OLYMPIA J. SNOWE
MAINE
COUNSEL TO THE ASSISTANT
MAJORITY LEADER
250 RUSSELL SENATE OFFICE BUILDING
(202) 224-6344

United States Senate

WASHINGTON, DC 20510–1903

COMMITTEES:
ARMED SERVICES
BUDGET
COMMERCE, SCIENCE, AND
TRANSPORTATION
CHAIR OF
OCEANS AND FISHERIES
SUBCOMMITTEE
SMALL BUSINESS

April 13, 1998

Shirley Ann Jackson
Chairman
Nuclear Regulatory Commission
Washington DC 20555

Dear Chairman Jackson:

On April 23, officials from the Nuclear Regulatory Commission will meet with representatives of Maine Yankee to discuss an investigation that is of great concern to the people of Maine. Since its inception, this case has been closely monitored by the Maine Congressional Delegation, local and state officials, and Maine citizens, all of whom are justifiably interested in its outcome.

Due to the importance of this issue to the people of Maine, I am writing to request that the enforcement conference currently scheduled for April 23 in King of Prussia, Pennsylvania as part of the Commission's Maine Yankee investigation be moved to Wiscasset, Maine. In addition I would like a response to a number of questions that have been raised concerning this meeting and the process involved:

1) Why is this meeting closed to the public and what is the precedent for closing such meetings.

2) After this meeting what are the steps remaining before a judgement is made?

3) Will the public be able to review any of this information prior to a judgement being made?

4) What occurs after a judgement is made by the NRC?

AUBURN
TWO GREAT FALLS PLAZA
SUITE 7B
AUBURN, ME 04210
(207) 786-2451

AUGUSTA
68 SEWALL STREET, SUITE 101C
AUGUSTA, ME 04330
(207) 622-8292

BANGOR
ONE CUMBERLAND PLACE, SUITE 306
BANGOR, ME 04401
(207) 945-0432

BIDDEFORD
231 MAIN STREET, SUITE 2
BIDDEFORD, ME 04005
(207) 282-4144

PORTLAND
3 CANAL PLAZA, SUITE 601
P.O. BOX 186
PORTLAND, ME 04112
(207) 874-0853
MAINE RELAY SERVICE
TDD 1-955-3323

PRESQUE ISLE
160 ACADEMY STREET, SUITE 3
PRESQUE ISLE, ME 04769
(207) 764-5124

IN MAINE CALL TOLL-FREE 1-800-432-1599

5) At what point in the process will information on the Maine Yankee investigation be made public?

I look forward to your expeditious response to my request .

Sincerely,

OLYMPIA J. SNOWE
United States Senator

OJS:jqc

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

December 19, 1997

EAs 96-397; 97-375; 97-559

Mr. Michael B. Sellman, President
Maine Yankee Atomic Power Company
P. O. Box 408
Wiscasset, Maine 04578

SUBJECT: APPARENT VIOLATIONS STEMMING FROM NRC OFFICE OF INVESTIGATIONS REPORT NOs.1-95-050, 1-96-025, AND 1-96-043

Dear Mr. Sellman:

This refers to the results of three investigations conducted by the NRC's Office of Investigations (OI) concerning (1) the adequacy of your facility's small break loss-of-coolant accident (SBLOCA) emergency core cooling system (ECCS) analyses, (2) your submittal to the NRC of inaccurate information pertaining to the capacity of the facility's atmospheric steam dump valves, and (3) a failure to perform station test procedures as required by facility technical specifications. The timeframe for these investigations spanned from December 1995 through October 1997. The synopses of the referenced investigation reports are provided as Enclosures 1 through 3.

With respect to the first matter, based upon a technical review and the results of the NRC Office of Investigations (OI) Report No. 1-95-050 pertaining to your SBLOCA analyses, the NRC identified several apparent violations of NRC requirements, which are provided as Enclosure 4. It appears that Maine Yankee Atomic Power Co. (MYAPCo) failed to use the SBLOCA analysis required by facility technical specifications effective November 18, 1991, to determine core operating limits for Cycle 12 and Cycle 13 operations, and that MYAPCo provided inaccurate information material to the NRC in facility Core Operating Limits Reports, which stated that MYAPCo had used the analytical methods specified by the facility technical specifications to determine operating limits for Cycle 12 and Cycle 13. It appears that careless disregard on the part of your staff contributed to these apparent violations.

In addition, in apparent violation of 10 C.F.R. § 50.46(a), MYAPCo used unacceptable evaluation models to determine ECCS performance for Cycle 14 operations and in the Core Performance Analysis Reports (CPARs) submitted to the NRC to support MYAPCo's reload analyses for Cycle 14 and Cycle 15. Specifically, the analyses were not capable of acceptably calculating ECCS performance for the portion of the break spectrum between 0.35ft^2 and at least 0.6 ft^2. Thus, it was not possible to confirm that the limiting break had been identified and that the ECCS was capable of mitigating the most severe postulated accident. In addition, it appears that MYAPCo maintained a materially incomplete and inaccurate Final Safety Analysis Report and submitted materially inaccurate information to the NRC in that the associated Cycle 14 and Cycle 15 Core Performance Analysis Reports did not reveal this inability to analyze the complete break spectrum, in violation of 10 C.F.R. §50.9(a). It also appears that MYAPCo used an unacceptable ECCS evaluation model for Cycle 14 operations and in the reload analyses for Cycle 14 and Cycle 15 in violation of 10 C.F.R. § 50.46(a), in that the SBLOCA analysis incorrectly calculated penetration factors and misapplied the Alb-Chambre correlation, thus overpredicting core cooling and overstating the

Enclosure 1

9712240011 15pp.

conservatism of the evaluation model. Finally, it appears that MYAPCo used an unacceptable "Best Estimate" SBLOCA analysis, in violation of 10 C.F.R. § 50.46(a), to calculate ECCS performance in connection with a 10 C.F.R. § 50.59 analysis of the effects of a reduction in steam generator pressure.

Although the analyses involved in the apparent violations discussed in the preceding paragraph were performed by your contractor, Yankee Atomic Electric Company (YAEC), it is apparent, based on the NRC technical review and investigation, that MYAPCo's oversight of YAEC activities was not sufficient to ensure compliance with regulatory requirements. In particular, it appears that during Cycle 14 operations it could not be determined whether the ECCS were capable of mitigating the most severe postulated accident. These apparent violations collectively represent a potentially significant lack of attention or carelessness toward licensed responsibilities and a failure to conduct adequate oversight of a vendor, resulting in the use of services of defective or indeterminate quality.

With respect to the second matter, based on the information developed by OI Report No. 1-96-025, it appears that, in violation of NRC requirements, MYAPCo willfully provided materially inaccurate information regarding the capacity of the Atmospheric Steam Dump Valve (ASDV) to the NRC in a March 1986 submittal of the Procedures Generation Package (PGP), which incorporated by reference revised Emergency Operating Procedures (EOPs). Facility personnel knew at the time of the 1986 submittal of the PGP that the ASDV had a capacity of 2 1/2%, and not 5% as reflected in the submittal. The apparent violation is provided as Enclosure 5.

With respect to the third matter, based on information developed by OI Report No. 1-96-043, it appears that MYAPCo willfully violated Technical Specification 5.8.2 and 10 C.F.R. § 50.9(a). Work orders specified that specific contacts be verified as open with a volt-ohm meter (VOM). The field engineers performing the tests, however, obtained a quantifiable electrical resistance value, indicating a problem. Instead of stopping the test and reconciling the discrepancy, the engineers documented that they verified open contacts using the VOM, when, in actuality, they visually verified that the contacts were open. The apparent violations are provided as Enclosure 6.

Based on the extensiveness of the investigations, the NRC does not consider that further information is necessary to make an informed enforcement decision. However, enforcement action will not be taken for these apparent violations until you have been provided an opportunity to either (1) respond to the apparent violations described above within thirty days or (2) request a predecisional enforcement conference. Concurrently with this letter, the NRC staff is issuing a Demand for Information (Demand) to YAEC and to Duke Engineering & Services Co. (DE&S) (Enclosure 7). The Demand details the results of the NRC's investigation into the ECCS matters discussed herein and requires that YAEC and DE&S explain why the NRC should permit any NRC licensee to use their services to perform Loss-of-Coolant Accident analyses or any safety-related analyses to meet NRC requirements. Should you elect to request an enforcement conference, it is requested that you bring responsible personnel from YAEC and/or DE&S. As part of any response or presentation at a predecisional enforcement conference, you should address why the NRC should not consider that certain apparent violations described herein were not the result of willfulness, deliberateness and/or careless disregard, on the part of your personnel. Consistent with the Enforcement Policy, a conference, if held, would be closed to public observation since the findings are based on Office Of Investigation reports that have not been publicly disclosed. Please contact R. Bellamy, Chief, Decommissioning and LAB Branch, at (610) 337-5200 within 7 days of the date of this letter to notify the NRC of your intended response.

Please be advised that the enclosed apparent violations are in draft and may change substantially upon further review of your response or your presentation at a predecisional enforcement conference. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 C.F.R. § 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be placed in the NRC Public Document Room (PDR). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction.

Sincerely,

for

Hubert J. Miller
Regional Administrator

Docket No. 50-309
License No. DPR-36

Enclosures:
(1) Synopsis of OI Report 1-95-050
(2) Synopsis of OI Report 1-96-025
(3) Synopsis of OI Report 1-96-043
(4) Apparent Violations Associated with SBLOCA ECCS Analysis
(5) Apparent Violation Associated with ASDV
(6) Apparent Violations Associated with Safety System Logic Testing
(7) Demand for Information (EA 97-387)

cc w/encls:
D. Davis, President, Yankee Atomic Electric Company (YAEC)
G. Leitch, Vice President, Operations, MYAPCo
M. Meisner, Vice President, Licensing and Regulatory Compliance, MYAPCo
R. Fraser, Director of Engineering
P. Anderson, Project Manager, YAEC
W. Odell, Director of Operations
M. Ferri, Director of Decommissioning
L. Diehl, Manager of Public and Governmental Affairs, MYAPCo
J. Ritsher, Ropes and Gray
P. Dostie, State of Maine Nuclear Safety Inspector
U. Vanags, State of Maine Nuclear Safety Advisor
C. Brinkman, Combustion Engineering, Inc.
W. Meinert, Nuclear Engineer, (name of company)
First Selectmen of Wiscasset
State of Maine Planning Officer - Nuclear Safety Advisor
State of Maine, SLO Designee
State of Maine Planning Officer - Executive Department
R. Shadis, Friends of the Coast

ENCLOSURE 1

SYNOPSIS OF OFFICE OF INVESTIGATIONS REPORT NO.1-95-50, "MAINE YANKEE ATOMIC POWER STATION: ALLEGED DELIBERATE FAILURE TO COMPLY WITH NRC REQUIREMENTS REGARDING THE ADEQUACY OF THE PLANTS EMERGENCY CORE COOLING SYSTEM AND MATERIAL OMISSIONS BY THE LICENSEE," DATED SEPTEMBER 6, 1996

On December 6, 1995, the Nuclear Regulatory Commission's (NRC) Office of Investigations (OI), Region I, initiated this investigation in response to anonymous allegations that were made public in early December 1995, regarding, among other things, the adequacy of the Emergency Core Cooling System (ECCS) at the Maine Yankee (MY) Atomic Power Station, Wiscasset, Maine. Generally, it was alleged that Maine Yankee Atomic Power Company (MYAPCo), in concert with Yankee Atomic Electric Company (YAEC), knowingly performed inadequate small break loss-of-coolant accident (SBLOCA) analyses of the ECCS and deliberately misrepresented the analyses to the NRC. Specifically, the OI investigation sought to determine: (1) whether MYAPCo deliberately failed to implement, for fuel Cycles 12 and 13, the RELAP5YA SBLOCA analysis, as accepted and approved by the NRC in a January 1989 Safety Evaluation Report (SER); and (2) if the RELAP5YA computer code was deliberately implemented in June 1993, for Cycle 14, in a manner that did not conform with the SER and the requirements of 10 C.F.R. 50.46.

Based on the evidence developed during this investigation, OI concludes that (1) for the period June 1990 through May 1993 (during Cycles 12 and 13), MYAPCo willfully failed to implement an acceptable EM (the RELAP5YA SBLOCA analysis approved by the NRC via a January 1989 SER) as required by 10 C.F.R. 50.46; and (2) MYAPCo/YAEC willfully failed to implement the RELAP5YA EM, in the June 1993 analysis for cycle 14, in a manner consistent with the NRC's January 1989 SER and the requirements of 10 C.F.R. 50.46.

ENCLOSURE 2

SYNOPSIS OF OFFICE OF INVESTIGATIONS REPORT NO.1-96-025, "MAINE YANKEE ATOMIC POWER STATION: INACCURATE INFORMATION PROVIDED TO NRC REGARDING THE CAPACITY OF THE ATMOSPHERIC STEAM DUMP," DATED JUNE 27, 1997

This investigation was initiated by the Nuclear Regulatory Commission (NRC) Office of Investigations (OI), Region I, on July 11, 1996, to determine if Maine Yankee Atomic Power Company (MYAPCo) willfully provided inaccurate information regarding the capacity of the Atmospheric Steam Dump valve (ASDV) to the NRC in a March 1986 submittal of the Procedures Generation Package (PGP), which incorporated, by reference, revised Emergency Operating Procedures (EOPs).

Based upon the evidence developed during this investigation, it is concluded that MYAPCo willfully provided inaccurate information regarding the capacity of the ASDV to the NRC in the 1986 submittal of the PGP.

ENCLOSURE 3

SYNOPSIS OF OFFICE OF INVESTIGATION REPORT NO. 1-96-043, "MAINE YANKEE ATOMIC POWER STATION: FALSIFICATION OF TEST RECORDS BY LICENSEE ENGINEERS," DATED OCTOBER 31, 1997

This investigation was initiated by the Nuclear Regulatory Commission (NRC), Office of Investigations (OI), Region I, on November 14, 1996, to determine whether two electrical engineers (EEs) of the Maine Yankee (MY) Atomic Power Company, working at the MY Atomic Power Station, Wiscasset, Maine, falsified separate test records in August 1996, which involved the electrical testing of equipment important to safety.

Based on the evidence developed during this investigation, it is concluded that the two EEs falsified test records by deliberately violating technical specification required procedures that controlled safety related testing. Specifically, OI's investigation determined that the EEs failed to conduct an electrical test as written in an approved work order, initialed the test record giving the appearance that the test was satisfactorily conducted as written, and failed to note the change in the test method that was actually implemented.

ENCLOSURE 4

APPARENT VIOLATIONS ASSOCIATED WITH ECCS ANALYSES (OI REPORT NO. 1-95-050)

A. APPARENT VIOLATIONS RELATING TO OPERATING CYCLE 12

1. Technical Specification (TS) 5.14.2, "Core Operating Limits Report," for the Maine Yankee Atomic Power Station (MYAPS) became effective November 18, 1991, and requires, in part, that analytical methods used to determine operating limits shall be limited to those previously reviewed and approved by NRC, as listed by TS 3.10. TS.3.10 lists a Small-Break Loss-of-Coolant (SBLOCA) analysis, "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3, dated October 1982" (RELAP5YA). TS.3.10. does not specify any SBLOCA analytical method developed by Combustion Engineering Corporation (CE) for SBLOCA analysis.

   However, between November 18, 1991, and February 14, 1992 (during Cycle 12 operations), Maine Yankee Atomic Power Company did not determine operating limits for Cycle 12 operations using the RELAP5YA SBLOCA analysis required by TS 5.14.2. In fact, a CE SBLOCA code was used to prepare the reload analysis, as stated in the Core Performance Analysis Report for Cycle 12 at Section 5.5.5.3.

2. 10 C.F.R. § 50.9(a) requires, in part, that information provided to the Commission by a licensee shall be complete and accurate in all material respects.

   However, on December 18, 1991, Maine Yankee Atomic Power Company (MYAPCo) provided to the Commission MYAPCo's Cycle 12 Core Operating Limits Report (COLR), which contained inaccurate information material to the NRC. The COLR stated that MYAPCo used analytical methods listed in TS 5.14 to determine operating limits. In fact, MYAPCo used the Combustion Engineering Small Break Loss-of-Coolant Accident (SBLOCA) analytical method, which was not listed in TS 5.14. The SBLOCA analytical method listed by TS 5.14 is "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3, dated October 1982" (RELAP5YA). This inaccurate information was material to the NRC because it was a representation that RELAP5YA, which had been approved for application to Maine Yankee Atomic Power Station pursuant to the Three Mile Island Action Plan, Item II.K.3.30 (NUREG 0737), had been used in concert with other approved codes to establish core operating limits for Cycle 12 operations.

B. APPARENT VIOLATIONS RELATING TO OPERATING CYCLE 13

1. Technical Specification (TS) 5.14.2, "Core Operating Limits Report," for the Maine Yankee Atomic Power Station (MYAPS) requires, in part, that analytical methods used to determine operating limits shall be limited to those previously reviewed and approved by NRC, as listed by TS 3.10. TS.3.10 specifies a Small-Break Loss-of-Coolant (SBLOCA) analysis, "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3, dated October 1982" (RELAP5YA). TS.3.10. does not specify any SBLOCA analysis produced by Combustion Engineering Corporation (CE).

However, between April 19, 1992 and July 7, 1993 (during Cycle 13 operations), Maine Yankee Atomic Power Company did not determine operating limits for Cycle 13 operations using the RELAP5YA SBLOCA analysis required by TS 5.14.2. In fact, a CE SBLOCA code was used to prepare the reload analysis, as stated in the Core Performance Analysis Report for Cycle 13 at Section 5.5.5.3.

2. 10 C.F.R. § 50.9(a) requires, in part, that information provided to the Commission by a licensee shall be complete and accurate in all material respects.

However, on April 7, 1992, Maine Yankee Atomic Power Company (MYAPCo) provided to the Commission MYAPCo's Cycle 13 Core Operating Limits Report (COLR), which contained inaccurate information material to the NRC. The COLR stated that MYAPCo used analytical methods listed in TS 5.14 to determine operating limits. In fact, MYAPCo used a Combustion Engineering Small-Break Loss-of-Coolant (SBLOCA) analysis, which was not listed in TS 5.14. The SBLOCA analysis listed by TS 5.14 is "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3, dated October 1982" (RELAP5YA). This inaccurate information was material to the NRC because it was a representation that RELAP5YA, which had been approved for application to MYAPS pursuant to the Three Mile Island Action Plan, Item II.K.3.30 (NUREG 0737), had been used to establish core operating limits for Cycle 13 operations.

C. APPARENT VIOLATIONS RELATING TO INABILITY TO ANALYZE ENTIRE BREAK SPECTRUM FOR CYCLE 14

10 C.F.R. § 50.46(a)(1) requires, in part, that emergency core cooling system (ECCS) performance must be calculated with an acceptable evaluation model and must be calculated for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents are calculated.

10 C.F.R. Part 50, Appendix K, Section II.4. requires that to the extent practicable, predictions of the evaluation model, or portions thereof, shall be compared with applicable experimental information.

