Yankee therefore believes that the additional language suggested by this interrogatory would be, at best, mere surplusage, and that it might possibly be misleading.

Interrogatory No. 19

Question:

19. On July 15, 1988, Vermont Yankee responded to an NRC request for additional information by submitting the report, "Impact of Alternate Testing on Component and System Availability (hereinafter called "The Report")."
  - a. Indicate who prepared "The Report," Pickard, Lowe and Garrick, Inc., or Yankee Atomic Electric Company. Indicate the relationship between Yankee Atomic Electric Company and Pickard, Lowe and Garrick, Inc.
  - b. "The Report" is a document which affects quality and safety, falling under the requirements of 10 CFR 50, Appendix B, Section VI, "Document Control," which states that such documents must be "reviewed for adequacy and approved for release by appropriate personnel." However, "The Report" provides no indication of review or approval. Provide documentation demonstrating that such review and approval took place, including the names of all reviewers and approvers; and copies of review, comment and approval copies from all reviewers and approvers.
  - c. Provide a copy of the Quality Assurance procedure governing the preparation, review and approval of "The Report."
  - d. Identify the qualifications of all preparers, reviewers and approvers, and specifically their background and experience in the preparation of PRA analyses.

Response:

a. The report was prepared by personnel from Yankee Atomic Electric Company (YAEC) and Pickard, Lowe and Garrick, Inc. (PLG). The relationship between YAEC and PLG was that of two independent contractors working together under the direction of Vermont Yankee Nuclear Power Corporation.

b. Vermont Yankee's request to change the Technical Specifications regarding alternate testing was submitted on December 7, 1987 and contained the licensee's conclusion that the proposed change did not involve an unreviewed safety question as described in 10 C.F.R. § 50.59. During NRC's review of this proposed change, supplemental information was requested of the licensee in the form of "additional information to complete our (NRC) review." "The Report" was prepared in response to this request and provided a quantitative basis documenting the conclusion in the amendment request that removing the current alternate testing requirement results is a measurable plant safety enhancement. This supplemental information provided in response to an NRC question, supports a prior Vermont Yankee determination and is therefore not a design record as defined by 10 C.F.R., Part 50, Appendix B and the Vermont Yankee Quality Assurance Program. Therefore, the Vermont Yankee Quality Assurance Program was not required to be applied to "The Report." The premise in this question is therefore not true and this question cannot be answered.

- c. See response to Interrogatory No. 19(b).
- d. This information is provided in the table constituting Attachment C to these answers.

Interrogatory No. 20

Question:

- 20. Section 5.2.1 of "The Report," as well as Sections 5.2.2 and 6.2, and Appendix C, make reference to 'Reference 4' for generic input data. Section 11 identifies Reference 4 as Pickard, Lowe and Garrick, Inc., "Probabilistic Risk Assessment Data Base for Light Water Reactors," PLG-0500, August 1988.
  - a. How can "The Report," submitted on July 15, 1988, use a reference published in August 1988?
  - b. Since PLG-0500 is used as basis for safety-related conclusions, it appears it should also meet 10 CFR 50, Appendix B, Section VI, Document Control requirements. Provide an indication of the level of Quality Assurance associated with the preparation of PLG-0500. Has Yankee Atomic audited this area of PLG's work?
  - c. Indicate the level of review of PLG-0500 by Yankee Atomic personnel.
  - d. Provide a copy of Reference 4.

Response:

- a. By oversight, the words "expected publication" were omitted before the date of August, 1988.
- b. Inasmuch as this question is founded upon a premise that is not true, it cannot be answered. See the answer to Interrogatory No. 19(b).
- c. Data from the PLG data base, which will be documented in PLG-0500, that was used in The Report was reviewed

by Yankee Atomic Electric Company for reasonableness and applicability. This review was based on experience and engineering judgment.

d. At the time The Report was issued, PLG-0500 was expected to be published in August, 1988; see the response to sub-part a. Publication has not yet occurred, and therefore a copy of PLG-0500 cannot be provided. Actual data values used in The Report are provided in The Report.

Interrogatory No. 21.

Question:

21. Several areas of "The Report" should have references added:
  - a. At page 1, line 1, identify a reference for "the Vermont Yankee Inservice Testing Program," and provide a copy.
  - b. At pages 6, 7, 27 and 28, references are not provided for equations. Identify the references and provide copies.

Response:

a. The document referred to is "Inservice Testing Program, Revision 9" transmitted to the NRC Staff by letter of Vermont Yankee dated July 28, 1988 (FVY 88-63) and a copy of which was served upon the Board and parties to this proceeding by letter of counsel dated August 4, 1988.

b. The equation on page 6 can be found in NUREG-0492, "Fault Tree Handbook."

The equation on page 7 is derived on page 7, based on the definition of a mathematical integral.

The equations on page 27 are definitions.



The equation on page 28 is derived based on the text and equations on pages 26 and 27.

Interrogatory No. 22

Question:

22. At page 1, lines 20-22 of "The Report" it is indicated, "Analyses were performed to quantify the impact of alternate testing on the availability of affected systems. The report presents the results of these analyses." Provide copies of these analyses and all supporting information.

Response:

The requested documents will be made available for inspection and copying at the offices of Yankee Atomic Electric Company, 580 Main Street, Bolton, Massachusetts, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 23

Question:

23. At page 1, line 5 of "The Report" it is stated, "Most other Boiling Water Reactors (BWR) do not have these alternate testing requirements, since alternate testing is not part of the BWR Standard Technical Specification."
- a. In order to make this statement, the testing requirements for all other BWRs must have been reviewed. Based on this statement, identify all BWR plants which have any part of the testing proposed to be eliminated which is more stringent than the Vermont Yankee proposal.
- b. Provide a tabular review of the BWR Standard Technical Specifications comparing (for each surveillance test proposed for elimination):
- 1) Vermont Yankee LCO "out of service times" before power reduction with those from the Standard Technical Specifications.