However, from October 14, 1993, through January 25, 1995 (during Cycle 14 operations), and in the Cycle 14 Core Performance Analysis Report (CPAR) submitted August 25, 1993, Maine Yankee Atomic Power Company (MYAPCo) failed to calculate a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents were calculated, because there was a portion of the small-break spectrum between .35 ft^2 and at least .6ft^2 for which no acceptable code was capable of calculating cooling performance or reliably calculating cooling performance. MYAPCo calculated Small-Break Loss-of-Coolant Accident (SBLOCA) ECCS performance up to the .35ft^2 break size, using the code described in "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3," dated October 1982 (RELAP5YA) and the plant-specific RELAP5YA SBLOCA evaluation model described in YAEC-1868, "Maine Yankee Small Break LOCA Analysis" (both of which were described as an Appendix K

approach to RELAP5YA). The RELAP5YA SBLOCA evaluation model documented in YAEC-1868 was incapable of calculating ECCS performance for breaks of and greater than 0.35 ft^2 because the code terminated after the safety injection tank actuation due to numerical convergence errors for the break of .35ft^2. MYAPCo calculated Large-Break Loss-of-Coolant (LBLOCA) ECCS Performance with the LBLOCA analysis described in YAEC-1160, "Application of Yankee WREM-Based Generic PWR ECCS Evaluation Model to Maine Yankee", dated July 1978 (WREM). Although the WREM LBLOCA evaluation model was demonstrated in 1996 to be capable of calculating ECCS performance down to the .6ft^2 break size, the evaluation model was not used to calculate ECCS performance in the small-break region for the Cycle 14 CPAR, and would not have been acceptable to calculate ECCS performance for break sizes in the small-break region of 0.6ft^2 and above because the evaluation model was not compared to applicable experimental data to demonstrate its reliability in calculating ECCS performance in the small-break region.

D. APPARENT VIOLATIONS RELATING TO INABILITY TO ANALYZE ENTIRE BREAK SPECTRUM FOR CYCLE 15

10 C.F.R. § 50.46(a)(1) requires, in part, that emergency core cooling system (ECCS) performance must be calculated with an acceptable evaluation model and must be calculated for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents are calculated.

10 C.F.R. Part 50, Appendix K, Section II.4. requires that to the extent practicable, the predictions of the evaluation model, or portions thereof, shall be compared with applicable experimental information.

However, in the Cycle 15 Core Performance Analysis Report (CPAR) submitted December 1, 1995, Maine Yankee Atomic Power Company (MYAPCo) failed to calculate a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents were calculated, because there was a portion of the small-break spectrum between .35 ft^2 and at least .6ft^2 for which no acceptable code was capable of calculating cooling performance or reliably calculating cooling performance. MYAPCo calculated Small-Break Loss-of-Coolant Accident (SBLOCA) ECCS performance up to the .35ft^2 break size, using the code described in "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3," dated October 1982 (RELAP5YA) and the plant-specific RELAP5YA SBLOCA evaluation model described in YAEC-1868, "Maine Yankee Small Break LOCA Analysis" (both of which were described as an Appendix K approach to RELAP5YA). The RELAP5YA SBLOCA evaluation model documented in YAEC-1868 was incapable of calculating ECCS performance for breaks of and greater than 0.35 ft^2 because the code terminated after the safety injection tank actuation due to numerical convergence errors for the break of .35ft^2. MYAPCo calculated Large-Break Loss-of-Coolant (LBLOCA) ECCS Performance with the LBLOCA analysis described in YAEC-1160, "Application of Yankee WREM-Based Generic PWR ECCS Evaluation Model to Maine Yankee", dated July 1978 (WREM). Although the WREM LBLOCA evaluation model was demonstrated in 1996 to be capable of calculating ECCS performance down to the .6ft^2 break size, the evaluation model was not used to calculate ECCS performance in the small-break region for the Cycle 15 CPAR, and would not have

been acceptable to calculate ECCS performance for break sizes in the small-break region of 0.6ft^2 and above because the evaluation model was not compared to applicable experimental data to demonstrate its reliability in calculating ECCS performance in the small-break region.

E. INCOMPLETE AND INACCURATE CORE PERFORMANCE ANALYSIS REPORTS

10 C.F.R. § 50.9(a) requires, in part, that information provided to the Commission by an applicant for a license or a licensee or information required by statute or the Commission's regulations to be maintained by the licensee or the applicant shall be complete and accurate in all material respects.

10 C.F.R. § 50.71(e)(6) requires each person licensed to operate a nuclear power reactor pursuant to 10 C.F.R. § 50.21 or 50.22 to retain the updated Final Safety Analysis Report (FSAR) until the Commission terminates the license.

10 C.F.R. § 50.46(a)(1) requires, in part, that emergency core cooling system (ECCS) performance must be calculated with an acceptable evaluation model and must be calculated for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents are calculated.

10 C.F.R. Part 50, Appendix K, Section II.4. requires that to the extent practicable, the evaluation model, or portions thereof, shall be compared with applicable experimental information.

However, MYAPCo's Final Safety Analysis Report was not complete and accurate in all material respects. The FSAR incorporates Core Performance Analysis Reports (CPARs) as Appendix D. The CPARs used by MYAPCo to support its Cycle 14 and Cycle 15 operations were submitted to the NRC on August 25, 1993, and on December 1, 1995, respectively, and relied upon an Emergency Core Cooling Performance (ECCS) Small-Break Loss-of-Coolant (SBLOCA) evaluation model described in YAEC-1868, "Maine Yankee Small Break LOCA Analysis" (YAEC-1868), and incorporated YAEC-1868, which was not complete and accurate in all material respects. YAEC-1868 described the plant-specific evaluation model of the ECCS code described in "YAEC 1300P, RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3," dated October 1982 (RELAP5YA). Both YAEC-1868 and RELAP5YA were Appendix K approaches to calculation of ECCS performance. YAEC-1868 included the following statements: "Evaluations [of ECCS performance] were performed over a complete range of break sizes"; "The base analysis [of ECCS performance] hence consisted of a complete matrix of break sizes"; and "The largest break size analyzed for Maine Yankee in this analysis was 0.35 ft^2. This covered a sufficient range to identify the limiting SBLOCA condition for Maine Yankee." These statements are incomplete and inaccurate in that the RELAP5YA evaluation model described by YAEC-1868 failed to calculate a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents were calculated, because there was a portion of the small-break spectrum between .35 ft^2 and at least .6ft^2 for which no acceptable code was capable of calculating or reliably cooling performance. The RELAP5YA SBLOCA analysis described in YAEC-1868 was incapable of calculating ECCS performance for

breaks of and greater than 0.35 ft^2 because the code terminated after the safety injection tank actuation due to numerical convergence errors for the break at .35ft^2. MYAPCo calculated Large-Break Loss-of-Coolant (LBLOCA) ECCS Performance with the LBLOCA analysis described in YAEC-1160, "Application of Yankee WREM-Based Generic PWR ECCS Evaluation Model to Maine Yankee", dated July 1978 (WREM). Although the WREM LBLOCA evaluation model was demonstrated in 1996 to be capable of calculating ECCS performance down to the .6ft^2 break size, the evaluation model was not used to calculate ECCS performance in the small-break region for the Cycle 14 and 15 CPARs, and would not have been acceptable to calculate ECCS performance for break sizes in the small-break region of 0.6ft^2 and above because the evaluation model was not compared to applicable experimental data to demonstrate its reliability in calculating ECCS performance in the small-break region. The inaccurate and incomplete statements in YAEC-1868 were material to the NRC because they concealed that the complete break spectrum had not been analyzed and that, contrary to the requirements of 10 C.F.R. § 50.46(a)(1), there was a portion of the break spectrum between .35ft^2 and at least .6ft^2 for which no acceptable code was capable of calculating cooling performance or reliably calculating cooling performance.

F. APPARENT VIOLATION RELATED TO IMPROPER APPLICATION OF ALB-CHAMBRE CORRELATION FOR CYCLE 14

10 C.F.R. § 50.46(a)(1) requires, in part, that emergency core cooling system (ECCS) performance must be calculated with an acceptable evaluation model.

However, from October 14, 1993, through January 25, 1995 (during Cycle 14 operations), and in the Cycle 14 Core Performance Analysis Report (CPAR) submitted August 25, 1993, MYAPCo calculated ECCS performance for SBLOCAs with an unacceptable evaluation model. MYAPCo used the ECCS code described in YAEC-1300P, "RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3," dated October 1982 (RELAP5YA), and the plant-specific RELAP5YA SBLOCA evaluation model described in YAEC-1868, "Maine Yankee Small Break LOCA Analysis" (YAEC-1868). RELAP5YA as applied was not an acceptable evaluation model because the nodalization model of YAEC-1868 incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of penetration factors and the cross flow resistance factor, and which as a result unacceptably overpredicted cooling performance and overstated the conservatism of RELAP5YA.

G. APPARENT VIOLATION RELATED TO IMPROPER APPLICATION OF ALB-CHAMBRE CORRELATION FOR CYCLE 15

10 C.F.R. § 50.46(a)(1) requires, in part, that emergency core cooling system (ECCS) performance must be calculated with an acceptable evaluation model.

However, in the Cycle 15 Core Performance Analysis Report (CPAR) submitted December 1, 1995, MYAPCo calculated ECCS performance for SBLOCAs with an unacceptable evaluation model. MYAPCo used the ECCS code described in YAEC-1300P, "RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3," dated October 1982 (RELAP5YA), and the plant-specific RELAP5YA SBLOCA evaluation model described in YAEC-1868, "Maine Yankee Small Break LOCA Analysis" (YAEC-1868). RELAP5YA as applied was not an acceptable evaluation model because the

nodalization model of YAEC-1868 incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of penetration factors and the cross flow resistance factor, and which as a result unacceptably overpredicted cooling performance and overstated the conservatism of RELAP5YA.

H. APPARENT VIOLATION RELATING TO ANALYSIS OF REDUCED STEAM GENERATOR PRESSURE FOR CYCLE 14

10 C.F.R. § 50.46(a)(1) requires, in part, that emergency core cooling system (ECCS) performance must be calculated with an acceptable evaluation model. 10 C.F.R. § 50.46(a)(1)(ii) provides that an ECCS evaluation model may be developed in conformance with the required and acceptable features of Appendix K ECCS Evaluation Models.

However, in a January 1993 analysis of a decrease in steam generator pressure, performed pursuant to the requirements of 10 C.F.R. § 50.59, MYAPCo used an unacceptable evaluation model to calculate Small-Break Loss-of-Coolant (SBLOCA) ECCS performance. MYAPCo used a Best Estimate (BE) plant-specific evaluation model (described in an August 1, 1990, report produced by Yankee Atomic Electric Company) to implement the SBLOCA code described in YAEC 1300P, "RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis, Volumes 1, 2, 3," dated October 1982 (RELAP5YA). In January 1989 the NRC transmitted its Safety Evaluation Report approving RELAP5YA for application to Maine Yankee Atomic Power Station as an Appendix K model, not as a BE model. Furthermore, contrary to 10 C.F.R. Part 50, Appendix K, the BE evaluation model calculated decay heat with the 1979 ANS Standard rather than the 1971 ANS Standard plus 20 percent, and calculated the two-phase critical flow with the RELAP5YA mechanistic model rather than the Moody critical flow model.

ENCLOSURE 5

APPARENT VIOLATION ASSOCIATED WITH PROVIDING INACCURATE INFORMATION TO THE NRC RELATIVE TO THE CAPACITY OF THE ATMOSPHERIC STEAM DUMP VALVE (OI REPORT NO.1-96-025)

Section 186 of the Atomic Energy Act of 1954, as amended, requires licensees to ensure that all submissions to the NRC be complete and accurate in all material respects.

However, the licensee submitted a Procedures Generation Package on March 18, 1986, which contained a materially inaccurate statement. Specifically, the licensee stated that the Atmospheric Dump Valve (ADV) had a 5% bypass capacity, when in fact it had a 2½ % capacity. The submission was made to demonstrate conformance to NUREG-0737, "Clarification of TMI Action Plan Requirements", Action Item I.C.1, "Guidance for the Evaluation and Development of Procedures for Transients and Accidents". The inaccurate statement was material to the NRC because the relief capacity relates to the ability to adequately achieve core cooling.

ENCLOSURE 6

APPARENT VIOLATIONS ASSOCIATED WITH SAFETY SYSTEM LOGIC TESTING (OI REPORT NO.1-96-043)

A. Technical Specification 5.8.2 states, in part, that written procedures be established, implemented, and maintained to control, among other things, activities concerning testing of safety related equipment.

Item 12 of Attachment C to Procedure No. 0-16-3, "Work Order Process," defines a Functional Test Instruction (FTI) as instructions that define the evolutions or operations necessary to prove functionality or operability of a component, system, or structure.

Precaution 3.1 of Work Order 96-02928-00, Attachment A, "Functional Test for P-14A/S on A Train SIAS and Bus 5 Undervoltage," and Work Order 96-02929-00, Attachment A, "Functional Test for P-14 B/S on B Train SIAS and Bus 6 Undervoltage," states that if any step cannot be completed as specified in the FTI, then the Field Engineer must be contacted and any deviation from this FTI must be authorized in accordance with Procedure 0-16-3.

Deviations to FTIs are permitted through the use of Minor Technical Changes (MTC) as described in Item 13 of Attachment C to Procedure No. 0-16-3.

However, on August 22, 1996, Step 5.3.3 of WO 96-02928-00 and WO 96-02929-00 could not be performed as written, and the licensee failed to resolve the discrepancy by making a Minor Technical Change. Specifically, Step 5.3.3 provided that at Main Control Board (MCB), Section C, open circuit continuity be verified at 86-RASA-2(YAF) using a volt-ohm meter (VOM) across the 5-5C contacts. The field test engineers could not verify the open contacts with a VOM because of resistance in the circuit caused by a bulb and resistor wired into the circuit. Instead of making a MTC to permit visual verification, the field engineers verified open circuit continuity visually and signed Step 5.3.3 as satisfactorily completed.

B. 10 C.F.R. § 50.9(a) provides in part that information required by the Commission's regulations to be maintained by the licensee to be complete and accurate in all material respects.

10 C.F.R. Part 50, Appendix B, Criterion XVII, "Quality Assurance Records," requires, in part, that records of tests affecting quality be maintained.

However, on August 22, 1996, the licensee created test records that were materially inaccurate. Step 5.3.3 of WO 96-02928-00 and WO 96-02929-00 provided that at MCB, Section C, open circuit continuity be verified at 86-RASA-2(YAF) using a volt-ohm meter (VOM) across the 5-5C contacts. The field test engineers could not verify the open contacts with a VOM because of resistance in the circuit caused by a bulb and resistor wired into the circuit. Instead, the field test engineers verified open circuit continuity visually and signed Step 5.3.3 as satisfactorily completed. These inaccuracies were material because the tests concerned functionality or operability of safety-related components.

UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Yankee Atomic Electric Company	)	EA 97-387
and		
Duke Engineering & Services Co.		

DEMAND FOR INFORMATION

I

Maine Yankee Atomic Power Company (Licensee or MYAPCo or Maine Yankee) is the holder of Facility Operating License No. DPR-36, issued by the Nuclear Regulatory Commission (NRC or Commission) pursuant to 10 CFR Part 50 on September 15, 1972. The license authorizes the operation of Maine Yankee Atomic Power Station (facility or MYAPS) in accordance with conditions specified therein. The facility is located on the Licensee's site in Lincoln County, Maine.

Yankee Atomic Electric Company (YAEC) provides certain basic components and services to the Licensee. The YAEC LOCA Group provided Loss-of-Coolant-Accident (LOCA) analyses of Emergency Core Cooling System (ECCS) performance, for use in safety and licensing analyses. It is the NRC's understanding that subsequent to the events described in this Demand for Information, Duke Engineering & Services (DE&S) purchased the YAEC LOCA Group.

II

As a result of concerns regarding Small-Break Loss-of-Coolant Accident (SBLOCA) analyses raised by the 1979 accident at Three Mile Island Unit 2, and pursuant to 10 C.F.R.

§ 50.54(f), the NRC required licensees to submit revised, documented Small-Break Loss-of-Coolant Accident (SBLOCA) analyses which were to meet the guidance of "Clarification of TMI Action Plan Requirements" (NUREG-0737 or TMI Action Plan), Items II.K.3.30. and II.K.3.31. In response to the guidance of Item II.K.3.30, on January 14, 1983, Maine Yankee submitted a report, YAEC-1300P, "RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis" (RELAP5YA) to the NRC. In January 1989, the NRC approved RELAP5YA for use by Maine Yankee as a 10 C.F.R. Part 50, Appendix K, evaluation model, acceptable to demonstrate compliance with the requirements of 10 C.F.R. § 50.46. RELAP5YA is a generic, non-plant-specific LOCA computer code for calculating ECCS performance over the Small-Break portion of the break spectrum.

Item II.K.3.31 of the TMI Action Plan provides that licensees should submit plant-specific calculations using the SBLOCA evaluation model approved by the NRC pursuant to Item II.K.3.30. Although the NRC approved RELAP5YA as an Appendix K model, YAEC prepared two plant-specific RELAP5YA evaluation models for Maine Yankee in response to TMI Action Plan Item II.K.3.31: a "Best Estimate" model and an Appendix K model.[1]

YAEC developed its "Best Estimate" (BE) RELAP5YA plant-specific evaluation model in June 1990 in order to satisfy a verbal commitment made to the NRC by Maine Yankee in 1989 that the Item II.K.3.31 plant-specific calculations would be completed by June 1990, and

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[1] An Appendix K model is a LOCA evaluation model which complies with the requirements set forth in Appendix K to 10 C.F.R. § 50.46. A best-estimate model is an evaluation model which provides realistic calculations of LOCA phenomena and uses nominal values of input parameters. The "Best Estimate" SBLOCA model developed by YAEC and referred to herein combined the two approaches, such that the limiting SBLOCA case was identified with best-estimate calculations using nominal values of input parameters and the peak cladding temperature of the limiting case was calculated with Appendix K-like models. The Appendix K SBLOCA model developed by YAEC and referred to herein was developed as a strict Appendix K approach.

because of difficulties in developing an Appendix K evaluation model. YAEC prepared a report of the BE RELAP5YA SBLOCA evaluation model analysis in August 1990. Maine Yankee relied upon that "Best Estimate" RELAP5YA SBLOCA analysis to evaluate the effects of a reduction in steam generator (SG) pressure, as part of a January 1993 written safety evaluation required by 10 C.F.R. § 50.59, in order to determine whether a reduction in SG pressure involved an unreviewed safety question.

YAEC completed its development of an Appendix K RELAP5YA SBLOCA evaluation model, described in its June 1993 report, YAEC-1868: "Maine Yankee Small Break LOCA Analysis" (YAEC-1868). YAEC-1868 states that the Appendix K, RELAP5YA SBLOCA evaluation model was "performed in conformance with the requirements of 10 CFR 50.46 and post-TMI Action Items II.K.3.30 and II.K.3.31....The 10 CFR 50.46 acceptance criteria were met, thus closing out Item II.K.3.31 for Maine Yankee." The Appendix K analysis described in YAEC-1868 was used to prepare Core Performance Analysis Reports (CPARs), which were submitted to the NRC as part of Maine Yankee's reload analyses for Cycle 14 and Cycle 15 operations. The RELAP5YA analysis described in YAEC-1868 was the SBLOCA analysis of record throughout Cycle 14 operations, which occurred between October 14, 1993, and January 25, 1995, but not during Cycle 15 operations because of the intervening January 3, 1996, "Confirmatory Order Suspending Authority for and Limiting Power Operation and Containment Pressure (Effective Immediately), and Demand for Information" (Order)[2]. 61 *Fed. Reg.* 735 (January 10, 1996).

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[2] Among other things, the Order limited operation of MYAPS to 2440 MWt, pending NRC review and approval of a plant-specific SBLOCA which conforms to TMI Action Plan Items II.K.3.30 and II.K.3.31 and which meets the requirements of 10 C.F.R. § 50.46.

The LOCA Group at YAEC prepared the RELAP5YA SBLOCA code and evaluation models for Maine Yankee. The Manager of the LOCA Group (hereinafter,"the Manager") was first employed in the LOCA Group as an engineer in 1980 and has been the Manager of the LOCA Group in the YAEC Nuclear Engineering Department since February 1989. The Manager participated in the development of the RELAP5YA code. The Manager supervised the development of both the BE and Appendix K plant-specific RELAP5YA evaluation models for Maine Yankee, and participated in the preparation of YAEC-1868. The Manager supervises all LOCA work, which includes preparation of CPARs, LOCA codes for other NRC licensees, including Vermont Yankee and Yankee Rowe, and safety analyses. The Lead Engineer in the LOCA Group (hereinafter "the Lead Engineer") has been an engineer in the LOCA group since 1978 and has been the lead engineer for MYAPS LOCA analyses since mid-1990. The Lead Engineer performed the quality assurance review of both the 1990 BE RELAP5YA SBLOCA analysis and the 1993 Appendix K RELAP5YA SBLOCA analysis described in YAEC-1868.

On December 4, 1995, the NRC received allegations that, among other things, YAEC, acting as agent for the Licensee, knowingly performed inadequate analyses of the Emergency Core Cooling System (ECCS) to support two license amendment applications to increase the rated thermal power at which MYAPS operates, first to 2630 MWt, and then to 2700 MWt. It was further alleged that YAEC management knew that the ECCS for Maine Yankee, if evaluated in accordance with 10 C.F.R. § 50.46, using the RELAP5YA SBLOCA evaluation model, did not meet licensing requirements.

In response to the allegations, NRC dispatched an Assessment Team to YAEC headquarters between December 11 and 14, 1995, to examine, among other things, SBLOCA analyses, especially the SBLOCA analysis which supported the Licensee's operating cycle 15 (Cycle 15) reload analyses. Based on the Assessment Team's review, and a meeting held with

the Licensee on December 18, 1995, the NRC staff issued its January 3, 1996, Order. The staff concluded in the Order, *inter alia*, that the Licensee had not demonstrated that computer code RELAP5YA would reliably calculate the peak cladding temperature for all break sizes in the small-break LOCA spectrum for Maine Yankee and that, for a variety of reasons, the plant-specific application of RELAP5YA did not conform to the requirements of 10 C.F.R. § 50.46 and thus was not acceptable for use by the Licensee. RELAP5YA had been used by Maine Yankee for Cycle 14 SBLOCA analyses, and had been proposed for use by Maine Yankee for Cycle 15 SBLOCA analyses, to demonstrate compliance with 10 C.F.R. § 50.46 requirements for calculating ECCS performance. The Order required the Licensee to submit a SBLOCA analysis specific to Maine Yankee for operation at power levels up to 2700 MWt, which must meet the requirements of 10 C.F.R. § 50.46, "Acceptance criteria for emergency core cooling systems for light water nuclear power reactors," and which must conform to the guidance of NUREG-0737, "Clarification of TMI Action Plan Requirements", Items II.K.3.30 and II.K.3.31, "SBLOCA Methods" and "Plant-specific Analysis," respectively, and Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps During LOCA". The Order suspended authority to operate Maine Yankee at 2700 MWt maximum power and limited power to 2440 MWt, pending NRC review and approval of the required SBLOCA analysis.

The NRC also initiated an investigation by the NRC Office of Investigations (OI) to examine possible wrongdoing. OI issued its Report No. 1-95-050 on September 6, 1996.

Based on the Assessment Team review and the OI investigation, the NRC staff concluded that, as a result of Maine Yankee's use of the Appendix K and BE RELAP5YA evaluation models, apparent violations of NRC requirements occurred as set forth in

correspondence to MYAPCo[3] (hereinafter "December 19, 1997 letter to MYAPCo") issued concurrently with this Demand for Information. Preparation of LOCA analyses by the YAEC LOCA Group caused Maine Yankee to apparently violate NRC requirements, as explained below.

III

A. During Cycle 14 operations, and in the Cycle 14 and Cycle 15 reload analyses, Maine Yankee used apparently unacceptable evaluation models which could not calculate or reliably calculate ECCS performance.

As set forth in the December 19 letter to MYAPCo, Enclosure 4, Apparent Violations C and D, Maine Yankee used unacceptable evaluation models to calculate ECCS performance during Cycle 14 operations, and in the Cycle 14 and Cycle 15 CPARs used to support reload analyses, in apparent violation of 10 C.F.R. § 50.46(a)(1), because there was a region of the small-break spectrum between break sizes of 0.35 ft^2 and at least 0.6 ft^2 for which no acceptable evaluation model could either calculate or reliably calculate ECCS performance.

To calculate core cooling performance, MYAPCo used the Appendix K, RELAP5YA SBLOCA evaluation model described in YAEC-1868 and the Large-Break Loss-of-Coolant-Accident (LBLOCA) analysis described in YAEC-1160, "Application of Yankee WREM-BASED Generic PWR ECCS Evaluation Model to Maine Yankee" (WREM LBLOCA). YAEC-1868 and YAEC-1160 were prepared by the YAEC LOCA Group for MYAPCo. The CPARs for Cycle 14 and Cycle 15 were also prepared for MYAPCo by YAEC, with the participation of the YAEC LOCA Group.

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[3]*See* letter dated December 19, 1997, from H. Miller, Regional Administrator, to M. Sellman, President, MYAPCo.

In order for LOCA codes to be acceptable, they must not only be capable of calculating any point on the break spectrum, but must be capable of producing reliable calculations. RELAP5YA was not capable of calculating at break sizes of and greater than 0.35 ft. While the WREM LBLOCA code was capable of calculating ECCS performance at break sizes of 0.6ft^2 and above[4], those calculations would have been unreliable at break sizes of 0.6 ft^2 and some portion of the break spectrum above 0.6 ft^2. Because LBLOCA codes cannot be assumed to produce reliable or acceptable results in the Small-Break region, in order for the WREM LBLOCA code to be acceptable for calculating cooling performance in the Small-Break region of and greater than 0.6 ft^2, it would have been necessary to verify WREM LBLOCA results in that region of the break spectrum against test data in order to estimate those uncertainties. The WREM LBLOCA evaluation model, however, was not used to calculate ECCS performance in the Small-Break region of and greater than 0.6ft^2 for Cycle 14 or Cycle 15, and likewise was not verified against applicable test date in that region of the break spectrum.[5] Because MYAPCo's ECCS analyses, singly or combined, were not capable of acceptably calculating any point on the break spectrum, it was not possible to analyze any point on the break spectrum and thus to confirm that the limiting break had been identified.

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[4] The WREM LBLOCA code analyzed break sizes of and greater than 3.6 ft^2 in the Cycle 14 and Cycle 15 reload analyses. At the request of NRC staff in early 1996, Maine Yankee analyzed break sizes further down the spectrum with the WREM LBLOCA code, and ultimately did so down to .6ft^2. Since no changes were made to the WREM LBLOCA code in so doing, it is apparent that the WREM LBLOCA code was capable of performing calculations in the Cycle 14 and Cycle 15 reload analyses for break sizes down to 0.6 ft^2.

[5] Neither the 1996 performance of the WREM LBLOCA code down to break sizes of 0.6 ft^2, nor any verification against test data in 1996, even if it had been done, would have made the WREM LBLOCA code acceptable for use in calculating break sizes down to 0.6 ft^2 during Cycle 14 operations or the Cycle 14 and Cycle 15 reload analyses. Section 50.46(a)(1) requires that an ECCS code be acceptable *before* being used, and does not permit the substitution of engineering judgement for the ability to analyze any point on the break spectrum to confirm that the limiting breaks were identified.

The Manager of the LOCA Group had the primary responsibility at YAEC for ensuring that LOCA codes developed by YAEC complied with 10 C.F.R. § 50.46 and 10 C.F.R. Part 50, Appendix K requirements, and the responsibility for bringing compliance problems to the attention of YAEC management. It is necessary for engineers in the LOCA Group to be familiar with Section 50.46 requirements in order to adequately perform their duties. The Lead Engineer told OI investigators that she understood that her job description required her to be familiar with 10 C.F.R. § 50.46 and Appendix K, and that she was expected to report compliance problems to the Manager.

The Manager and the Lead Engineer were identified by the YAEC-1868 report as "major contributors" to the RELAP5YA analysis described in YAEC-1868. The Manager participated in the development of the RELAP5YA code, supervised the development of the RELAP5YA analysis described in YAEC-1868, and was one of the preparers of YAEC-1868. The Manager of the LOCA Group supervised all LOCA work, which includes the LBLOCA analyses for Maine Yankee. The Lead Engineer was employed in the LOCA Group as an engineer in 1978, has been the principal engineer for Maine Yankee LOCA analyses since mid-1990, and performed the quality assurance review of the RELAP5YA SBLOCA analysis described in YAEC-1868. As a result of their duties, the Manager and the Lead Engineer were also familiar with the WREM LBLOCA evaluation model and analyses developed and performed by YAEC for use by Maine Yankee. Additionally, the CPARs for Cycle 14 and Cycle 15 were prepared with the participation of the YAEC LOCA Group, including the Lead Engineer, and approved by the Manager, among others.

The apparent failure of the RELAP5YA SBLOCA analysis described in YAEC-1868 to comply with Section 50.46(a)(1) is of heightened concern because the oscillations and instability in the analysis became more severe at larger break sizes, increasing the risk that the limiting

breaks had not been identified. The Lead Engineer told OI investigators that although RELAP5YA had failed at 0.35 ft^2, she nonetheless believed, during her review of YAEC-1868, that the worst case had been bounded (the limiting transient had been identified). The Manager told OI investigators that, despite the fact that RELAP5YA had failed at 0.35 ft, he was nonetheless confident, during the development of the RELAP5YA SBLOCA analysis reflected in YAEC-1868, that the limiting break had been identified because Peak Cladding Temperature calculations had trended downward with increasing break size. This rationale is neither acceptable nor credible because, as explained above, RELAP5YA experienced increasing oscillations as break size increased and because there was a portion of the break spectrum for which there was no acceptable evaluation model capable of calculating cooling performance.

In view of the above, it is reasonable to conclude that the Manager and the Lead Engineer knew that there was a portion of the break spectrum between 0.35 ft and at least 0.6 ft^2 for which no NRC-approved, acceptable LOCA evaluation model was capable of either calculating or reliably calculating cooling performance.

In view of the above, it is also reasonable to conclude that as a result of its preparation and review of the RELAP5YA SBLOCA analysis described in YAEC-1868, and its preparation and approval of the CPAR's used to support MYAPCo's Cycle 14 and Cycle 15 reload analyses, YAEC caused MYAPCo to be in apparent violation of 10 C.F.R. § 50.46(a)(1).

B. MYAPCo maintained information and submitted to the NRC Core Performance Analysis Reports, in support of Cycle 14 and Cycle 15 reload applications, which apparently were not complete and accurate in all material respects.

As set forth in the December 19, 1997 letter to MYAPCo, Enclosure 4, Apparent Violation E, Maine Yankee maintained information and submitted to the NRC Core Performance Analysis Reports (CPARS), in support of Cycle 14 and Cycle 15 reload analyses, which were

not complete and accurate in all material respects, in apparent violation of 10 C.F.R. § 50.9(a). MYAPCo used the RELAP5YA SBLOCA analysis described in YAEC-1868[6] to prepare the CPARs in order to demonstrate compliance with 10 C.F.R. § 50.46. YAEC-1868, in its entirety, conceals the lack of an acceptable evaluation model to calculate ECCS performance for a portion of the break spectrum between 0.35 ft^2 and at least 0.6 ft^2 (*see* Section III.A., *supra*) by making statements which imply that the complete break spectrum was analyzed or capable of analysis, and by stating that a sufficient number of break sizes was analyzed such that the limiting LOCA conditions were identified in conformance with the requirements of 10 C.F.R. § 50.46(a)(1).

Through its submission of YAEC-1868 to MYAPCO, YAEC provided to MYAPCo information required to be maintained by the NRC which apparently was not complete and accurate all material respects. Based upon the Assessment Team review and the OI investigation, it appears that no Maine Yankee personnel realized that the RELAP5YA code failed at 0.35 ft^2 or that there might be a portion of the break spectrum for which there was no acceptable evaluation model to calculate ECCS performance, and that no one at YAEC informed MYAPCo personnel that RELAP5YA had failed at 0.35 ft^2. The Manager told OI investigators that he did not think that the failure of RELAP5YA at 0.35 ft^2 was significant, and does not recall discussing this failure of RELAP5YA with the manager in charge of the Engineering Section of the Licensing and Engineering Group of MYAPCo, who was the MYAPCo manager kept directly apprised by YAEC and by the Manager of the development of the plant-specific RELAP5YA evaluation models on a continuing basis.

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[6] YAEC-1868 is a record required to be maintained by the NRC because it is part of the documentation underlying the CPARs, which are records required to be maintained by 10 C.F.R. § 50.71.

Statements in YAEC-1868 that RELAP5YA "terminated" after SIT actuation for the 0.35 ft^2 break size case (*see* YAEC-1868, at 22) do not reveal the non-compliance with 10 C.F.R. § 50.46(a)(1). That language would not signify to an individual without expertise in LOCA codes that RELAP5YA had failed and was not capable of calculating ECCS performance at break sizes of and greater than 0.35 ff. If YAEC-1868 had explicitly stated that RELAP5YA failed at 0.35 ft^2 and was not capable of calculating ECCS performance at break sizes of and greater than 0.35 ft^2, and that there was no NRC-approved, acceptable evaluation model which could analyze a portion of the break spectrum, the description of the RELAP5YA SBLOCA evaluation model would have been complete and accurate.

The Manager participated in the development of the RELAP5YA code, supervised the development of the RELAP5YA evaluation model described in YAEC-1868, and assisted in the preparation of YAEC-1868. The Lead Engineer performed the quality assurance review of RELAP5YA SBLOCA analysis described in YAEC-1868. Both the Manager and the Lead Engineer were familiar with the WREM LBLOCA analysis developed by YAEC for Maine Yankee. It is reasonable to conclude that the Manager and the Lead Engineer knew that there was a portion of the break spectrum, between break sizes of 0.35 ff and at least 0.6 ft^2, for which no NRC-approved, acceptable LOCA evaluation model was capable of either calculating or reliably calculating cooling performance. (*See* Section III.A, *supra*).

Based on the above, it is reasonable to conclude that, as a result of YAEC's preparation and review of YAEC-1868, YAEC provided MYAPCo with information that was not complete and accurate in all material respects, and thus caused MYAPCO to be in apparent violation 10 C.F.R. § 50.9(a).

C. <u>During Cycle 14 operations and in the Cycle 14 and Cycle 15 CPAR, MYAPCo used an apparently unacceptable SBLOCA evaluation model which over predicted core cooling.</u>

As set forth in the December 19, 1997 letter to MYAPCo, Enclosure 4, Apparent Violations F and G, the RELAP5YA SBLOCA evaluation model described in YAEC-1868, used to calculate core cooling performance in Cycle 14 operations and in the Cycle 14 and Cycle 15 CPARs, apparently did not satisfy the requirements of 10 C.F.R. § 50.46(a)(1), because as a result of incorrect calculations of the penetration factors, which arose from misapplication of the Alb-Chambre penetration correlation[7], the analysis provides no basis to assume full penetration of the emergency core cooling system injection and provides no basis to derive the loss coefficient of 600 used for the split downcomer nodalization. These deficiencies resulted in over prediction of core cooling and overstatement of the conservatism of the model.

Junction 057[8] was the only communication between the intact loop and the broken loop downcomers. A very large loss coefficient of 600, compared to 0.6 in the original model, is used for Junction 057 in YAEC-1868. The loss coefficients were calculated based on penetration factors ranging from 0.96 to 1.0. If the Alb-Chambre correlation had been applied correctly, penetration factors would have been calculated in the range of -0.6657 to -0.7767, which is a

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[7] The Alb-Chambre Correlation is an empirical correlation developed by Gary P. Alb and Paul L. Chambre ("Correlations for the Penetration of ECC Water in a Model of A PWR Downcomer Annulus," Nuclear Engineering and Design, 53, PP 237-248) for calculation of the penetration factor of the injected ECCS water penetrating the downcomer annulus into the lower plenum.

[8] A junction is a connection that provides a flow path or communication between two nodes, or volumes, in a plant nodalization model. Junction 057 is the flow junction between two halves (nodes) of the downcomer in the reactor vessel downcomer nodalization scheme.

meaningless result because the calculations would have been less than zero.[9] Such calculations also indicate other possible errors in application of the Alb-Chambre correlation.

The Manager supervised the preparation of RELAP5YA SBLOCA analysis described in YAEC-1868, and the Manager was one of the preparers of the YAEC-1868 report. The Lead Engineer performed the Quality Assurance (QA) review of the analysis described in YAEC-1868. The Manager and the Lead Engineer should have realized during their work associated with the RELAP5YA analysis described in YAEC-1868 that the Alb-Chambre correlation had been incorrectly applied. In particular, an adequate QA review would have revealed the errors and the unacceptability of the RELAP5YA SBLOCA analysis described in YAEC-1868.

In view of the above, it is reasonable to conclude that YAEC caused MYAPCo to rely on an unacceptable SBLOCA evaluation model in apparent violation of 10 C.F.R. § 50.46(a)(1).

D. MYAPCo used an apparently unacceptable Best Estimate RELAP5YA SBLOCA evaluation model to calculate ECCS performance.

As set forth in the December 19, 1997 letter to MYAPCo, Enclosure 4, Apparent Violation H, MYAPCo performed a safety analysis in order to determine if a decrease in steam generator pressure involved an unreviewed safety question, pursuant to the requirements of 10 C.F.R. § 50.59, and in so doing used an unacceptable Best Estimate RELAP5YA evaluation model to calculate SBLOCA ECCS performance, in apparent violation of 10 C.F.R. § 50.46(a)(1). The Section 50.59 analysis was prompted by equipment degradation which had caused a reduction

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[9] A penetration factor is the fractional or partial penetration of ECC injection water into the downcomer, defined as the ratio of the volumetric flow rate of the ECC water penetrating into the lower plenum to the volumetric inlet flow rate. The penetration factor ranges from 0 for no penetration (total bypass) to 1 for full penetration. Penetration factors either greater than 1 or less than 0 are meaningless because they are physically impossible.

in SG pressure, which was possibly a non-conforming condition, as the operating SG pressure had fallen below the pressure assumed in the SBLOCA analysis of record.[10]

MYAPCo's January 1993 Section 50.59 analysis relied upon an analysis of the effect of the reduction in SG pressure on ECCS performance prepared by YAEC, which used, among other analyses, the Best Estimate (BE) RELAP5YA SBLOCA analysis. The YAEC LOCA Group prepared "Impact of Low Steam Generator Pressure on LOCA Analysis" (LOCA 91-04), dated January 25, 1991, which used the June 1990 BE RELAP5YA analysis for the SBLOCA portion of the study. LOCA 91-04 was approved by the Manager of the YAEC Nuclear Engineering Department for the Manager. A YAEC Memorandum, "Impact of Lower Steam Generator Pressure on the Safety Analysis" (NED 91-18), dated January 28, 1991, relied on LOCA 91-04 to evaluate the impact of reduced steam generator pressure on the MYAPCo safety analysis. The Manager was provided a copy of NED 91-18, which was also transmitted to the Vice President of MYAPCo Licensing and Engineering, on January 28, 1991. Finally, in a YAEC memorandum dated May 29, 1992, and titled "Steam Generator Pressure and Heat Transfer Coefficient Monitoring", YAEC concluded that "the lower initial SG pressure did not affect the results of the licensing analysis," based in part on NED 91-18. The May 29, 1992, memorandum states: "This memo is safety-related". The Manager approved the May 29, 1992, memorandum, which was transmitted to the Vice President of MYAPCo Licensing and Engineering on June 1,

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[10] The SG pressure assumed in the SBLOCA analysis of record (the CE SBLOCA analysis) between Cycle 4 and mid-Cycle 13, and thus at the time of the January 1991 SG pressure reduction analysis performed pursuant to Section 50.59, was approximately 877 psig. An internal memorandum from F. John Card, dated April 7, 1989 (File 14.82, 2.10), states that on April 6, 1989, at full power, SG pressure was 827 psig, and that on October 30, 1984, at 2630 MWt SG pressure was 825 psig.