- 2) Any areas where the standard Technical Specifications require testing upon a "component out of service" which are not included in the Vermont Yankee proposal.
- c. Provide justification for any item in part b. above in which the Standard Technical Specification is more stringent than Vermont Yankee proposal. If there are either LCO or Surveillance Testing requirements which are more restrictive in the Standard Technical Specifications, explain what is meant by the statement in the Vermont Yankee proposal letter of December 7, 1987, at page 3, paragraph 3, "The change is . . . consistent with the testing requirements contained in the BWR Standard Technical Specifications."

Response:

a. Noting that the statement by which this interrogatory is preceded is true neither as a matter of fact nor logic, Vermont Yankee is aware of no such plant.

b. Vermont Yankee does not have the information called for by this information in any compiled form. However, the information called for by this interrogatory is contained in, and can be extracted and compiled by comparison of, the BWR Standard Technical Specifications, which is a publicly available document, and the Vermont Yankee Technical Specifications, of which the Intervenor is believed to have a copy and which will be provided for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel for the parties. The burden of extracting and compiling the information from these documents would be essentially the same for Vermont Yankee as for the

Intervenor. (See Fed. R. Civ. P. 33(c).) Consequently, Vermont Yankee objects to this interrogatory on the ground set forth supra at note 1.

- c. See response to Interrogatory No. 23(b).

Interrogatory No. 24

Question:

24. In Attachment 1 to the Vermont Yankee proposal of December 7, 1987, it is reasoned that daily surveillance should not be performed based on the increased chance of component failure or degradation due to testing. It is further mentioned in "The Report" at page 4, "Reduced reliability due to equipment degradation from excessive testing."
- a. What is considered to be "test degradation?" Is it failures caused by the testing or is it the increased potential for demand failures required from misalignment in the event of an accident?
- b. For each system or subsystem affected by this proposed change, discuss whether design changes are possible or desirable to allow the required testing to be accomplished safely.
- c. IEEE-323 and Regulatory Guide 1.89 require that safety-related electrical equipment and components are tested to the environment and service conditions in which they are expected to function. For each component identified in Attachment 1 of Vermont Yankee letter, December 7, 1987, provide copies of the applicable Environmental Qualification test reports and identify a section reference in the report which indicates how this surveillance testing has been taken into account in the qualification.
- d. Discuss why a requirement to be at HOT SHUTDOWN within 12 hours of an inoperable redundant component is not a more prudent action to protect public safety since it is stated that the testing presently required is unsafe.

Response:

a. "Test degradation" refers to component wear or damage that occurs as a result of a test demand. Degradation that is repaired after the test is referred to as "test-related failure" and is considered in the analysis presented in The Report. Degradation that does not manifest itself as failure and is not repaired after the test is the "test degradation" referred to on page 4 of The Report.

b. Vermont Yankee does not understand what the proponent of this information means by the phrase "to be accomplished safely," and does not understand what the design goals would be, and consequently does not understand what is requested by this interrogatory.

c. Vermont Yankee is unaware of an connection between the testing required (if any) to establish the environmental qualification of electrical equipment and the alternative testing requirements that are the subject of this amendment, and consequently Vermont Yankee does not understand what information is sought by this interrogatory. Vermont Yankee will make the Environmental Qualification reports for any component available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, or such other place as such reports may customarily be kept, at a date and time mutually convenient to counsel for the parties and upon specification by the

Intervenor of the component for which it wishes to inspect the Environmental Qualification report.

d. Vermont Yankee objects to this interrogatory on the ground that, as phrased, it is not relevant to the admitted contention in this proceeding. Notwithstanding and without waiving this objection, Vermont Yankee provides the following information:

As Vermont Yankee understands this interrogatory, it asks why any form of continued operation of the plant following the unavailability of one train of a redundant system should be countenanced, that is to say, why should not all Limiting Condition of Operations ("LCOs") be zero as a matter of regulatory policy? As it thus understands the question, Vermont Yankee does not believe that it has anything to do with the conformity of the proposed amendment to the Commission's Regulations, or with the desirability of the pending amendment. Without regard to anyone's view of the comparative desirability of zero period LCOs as a matter of policy, approval of the pending amendment makes sense because it would eliminate testing that is both unnecessary and a contributor to the unavailability of the systems being tested. As for the judgment that permitting the continued operation of a plant following the loss of a redundant train, for a limited time, both sound engineering judgment and history lead to the conclusion that the percentage of the time of one-train unavailability that the second train is also un-

available is very low, and the percentage of the time that any system may be called upon to ensure the public safety is also very low. The compound probability of both conditions is, therefore, even lower. On the other hand, requiring unnecessary plant shutdowns is costly to society, both in economic terms and in terms of unavailable power (or demands upon finite sources of power), and such shutdowns pose their own potential challenges to plant systems. Consequently, Vermont Yankee believes that the judgment inherent in the regulatory philosophy that this interrogatory questions is that the risk that might be avoided by the alternative philosophy that this interrogatory may be advocating is far outweighed by the costs and risks of that alternative philosophy.

Interrogatory No. 25

Question:

25. At page 6 of "The Report," it is indicated that the linear approximation is valid only when the condition is met that the failure rate-time product is 'much less' than 1. At page 7, the same condition applies, although it is not stated. However, for the failure rate data provided on pages 31 and 32, and the time periods graphed on pages 34 through 38, it appears this condition may not always be satisfied. Describe how the results of the analysis would change if the failure rate-time product approaching 1 were taken into account.

Response:

The function  $[\lambda]t$  is an approximation to the function  $1 - e^{-[\lambda]t}$ . At  $t = 0$ , both functions give the same value (zero). As  $t$  increases, the value of  $[\lambda]t$  is

always greater than the value of  $1-e^{-[\lambda]t}$ . Thus, use of the function  $[\lambda]t$  to approximate  $1-e^{-[\lambda]t}$  will overestimate the unavailability due to time-related failures. Use of the function  $1-e^{-[\lambda]t}$  would change the results by reducing time-related failures. This produces an even larger gain in availability due to eliminating daily alternate tests.

Interrogatory No. 26

Question:

26. At page 8 of "The Report," the second example indicates that the valve which fails the test would be declared inoperable and repaired.
- a. Why should it not rather read that, if the valve fails the test, the unit is brought to a safe shutdown condition?
  - b. If it is the practice to attempt repair when both redundant trains are inoperable, provide a comparison between Vermont Yankee and BWR Standard Technical Specifications of the time allowed for this repair before LCO shutdown is required. Provide this comparison for each surveillance test which is proposed for deletion or modification.
  - c. Provide an explanation and basis if, for any system, the comparison indicates the BWR Standard Technical Specification is more restrictive than the Vermont Yankee Technical Specifications.

Response:

- a. The second example on page 8 of the report was intended to illustrate the definition of test-related failure. If a valve fails a test, the subsequent action depends on the Technical Specification requirements.

Technical Specifications do not require the unit to be brought to shutdown whenever a valve fails a test.

b. Such is not the practice. Initiation of an "LCO shutdown" is required at VYNPS whenever redundant trains are inoperable, and this requirement will not be changed by the proposed amendment.

c. No answer required.

Interrogatory No. 27

Question:

27. The anomaly presented in the graphs on pages 34, 43 and 45 of "The Report" is purely a function of the attempt to repair while both redundant trains are inoperable instead of bringing the plant to an immediate safety shutdown condition. This is confirmed by statements in Sections 5.3.1 and 7.0 of "The Report." This is an anomaly because it seems to indicate it is more desirable to not discover a failure by testing (if the failure is to occur on the next demand), but rather to discover it in an accident event if one were to occur. The anomaly is removed from the results if it is assumed the plant immediately proceeds to safe shutdown instead of repair.
- a. Describe how shutdown situations are treated in the analyses described by "The Report." If the repair period extends beyond the LCO limit, how is this accounted for? Does your analysis account for unavailability because the plant is in an outage?
  - b. Provide the graphical representations on pages 34, 43 and 45, assuming immediate shutdown instead of repair. For this analysis, to assure conservatism, choose and justify a minimum value for Demand Failures and a maximum value for time-related failure rate.
  - c. Comparing the results from part b. above with the graphs on pages 34, 43 and 45, discuss the prudence [sic] of a policy of proceeding immediately to safe shutdown.



- d. If a failure is to occur on the next demand (and the redundant train is inoperable), is it more desirable to discover this by test or in an emergency situation?

Response:

a. A shutdown LCO is entered whenever two ECCS subsystems are declared inoperable. The LCO requires that the unit be in shutdown within 24 hours. Repair times used in the report on page 32 are less than 24 hours. Thus, although the Technical Specifications would allow an unavailability for up to 24 hours, the analysis limited the unavailability to the repair duration.

No unavailability was considered after the plant was shut down.

b. As discussed in Part a above, the analysis in the report already considered the Technical Specifications for shutdown given that two ECCS subsystems are declared inoperable. Since no change in the duration of the Technical Specification shutdown LCO is being sought by this amendment, further analysis discussing different shutdown LCO durations is not meaningful.

c. As discussed in Part b above, discussions of the shutdown LCO duration is not meaningful.

d. The report assumes that the demand-related failures are random. Thus, the probability that a demand-related failure will occur on the next demand is assumed to be the same as the probability that a demand-related failure will occur on the second or third or fourth or the  $n^{\text{th}}$  demand.

Thus, for demand-related failures, the probability of failure upon an actual accident demand is the same before and after the test (or after repair if a demand-related failure occurred at the test).

If a failure is to occur on the next demand, then by definition, the probability of a demand-related failure is 1.0 for the next demand, and some other value for subsequent demands.

This is inconsistent with the random nature of a demand-related failure as applied in the report. Thus, the appropriateness of testing given a demand failure probability of 1.0 is not meaningful.

Interrogatory No. 28

Question:

28. Discuss how the inoperable state of the standby Liquid Control System which existed from July 11, 1984 to February 8, 1986, is taken into account in the analysis described in "The Report."

Response:

The interrogatory refers to the SLC System "Squib" (explosive) valves, which failed to detonate during annual surveillance testing. Detonation of the squib valves is not (and could not be) within the scope of alternate testing, and this failure, therefore, is not within the scope of the testing to be deleted by the proposed amendment. The Report is limited specifically to the testing to be deleted by the proposed amendment, and conceptually to testing capable of being performed while the reactor is operating. Detonation

of the squib valves, therefore, is not, could not be, and should not have been "taken into account" by the Report.

Interrogatory No. 29

Question:

In Section 8.0 of "The Report," it is indicated:

"The identification of potential common cause component groups and development of procedures to systematically evaluate events for the root causes and coupling mechanisms is an effective method for minimizing the occurrence of unanticipated multiple failures."

For the life of the plant, tabulate each potential common cause which has been identified by your procedures. Include date, descriptions, and event reports numbers. Provide a copy of all event reports identifying common causes.