1992. The MYAPCo Section 50.59 analysis of reduced steam generator pressure referenced and relied upon NED 91-18[11] and the May 29, 1992 memorandum.[12]

A Section 50.59 analysis cannot confirm that ECCS performance will be adequate unless the Section 50.59 analysis uses LOCA evaluation models acceptable to demonstrate compliance with 10 C.F.R. § 50.46. Maine Yankee's reliance upon the BE RELAP5YA model was in apparent violation of 10 C.F.R. § 50.46(a)(1) because the January 1989 NRC SER approved RELAP5YA for application to Maine Yankee as a full Appendix K evaluation model, not as a BE evaluation model, to demonstrate compliance with 10 C.F.R. § 50.46. Additionally, the BE RELAP5YA evaluation model apparently did not comply with 10 C.F.R. Part 50, Appendix K, because: (1) the BE model calculated decay heat with the 1979 ANS Standard rather than the required 1971 ANS Standard plus 20 percent; and (2) the BE model calculated the two-phase critical flow with the RELAP5YA mechanistic model rather than the required Moody critical flow model.

It is reasonable to conclude that the Manager of the YAEC LOCA Group was aware, before the studies of the impact of reduced steam generator pressure on LOCA analyses were performed, that the BE version of RELAP5YA did not conform to the SER and that its use without NRC approval would be unacceptable. A memorandum dated January 2, 1990, prepared by the Manager, states that the Best Estimate RELAP5YA SBLOCA code, which the Manager had proposed to develop to resolve the Three Mile Island Action Plan Item II.K.3.31,

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[11] Maine Yankee's "Technical Evaluation" associated with the Section 50.59 analysis referenced NED 91-18 as MYP 91-0098, the identification number Maine Yankee assigned to NED 91-18 upon its receipt.

[12] Maine Yankee's "10 CFR 50.59 Determination" referenced the May 29, 1992 memorandum as MYP 92-0605, the identification number Maine Yankee assigned to the May 29, 1992 YAEC memorandum upon its receipt.

differs from the approach approved by the SER, and suggests that a summary report describing the proposed BE method and results be submitted to the NRC. The Manager told OI investigators that this had not been done, that he believed that MYAPCo personnel had discussed the possibility of a BE approach to close out Item II.K.3.31 with the NRC Project Manager for MYAPCO, that the NRC staff did not issue an approval of that proposal, that the Manager was not aware of any NRC approval of that proposal, and that he believed that the BE RELAP5YA model would not be acceptable for use in licensing matters.

It is also reasonable to conclude that the Manager knew that the analysis which YAEC performed regarding the effects of a reduction in steam generator pressure on LOCA analyses was a safety analysis which would be used by Maine Yankee in a Section 50.59 analysis or other safety analysis. The Manager stated to OI investigators that he did not know whether the YAEC analyses were in fact used by Maine Yankee to perform a Section 50.59 analysis. Because of the very nature of their work, however, LOCA group engineers, including the Manager, would have to have known that the YAEC analyses of SG pressure reduction were intended by Maine Yankee to be used for a Section 50.59 or other safety analysis. The October 31, 1990, Maine Yankee Service request (MY-A-24-82, Rev. 3), NED 91-18, "Impact of Lower Steam Generator Pressure on the Safety Analysis", and the May 29, 1992 memorandum, "Steam Generator Pressure and Heat Transfer Coefficient Monitoring", explicitly state that the YAEC studies were performed to determine the effect of the SG pressure reductions upon the MYAPS safety analysis. In view of the intended use of the YAEC analysis, the Manager should have provided Maine Yankee with an analysis which met NRC requirements.

In view of the above, it is reasonable to conclude that by approving the use of and by providing to Maine Yankee an unacceptable analyses of the effects of reductions in SG pressure on LOCA analyses, YAEC caused Maine Yankee to apparently violate

10 C.F.R. § 50.46(a)(1) by relying on an unacceptable SBLOCA evaluation model to calculate ECCS cooling performance in preparing a Section 50.59 analysis.

IV

The foregoing situation raises serious questions concerning regard for and adherence to NRC requirements and concerning management control and supervision over licensed activities. Questions are raised as to whether YAEC and/or DE&S will in the future provide complete and accurate information to licensees and to the NRC; whether YAEC and/or DE&S are willing and able to otherwise conduct their activities in accordance with the Commission's requirements; and whether YAEC and/or DE&S should be permitted to provide LOCA analyses or other safety-related analyses to NRC licensees.

Further information is needed to determine whether the Commission can have reasonable assurance that in the future licensees can rely upon YAEC and/or DE&S to provide complete and accurate information; whether YAEC and/or DE&S are willing and able to otherwise conduct its activities in accordance with the Commission's requirements; and whether YAEC and/or DE&S should be permitted to provide LOCA analyses or other safety-related analyses to NRC licensees.

V

Accordingly, pursuant to sections 161c, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 C.F.R. § 2.204, the Commission needs the following information to determine whether enforcement action should be taken

against Yankee Atomic Electric Company (YAEC) and/or Duke Engineering & Services (DE&S) Company to ensure future compliance, on the part of NRC licensees, with NRC requirements:

A. An explanation why, in view of the matters set forth above, the NRC should permit any NRC Licensee to use the services of YAEC LOCA Group and/or DE&S, to the extent that YAEC LOCA Group was transferred to DE&S, to perform LOCA analyses or any safety-related analyses to meet NRC requirements.

B. An explanation why the NRC should not consider the inadequate analyses, which apparently caused MYAPCo to be in violation of NRC requirements, to be the result of wilfulness, either deliberateness or careless disregard, on the part of YAEC and/or DE&S personnel.

VI.

Yankee Atomic Electric Company and Duke Engineering & Services Co. are required to submit their responses in writing and under oath or affirmation, to the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, within 30 days of the date of this Demand for Information. Copies also shall be sent to the Director, Office of Enforcement , the Assistant General Counsel for Hearings and Enforcement at the same address, and to the Regional Administrator, NRC Region I, 475 Allendale Road, King of Prussia, PA 19406-1415.

After reviewing the responses, the NRC will determine whether further action is necessary to ensure compliance with regulatory requirements.

FOR THE NUCLEAR REGULATORY COMMISSION

Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland
this 19 day of December, 1997

Maine Yankee

P.O. BOX 408 • WISCASSET, MAINE 04578 • (207) 882-6321

April 03, 1998
MN-98-23 MJM-98-028

UNITED STATES NUCLEAR REGULATORY COMMISSION
Attention: Document Control Desk
Washington, D.C. 20555

References: a) License No. DPR-36 (Docket No. 50-309)
b) USNRC Letter to MYAPCo dated December 19, 1997, APPARENT VIOLATIONS STEMMING FROM NRC OFFICE OF INVESTIGATIONS REPORT Nos. 1-96-025, 1-95-050, AND 1-96-043

Subject: Response to APPARENT VIOLATIONS STEMMING FROM NRC OFFICE OF INVESTIGATIONS REPORT Nos. 1-96-025, 1-95-050, AND 1-96-043

Gentlemen:

This letter and the attached documents provide Maine Yankee Atomic Power Company's response to the apparent violations contained in the enclosures to Reference (b). Attachment A hereto is a table of contents. Attachment B is an executive summary. Attachment C provides Maine Yankee's detailed responses to the apparent violations. Attachment C also contains an appendix which addresses the "willfulness" standard. It is our hope that these documents, as well as the discussion in this letter, will provide you with additional insight prior to the enforcement conference. As indicated by Maine Yankee's responses to the apparent violations, Maine Yankee adopts and incorporates those portions of Duke Engineering & Services, Inc.'s Response to the Nuclear Regulatory Commission's Demand for Information, dated February 27, 1998, that are relevant to the cited apparent violations.

We are reaching the end of a long and grueling effort associated with questions and issues about Maine Yankee's application of RELAP5YA. Maine Yankee, Yankee Atomic Electric Company and NRC personnel have literally invested years in identifying, investigating and resolving these questions. It is no exaggeration to say that the careers and lives of certain individuals at Maine Yankee and Yankee Atomic have been severely affected. This is particularly troubling because it appears that the entire RELAP5YA affair could have been avoided if, at any time during a several year period, Maine Yankee had simply scheduled a meeting with NRC technical reviewers to discuss ongoing problems related to RELAP5YA analyses.

Enclosure 2

The RELAP5YA events and the related enforcement action pose so many questions requiring such detailed answers that an enforcement conference is not an adequate forum to respond. For this reason, Maine Yankee has chosen to depart from tradition and to provide this written response in advance of the enforcement conference. By doing so we hope to be able to focus attention during the enforcement conference on the following key questions and answers:

1. Was safe operation of Maine Yankee ever in doubt?

No. At all times, Maine Yankee and Yankee Atomic personnel utilized proven analytic codes and acceptable safety-based reasoning to support operation of Maine Yankee. The large break (LB) LOCA was at all times the limiting break, and the WREM LBLOCA model was clearly an acceptable tool on which to base safety decisions. Maine Yankee believes that the RELAP5YA issues as a whole constitute a situation involving technical non-compliance with regulations and lack of familiarity with NRC expectations and regulatory interpretations, rather than an infringement on safety margins.

2. Did Maine Yankee's activities with respect to RELAP5YA lead to errors and mistakes constituting regulatory violations?

Yes. Those violations are, on one hand, typical of analysis-based problems and mistakes occurring throughout the industry over an extended period of time. On the other hand, the violations are atypical of industry leaders in that they reflect a failing by Maine Yankee to stay current on evolving standards and NRC expectations. The Independent Safety Assessment team (ISAT) report was perceptive in identifying Maine Yankee's insularity as a major contributor to reduced performance standards compared to the higher performing plants in the industry. RELAP5YA is an instance where insularity and isolation enabled a mistaken but good faith belief that regulatory compliance had been achieved.

3. Were these errors and mistakes deliberate or the result of careless disregard?

Clearly not. Maine Yankee and Yankee Atomic personnel always maintained their safety focus, ensuring that NRC approved small break (SB) LOCA codes were used to confirm safe plant operation. These same personnel were convinced that prior NRC approvals, coupled with satisfactory analysis results, were synonymous with compliance with relevant regulations. This confusion with respect to regulatory interpretation and implementation, which was shared at times by NRC personnel, was not indicative of an intent or desire to circumvent NRC requirements. Extensive investigations at both Maine

Yankee and Yankee Atomic confirmed an honest, albeit sometimes misguided, intent on the part of each individual to remain compliant with applicable regulations.[1]

4. Are RELAP5YA issues of regulatory significance?

Yes. To an outside observer, the RELAP5YA problems clearly are an example of excessive reliance on, and less than adequate oversight of, vendor activities on the part of Maine Yankee. Because of the industry's extensive reliance on vendors and contractors for certain activities such as license basis safety analyses, the NRC has more than a passing interest in ensuring that licensees exert good oversight of their contractors' work. The RELAP5YA lesson and message received by the industry well before this enforcement action was the importance that the NRC places upon strong oversight of contractor performance.

As a result of the lengthy investigation conducted by the Office of Investigations and the referral of this matter for further investigation to the Department of Justice, Maine Yankee's response to the apparent violations, along with the scheduled enforcement conference, represent Maine Yankee's first real opportunity in the almost two and one-half year period since the anonymous allegations were received to have a meaningful dialogue with the NRC and to achieve a common understanding of the events that underlie these apparent violations.

Overview of RELAP5YA Issues

The scope of the apparent RELAP5YA violations spans a number of years, hundreds of documents and thousands of pages of interviews. Because of the legal and enforcement implications, it is difficult to present even a simple discussion of any aspect of the RELAP5YA matter without resorting to a review of extensive supporting and background material -- at which point, it is easy to be lost in the details and to overlook the forest for the trees. While a great deal of detail is provided in the attached materials, we believe it is appropriate to begin with an overview of what is essentially a simple RELAP5YA story.

The RELAP5YA story began in 1980 with a desire on the part of Yankee Atomic to provide additional services to its customers. Although Yankee Atomic had a strong analytic capability, LOCA analyses for Maine Yankee and other Yankee Atomic clients were still being performed by the original NSSS vendors.

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[1] Maine Yankee believes it is important to note that, with very few exceptions, the Maine Yankee employees who had direct involvement in the RELAP5YA issues are no longer employed at Maine Yankee. It is also important to note that Maine Yankee has implemented an almost complete change in the company's senior management.

Yankee Atomic initiated a project to develop a SBLOCA analysis capability based on the RELAP model. In retrospect, "Yankee Atomic management did not obtain sufficient experience and depth in the staffing of the RELAP5YA project team. . . . Few of the staff had any prior LOCA analysis experience."[2] Nonetheless, the project team persisted, becoming technically qualified and knowledgeable about SBLOCA computer models and phenomena.[3]

While it is clear that the Yankee Atomic LOCA Group achieved technical competence in dealing with SBLOCA analyses, it is equally clear that the LOCA Group, along with cognizant Maine Yankee personnel, were relatively isolated from the rest of the industry, in particular the NRC/industry LOCA community. Whereas NSSS vendors had interacted for years with the NRC LOCA reviewers and understood NRC expectations, the Yankee Atomic and Maine Yankee personnel were new to the largely arcane area of LOCA analyses. Unlike virtually all other areas of NRC regulation, NRC's expectations and guidance for LOCA analyses are not published -- rather they are learned through years of personal interaction and experience with LOCA reviewers. Lacking published NRC guidance, it is understandable (although not acceptable) that Yankee Atomic and Maine Yankee personnel reached conclusions and adopted approaches counter to NRC's interpretation of some aspects of the requirements associated with 10 C.F.R. §50.46. Two prime examples of such approaches are as follows:

- NRC's apparent violations indicate that the RELAP5YA code was not capable of calculating ECCS cooling performance for small break sizes between 0.35 ft.^{2} and at least 0.6 ft.^{2} While not expressly stated by the apparent violations, the NRC's Demand for Information to Yankee Atomic and Duke Engineering & Services, Inc. states that it is reasonable to conclude that the Yankee Atomic LOCA engineers knew that the RELAP5YA code was not capable of reliably calculating cooling performance for this portion of the SBLOCA break spectrum. In fact, the Yankee Atomic LOCA engineers did not undertake to run additional analyses for break sizes larger than 0.35 ft.^{2} because they did not believe there was any need or requirement to do so. The YAEC engineers interpreted 10 C.F.R. §50.46 to require only that the limiting break be identified and bounded, not that the analysis include a full range spectrum of break sizes. When the LOCA engineers determined that the limiting break had been identified, based on a sufficient number of break size calculations and supported by engineering judgment, they did not believe there was any reason or requirement to perform additional analyses for

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2 *See* Duke Engineering & Services, Inc. Response to the NRC's Demand for Information, dated February 27, 1998, Appendix C, "Yankee Atomic Small Break LOCA Technical Review Report", pp. C-12 - C-13.

3 *Id.* at C-14.

larger break sizes. The LOCA team concluded that there was sufficient technical basis (i.e., decreasing PCT with increasing SBLOCA size) to conclude that the limiting SBLOCA size had been identified and that additional computer runs above 0.35 ft.^{2} were unnecessary. Unfortunately, this conclusion and the engineering judgment supporting it were not shared with the NRC at the time.

- RELAP5YA was limited in its ability to realistically model ECCS bypass flow (it significantly overpredicted the amount of injected water that bypasses the reactor core). To correct this deficiency, the Yankee Atomic team introduced a non-physical loss coefficient between two volumes representing a reactor vessel downcomer to acceptably predict experimentally determined bypass flow. This approach has withstood technical scrutiny; however, the team did not identify the modeling change as one which required NRC approval and did not discuss the issue with the NRC.

These two examples are typical of the thought process and approach prevalent at Yankee Atomic and Maine Yankee subsequent to NRC approval of the RELAP5YA model in 1989. In each instance, the team pursued a technically supportable approach to resolving a modeling problem -- an approach which, had it been presented to the NRC for review, may likely have received NRC approval or, alternatively, would have resulted in resolution of any technical issues through dialogue. But, in each case, the team was sufficiently remote from the LOCA community and NRC expectations that they failed to recognize the need for discussions with the regulator. In these and other examples, the Yankee Atomic and Maine Yankee personnel believed that they were compliant with the requirements and expectations of the NRC. Far from looking for loopholes in the regulations (much less, intending to violate the regulations), the team, in their isolation, naively assumed that requirements and expectations had been met.

As concluded by the group of LOCA industry experts brought together by Duke Engineering & Services, Inc. to review and evaluate these RELAP5YA issues, the Yankee Atomic LOCA team was "sincere, honest, open and cooperative. Throughout the history of the RELAP5YA project the staff has been conscientious and hardworking, and had good intentions of establishing independent analysis capabilities to broaden their support of their customers."[4] However, it was also apparent to these LOCA industry experts that the LOCA Group staff was not expert in LOCA analysis-related history, precedent and licensing processes.[5]

Following NRC approval of RELAP5YA in 1989, Maine Yankee personnel became more directly involved in licensing activities associated with RELAP5YA.

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[4] *Id.* at C-15.

[5] *Id.*

Typical of most licensees, Maine Yankee requested that Yankee Atomic interactions with the NRC concerning Maine Yankee be coordinated through Maine Yankee personnel.

Also, shortly after approval of RELAP5YA, the NRC came under intense congressional scrutiny and pressure regarding the status of implementation of Three Mile Island (TMI) Action Plan items. The NRC Chairman's March 1989 response to congressional inquiry did not include Maine Yankee on a list of plants with open TMI Action Plan items (i.e., indicating Maine Yankee had completed all required items). In order to confirm the level of Maine Yankee compliance with the TMI Action Plan, the NRC requested, in April 1989, Maine Yankee's understanding of its TMI Action Plan implementation status. In two separate letters to the NRC in April 1989, Maine Yankee told the NRC that all TMI Action Plan items were complete with one exception -- Action Item II.K.3.31, which involved conducting plant-specific calculations using NRC-approved models for SBLOCA. Maine Yankee informed the NRC that the SBLOCA calculations were expected to be completed in 1990.

Despite Maine Yankee's statements in correspondence dated April 14 and April 18, 1989 that II.K.3.31 was incomplete and that completion of the Action Item was not expected until the following year, approximately three weeks later, on May 8, 1989, the NRC's Project Manager for Maine Yankee provided a letter closing out TMI Action Item II.K.3.31.[6] In a follow-up NRC report submitted to Congress in June 1989, Maine Yankee is again not identified as having any open TMI Action Items, this time presumably as a result of the Project Manager's May 8, 1989 letter closing II.K.3.31 for Maine Yankee.

During this period, Yankee Atomic began a several year effort to produce a set of RELAP5YA SBLOCA calculations for Maine Yankee compliant with 10 C.F.R. §50.46 and Appendix K. The RELAP5YA model continued to experience problems that had been identified during the development stage, such as code instabilities and oscillations, and much of the delay was attributable to computational speed limitations. During this period, Maine Yankee believes it was kept adequately apprised by Yankee Atomic personnel, particularly the LOCA Group Manager and other LOCA Group engineers, concerning the status of the SBLOCA analysis for Maine Yankee, concerning the technical difficulties encountered by the LOCA Group in its efforts to apply RELAP5YA to Maine Yankee, and concerning the LOCA Group's possible solutions for overcoming those technical difficulties.

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[6] The Project Manager recalls that in a phone conversation with Maine Yankee on May 5, 1989 he was told that the SBLOCA analyses for II.K.3.31 were "operational" and would be used to develop the next fuel reload (i.e., in 1990). This apparently formed his basis for closing II.K.3.31. Although Maine Yankee personnel do not recall this conversation, the conversation, as recalled by the NRC Project Manager, includes essentially the same type of information as provided three weeks earlier in the April 1989 letters on TMI Action Plan compliance, i.e., that SBLOCA calculations would not be performed until 1990.

During this period there was no indication of undue or improper pressure from Yankee Atomic management or Maine Yankee personnel to achieve certain results, nor was there any concealment by the LOCA Group of the progress (or lack thereof) in the SBLOCA work. Indeed, while a number of different RELAP5YA approaches and modifications were tried, and the continuing difficulties attempted to be resolved, the LOCA team continued to use the previously approved NSSS vendor analyses for Cycles 12 and 13 at Maine Yankee, and Maine Yankee so informed the NRC. Because it was understood by Yankee Atomic and Maine Yankee personnel that the NRC had unconditionally closed TMI Action Item II.K.3.31 through the NRC Project Manager's letter in 1989, and because YAEC considered changes being made to be code inputs rather than model changes, there was little discussion of the need to submit intermediate RELAP5YA Appendix K modifications and approaches to the NRC. Based on the May 1989 letter, Maine Yankee and Yankee Atomic personnel believed that NRC review of the SBLOCA analysis would occur by NRC inspection. Accordingly, when the Appendix K SBLOCA calculations were ultimately completed and approved by Yankee Atomic in 1993, Maine Yankee and Yankee Atomic personnel did not believe or understand that a submittal to the NRC was necessary.

An appropriate safety focus was maintained throughout this period. As noted above, NRC-approved NSSS vendor analyses formed the safety basis for Maine Yankee while RELAP5YA plant specific calculations were being developed. Yankee Atomic and Maine Yankee personnel also knew that the large break LOCA (LBLOCA) event (not SBLOCA) was limiting for Maine Yankee, i.e., LBLOCA had always produced more severe consequences, such as elevated peak clad temperatures, than SBLOCA. Since the stated purpose of 10 C.F.R. §50.46 is to identify the most severe postulated LOCA, and because it was the LBLOCA which set the technical specification operating limits for each cycle of operation, when combined with NSSS vendor SBLOCA calculations, Yankee Atomic and Maine Yankee personnel concluded that both safety performance and regulatory compliance had been achieved.

Unlike many in the industry, Maine Yankee did not communicate its SBLOCA approach to the NRC and did not maintain a dialogue to address technical issues and problems. Had Maine Yankee personnel responsible for NRC interaction recognized that communication on SBLOCA issues between Maine Yankee and NRC was well below industry standards, the entire RELAP5YA enforcement action, not to mention the Department of Justice referral and criminal investigation, would never have occurred. Simple communication would have identified areas of misunderstanding with respect to compliance and NRC expectations which could have been remedied at any time from 1990 - 1993.

The lesson in RELAP5YA is not one of willful disregard of regulations, nor lack of safety consciousness. Rather, the lesson is twofold:

- Isolation can lead to non-compliance in evolving regulatory areas; and
- Frequent, open communications with the regulators prevent misunderstandings and enhance trust.

With 20/20 hindsight these events reveal Maine Yankee deficiencies in communication with the NRC, and in understanding and implementing regulatory expectations. They do not, however, establish a willful intent to deceive or mislead the regulator, or otherwise violate the public trust. Nor do these events evidence careless disregard by Maine Yankee of regulatory requirements. The NRC investigators, from the beginning, appeared to operate on the premise that the Yankee Atomic engineers, and, presumably, cognizant Maine Yankee personnel, knew they had a code that did not work, and that the companies sought to conceal these deficiencies from the regulator. To the contrary, the record, as understood by both Maine Yankee and Duke Engineering & Services, Inc., suggests technically competent, honest analysts insulated and isolated from the rest of the industry and the NRC, with problems compounded by Maine Yankee deficiencies in communications and in understanding evolving regulatory expectations in a changing environment. Moreover, based on a thorough evaluation of the analytical codes (other than RELAP5YA) supplied by Yankee Atomic for Maine Yankee safety analyses, the NRC's own Independent Safety Assessment (ISA) team concluded that, overall, Yankee Atomic's analytic code work for Maine Yankee was very good.[7] Accordingly, Maine Yankee's reliance on, and confidence in, Yankee Atomic's technical expertise was reasonable.

Maine Yankee looks forward to the enforcement conference as an opportunity to establish with the NRC, and, ultimately, with the public, a common understanding of the facts surrounding the RELAP5YA allegations, the root causes, the corrective actions taken, and their safety significance.

Maine Yankee respectfully suggests that this opportunity to reach a common understanding of events is somewhat diminished by the NRC's refusal to provide Maine Yankee with the relevant OI reports. In the interests of achieving the maximum level of mutual understanding and open discussion, Maine Yankee renews its prior requests that it be provided with copies of those reports sufficiently in advance of the enforcement conference to permit a meaningful review and dialogue. In the event that the NRC again denies this request, Maine Yankee requests, on the basis of fundamental fairness in that company and individual reputations are at stake, that the NRC come to the enforcement conference prepared to identify and discuss with specificity the basis for any belief that Maine Yankee and/or its employees or agents deliberately violated or carelessly disregarded regulatory requirements. Only then will we be able to achieve a mutual understanding of the RELAP5YA issues, thereby assuring a full and fair opportunity to confront the issues we face.

In addition to the ECCS/RELAP5YA issues that underlie most of the apparent violations, Maine Yankee's response also addresses the apparent violations associated

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[7] *See* United States Nuclear Regulatory Commission Independent Safety Assessment of Maine Yankee Atomic Power Company, dated October 7, 1996, p. 70 ("The use of analytic codes for safety analyses was very good. Cycle specific core performance analyses were excellent.").

with the Atmospheric Steam Dump Valve (ADV) matter and the safety system logic testing issues. Maine Yankee respectfully suggests that the factual record underlying these apparent violations does not support a conclusion that Maine Yankee personnel deliberately violated, or carelessly disregarded, NRC requirements.

Pursuant to the request of NRC staff, we are providing 10 copies of Maine Yankee's response. We are also enclosing one redacted copy for the Public Document Room from which the names of Maine Yankee and Yankee Atomic employees have been redacted. Please contact us should you need additional information in advance of the enforcement conference.

Very truly yours,

Michael J. Meisner
Maine Yankee President

Attachments
cc: James Lieberman
Hubert J. Miller
John Zwolinsky
Michael Webb
Ronald Bellamy
Rick Rasmussen
Patrick J. Dostie
Uldis Vanags

ATTACHMENT A

TABLE OF CONTENTS

ATTACHMENT B

EXECUTIVE SUMMARY

I. MYAPCO RESPONSES TO APPARENT VIOLATIONS ASSOCIATED WITH ECCS ANALYSES (OI REPORT NO. 1-95-050).

By letter dated December 1, 1995, the Union of Concerned Scientists (UCS) provided to the State of Maine Nuclear Safety Advisor a copy of an anonymous letter that contained allegations regarding analyses conducted by Yankee Atomic Electric Company (YAEC) of the performance of the Emergency Core Cooling System (ECCS) at the Maine Yankee Atomic Power Plant (Maine Yankee). The anonymous letter alleged that YAEC conducted fraudulent evaluations of Maine Yankee ECCS performance and that Maine Yankee Atomic Power Company (MYAPCO) deliberately misrepresented the results to the Nuclear Regulatory Commission (NRC). Upon receipt of these allegations, the NRC sent an assessment team to YAEC to evaluate the technical aspects of the allegations. On January 3, 1996, the NRC issued a "Confirmatory Order Suspending Authority for and Limiting Power Operation and Containment Pressure (Effective Immediately) and Demand for Information." The Confirmatory Order was based in part on the NRC's allegations that MYAPCO could not demonstrate that the RELAP5YA computer code would reliably calculate the peak cladding temperature (PCT) for all Small Break Loss-of-Coolant Accidents (SBLOCAs) for Maine Yankee.

As a result of the anonymous allegations, MYAPCO and YAEC established three teams to evaluate these issues. MYAPCO and YAEC management formed a Response Team, composed of managers and technical specialists with responsibilities for the analyses in question, and an Independent Review Team, composed of managers and technical specialists with no prior responsibilities for the analyses in question, to evaluate the technical aspects of the allegations. The results of these evaluations were submitted to the NRC by MYAPCO on January 22, 1996. In February 1996, MYAPCO and YAEC executive management chartered an Assessment Team to determine the underlying cause(s) of the allegations.

The NRC Office of Investigations (OI) commenced an investigation into YAEC's and MYAPCO's alleged deliberate failure to comply with NRC requirements regarding the adequacy of the Maine Yankee ECCS. That investigation culminated in the issuance of OI Report No. 1-96-050, dated September 6, 1996. Despite the fact that the results of the OI investigation apparently provide, at least in significant part, the basis to conclude willfulness of the apparent violations identified by the NRC concerning the ECCS analyses, MYAPCO has never been allowed to review the OI report.

On December 19, 1997, the NRC sent a letter and enclosures to MYAPCO identifying ten apparent violations associated with the ECCS analyses. The NRC indicated that enforcement action based upon these apparent violations would not be taken until MYAPCO had been provided with an opportunity to respond to the apparent violations or to request a predecisional enforcement conference. Because the

RELAP5YA events and the related NRC enforcement action involve so many questions requiring detailed and fact-specific responses, MYAPCO concluded that a predecisional enforcement conference did not alone provide an adequate forum for MYAPCO's response. For this reason, MYAPCO determined it necessary and appropriate to provide this detailed written response in advance of the enforcement conference.

MYAPCO's detailed responses to the apparent violations associated with the ECCS analyses are provided in Attachment C. In an appendix to Attachment C, MYAPCO has addressed the legal standard of "willfulness".

As noted above, Enclosure 4 to the NRC's December 19, 1997 letter to MYAPCO identified ten apparent violations associated with the Maine Yankee ECCS analyses. These apparent violations, and MYAPCO's response to each of the apparent violations, are briefly summarized below.

A. Apparent Violations Relating to Operating Cycle 12
B. Apparent Violations Relating to Operating Cycle 13

Four of the apparent violations (A.1, A.2, B.1 and B.2) are based upon NRC allegations that MYAPCO (1) failed to use the SBLOCA analysis required by a change in the technical specifications for the Maine Yankee plant, which became effective on November 18, 1991, in determining the core operating limits for Cycles 12 and 13, and (2) provided the NRC with "inaccurate information material to the NRC" in the COLRs for Cycles 12 and 13. An objective assessment of the underlying testimony and documentary evidence presented to the NRC during the course of the OI investigation demonstrates that (a) MYAPCO complied with the facility technical specifications used in determining the core operating limits in Cycles 12 and 13, and (b) the information provided in the COLRs for Cycles 12 and 13 was complete and accurate in all material respects.

1. Apparent Violation A.1

Summary Statement of Apparent Violation A.1:

Between November 18, 1991 and February 14, 1992, MYAPCO did not determine operating limits for Cycle 12 operations using the RELAP5YA SBLOCA analysis required by Maine Yankee Technical Specification (TS) 5.14.2. In fact, a Combustion Engineering (CE) SBLOCA code was used to prepare the reload analysis.

Summary of MYAPCO Response to Apparent Violation A.1:

MYAPCO denies this violation. MYAPCO was not required by TS 5.14.2 to determine core operating limits for the last three months of Cycle 12 (the period from November 18, 1991, the date when TS 5.14.2 became effective, until February 14, 1992, the date on which this fuel cycle ended) using the RELAP5YA SBLOCA analysis. The actual wording of the amended technical specifications, issued approximately 17 months

after the start of Cycle 12, and some 22 months after MYAPCO's submittal of its Cycle 12 CPAR upon which the NRC approved the Cycle 12 operating limits, clearly indicated that it was intended to apply to reload cycles that commenced after the effective date of the amendment and to COLRs that were submitted before each future reload cycle. Even if the NRC disagrees with MYAPCO's position that the wording of the amended technical specification makes clear that it applied only to reload cycles that commenced after the effective date of the amendment, and thus not to the last three months of Maine Yankee's Cycle 12, the factual record demonstrates that MYAPCO was not required to use RELAP5YA as the SBLOCA analysis of record for Cycle 12 -- either before or after the amendment of the technical specifications -- and that no violation of the technical specifications for the Maine Yankee plant occurred in connection with the use of the CE SBLOCA analysis in Cycle 12. In any event, the NRC's position on this apparent violation is inconsistent with, and contradicted by, NRC guidance provided to MYAPCO on what is effectively this same issue. When Maine Yankee, during the post-allegation time period of December 1995-January 1996, raised with the NRC the issue of whether the plant technical specification needed to be amended to add the CE SBLOCA code to the list of approved analytical methods in light of Maine Yankee's reverting to use of the CE code (with additional calculations to account for changes in plant operating parameters between Cycle 4 and Cycle 15), guidance provided by NRC staff was that the technical specification containing the list of NRC-approved codes did not need to be amended because the CE SBLOCA code would not be used to determine core operating limits.

2. Apparent Violation A.2.

Summary Statement of Apparent Violation A.2:

On December 18, 1991, MYAPCO submitted to the NRC MYAPCO's Cycle 12 COLR, which contained inaccurate information material to the NRC, in violation of 10 C.F.R. §50.9(a). The COLR stated that MYAPCO used analytical methods listed in TS 5.14 to determine operating limits. In fact, MYAPCO used a Combustion Engineering SBLOCA analytical method, which was not listed in TS 5.14. This inaccurate information was material to the NRC because it was a representation by MYAPCO that RELAP5YA had been used in concert with other approved codes to establish operating limits for Cycle 12 operations.

Summary of MYAPCO Response to Apparent Violation A.2:

MYAPCO denies this violation. The Cycle 12 COLR did not contain inaccurate information. As of December 1991, when Cycle 12 was drawing to a close, the RELAP5YA code was appropriately listed in TS 5.14 as one of the approved methodologies available to be used in connection with future fuel cycles and that could be used to derive core operating limits in future fuel cycles pursuant to the revised technical specifications, which became effective on November 18, 1991. Based on prior Maine Yankee submittals, the NRC knew that the CE SBLOCA analysis was the analysis of record for Cycle 12 and that the WREM LBLOCA code had been used to set the LOCA-related core operating limits for Cycle 12, and the NRC had already approved the

operating limits on that basis. The Maine Yankee plant had been operating in accordance with these core operating limits for almost 18 months prior to MYAPCO's formal submission of the Cycle 12 COLR in December 1991. The Cycle 12 COLR accurately stated that the core operating limits for Cycle 12 had been established using the approved methodologies listed in TS 5.14. In any event, the NRC's position on this apparent violation is inconsistent with, and contradicted by, NRC guidance provided to MYAPCO on what is effectively this same issue.

3. Apparent Violation B.1.

Summary Statement of Apparent Violation B.1:

Between April 19, 1992 and July 7, 1993, MYAPCO did not determine operating limits for Cycle 13 operations using the RELAP5YA SBLOCA analysis required by TS 5.14.2. In fact, a Combustion Engineering SBLOCA code was used to prepare the reload analysis.

Summary of MYAPCO Response to Apparent Violation B.1:

MYAPCO denies this violation. MYAPCO was not required by TS 5.14.2 to determine core operating limits for Cycle 13 using the RELAP5YA SBLOCA analysis. TS 5.14.2 requires that the methods used to determine core operating limits be limited to the NRC-approved methodologies listed therein. In fact, MYAPCO's operating limits for Cycle 13 were established using approved analytical methods listed by the technical specification. The Cycle 13 CPAR submitted to the NRC with the Cycle 13 COLR made clear that the LBLOCA remained the limiting break for the Maine Yankee plant and that the core operating limits were again developed based on the NRC-approved WREM code for LBLOCA analysis. The Cycle 13 CPAR also specifically disclosed that the Combustion Engineering SBLOCA analysis continued to be used by MYAPCO as the SBLOCA analysis of record for Cycle 13. While the CE code continued to be used by MYAPCO as its SBLOCA analysis of record through Cycle 13, neither the CE code nor the RELAP5YA SBLOCA analysis was utilized by MYAPCO to determine core operating limits for Cycle 13. In any event, the NRC's position on this apparent violation is inconsistent with, and contradicted by, NRC guidance provided to MYAPCO on what is effectively this same issue.

4. Apparent Violation B.2.

Summary Statement of Apparent Violation B.2:

On April 7, 1992, MYAPCO submitted to the NRC MYAPCO's Cycle 13 COLR, which contained inaccurate information material to the NRC, in violation of 10 C.F.R. §50.9(a). The COLR stated that MYAPCO used analytical methods listed in TS 5.14 to determine operating limits. In fact, MYAPCO used a Combustion Engineering SBLOCA analytical method, which was not listed in TS 5.14. This inaccurate information was material to the NRC because it was a representation by MYAPCO that RELAP5YA had been used in concert with other approved codes to establish operating limits for Cycle 12 operations.

Summary of MYAPCO Response Apparent Violation B.2:

MYAPCO denies this violation. As demonstrated by MYAPCO's responses to Apparent Violations A.1, A.2 and B.1, the inclusion of the RELAP5YA code in the TS 5.14 list of analytical methods used to determine core operating limits did not constitute a submission of inaccurate information to the NRC. The Cycle 13 COLR statement that MYAPCO used analytical methods listed in TS 5.14 to determine core operating limits was true and accurate. The Cycle 13 CPAR, which was submitted to the NRC at the same time as the Cycle 13 COLR that is the subject of this apparent violation, made clear that (1) the LBLOCA continued to be the limiting break for Cycle 13, (2) the core operating limits were developed based upon the NRC-approved WREM code for LBLOCA analysis, and (3) the Combustion Engineering SBLOCA analysis was still being used by MYAPCO as its SBLOCA analysis of record for Cycle 13. In any event, the NRC's position on this apparent violation is inconsistent with, and contradicted by, NRC guidance provided to MYAPCO on what is effectively this same issue.

C. MYAPCO Response to Apparent Violations Relating to Inability to Analyze Entire Break Spectrum for Cycle 14.

Summary Statement of Apparent Violation C:

MYAPCO failed during Cycle 14 operations and in the Cycle 14 CPAR to use an acceptable evaluation model to calculate ECCS performance. The codes used by MYAPCO failed to satisfy the requirements of 10 C.F.R. §50.46 because the analyses were not capable of calculating or reliably calculating cooling performance for the portion of the break spectrum between 0.35 $ft.^2$ and at least 0.6 $ft.^2$

Summary of MYAPCO Response to Apparent Violation C:

MYAPCO acknowledges and agrees that, contrary to NRC expectations and industry standards, the RELAP5YA SBLOCA evaluation model described by YAEC-1868, and used by MYAPCO as its licensing basis SBLOCA analysis for Cycle 14, has not demonstrated the capability to analyze all break sizes within the historical Maine Yankee SBLOCA break spectrum and that, as a result, MYAPCO failed to meet NRC expectations concerning compliance with 10 C.F.R. §50.46. MYAPCO understands that YAEC LOCA engineers interpreted §50.46 to require only that the limiting break be identified and bounded, not that the analysis include a full range spectrum of break sizes. When the YAEC engineers determined that the limiting break had been identified by the analysis using a sufficient number of break size calculations and supported by engineering judgment, YAEC did not undertake to run additional analyses for larger break sizes because they did not believe there was a need or requirement to do so. YAEC-1868, the report prepared by Yankee Atomic describing the RELAP5YA plant-specific SBLOCA analysis for Maine Yankee, states that the analysis described therein satisfies the requirements of 10 C.F.R. §50.46 and complies with the conditions established by the NRC's 1989 SER approving the RELAP5YA code for application to Maine Yankee. In making its determination to use RELAP5YA as its licensing basis SBLOCA analysis for Cycle 14, it was MYAPCO's good faith

understanding and belief that the YAEC analysis for Maine Yankee satisfied the conditions of the RELAP5YA SER and complied with the requirements of 10 C.F.R. §50.46 and Appendix K. MYAPCO's failure to meet NRC expectations concerning 10 C.F.R. §50.46 compliance did not result from careless disregard by MYAPCO of NRC requirements.