Response:

Vermont Yankee objects to this interrogatory on the same grounds as are stated above in response to Interrogatories Nos. 13 and 14. Notwithstanding and without waiving this objection, Vermont Yankee has researched and provide this information for the last 5 years during the process of preparing Attachment B to these interrogatories, and provides the following information:

Potential common cause events are evaluated by one or more of the following methods:

Investigation and follow-up of a Potential Reportable Occurrence" and resulting "Licensee Event Report" by engineering personnel (Procedure AP-0010).

Review and follow-up of the periodic review of equipment history by maintenance personnel (Procedure AP-0200).

Investigation and follow-up by the shift supervisor and associated maintenance personnel.

Only the first two methods are formally documented in plant records. LERs 84-22, 86-04, PROs 88-34 and 88-60, and certain AP-0200.03 forms have been determined to be potentially responsive to this interrogatory and these documents will be made available for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel in this proceeding.

Interrogatory No. 30

Question:

30. In EPRI NP-5475, "Identification and Classification of Technical Specification Problems," December 1987, the statement is made in Section 4.2, Implications for the Use of Risk Based Methods in Technical Specification Improvement:

"There are at present no generally accepted means of directly associating levels of risk and risk changes with the requirement of any technical specification."

Why it would not be more prudent to withdraw the present amendment at this time pending establishment by the Industry of "generally accepted means," endorsed by the NRC?

Response:

Vermont Yankee objects to this interrogatory on the ground that it is not relevant to the admitted contention in this proceeding, which is to be decided on the basis of whether the proposed amendment conforms to the Commission's Regulations and not whether someone might think it prudent to withdraw it. Notwithstanding and without waiving this objection, Vermont Yankee provides the following information:

The statement:

"There are at present no generally accepted means of directly associating levels of risk and risk changes with the requirements of any Technical Specification."

refers to quantitative levels of absolute risk and quantitative changes in risk. It reflects the lack of established numerical criteria for acceptable risk, even though levels of risk and changes in risk can be calculated numerically.

Note that the following is also stated in Section 4.2, EPRI NP-5475:

"At present, the most objective and direct means available for assessing the public safety impact of Technical Specifications is the use of risk-based methods."

The strength of these risk-based methods is their ability to perform relative comparisons. That is, will a given change increase or decrease safety? When the results show a safety benefit, which is consistent with engineering judgment and experience, then Vermont Yankee believes it is prudent to proceed with the change.

Interrogatory No. 31

Question:

31. Demonstrate that the "out-of-service times," during which it is proposed not to verify redundant subsystem availability by test, do not cause unnecessary risk to public health and safety and the environment.

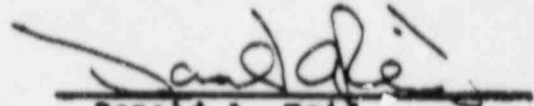
Response:

This demonstration is contained in the Report.

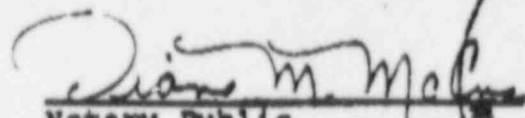
To: Bob Gad ①  
7 Pages

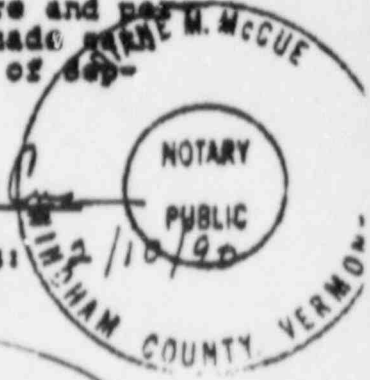
**Signatures**

Donald A. Reid, being first duly sworn, states that the foregoing answers are true, except insofar as they are based on information that is available to Vermont Yankee but not within his personal knowledge, as to which he, based on such information, believes them to be true, this 19<sup>th</sup> day of September, 1988.


  
Donald A. Reid

Then personally appeared Donald A. Reid, before and personally known to me, who, being first duly sworn, made that the foregoing statement is true, this 19<sup>th</sup> day of September, 1988.

  
Notary Public  
My Commission expires:



As to objections:

  
R. F. Gad III  
Ropes & Gray  
238 Franklin Street  
Boston, Massachusetts 02110  
(617) 423-6100

ATTACHMENT A

COMPONENT	MANUFACTURER/ SUPPLIER	MODEL NO.	SAFETY CLASS
P46-1A(1B)	Bingham	Motor 5K6329XL5A Pump Type CVDS	2
CS-5A(5B)	Walworth Reliance Phil Gear Corp.	5206-WE Frame K48 SMB-000	2
CS-12A(12B)	Walworth Reliance Phil Gear Corp.	527 7PSB-WE 215R2/215TR2 SMB-2	1
CS-11A(11B)	Walworth Reliance Phil Gear Corp.	5247-WE Frame 215R2 SMB-2	2
CS-26A(26B)	Walworth Reliance Phil Gear Corp.	A-5798-M-38 Frame P-86 SMB-1	2
HPCI Pump	Byron Jackson	10x12x15 DVMX 12x14x23 DVS	2
Turbine Stop Valve	Schutte & Koerting	68-XC-71	2
Turbine Control Valve	Robert Shaw	E-9803-62	2
HPCI 14	Walworth Peerless Phil Gear Corp.	Frame D5224B SMB-3-80	2
HPCI-50A	AFC Industries	73-53-3 DH	2
HPCI-25	Walworth Peerless Phil Gear Corp.	A-9533-11-58C Frame 0202G SMB-1	2
HPCI-19	Walworth Peerless Phil Gear Corp.	Frame D22SN SMB-4	2

COMPONENT	MANUFACTURER/ SUPPLIER	MODEL NO.	SAFETY CLASS
HPCI-20	Walworth Peerless Phil Gear Corp.	5247 PS-WE Frame D22SN SMB-4	2
HPCI-21	Walworth Peerless Phil Gear Corp.	Frame D2918 SMB-3	2
HPCI-24	Walworth Peerless Phil Gear Corp.	5247 PSB-HE Frame D201G SMB-1	2
HPCI-57,58	Walworth Peerless Phil Gear Corp.	334384 Frame D564 Frame D56H SMB-1	2
HPCI-17	Walworth Reliance Phil Gear Corp.	5202-WE Frame R56 SMB-0	2
HPCI-42,43	AFC Industries	70-18-1 DRTFS RS-192794	0
HPCI-39,40	Black, Siralls & Bryson		0
HPCI-53	AFC Industries	70-18-1 DRTFS	2
HPCI-54	Black, Siralls & Bryson		2
REF-2A(2B)	Chicago Blower Allis Chalmers	2T-10-12	2
SB-4A(4B)	Dynatrol Robot Arm Actuation	00616-1	2
SB-5	Dynatrol Robot Arm Actuation	00616-6	2
SGT-1A(1B)	Dynatrol Robot Arm Actuation	00616-4	2



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COMPONENT	MANUFACTURER/ SUPPLIER	MODEL NO.	SAFETY CLASS
SGT-2A(2B)	Dynatrol Robot Arm Actuation	00616-5	2
SGT-3A(3B)	Dynatrol Robot Arm Actuation	00616-7	2
P7-1A,B,C,D	Byron Jackson Westinghouse	18 KXH Frame 509 P24	3
#1 Fan, West Tower	Fluor Products Westinghouse	28-6 Frame D135 PWO-35 (Gear)	3
RSW 89A/B	Walworth Reliance Phil Gear Corp.	45336-4 B/M 535759 Frame 213R2 SMB-2	3
P8-1A,B,C,D	Byron Jackson Westinghouse	Frame 5885 P30	3
DQ-1-1A (1B)	Fairbanks/Morse	38TDS-1/8	2 & 3
P92-1A(1)	Tuthill Co.		3
RHR-38A/B	Walworth Reliance Phil Gear Corp.	Frame L1 SMB-00	2
RHR-34A/B	Walworth Reliance Phil Gear Corp.	10 Glob CS Frame T56 SMB-2	2
RHR-28A/B	Walworth Reliance Phil Gear Corp.	Frame T56 SMB-0	2
RHR-31A/B	Walworth Reliance Phil Gear Corp.	Frame T56 SMB-0	2

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COMPONENT	MANUFACTURER/ SUPPLIER	MODEL NO.	SAFETY CLASS
RHR-39A/B	Walworth Peerless Phil Gear Corp.	12 GATE CS Frame P12M SMB-0	2
RHR-16A/B	Walworth Reliance Phil Gear Corp.	102430 Frame L56 SMB-00	2
RHR-65A/B	Walworth Reliance Phil Gear Corp.	5281-WE Frame 256 UR4 SMB-A	2
RHR-15A,B,C,D	Walworth Reliance Phil Gear Corp.	33438-4 Frame P56 SMB-2	2
RHR-13A,B,C,D	Walworth Reliance Phil Gear Corp.	33438-4 Frame P56 SMB-2	2
RHR-183	Walworth Reliance Phil Gear Corp.	33438-4 Frame P56 SMB-0	2
RHR-184	Walworth Reliance Phil Gear Corp.	33438-4 Frame P56 SMB-0	3
RHR-66	Walworth Reliance Phil Gear Corp.	4 GATE CS Frame K48 SMB-000	2
RHR-57	Walworth Reliance Phil Gear Corp.	338622P Frame DG56D SMB-00	0
RHR-27A/B	Rockwell Elec. Apparatus Co. Phil Gear Corp.	714BJHY Frame C256Y SMB-4T	1
RHR-25A/B	Walworth Reliance Phil Gear Corp.	C45215 Frame 2544R3 SMB-3	1

COMPONENT	MANUFACTURER/ SUPPLIER	MODEL NO.	SAFETY CLASS
P10-1A,B,C,D	Bingham GE Tricolad	16x18x26 CV1C Frame 6346 P42	2
P45-1A(18)	Union Pump Co. GE Tricolad	Triplex Pos. Disp. Frame 325Y	2
RCIC-1	Gimpe <sup>1</sup>	80-13738-A	2
RCIC-12	ACF Industries	70-14-2-RH	0
RCIC-13	ACF Industries	70-14-2-RH	0
RCIC-20, 21	Walworth Peerless Phil Gear Corp.	A9491-M-102F Frame D56C SMB-00	2
RCIC-30	Walworth Peerless Phil Gear Corp.	A-9533-M-5-E Frame D56F SMB-0	2
RCIC-132	Dresser Reliance Phil Gear Corp.	7150W <sub>1</sub> Frame D56 SMB-00	2
RCIC-27	Dresser Reliance Phil Gear Corp.	7150W <sub>1</sub> Frame D56 SMB-00	2
RCIC-131	Walworth Peerless Phil Gear Corp.	C-44099 Frame DQ56D SMB-00	2
RCIC-32	Black, Stralls & Bryson	70-18-1 DRTS	2
RCIC-34	Black, Stralls & Bryson	70-18-1 DRTS	0
RCIC-35	Black, Stralls & Bryson	70-18-1 DRTS	0
RCIC-18	Walworth Peerless Phil Gear Corp.	A-7588-M-164D Frame D56A SMB-00	2