D. MYAPCO Response to Apparent Violations Relating to Inability to Analyze Entire Break Spectrum for Cycle 15.

Summary Statement of Apparent Violation D:

MYAPCO failed in the Cycle 15 CPAR to use an acceptable evaluation model to calculate ECCS performance. The codes used by MYAPCO failed to satisfy the requirements of 10 C.F.R. §50.46 because the analyses were not capable of calculating or reliably calculating cooling performance for the portion of the break spectrum between 0.35 $ft.^2$ and at least 0.6 $ft.^2$

Summary of MYAPCO Response Apparent Violation D:

MYAPCO acknowledges and agrees that, contrary to NRC expectations and industry standards, the RELAP5YA SBLOCA evaluation model described by YAEC-1868, and used by MYAPCO as its licensing basis SBLOCA analysis for Cycle 15, has not demonstrated the capability to analyze all break sizes within the historical Maine Yankee SBLOCA break spectrum and that, as a result, MYAPCO failed to meet NRC expectations concerning compliance with 10 C.F.R. §50.46. MYAPCO understands that YAEC LOCA engineers interpreted §50.46 to require only that the limiting break be identified and bounded, not that the analysis include a full range spectrum of break sizes. When the YAEC engineers determined that the limiting break had been identified by the analysis using a sufficient number of break size calculations and supported by engineering judgment, YAEC did not undertake to run additional analyses for larger break sizes because they did not believe there was a need or requirement to do so. YAEC-1868, the report prepared by Yankee Atomic describing the RELAP5YA plant-specific SBLOCA analysis for Maine Yankee, states that the analysis described therein satisfies the requirements of 10 C.F.R. §50.46 and complies with the conditions established by the NRC's 1989 SER approving the RELAP5YA code for application to Maine Yankee. In making its determination to use RELAP5YA as its licensing basis SBLOCA analysis for Cycle 15, it was MYAPCO's good faith understanding and belief that the YAEC analysis for Maine Yankee satisfied the conditions of the RELAP5YA SER and complied with the requirements of 10 C.F.R. §50.46 and Appendix K. MYAPCO's failure to meet NRC expectations concerning 10 C.F.R. §50.46 compliance did not result from careless disregard by MYAPCO of NRC requirements.

E. MYAPCO Response to Apparent Violation Relating to Incomplete and Inaccurate Core Performance Analysis Reports.

Summary Statement of Apparent Violation E:

The CPARs used by MYAPCO to support its Cycle 14 and Cycle 15 operations relied upon and incorporated YAEC-1868, "Maine Yankee Small Break LOCA Analysis," which contained inaccurate and incomplete statements material to the NRC, in violation of 10 C.F.R. §50.9(a). These statements concealed the fact that the complete break spectrum had not been analyzed and that, contrary to the requirements of 10 C.F.R. §50.46(a)(1), there was a portion of the break spectrum between 0.35 $ft.^2$ and at least 0.6 $ft.^2$ for which no acceptable code was capable of reliably calculating cooling performance.

Summary of MYAPCO Response to Apparent Violation E:

MYAPCO denies this violation. While YAEC-1868 contains erroneous statements which, when viewed alone, do not accurately reflect the range of the SBLOCA break spectrum analyzed, the report, when read as a whole, cannot be fairly characterized as incomplete or inaccurate in any material respect.

F. MYAPCO Response to Apparent Violation Related to Improper Application of the Alb-Chambre Correlation for Cycle 14.

Summary Statement of Apparent Violation F:

During Cycle 14 operations, and in the Cycle 14 CPAR, MYAPCO calculated ECCS performance for SBLOCAs with an unacceptable evaluation model, in violation of 10 C.F.R. §50.46(a)(1). The nodalization model of YAEC-1868 incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of penetration and the cross flow resistance factor, and which, as a result, unacceptably overpredicted cooling performance and overstated the conservatism of RELAP5YA.

Summary of MYAPCO Response to Apparent Violation F:

MYAPCO denies this violation based on the findings and conclusions of the team of industry experts in the area of LOCA analysis sponsored by Duke Engineering & Services, Inc. (the "Technical Review Team"). Based on the findings of the Technical Review Team, MYAPCO acknowledges the existence of an arithmetic error made in YAEC's application of the Alb-Chambre correlation, but denies that this error resulted in invalid input to the SBLOCA analyses. The Technical Review Team concluded that this calculational error did not result in unacceptable overprediction of Maine Yankee ECCS cooling performance or in overstatement of the conservatism of the RELAP5YA SBLOCA model.

G. MYAPCO Response to Apparent Violation Related to Improper Application of the Alb-Chambre Correlation for Cycle 15.

Summary Statement of Apparent Violation G:

MYAPCO calculated ECCS performance for SBLOCAs in the Cycle 15 CPAR with an unacceptable evaluation model, in violation of 10 C.F.R. §50.46(a)(1). The nodalization model of YAEC-1868 incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of penetration and the cross flow resistance factor, and which, as a result, unacceptably overpredicted cooling performance and overstated the conservatism of RELAP5YA.

Summary of MYAPCO Response to Apparent Violation G:

MYAPCO denies this violation based on the findings and conclusions of the team of industry experts in the area of LOCA analysis sponsored by Duke Engineering & Services, Inc. (the "Technical Review Team"). Based on the findings of the Technical Review Team, MYAPCO acknowledges the existence of an arithmetic error made in YAEC's application of the Alb-Chambre correlation, but denies that this error resulted in invalid input to the SBLOCA analyses. The Technical Review Team concluded that this calculational error did not result in unacceptable overprediction of Maine Yankee ECCS cooling performance or in overstatement of the conservatism of the RELAP5YA SBLOCA model.

H. MYAPCO Response to Apparent Violation Relating to Reduced Steam Generator Pressure for Cycle 14.

Summary Statement of Apparent Violation H:

MYAPCO violated 10 C.F.R. §50.46 by its reliance on an unacceptable SBLOCA evaluation model (the Best Estimate plant-specific evaluation model described in the YAEC report dated August 1, 1990) to calculate ECCS performance in preparing an analysis of a decrease in steam generator pressure, performed pursuant to the requirements of 10 C.F.R. §50.59.

Summary of MYAPCO Response to Apparent Violation H:

MYAPCO agrees with the NRC's conclusion that MYAPCO's use of the Best Estimate SBLOCA evaluation model in support of the January 1993 10 C.F.R. §50.59 review of decreased steam generator pressure failed to comply with the requirements of 10 C.F.R. §50.46(a)(1). The factual record demonstrates that this violation was given rise to by good faith errors and an imperfect understanding of, and lack of sophistication in dealing with, license basis issues, which was typical of the industry at the time. The violation did not result from careless disregard by MYAPCO of regulatory requirements.

II. MYAPCO'S RESPONSE TO APPARENT VIOLATION ASSOCIATED WITH PROVIDING INACCURATE INFORMATION TO THE NRC RELATIVE TO THE CAPACITY OF THE ATMOSPHERIC STEAM DUMP VALVE (OI REPORT NO. 1-96-025).

Enclosure 5 to the NRC's December 19, 1997 letter to MYAPCO identifies an apparent violation associated with MYAPCO's providing inaccurate information to the NRC regarding the capacity of the plant's Atmospheric Steam Dump Valve (ADV). This violation, which was self-identified and reported by MYAPCO to the NRC, was the subject of a separate OI investigation and report (OI Report No. 1-96-025). The NRC's characterization of this apparent violation appears to be based on the OI investigators' conclusion that MYAPCO willfully provided the erroneous ADV capacity information to the NRC.

Upon identifying in early 1996 the 1986 submittal error that underlies this violation, and the fact that the NRC had not previously been made aware of the error, MYAPCO management immediately notified the NRC and committed to conduct a full investigation of this matter. MYAPCO conducted an investigation concerning the issue of individual responsibility for the erroneous submittal. MYAPCO management also chartered a comprehensive Root Cause Evaluation. Separate reports prepared as a result of MYAPCO's investigations were provided by MYAPCO to the NRC upon their completion. The results of these investigations are described briefly below, and addressed in greater detail in the main body of MYAPCO's response to the apparent violations (See Attachment C, Section II).

Summary Statement of Apparent Violation:

MYAPCO, on March 18, 1986, submitted to the NRC a Procedures Generation Package that contained a materially inaccurate statement regarding Atmospheric Dump Valve bypass capacity, in violation of Section 186 of the Atomic Energy Act of 1954, as amended.

Summary of MYAPCO Response to Apparent Violation:

MYAPCO agrees that the Procedures Generation Package (PGP) submitted to the NRC on March 18, 1986 contained a materially inaccurate statement regarding the Maine Yankee plant's ADV capacity, but MYAPCO disagrees with and denies the conclusion stated by the synopsis of the OI report, which is echoed by the NRC's December 19, 1997 letter, that MYAPCO willfully provided this erroneous information to the NRC. Moreover, MYAPCO denies that its provision of this inaccurate information to the NRC rises to the level of egregiousness to be fairly characterized as a violation of Section 186 of the Atomic Energy Act of 1954, as amended (the "Act"), based on the current NRC usage of that provision.

In February 1996, MYAPCO's then EOP Coordinator learned that, on March 18, 1986, MYAPCO had submitted a PGP that incorrectly stated the capacity of the plant's ADV and thus provided an incorrect result for the plant's ability to recover from an

Inadequate Core Cooling (ICC) event. MYAPCO management immediately notified the NRC of this finding. Based on its investigations concerning this matter, MYAPCO found that, acting through a non-supervisory employee, MYAPCO had submitted a PGP in March 1986 that contained inaccurate information. MYAPCO further concluded that no MYAPCO employee engaged in deliberate misconduct, but that the submittal to the NRC of the document containing inaccurate information was the result of judgmental error on the part of the non-supervisory employee that violated both the NRC's and MYAPCO's expectations concerning the provision of accurate and complete information to the NRC. MYAPCO further concluded that no employees, except for the non-supervisory employee responsible for the submittal, had knowledge or reason to know that the submittal contained erroneous information at the time of its transmittal to the NRC; nor did any other employee have any knowledge or reason to know after the submittal that the submittal contained a factual error.

With respect to the OI's conclusion of willfulness, the factual record demonstrates that there was never any attempt by MYAPCO to conceal from the NRC the ADV capacity information, or the fact that the EOPs for the ICC event were inadequate. In July 1989, pursuant to an on-site NRC audit of the Maine Yankee Emergency Operating Procedures (EOPs), MYAPCO provided to the NRC documents that disclosed and discussed the difficulty with the EOPs associated with an ICC event, including the reason for the difficulty (i.e., the ADV capacity). MYAPCO does not present this information in an effort to excuse its provision of erroneous information to the NRC in March 1986. Rather, it is emphasized solely to demonstrate that there was no effort or intent by MYAPCO to conceal from the NRC information concerning the problems with the ICC procedures. This point is further demonstrated by the fact this violation was self-identified by MYAPCO and reported to the NRC.

MYAPCO respectfully suggests that the submittal of the PGP containing the factual error does not support a conclusion that MYAPCO deliberately intended to violate, or carelessly disregarded, regulatory requirements. While MYAPCO understands based on communications with the NRC that Section 186 of the Act has been cited by the NRC because the violation occurred before the promulgation of 10 C.F.R. §50.5, the actions and events underlying this violation do not rise to the level of egregious misconduct involving material false statements for which violations of Section 186 are reserved by the NRC.

III. MYAPCO'S RESPONSE TO APPARENT VIOLATIONS ASSOCIATED WITH SAFETY SYSTEM LOGIC TESTING (OI REPORT NO. 1-96-043).

Enclosure 6 to the NRC's December 19, 1997 letter identifies two apparent violations associated with safety system logic testing performed by MYAPCO field engineers on August 22, 1996. These apparent violations, both of which arise out of the very same conduct of Maine Yankee field engineers in failing to follow plant procedures, appear to be based entirely upon findings and conclusions developed by OI investigators and documented in a separate OI report (OI Report No. 1-96-043). The OI Report appears to be the sole basis for the statement contained in the NRC's December 19, 1997

letter that "it appears that MYAPCo willfully violated Technical Specifications 5.8.2 and 10 C.F.R. §50.9(a)."

Based on its review of the events underlying these apparent violations, MYAPCO agrees that its field engineers failed to comply with Maine Yankee plant procedures in performing the system logic testing and, as a result of the procedure non-compliance, created test records that failed to adequately and accurately document the field engineers' exercise of engineering judgment and variance from specific work order procedural steps. However, MYAPCO does not understand the basis for the NRC's decision that these violations arising from procedure non-compliance are the appropriate subject of escalated enforcement action. The failure by the MYAPCO field engineers to comply with plant procedures was clearly a judgmental error, but MYAPCO respectfully suggests that there is no indication that the non-compliance grew out of a deliberate intent to violate, or careless disregard of, either Maine Yankee plant procedures or NRC requirements.

Because of the highly fact-specific nature of these apparent violations, rather than attempting to summarize these apparent violations, MYAPCO restates the violations verbatim from Enclosure 6 to the NRC's December 19, 1997 letter. MYAPCO's response to these violations is then briefly summarized below.

Statement of Apparent Violation A:

Technical Specification 5.8.2 states, in part, that written procedures be established, implemented, and maintained to control, among other things, activities concerning testing of safety related equipment.

Item 12 of Attachment C to Procedure No. 0-16-3, "Work Order Process," defines a Functional Test Instruction (FTI) as instructions that define the evolutions or operations necessary to prove functionality or operability of a component, system, or structure.

Precaution 3.1 of Work Order 96-02928-00, Attachment A, "Functional Test for P-14A/S on A Train SIAS and Bus 5 Undervoltage," and Work Order 96-02929-00, Attachment A, "Functional Test for P-14 B/S on B Train SIAS and Bus 6 Undervoltage," states that if any step cannot be completed as specified in the FTI, then the Field Engineer must be contacted and any deviation from this FTI must be authorized in accordance with Procedure 0-16-3.

Deviations to FTIs are permitted through the use of Minor Technical Changes (MTC) as described in Item 13 of Attachment C to Procedure No. 0-16-3.

However, on August 22, 1996, Step 5.3.3 of WO 96-02928-00 and WO 96-02929-00 could not be performed as written, and the licensee failed to resolve the discrepancy by making a Minor Technical Change. Specifically, Step 5.3.3 provided that at Maine Control Board (MCB), Section C, open circuit continuity be verified at 86-RASA-2(YAF) using a volt-ohm meter (VOM) across the 5-5C contacts. The field test engineers could not verify the open contacts with a VOM because of resistance in the circuit caused by a bulb and resistor wired into the circuit. Instead of making a MTC to

permit visual verification, the field engineers verified open circuit continuity visually and signed Step 5.3.3 as satisfactorily completed.

Statement of Apparent Violation B:

10 C.F.R. § 50.9(a) provides in part that information required by the Commission's regulations to be maintained by the licensee to be complete and accurate in all material respects.

10 C.F.R. Part 50, Appendix B, Criterion XVII, "Quality Assurance Records," requires, in part, that records of tests affecting quality be maintained.

However, on August 22, 1996, the licensee created test records that were materially inaccurate. Step 5.3.3 of WO 96-02928-00 and WO 96-02929-00 provided that at MCB, Section C, open circuit continuity be verified at 86-RASA-2(YAF) using a volt-ohm meter (VOM) across the 5-5C contacts. The field test engineers could not verify the open contacts with a VOM because of resistance in the circuit caused by a bulb and resistor wired into the circuit. Instead, the field test engineers verified open circuit continuity visually and signed Step 5.3.3 as satisfactorily completed. These inaccuracies were material because the tests concerned functionality or operability of safety-related components.

Summary of MYAPCO Response to Apparent Violations A and B:

MYAPCO agrees with the violations as stated by Enclosure 6. MYAPCO disagrees with the statement contained in the NRC's December 19, 1997 letter that MYAPCO willfully violated TS 5.8.2 and 10 C.F.R. §50.9(a), and MYAPCO disagrees with the statement contained in the synopsis of the underlying OI report (Enclosure 3) that the MYAPCO field engineers deliberately violated plant procedures required by Maine Yankee's technical specifications.

While the actions of the MYAPCO field engineers were based on the engineers' exercise of inappropriate judgment, which MYAPCO does not condone, and which failed to meet company expectations concerning procedure compliance, MYAPCO respectfully suggests that an objective review of the factual record underlying these apparent violations does not support a conclusion that the field engineers deliberately intended to violate Maine Yankee technical specifications or regulatory requirements. MYAPCO further suggests that these violations are not the appropriate subject of escalated enforcement action.

ATTACHMENT C

MAINE YANKEE RESPONSES TO NRC APPARENT VIOLATIONS

I. MYAPCO RESPONSES TO APPARENT VIOLATIONS ASSOCIATED WITH ECCS ANALYSES (OI REPORT NO. 1-95-050) (ENCLOSURE 4).

A. Apparent Violations Relating to Operating Cycle 12
B. Apparent Violations Relating to Operating Cycle 13

INTRODUCTION

Four of the "apparent violations" (A.1, A.2, B.1 and B.2) identified in the NRC's December 19, 1997 letter and enclosures to Maine Yankee Atomic Power Company (MYAPCO) are based upon the NRC's view that MYAPCO allegedly (1) failed to use the Small Break Loss-of-Coolant Accident (SBLOCA) analysis required by a change in the plant technical specifications, which became effective on November 18, 1991, in determining the core operating limits for Cycles 12 and 13, and (2) provided the NRC with "inaccurate information material to the NRC" in the Core Operating Limits Reports (COLRs) for Cycles 12 and 13.[1]

The NRC's statement of Apparent Violations A.1, A.2, B.1 and B.2 does not allege willful misconduct by MYAPCO personnel. However, the synopsis of the underlying investigative report prepared by the NRC Office of Investigations (OI) in connection with this matter (OI Report No. 1-96-50) indicates that OI concluded that MYAPCO "willfully failed to implement an acceptable" SBLOCA analysis utilizing the RELAP5YA code in Cycles 12 and 13, this despite the overwhelming weight of the testimony and documentary evidence to the contrary presented to OI during the course of its investigation. In apparent reliance on OI's conclusions, the NRC states in its December 19, 1997 letter that "it appears that carelss [*sic*] disregard on the part of [MYAPCO] staff contributed to these apparent violations."

MYAPCO respectfully suggests that, as shown below, an objective assessment of the underlying testimony and documentary evidence presented to the NRC during the course of the OI investigation demonstrates that (a) MYAPCO complied with the facility technical specifications used to determine the core operating limits in Cycles 12 and 13, and (b) the information provided in the COLRs for Cycles 12 and 13 was complete and accurate in all material respects. Moreover, even if any technical violation of NRC's

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[1] While MYAPCo responds separately to each of these apparent violations below, this introductory section addresses these four apparent violations together because they are based largely upon common factual and regulatory issues.

regulatory requirements arguably occurred in connection with the determination of the core operating limits for these cycles or the information contained in these COLRs, any suggestion that it resulted from any deliberate intent to violate, or careless disregard of, regulatory requirements by MYAPCO personnel is unsupported by the factual record.

Additional information in support of MYAPCO's position with respect to these apparent violations is set forth below.

1. **Apparent Violation A.1**

Summary Statement of Apparent Violation A.1:

Between November 18, 1991 and February 14, 1992, MYAPCO did not determine operating limits for Cycle 12 operations using the RELAP5YA SBLOCA analysis required by Maine Yankee Technical Specification 5.14.2. In fact, a Combustion Engineering SBLOCA code was used to prepare the reload analysis.

Summary Statement of Response to Apparent Violation A.1:

MYAPCO denies this violation. MYAPCO was not required by TS 5.14.2 to determine core operating limits for the last three months of Cycle 12 (the period from November 18, 1991, the date when TS 5.14.2 became effective, until February 14, 1992, the date on which this fuel cycle ended) using the RELAP5YA SBLOCA analysis. Moreover, MYAPCO did not use the Combustion Engineering SBLOCA code to set core operating limits. LOCA-related core operating limits were established using the NRC-approved WREM LBLOCA code.

Discussion:

Enclosure 4 states as Apparent Violation A.1 MYAPCO's alleged failure between November 18, 1991 and February 14, 1992 (during Cycle 12 operations) to "determine operating limits for Cycle 12 operations using the RELAP5YA SBLOCA analysis required by TS 5.14.2." MYAPCO denies this violation.

While the NRC's statement of Apparent Violation A.1 contains some accurate information, it presents an incomplete picture of the factual record relevant to this apparent violation. By this response, MYAPCO seeks to present a more complete presentation of factual information relevant to this alleged violation.

MYAPCO agrees that Technical Specification (TS) 5.14 "Core Operating Limits Report" for the Maine Yankee plant, which became effective on November 18, 1991, requires, in part, that the analytical methods used to determine the core operating limits for a given fuel cycle shall be limited to those previously reviewed and approved by the NRC, as listed in TS 5.14.2, including TS 2.1, 2.2, and 3.10. MYAPCO also agrees that (1) TS 3.10 lists the RELAP5YA SBLOCA analysis as one of the NRC-approved methodologies, (2) TS 3.10 does not list any SBLOCA analysis developed by

Combustion Engineering (CE), and (3) a CE SBLOCA analysis was used in the preparation of the reload analysis for Cycle 12.

MYAPCO does not agree that it was required by TS 5.14.2 to determine the core operating limits for the last three months of Cycle 12 (*i.e.*, the period from November 18, 1991, the date when TS 5.14.2 became effective, until February 14, 1992, the date on which this twenty month fuel cycle ended) using the RELAP5YA SBLOCA analysis merely because this analysis was listed as an approved methodology in TS 3.10, which became effective as of November 18, 1991.

By application dated January 16, 1990, MYAPCO had submitted proposed changes to its Technical Specifications to reflect the proposed cycle-specific operating parameters for Cycle 12.[2] This submittal included a copy of the Cycle 12 Core Performance Analysis Report (CPAR), dated December 1989, prepared by Yankee Atomic Electric Company (YAEC), which provided the basis for the proposed core operating limits.

The section of the CPAR dealing with LOCA analyses made clear that the Large Break (LB) LOCA was the limiting break and that the core operating limits were developed based upon the NRC-approved WREM Code for LBLOCA analysis.[3] The CPAR also specifically identified the small break LOCA analysis performed by Combustion Engineering (CE), which had been the SBLOCA analysis of record for the Maine Yankee plant in prior fuel cycles beginning with Cycle 4, as MYAPCO's SBLOCA analysis of record for Cycle 12.[4]

The NRC Project Manager for Maine Yankee had also been previously advised by MYAPCO that it intended to rely upon the CE SBLOCA analysis as the analysis of record for Cycle 12, and MYAPCO understood that the Project Manager had consented to MYAPCO's continued use of the CE Code for this purpose.[5] In addition, the NRC itself had specifically acknowledged that existing Appendix K evaluation models, such as the CE code, would be "grandfathered" and could continue to be used for LOCA analyses

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2 *See* Letter from MYAPCO to NRC, MN-90-03, Proposed Change 152 - Cycle 12 Technical Specifications (Jan. 16, 1990).

3 *See* Cycle 12 CPAR at pp. 88-91.

4 *See* Cycle 12 CPAR at p. 91.

5 *See, e.g.*, Memoranda dated September 20, 1989, October 6, 1989, and October 12, 1989, from S.E. Nichols to G.D. Whittier at MYAPCO re: telephone conferences and meeting with the NRC Project Manager.

when it modified 10 C.F.R. §50.46 in 1988 to permit the use of more realistic evaluation models.[6]

On May 17, 1990, the NRC issued Amendment No. 116 to MYAPCO's Operating License for the Maine Yankee plant in response to the January 16, 1990 application. The license amendment modified the Technical Specifications to reflect the operating limits for Cycle 12 set forth in MYAPCO's application.[7] Attached to the license amendment was a Safety Evaluation Report (SER) prepared by the Office of Nuclear Reactor Regulation (NRR) supporting the license amendment. In the "Safety Analysis" section of the SER, the NRC specifically acknowledged that the transient and accident analyses which MYAPCO performed for Cycle 12 were acceptable, and the NRC confirmed that the reanalysis which MYAPCO performed for a LOCA and each of the other transients "was done using NRC approved methods and demonstrated that the applicable acceptance criteria for the accident or transient continue to be met."[8] The SER stated in its conclusion:

> The staff has reviewed the information provided in the Maine Yankee Cycle 12 Core Performance Analysis Report and Reference 1 [Charles D. Frizzle (MYAPC) letter to U.S. Nuclear Regulatory Commission, January 16, 1990]. The staff finds the associated modified Technical Specifications acceptable.
>
> Based on the considerations discussed above, the staff has concluded that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner (2) such activities will be conducted in compliance with the Commissions [sic] regulations and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

In response to NRC Generic Letter 88-16 "Removal of Cycle-Specific Parameter Limits from Technical Specifications," dated October 4, 1988, MYAPCO submitted its

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6 *See* NRC Final Rule, Emergency Core Cooling Systems, Revisions to Acceptance Criteria. 53 Fed. Reg. 35996, 35997, (Sept. 18, 1988). ("The Commission also believes that the decision to permit continued use of [Appendix K evaluation] models [indefinitely] can and should be made at this time because it believes that both methods provide adequate protection of the public health and safety"; "This final rule explicitly finds that ECCS evaluation models, which have been previously approved as satisfying the requirements of Appendix K, remain acceptable"; "These minor changes to Appendix K do not affect any existing approved evaluation models. . .").

7 *See* Letter from E.J. Leeds (NRC) to C.D. Frizzle (MYAPCO) re Issuance of Amendment 116 (May 17, 1990).

8 *See* NRC SER Supporting Amendment No. 166 at pp. 3-4.

proposed amendment to its Technical Specifications to eliminate the cycle-specific operating limits and to incorporate the Core Operating Limits Report (COLR), which would contain the cycle-specific limits. MYAPCO's proposed amendment was not even submitted to the NRC until November 5, 1990, *more than four months after the commencement of Cycle 12* on June 30, 1990.[9] MYAPCO's submittal included "Proposed Technical Specification Changes" and a "Representative Cycle 12 Core Operating Limits Report."

MYAPCO's proposed amendment to eliminate the cycle-specific operating limits from the Technical Specifications was not approved by the NRC until November 18, 1991 -- *just three months prior to the completion of Cycle 12.*[10] MYAPCO submitted its Cycle 12 COLR on December 18, 1[illegible] which was essentially identical to the representative Cycle 12 COLR previously submitted by MYAPCO with its November 5, 1990 license amendment application.

The actual requirement imposed under TS 5.14 of MYAPCO's Technical Specifications, as amended effective November 18, 1991, states, in pertinent part:

> 5.14 Core Operating Limits Report
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> 5.14.1 The core operating limits shall be established and documented in the Core Operating Limits Report *before each reload cycle* for the following:
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> * * *
>
> 5.14.2 The analytical methods *used to determine the core operating limits* shall be limited to those previously reviewed and approved by the NRC as follows:
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> * * *
>
> Tech. Spec. 3.10
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> * * *
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> 11. YAEC-1160, "Application of Yankee WREM-Based Generic PWR ECCS Evaluation Model to Maine Yankee," dated July, 1978.
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9 *See* Letter from MYAPCO to NRC, MN-90-91, Proposed Change No. 151, Elimination of Cycle Specific Limits (Nov. 5, 1990).

10 *See* Letter from E.H. Trottier (NRC) to C.D. Frizzle (MYAPCO) re: Issuance of Amendment No. 124 (Nov. 18, 1991).

14. YAEC-1300P, "RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis," Volumes 1, 2, 3, dated October, 1982. (Emphasis added)

Thus, the actual wording of this change to the technical specifications, issued approximately 17 months *after* the start of Cycle 12, and some 22 months *after* MYAPCO's submittal of its Cycle 12 CPAR to the NRC which provided the basis for the Cycle 12 operating limits, clearly indicated that it was intended to apply to reload cycles that commenced after the effective date of this amendment and to COLRs that were submitted "before" each future reload cycle.

An objective review of the cited documents and the relevant portions of the OI interviews of the MYAPCO and YAEC employees who had first-hand knowledge of these issues will confirm the accuracy of the additional factual information summarized above. These facts demonstrate that MYAPCO was not required to use RELAP5YA as the SBLOCA analysis of record for Cycle 12 -- either before or after the issuance of Amendment No. 124 on November 18, 1991 -- and that no violation of MYAPCO's Technical Specifications for the Maine Yankee plant occurred in connection with the use of the CE SBLOCA analysis in Cycle 12. These facts also clearly demonstrate that no deliberate violation or careless disregard of NRC requirements occurred in connection with MYAPCO's use of the CE SBLOCA analysis in Cycle 12.

Even if it is assumed for purposes of argument that the amended tech specs applied to the last three months of Cycle 12 operations, TS 5.14.2 did not "require" that MYAPCO rely upon RELAP5YA to determine operating limits for Cycle 12. Rather, TS 5.14.2 requires that the methods used to determine core operating limits "*be limited*" to the listed NRC-approved methodologies. In fact, the LOCA-related core operating limits for Cycle 12 were established using one of the approved analytical methods listed by TS 5.14.2. Because the LBLOCA was the limiting break for the Maine Yankee plant for Cycle 12, MYAPCO utilized "YAEC-1160, 'Application of Yankee WREM-Based Generic PWR ECCS Evaluation Model to Maine Yankee' dated July 1978" (WREM Code), the NRC-approved LBLOCA method, to determine core operating limits.[11, 12] TS 5.14 did not require that every one of the listed NRC-approved methodologies be utilized to determine core operating limits for Cycle 12 or any other specific fuel cycle. While the CE code continued to be relied upon by MYAPCO as its SBLOCA analysis of record

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[11] As noted above, this LOCA reanalysis and the core operating limits for Cycle 12 had been specifically reviewed and approved by the NRC in Amendment No. 116 and the related NRC SER for Cycle 12.

[12] For each fuel cycle, a sensitivity study (at the very least) is conducted to ensure that the most limiting (severe) value is identified for each applicable operating limit. Historically, Maine Yankee analyses have consistently identified the LBLOCA as being the most limiting LOCA event. This remained true for Cycle 12 (and Cycle 13). Thus, the event which set operating limits associated with LOCA was the LBLOCA.

throughout Cycle 12, as specifically described by the Cycle 12 CPAR, neither the CE code nor the RELAP5YA code was utilized by MYAPCO to determine core operating limits for Cycle 12.

MYAPCO's position on this issue is consistent with, and supported by, guidance provided by the NRC to MYAPCO during the time period of late December-early January 1996. When the NRC concerns about the RELAP5YA Code arose in this post-allegation time period, the Maine Yankee plant was derated from 2700 MWt to 2440 MWt.[13] However, MYAPCO was authorized by the NRC to continue operating the Maine Yankee plant based on the results of the CE SBLOCA analysis used in prior operating cycles and some additional calculations. As described by [redacted], MYAPCO's former Vice President of Licensing and Engineering, during his OI interview, when MYAPCO raised the issue of whether the Technical Specifications needed to be amended to add the CE SBLOCA methodology to the list of approved analytical methods in light of MYAPCO's reverting to use of the CE SBLOCA method for Cycle 15 operations, guidance received in a series of conversations with NRC staff, including Messrs. Russell, Zwolinsky and Trottier, was that the Technical Specifications did not need to be modified because the CE code being relied on for SBLOCA analysis would not be used to determine core operating limits. Thus, the NRC's current position is inconsistent with, and contradicted by, the NRC's own prior interpretation and guidance to MYAPCO on what is effectively the same issue.

MYAPCO respectfully suggests that there is no legitimate basis upon which to conclude that any deliberate violation or careless disregard of NRC regulatory requirements by MYAPCO occurred in connection with the use of the CE SBLOCA analysis in Cycle 12.

This Apparent Violation Is Not Safety Significant

Even if the NRC concludes that a technical violation occurred, the apparent violations relating to Operating Cycles 12 and 13 regarding use of RELAP5YA for SBLOCA analysis had no actual or potential safety consequences. If, contrary to the weight of the evidence provided herein, the NRC considers it appropriate to issue a violation for this matter, the enforcement action issue would have some regulatory significance, albeit historical, in its application and use in a regulatory context. It has been amply demonstrated that the LBLOCA is the limiting LOCA event for Maine Yankee. Regardless of the computer code used to do the analysis for SBLOCA, whether RELAP5YA, CE, or a scoping analysis, SBLOCA has always been shown to be less limiting than LBLOCA. Since operating limits to ensure safety operation are set using limiting events, Maine Yankee has always operated with LOCA related operating limits set using an approved LBLOCA code. This safety significance discussion applies

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13 *See* NRC Confirmatory Order Suspending Authority For And Limiting Power Operation And Containment Pressure (Effective Immediately) And Demand For Information (Jan. 3, 1996).

equally to each of the NRC's apparent violations relating to Operating Cycles 12 and 13 (A.1, A.2, B.1, B.2) and will not be separately restated in MYAPCO's responses to each of those violations.

Enforcement Based on Apparent Violation A.1 Is Time Barred

Pursuant to 28 U.S.C. §2462, the commencement by the NRC of any enforcement proceeding against MYAPCO, based on Apparent Violation A.1, to impose and/or collect a civil penalty under section 234 of the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2282 (the "Act"), is time barred. The time bar established by 42 U.S.C. §2282 is not restricted to a civil action brought by the Attorney General, on the request of the NRC, to collect a civil penalty pursuant to 42 U.S.C. §2282(c). The five-year limitations period applies equally to the *commencement* of any proceeding under section 234 of the Act to *assess or impose* a civil penalty based on an alleged violation occurring outside the five-year limitations period. *See 3M Company v. Browner*, 17 F.3d 1453, 1457-59 (D.C. Cir. 1994). The five-year limitations period applicable to Apparent Violation A.1 expired on or before February 14, 1997.

2. Apparent Violation A.2.

Summary Statement of Apparent Violation A.2:

On December 18, 1991, MYAPCO submitted to the NRC MYAPCO's Cycle 12 COLR which contained inaccurate information material to the NRC, in violation of 10 C.F.R. §50.9(a). The COLR stated that MYAPCO used analytical methods listed in TS 5.14 to determine operating limits. In fact, MYAPCO used a Combustion Engineering SBLOCA analytical method, which was not listed in TS 5.14. This inaccurate information was material to the NRC because it was a representation by MYAPCO that RELAP5YA had been used in concert with other approved codes to establish operating limits for Cycle 12 operations.

Summary Statement of Response to Apparent Violation A.2:

MYAPCO denies this violation. The Cycle 12 COLR did not contain inaccurate information. MYAPCO did not use the Combustion Engineering SBLOCA analysis to determine core operating limits. The large break LOCA had been determined to be the limiting break for Cycle 12 and all other Maine Yankee cycles, and the core operating limits for Cycle 12 were established using the NRC-approved WREM LBLOCA code listed in TS 5.14.

Discussion:

Enclosure 4 identifies as an apparent violation of 10 C.F.R. §50.9(a) MYAPCO's submission to the NRC on December 18, 1991 of the Cycle 12 COLR which stated that MYAPCO had used analytical methods listed in TS 5.14 to determine operating limits.

The NRC alleges that this COLR statement constituted inaccurate information material to the NRC because it was a representation by MYAPCO that the RELAP5YA code had been used in concert with other approved codes to establish operating limits for Cycle 12 operations.

The NRC's summary regarding Apparent Violation A.2 again presents an incomplete picture of the factual record relevant to this apparent violation. MYAPCO agrees that 10 C.F.R. §50.9 requires that information provided to the NRC by a licensee shall be complete and accurate in all material respects. MYAPCO agrees that it submitted a COLR for Cycle 12 on December 18, 1991 after the NRC issued Amendment No. 124 on November 18, 1991 eliminating the requirement for NRC review of cycle-specific operating limits. This COLR was essentially identical to the representative Cycle 12 COLR which MYAPCO had previously submitted to the NRC with its November 5, 1990 license amendment application.

MYAPCO further agrees that (a) the Cycle 12 COLR stated that the core operating limits were derived using the NRC-approved methodologies listed in TS 5.14, and (b) the RELAP5YA SBLOCA analysis was one of the methodologies listed in TS 5.14. MYAPCO once again agrees that the CE SBLOCA analysis was not listed in TS 5.14, but denies that the CE code was used to determine the core operating limits for Cycle 12. MYAPCO denies that it provided any inaccurate information to the NRC in this COLR and also denies that the listing of the RELAP5YA code in TS 5.14 constituted a representation that this code had been "used in concert with other approved codes to establish the core operating limits for Cycle 12 operations."

In addition to the factual information provided in its response to Apparent Violation A.1, MYAPCO believes that the following information has a material bearing on this alleged violation:

Thus, the NRC already knew and concurred that the CE SBLOCA analysis was the SBLOCA analysis of record for Cycle 12, as evidenced by the SER supporting Amendment No. 116 issued by the NRC in May 1990, which specifically approved the Cycle 12 CPAR and the core operating limits for Cycle 12 contained therein. The NRC also clearly knew, based on its review and approval in Amendment No. 116 and the related SER of the LOCA reanalysis and core operating limits for Cycle 12, that the RELAP5YA code was not used in the preparation of the Cycle 12 CPAR, that the LBLOCA had been determined to be the limiting break for Cycle 12, and that the core operating limits for Cycle 12 had been established using the NRC-approved WREM LBLOCA code. The Maine Yankee plant had been operating in accordance with these core operating limits for almost the entire length of Cycle 12 (approximately 18 months) prior to the formal submission of the Cycle 12 COLR in December 1991. Contrary to the information contained in the NRC's statement of this apparent violation, MYAPCO did not use the CE SBLOCA analysis to determine core operating limits.