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COMPONENT	MANUFACTURER/ SUPPLIER	MODEL NO.	SAFETY CLASS
RCIC-41	Walworth Peerless Phil Gear Corp.	5206-WE Frame D66A SMB-000	2
RCIC-39	Walworth Peerless Phil Gear Corp.	5206 WE Frame D56A SMB-00	2
P47-1A	Bingham	4x6x9B MSD 5STG	2
UPS	Exide	UPS 480/250 P3 -277/480 Special	

- Note:
1. The specific manufacturing code applicable to these components at the time they were specified is not readily available without substantial effort. Vermont Yankee will make the documents from which such information can be extracted available for inspection at the offices of Yankee Atomic Electric Company, 580 Main Street, Bolton, Massachusetts, upon the specification of any particular component or components.
  2. The applicable Environmental Qualification Reports will be available in the Document File at Vermont Yankee on Factory Road, Brattleboro, Vermont.
  3. All components are generally designed for a service life of 40 years unless specifically stated otherwise in the Environmental Qualification Reports.
  4. None of the above components "becomes active only during the testing which is proposed to be eliminated."

To: Bob Gled  
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Page 1INDEX OF SYSTEM STATUS

SYSTEM	COMPONENT	DATE OF EVENT	(S) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
HPCI	HPCI	8-9-83	1 Day	N/A
RHR	RHR-38A	8-16-83	1 Day	LER 83-19/3L
Diesel	'B' D/G	8-26-83	1 Day	LER 83-20/1P
Core Spray	Core Spray 7B	8-26-83	1 Day	LER 83-20/1P
RHR	'C' RHR Pump	8-27-83	1 Day	N/A
RCIC	RCIC	9-14-83	2 Days	PRO-44
SBGT	'A' SBGT	9-29-83	1 Day	N/A
SBGT	'B' SBGT	10-5-83	2 Days	N/A
SBGT	'B' SBGT	10-11-83	1 Day	N/A
SBGT	'A' SBGT	10-11-83	1 Day	N/A
Diesel	'A' Diesel	10-12-83	1 Day	LER 83-27/1P
Core Spray	'B' Core Spray	10-12-83	1 Day	LER 83-27/1P
RHR	'D' RHR Pump	10-14-83	1 Day	LER 83-28/3L
RCIC	RCIC	11-16-83	2 Days	LER 83-32/1P
HPCI	HPCI-20	11-17-83	1 Day	LER 83-32/1P
Diesel	'A' Diesel	12-1-83	1 Day	N/A
Diesel	'B' Diesel	12-1-83	1 Day	N/A
RCIC	RCIC	12-14-83	1 Day	N/A
SBGT	'A' SBGT	12-19-83	1 Day	N/A
UPS	'A' UPS	12-21-83	2 Days	N/A
RCIC	RCIC	1-6-84	1 Day	LER 84-01
SBGT	'B' SBGT	1-10-84	1 Day	N/A
Core Spray	'A' Core Spray	2-9-84	1 Day	N/A

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SYSTEM	COMPONENT	DATE OF EVENT	(X) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
RHR Service Water	'A' RHR S/W	11-2-84	1 Day	N/A
Diesel	'A' D/G	11-27-84	1 Day	N/A
Diesel	'B' D/G	11-28-84	1 Day	N/A
SBGT	'A' SBGT	12-4-84	1 Day	N/A
SBGT	'B' SBGT	12-5-84	1 Day	N/A
SBGT	'A' SBGT	12-16-84	2 Days	N/A
Service Water	'A' S/W Pump	12-31-84	4 Days	N/A
Diesel	'B' D/G	1-7-85	1 Day	N/A
SBGT	'B' SBGT	1-8-85	1 Day	N/A
SLC	'A' SLC Pump	1-16-85	2 Days	PRO-5
Diesel	'B' Fuel Oil XFR Pump	1-24-85	1 Day	PRO-6
Service Water	'C' S/W Pump	1-28-85	2 Days	N/A
Diesel	'A' D/G	2-14-85	1 Day	N/A
Diesel	'B' D/G	2-15-85	1 Day	N/A
Core Spray	'A' C/S	2-20-85	1 Day	N/A
Core Spray	'B' C/P	2-20-85	1 Day	N/A
Diesel	'A' D/G	2-21-85	1 Day	N/A
UPS	'B' UPS	3-5-85	1 Day	N/A
RHR	RHR-66	3-28-85	1 Day	N/A
Diesel	'B' D/G	4-19-85	1 Day	N/A
Diesel	'A' D/G	4-23-85	1 Day	N/A
Cooling Tower	#1 Mist Fan	5-1-85	2 Days	N/A
Service Water	'D' S/W Pump	6-10-85	1 Day	N/A

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SYSTEM	COMPONENT	DATE OF EVENT	( $\leq$ ) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
Service Water	'A' S/W Pump	2-13-84	8 Days	N/A
RCIC	RCIC	3-13-84	2 Days	N/A
RHR	RHR-31B	3/16/84	1 Day	N/A
SBGT	'3' SBGT	3-30-84	1 Day	N/A
RHR	RHR 39-A	4-3-84	2 Days	PRO-5
Service Water	'D' S/W Pump	4-12-84	1 Day	N/A
HPCI	Trip Throttle Valve	4-20-84	1 Day	LER 84-05
SLC	'B' SLC Pump Relief Valve	5-4-84	1 Day	N/A
UPS	'A' UPS	5-4-84	1 Day	N/A
Diesel	'A' D/G	5-8-84	1 Day	PRO-10
Service Water	'D' S/W Pump	5-14-84	1 Day	N/A
RCIC	Flow XMTR	5-15-84	1 Day	PRO-13
Diesel	'A' D/G	5-21-84	1 Day	N/A
SBGT	'A' SBGT	5-31-84	1 Day	N/A
Core Spray	'A' C/S Pump	6-6-84	1 Day	PRO-15
SBGT	'B' SBGT	6-7-84	2 Days	N/A
SBGT	'A" SBGT	6-28-84	1 Day	N/A
RCIC	RCIC-15	9-8-84	1 Day	LER 84-20
SBGT	'B' SBGT	10-17-84	1 Day	N/A
SBGT	'A' SBGT	10-17-84	1 Day	N/A
Diesel	'A' D/G	10-22-84	2 Days	LER 84-22/PRO-45
Diesel	'B' D/G	10-23-84	1 Day	LER 84-22/PRO-45

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SYSTEM	COMPONENT	DATE OF EVENT	( $\leq$ ) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
SBQT	'A' SBQT	6-10-85	1 Day	N/A
RCIC	RCIC-18	6-12-85	1 Day	PRO-19 and 20
Diesel	'B' D/G	6-25-85	2 Days	N/A
Diesel	'A' D/G	6-27-85	1 Day	N/A
SBQT	'B' SBQT	7-10-85	1 Day	N/A
RCIC	Suction Pressure Switch	7-17-85	1 Day	PRO-25
HPCI	Fitting Leak	7-18-85	1 Day	PRO-26
HPCI	HPCI	8-5-85	3 Days	N/A
Diesel	'A' D/G	8-28-85	1 Day	PRO-31
Diesel	'B' D/G	8-28-85	1 Day	PRO-31
Diesel	'B' D/G	8-29-85	1 Day	PRO-31
Service Water	'A' S/W Pump	8-30-85	2 Days	N/A
Diesel	'B' D/G	8-31-85	1 Day	N/A
Service Water	'A' S/W Pump	10-2-85	18 Days	N/A
Service Water	'A' S/W Pump	7-3-86	12 Days	N/A
RCIC	RCIC	7-15-86	1 Day	N/A
Service Water	'D' S/W Pump	7-16-86	1 Day	N/A
Service Water	'B' S/W Pump	7-17-86	1 Day	N/A
Service Water	'C' S/W Pump	7-18-86	1 Day	N/A
Diesel	'B' D/G	7-27-86	1 Day	N/A
UPS	'B' UPS	7-30-86	1 Day	N/A
Cooling Tower	#1 West Fan	8-1-86	1 Day	N/A



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SYSTEM	COMPONENT	DATE OF EVENT	( $\leq$ ) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
HPCI	HPCI	8-15-86	1 Day	N/A
HPCI	Gland Seal Cond Pump	8-18-86	1 Day	86-56
UPS	'B' UPS	9-4-86	1 Day	86-58
SLC	'B' SLC Pump	10-24-86	1 Day	N/A
SLC	'B' Squib Continuity	10-24-86	3 Days	86-61
RCIC	RCIC	11-13-86	1 Day	N/A
SBGT	'B' SBGT	12-1-86	2 Days	N/A
Service Water	'C' S/W Pump	12-2-86	1 Day	N/A
Core Spray	'B' C/S Pump	12-8-86	1 Day	N/A
Core Spray	'B' C/S Pump	12-19-86	1 Day	86-67
SBGT	'A' SBGT	1-12-87	1 Day	N/A
Service Water	'A' S/W Pump	1-12-87	22 Days	N/A
Core Spray	'B' C/S Pump	1-20-87	2 Days	N/A
SBGT	'A' SBGT	1-20-87	1 Day	N/A
Service Water	'D' S/W Pump	2-4-87	27 Days	N/A
Diesel	'B' D/G	2-4-87	1 Day	87-05
Diesel	'B' D/G	2-17-87	2 Days	N/A
Diesel	'A' D/G	2-26-87	1 Day	N/A
Service Water	'B' S/W Pump	3-10-87	1 Day	87-11
Service Water	'C' S/W Pump	3-10-87	1 Day	87-11
Service Water	'A' S/W Pump	3-10-87	1 Day	87-11
SBGT	'A' SBGT	3-27-87	1 Day	N/A

SYSTEM	COMPONENT	DATE OF EVENT	( $\leq$ ) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
Service Water	'D' S/W Pump	3-31-87	21 Days	N/A
Core Spray	'B' C/S Pump	4-2-87	1 Day	N/A
RHR	'B' RHR Pump	4-20-87	9 Days	N/A
Service Water	'C' S/W Pump	4-24-87	1 Day	N/A
RHR	'D' RHR Pump	5-4-87	6 Days	87-21A/B
Service Water	'A' S/W Pump	5-4-87	15 Days	N/A
RHR	'A' RHR Pump	5-11-87	5 Days	87-21A/B
RHR	'C' RHR Pump	5-18-87	5 Days	87-21A/B
RHR	'D' RHR Pump	5-28-87	1 Day	87-21A/B
SBGT	'A' SBGT	6-9-87	1 Day	N/A
HPCI	HPCI	6-10-87	4 Days	07-27
SBGT	'B' SBGT	6-30-87	1 Day	N/A
RHR	'D' RHR Pump	6-30-87	1 Day	N/A
RCIC	RCIC	10-21-87	1 Day	N/A
HPCI	Flow XMTR	11-5-87	1 Day	LER 87-16
RCIC	RCIC	11-9-87	1 Day	N/A
RCIC	Exhaust Check Valve	11-14-87	5 Days	LER 87-18
SBGT	'B' SBGT	11-25-87	1 Day	N/A
SBGT	'A' SBGT	11-25-87	1 Day	N/A
Diesel	'A' D/G	12-7-87	5 Days	N/A
Core Spray	C/S SA	12-11-87	1 Day	N/A
HPCI	HPCI	12-14-87	1 Day	N/A
Diesel	'B' D/G	12-15-87	1 Day	N/A

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SYSTEM	COMPONENT	DATE OF EVENT	( $\leq$ ) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
RHR	RHR-26A	12-15-87	1 Day	87-68
RHR	'B' RHR	12-29-87	1 Day	N/A
RHR Service Water	'B' RHR S/W	1-5-88	1 Day	88-01
RCIC	RCIC	1-12-88	1 Day	88-03
HPCI	Gland Seal Vacuum Pump	1-14-88	1 Day	88-05
RCIC	RCIC	1-14-88	1 Day	88-04
Service Water	'B' S/W Pump	1-18-88	17 Days	N/A
UPS	'A' UPS	2-2-88	1 Day	88-08
SLC	'B' SLC Pump	2-9-88	1 Day	N/A
HPCI	HPCI	2-12-88	1 Day	N/A
Core Spray	'A' C/S	2-12-88	1 Day	N/A
UPS	'B' UPS	2-18-88	1 Day	N/A
SBGT	'A' SBGT	2-22-88	1 Day	N/A
SBGT	'B' SBGT	2-23-88	1 Day	N/A
SBGT	'A' SBGT	3-14-88	2 Days	N/A
SBGT	'A' SBGT	3-28-88	1 Day	N/A
UPS	'B' UPS	3-29-88	3 Days	88-20
Core Spray	C/S-11B	3-31-88	3 Days	88-19
Service Water	'B' S/W Pump	4-5-88	1 Day	N/A
Service Water	'D' S/W Pump	4-5-88	9 Days	N/A
UPS	'B' UPS	4-9-88	1 Day	N/A
UPS	'B' UPS	4-9-88	1 Day	88-26

Attachment B  
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SYSTEM	COMPONENT	DATE OF EVENT	( $\Delta$ ) REPAIR REPLACEMENT TIME	EVENT REPORT NUMBER
UPS	'B' UPS	4-10-88	1 Day	88-27
SBGT	'B' SBGT	4-11-88	1 Day	N/A
RCIC	RCIC-1	4-11-88	1 Day	88-21
Service Water	'A' S/W Pump	4-14-88	1 Day	N/A
Service Water	'D' S/W Pump	4-15-88	1 Day	N/A
RCIC	RCIC	4-19-88	1 Day	N/A
RHR Service Water	'D' RHR S/W Pump	4-26-88	1 Day	88-34
RHR Service Water	'A' RHR S/W Pump	5-4-88	1 Day	88-34
Service Water	'C' S/W Pump	5-9-88	1 Day	N/A
RCIC	Trip Solenoid	5-11-88	2 Days	88-35
HPCI	HPCI-14	5-13-88	1 Day	88-36
HPCI	HPCI	5-16-88	1 Day	N/A
Diesel	'B' D/G	5-24-88	2 Days	N/A
RHR	RHR-18	6-25-88	1 Day	88-42
Diesel	'A' D/G	8-9-88	1 Day	N/A
Diesel	'A' D/G	8-17-88	1 Day	N/A
Diesel	'A' D/G	8-23-88	1 Day	N/A
RHR Service Water	RHR S/W 89A	8-24-88	2 Days	88-60
Diesel	'A' D/G	9-1-88	3 Days	88-61

ATTACHMENT C

<u>Names</u>	<u>Company</u>	<u>Role in Study</u>	<u>Qualifications</u>	<u>Position</u>	<u>Years' Experience</u>	
					<u>Total</u>	<u>PRA-Related</u>
Kevin Burns	YAEC	Preparer	M.S., Nuclear Engineering, MIT	Lead Engineer for Vermont Yankee in Safety Assessment Group	8	2
Andrew Dykes	PLG	Preparer	Ph.D., Nuclear Engineering, MIT	Consultant for PRA analysis at PLG	24	4
Vesna Dimitrijevic	YAEC	Reviewer	Ph.D., Nuclear Engineering, MIT	Engineer, Safety Assessment Group	12	12
James Chapman	YAEC	Reviewer	M.S., Engineering, RPI	Manager, Safety Assessment Group	15	9

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I, R. K. Gad III hereby certify that on September 19, 1988, I made service of the within document in accordance with the rules of the Commission by mailing a copy thereof postage prepaid to the following:

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Chairman  
Administrative Judge  
Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory  
Commission  
Washington, DC 20555

Samuel H. Press, Esquire  
Vermont Department of  
Public Service  
120 State Street  
Montpelier, VT 05602

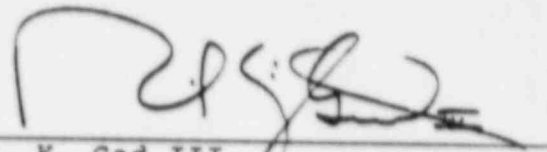
Mr. Glenn O. Bright  
Administrative Judge  
Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory  
Commission  
Washington, DC 20555

George B. Dean, Esquire  
Assistant Attorney General  
Department of the Attorney  
General  
One Ashburton Place  
Boston, MA 02108

Mr. James H. Carpenter  
Administrative Judge  
Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory  
Commission  
Washington, DC 20555

Ann P. Hodgdon, Esquire  
Office of the General Counsel  
U.S. Nuclear Regulatory  
Commission  
Washington, DC 20555

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Atomic Safety and Licensing  
Board Panel Docket (2 copies)  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555



R. K. Gad III