There was no misrepresentation or deception associated with the listing of the RELAP5YA code as one of the approved methodologies in TS 5.14. MYAPCO and YAEC employees who were knowledgeable in this area and who were questioned

concerning this issue during the course of the OI investigation indicated that RELAP5YA was listed as one of the approved methodologies at the time the license amendment application was submitted in November 1990, because the list of analytical methods prepared by YAEC in anticipation of the November 1990 license amendment application was intended to include NRC-approved methods which could be used by MYAPCO in connection with setting future core operating limits, and RELAP5YA was the SBLOCA code that YAEC intended to use to perform SBLOCA analyses for future fuel cycles at the time this amendment application was prepared and submitted. (*See, e.g.*, OI Interviews of Messrs. [redacted]) MYAPCO and YAEC personnel believed that the statement in the COLR that the core operating limits for Cycle 12 had been derived using the NRC-approved methodologies listed in TS 5.14 was complete and accurate because the WREM LBLOCA code had been used to establish the LOCA-related limits and this code was listed in TS 5.14. MYAPCO and YAEC personnel also denied that the listing of RELAP5YA as one of the approved methodologies in any way "suggested" that this code was used in the establishment of the core operating limits for Cycle 12.

At the time of the November 1990 license amendment application, MYAPCO and YAEC personnel believed in good faith that the RELAP5YA code, which had been approved in January 1989 for application to Maine Yankee pursuant to TMI Action Plan, Item II.K.3.30 (NUREG 0737), would be the SBLOCA analysis used in connection with future core reloads beginning with Cycle 13. Accordingly, RELAP5YA was included in the list of NRC-approved methods prepared in connection with the mid-Cycle 12 license amendment application. The CE SBLOCA analysis, which was not directly available for exercise by YAEC, and which was not anticipated by MYAPCO or YAEC to be used in future core reload analyses, was not included in the list of NRC-approved analytical methods incorporated into the Technical Specifications.

The fact that the CE SBLOCA analysis was not listed as one of the NRC-approved methodologies in TS 5.14 is irrelevant, as demonstrated by NRC guidance to MYAPCO on what is effectively the same issue. As discussed in greater detail in MYAPCO's response to Apparent Violation A.1, MYAPCO personnel, during the post-allegation time period of December 1995-January 1996, raised with NRC officials the specific issue of whether TS 5.14 needed to be amended to add the CE SBLOCA method to the list of approved methodologies in light of the NRC's decision to allow MYAPCO to continue Cycle 15 operations relying on the CE SBLOCA analysis with some additional calculations. The guidance that MYAPCO received at that time from the NRC was that the TS 5.14 listing of approved codes did not need to be revised to add the CE code because the CE SBLOCA analysis *was not being used to establish a core operating limit* [redacted]

As with Apparent Violation A.1, a review of the underlying documents and relevant portions of the OI interviews of the MYAPCO and YAEC employees who had first-hand knowledge of these issues confirms the accuracy of the factual information summarized above. As of December 1991, when Cycle 12 was drawing to a close, the RELAP5YA code was appropriately listed in TS 5.14 as one of the approved methodologies available to be used in connection with future fuel cycles and that could

be used to derive the core operating limits in future fuel cycles pursuant to the change in the Technical Specifications which became effective on November 18, 1991. The NRC knew that the CE SBLOCA analysis was the analysis of record for Cycle 12 and that the LBLOCA WREM code had been used to set the core operating limits for Cycle 12, as evidenced by the NRC SER issued in support of Amendment No. 116. The Maine Yankee plant had been operating in accordance with these core operating limits for almost 18 months prior to the formal submission of the Cycle 12 COLR in December 1991. The Cycle 12 COLR accurately stated that the core operating limits for Cycle 12 had been established using the approved methodologies listed in TS 5.14, and the WREM Code was clearly listed in TS 5.14.

Based on the facts, the allegation in Apparent Violation A.2 that the Cycle 12 COLR somehow mislead the NRC into thinking that the RELAP5YA code had been used in setting the core operating limits for Cycle 12 does not withstand scrutiny. In any event, the factual record certainly does not support a conclusion that there was any deliberate violation or careless disregard of NRC regulatory requirements by MYAPCO in connection with the preparation and submission of this Cycle 12 COLR. As discussed above, even if the NRC concludes that a technical violation occurred, MYAPCO's statement in the Cycle 12 COLR that NRC-approved methods listed in TS 5.14 had been used to determine operating limits was based on a reasonable interpretation of TS 5.14.

This Apparent Violation Is Not Safety Significant

See MYAPCO's discussion regarding "safety significance" in its response to Apparent Violation A.1. That discussion, which is incorporated by reference herein, applies equally to this apparent violation.

Enforcement Based on Apparent Violation A.2 Is Time Barred

Pursuant to 28 U.S.C. §2462, the commencement by the NRC of any enforcement proceeding against MYAPCO, based on Apparent Violation A.2, to impose and/or collect a civil penalty under section 234 of the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2282 (the "Act"), is time barred. The time bar established by 42 U.S.C. §2282 is not restricted to a civil action brought by the Attorney General, on the request of the NRC, to collect a civil penalty pursuant to 42 U.S.C. §2282(c). The five-year limitations period applies equally to the commencement of any proceeding under section 234 of the Act to *assess or impose* a civil penalty based on an alleged violation occurring outside the five-year limitations period. *See 3M Company v. Browner*, 17 F.3d 1453, 1457-59 (D.C. Cir. 1994). The five-year limitations period applicable to Apparent Violation A.2 expired on or before December 18, 1996.

3. Apparent Violation B.1.

Summary Statement of Apparent Violation B.1:

Between April 19, 1992 and July 7, 1993, MYAPCO did not determine operating limits for Cycle 13 operations using the RELAP5YA SBLOCA

analysis required by TS 5.14.2. In fact, a Combustion Engineering SBLOCA code was used to prepare the reload analysis.

Summary Statement of Response to Apparent Violation B.1:

MYAPCO denies this violation. MYAPCO was not required by TS 5.14.2 to determine core operating limits for Cycle 13 using the RELAP5YA SBLOCA analysis.

Discussion:

Enclosure 4 identifies as Apparent Violation B.1 MYAPCO's alleged failure between April 19, 1992 and July 7, 1993 (during Cycle 13 operations) to "determine operating limits for Cycle 13 operations using the RELAP5YA SBLOCA analysis required by TS 5.14.2."

The NRC's summary regarding Apparent Violation B.1 suffers from some of the same deficiencies as the summary regarding Apparent Violation A.1. MYAPCO, by its response, again seeks to present a more complete presentation of factual information relevant to this alleged violation.

MYAPCO agrees that TS 5.14 "Core Operating Limits Report" for the Maine Yankee plant requires, in part, that the analytical methods used to determine the core operating limits for a given fuel cycle shall be limited to those previously reviewed and approved by the NRC, as listed in TS 5.14.2, including TS 2.1., 2.2, and 3.10. MYAPCO also agrees that (1) TS 3.10 lists the RELAP5YA SBLOCA analysis as one of the NRC-approved methodologies, (2) TS 3.10 does not list the CE SBLOCA analysis, and (3) the CE SBLOCA analysis was used in the preparation of the reload analysis for Cycle 13.

MYAPCO does not agree, however, that it was required by TS 5.14.2 to determine the core operating limits for Cycle 13 operations using the RELAP5YA SBLOCA analysis merely because this analysis was listed as an approved methodology in TS 5.14.

On April 7, 1992, MYAPCO transmitted to the NRC its Cycle 13 COLR in accordance with the "reporting requirements" of TS 5.9 for the Maine Yankee plant, as amended effective November 18, 1991.[14] This submittal also included the CPAR for Cycle 13 (dated December 1991) prepared by YAEC, which formed the basis for the plant core operating limits.

The section of the Cycle 13 CPAR dealing with LOCA analyses indicated that the LBLOCA was the limiting break and that the core operating limits were developed based

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[14] *See* Letter from MYAPCO to NRC, MN-92-37, Transmittal of the Cycle 13 Core Operating Limits Report (April 7, 1992).

upon the NRC-approved WREM code for LBLOCA Analysis.[15] The CPAR also specifically indicated that the SBLOCA analysis using the CE code -- which had been the SBLOCA analysis of record for the Maine Yankee plant in prior fuel cycles beginning with Cycle 4 -- was still being used as the SBLOCA analysis of record for Cycle 13.[16]

The requirement imposed under TS 5.14 states, in pertinent part:

> 5.14.2 The analytical methods used to determine the core operating limits shall be limited to those previously reviewed and approved by the NRC as follows:
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> * * *
>
> Tech. Spec. 3.10
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> * * *
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> 11. YAEC-1160, "Application of Yankee WREM-Based Generic PWR ECCS Evaluation Model to Maine Yankee," dated July, 1978.
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> * * *
>
> 14. YAEC-1300P, "RELAP5YA: A Computer Program for Light Water Reactor System Thermal-Hydraulic Analysis," Volumes 1, 2, 3, dated October, 1982.

Contrary to the NRC's statement of the apparent violation, TS 5.14.2 did not "require" that MYAPCO rely upon the RELAP5YA code to determine operating limits for Cycle 13. This position is belied by the language of TS 5.14.2 itself. TS 5.14.2 requires that the methods used to determine the core operating limits "*be limited*" to the NRC-approved methodologies listed therein. In fact, MYAPCO's core operating limits for Cycle 13 were established using approved analytical methods listed by TS 5.14.2. As noted above, the Cycle 13 CPAR submitted to the NRC with the Cycle 13 COLR indicated that the LBLOCA remained the limiting break for the Maine Yankee plant and that the core operating limits were again developed based on the NRC-approved WREM code for LBLOCA analysis. The Cycle 13 CPAR also specifically disclosed that the CE SBLOCA analysis continued to be used by MYAPCO as the SBLOCA analysis of record for Cycle 13, as is acknowledged by the NRC in its statement of this apparent violation. While the CE code continued to be used by MYAPCO as its SBLOCA analysis of record through Cycle 13, neither the CE code nor the RELAP5YA SBLOCA analysis was utilized by MYAPCO to determine core operating limits for Cycle 13.

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15 *See* Cycle 13 CPAR at pp. 83-85.

16 *See* Cycle 13 CPAR at pp. 85-86.

As discussed in greater detail in MYAPCO's response to Apparent Violation A.1, the position taken by the NRC in asserting this apparent violation is inconsistent with, and contradicted by, NRC's prior interpretation and guidance to MYAPCO on what is effectively the same issue.

These facts demonstrate that MYAPCO was not required to use RELAP5YA as the SBLOCA analysis of record for Cycle 13 and that no violation of the Technical Specifications for the Maine Yankee plant occurred in connection with the use of the CE SBLOCA analysis in Cycle 13. An objective review of these facts also demonstrates that no deliberate violation or careless disregard of NRC requirements occurred in connection with MYAPCO's use of the CE SBLOCA analysis in Cycle 13.

It is MYAPCO's position that operating limits for Cycle 13 were, in fact, determined using analytical methods approved by the NRC, as listed by MYAPCO's Technical Specifications, and that the RELAP5YA code was not used, or required to be used, to determine Cycle 13 core operating limits. MYAPCO respectfully suggests that an objective review of the factual record demonstrates that there is no legitimate basis upon which to conclude that any deliberate violation or careless disregard of NRC regulatory requirements by MYAPCO occurred in connection with the use of the CE SBLOCA analysis in Cycle 13.

This Apparent Violation Is Not Safety Significant

See MYAPCO's discussion regarding "safety significance" in its response to Apparent Violation A.1. That discussion, which is incorporated by reference herein, applies equally to this apparent violation.

4. Apparent Violation B.2.

Summary Statement of Apparent Violation B.2:

On April 7, 1992, MYAPCO submitted to the NRC MYAPCO's Cycle 13 COLR, which contained inaccurate information material to the NRC, in violation of 10 C.F.R. §50.9(a). The COLR stated that MYAPCO used analytical methods listed in TS 5.14 to determine operating limits. In fact, MYAPCO used a Combustion Engineering SBLOCA analytical method, which was not listed in TS 5.14. This inaccurate information was material to the NRC because it was a representation by MYAPCO that RELAP5YA had been used in concert with other approved codes to establish operating limits for Cycle 12 operations.

Summary Statement of Response Apparent Violation B.2:

MYAPCO denies this violation. The Cycle 13 COLR did not contain inaccurate information. MYAPCO did not use the Combustion Engineering SBLOCA analysis to determine core operating limits. The LBLOCA had been determined to be the limiting break for Cycle 13, and

the core operating limits for Cycle 13 were established using the NRC-approved WREM LBLOCA code listed in TS 5.14.

Discussion:

The NRC identifies as an apparent violation of 10 C.F.R. §50.9(a) MYAPCO's submission to the NRC on April 7, 1992 of the Cycle 13 COLR which stated that MYAPCO had developed the core operating limits using the NRC-approved methodologies listed in TS 5.14. The NRC alleges that this COLR statement constituted inaccurate information material to the NRC because it was a representation by MYAPCO that the RELAP5YA code had been used to establish core operating limits for Cycle 13 operations.

The NRC's statement regarding Apparent Violation B.2 again presents an incomplete picture of the factual record relevant to this apparent violation. MYAPCO agrees that 10 C.F.R. §50.9 requires that information provided to the NRC by a licensee shall be complete and accurate in all material respects. MYAPCO agrees that it submitted a COLR for Cycle 13 on April 7, 1992. MYAPCO further agrees that (a) the Cycle 13 COLR stated that the core operating limits were derived using the NRC-approved methodologies listed in TS 5.14, and (b) the RELAP5YA SBLOCA analysis was one of the methodologies listed in TS 5.14. MYAPCO again agrees that the CE SBLOCA analysis was not listed in TS 5.14, but denies that the CE code was used to determine the core operating limits for Cycle 13. MYAPCO categorically denies that it provided any inaccurate information to the NRC in this COLR and also categorically denies that the listing of the RELAP5YA Code in TS 5.14 constituted a representation that this code had been "used to establish the core operating limits for Cycle 13 operations."

As demonstrated by the factual information provided in MYAPCO's responses to Apparent Violations A.1, A.2 and B.1, the inclusion of the RELAP5YA code in the TS 5.14 list of analytical methods used to determine core operating limits did not constitute a submission of inaccurate information to the NRC. The Cycle 13 COLR statement that MYAPCO used analytical methods listed in TS 5.14 to determine core operating limits was true and accurate.

The Cycle 13 CPAR, which was submitted to the NRC at the same time as the Cycle 13 COLR that is the subject of this apparent violation, made clear that (1) the LBLOCA was the limiting break for Cycle 13, (2) the core operating limits were developed based upon the NRC-approved WREM code for LBLOCA analysis, and (3) the CE SBLOCA analysis was still being used by MYAPCO as its SBLOCA analysis of record for Cycle 13.[17]

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17 *See* Cycle 13 CPAR at pp. 83-86.

As discussed above, prior NRC guidance provided to MYAPCO in the December 1995/January 1996 time frame demonstrates the irrelevance of the fact that the CE SBLOCA analysis was not listed as one of the NRC-approved methodologies in TS 5.14. The NRC, at that time, recognized that the SBLOCA analysis of record for MYAPCO did not need to be included in TS 5.14 because the SBLOCA analysis was not used to determine core operating limits. Thus, the NRC's current position as stated by Apparent Violation B.2 is inconsistent with, and contradicted by, its prior interpretation and guidance provided to MYAPCO on what is effectively the same issue.

MYAPCO denies that it provided inaccurate information to the NRC in the Cycle 13 COLR, and it denies that the listing of the RELAP5YA code in TS 5.14 constituted a representation that this code had been used to establish the core operating limits for Cycle 13 operations. Based on the factual record, the NRC's allegation that the Cycle 13 COLR mislead the NRC into thinking that the RELAP5YA Code had been used to determine Cycle 13 operating limits does not withstand scrutiny. An objective review of the factual record certainly does not support or justify a conclusion that there was any deliberate violation or careless disregard by MYAPCO of its regulatory obligations.

This Apparent Violation Is Not Safety Significant

See MYAPCO's discussion regarding "safety significance" in its response to Apparent Violation A.1. That discussion, which is incorporated by reference herein, applies equally to this apparent violation.

Enforcement Based on Apparent Violation B.2 Is Time Barred

Pursuant to 28 U.S.C. §2462, the commencement by the NRC of any enforcement proceeding against MYAPCO, based on Apparent Violation B.2, to impose and/or collect a civil penalty under section 234 of the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2282 (the "Act"), is time barred. The time bar established by 42 U.S.C. §2282 is not restricted to a civil action brought by the Attorney General, on the request of the NRC, to collect a civil penalty pursuant to 42 U.S.C. §2282(c). The five-year limitations period applies equally to the commencement of any proceeding under section 234 of the Act to *assess or impose* a civil penalty based on an alleged violation occurring outside the five-year limitations period. *See 3M Company v. Browner*, 17 F.3d 1453, 1457-59 (D.C. Cir. 1994). The five-year limitations period applicable to Apparent Violation B.2 expired on or before April 7, 1997.

C. MYAPCO Response to Apparent Violations Relating to Inability to Analyze Entire Break Spectrum for Cycle 14 (Apparent Violation C).

Summary Statement of Apparent Violation C:

MYAPCO failed during Cycle 14 operations (from October 14, 1993 through January 25, 1995), and in the Cycle 14 CPAR, to use an acceptable evaluation model to calculate ECCS performance. The codes used by MYAPCO failed to satisfy the requirements of 10 C.F.R. §50.46 because the analyses were not capable of calculating or reliably

calculating cooling performance for the portion of the break spectrum between 0.35 ft.^{2} and at least 0.6 ft.^{2}

Summary Statement of Response to Apparent Violation C:

MYAPCO acknowledges that, contrary to NRC expectations, and industry standard practice, the RELAP5YA SBLOCA evaluation model described in YAEC-1868 has not demonstrated the capability to analyze all break sizes on the Maine Yankee SBLOCA break spectrum and that, as a result, the analysis did not meet NRC expectations concerning compliance with 10 C.F.R. §50.46.

Discussion:

Enclosure 4 states as Apparent Violation C MYAPCO's failure during Cycle 14 operations (from October 14, 1993 through January 25, 1995), and in the Cycle 14 CPAR submitted to the NRC on August 25, 1993, to use an acceptable evaluation model capable of reliably calculating cooling performance. The NRC asserts that the codes used by MYAPCO were in apparent violation of 10 C.F.R. §50.46(a)(1) because the analyses were not capable of calculating or reliably calculating ECCS performance for the region of the break spectrum between 0.35 ft.^{2} and at least 0.6 ft.^{2}. As a result, the NRC states that it was not possible to confirm that the limiting break had been identified and that the ECCS was capable of mitigating the most severe postulated accident.

The NRC's statement of this apparent violation in Enclosure 4 does not allege willfulness on the part of MYAPCO. However, the NRC's December 19, 1997 letter states that the apparent violations associated with the ECCS analyses "collectively represent a potentially significant lack of attention or carelessness toward licensed responsibilities and a failure to conduct adequate oversight of a vendor, resulting in the use of services of defective or indeterminate quality." The synopsis of the OI report (OI Report No. 1-95-050) indicates that OI concluded that "MYAPCo/YAEC willfully failed to implement the RELAP5YA EM in the June 1993 analysis for Cycle 14, in a manner consistent with the NRC's January 1989 SER and the requirements of 10 C.F.R. §50.46."

MYAPCO acknowledges that, contrary to NRC expectations and industry standards, the RELAP5YA SBLOCA evaluation model described by YAEC-1868 has not demonstrated the capability to analyze all break sizes within the historical Maine Yankee SBLOCA break spectrum and that, as a result, MYAPCO failed to meet NRC expectations concerning 10 C.F.R. §50.46 compliance. Maine Yankee denies that this failure to meet NRC expectations was the result of willfulness, either deliberateness or careless disregard, by MYAPCO or MYAPCO personnel.[18]

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[18] Although there have been prior instances where licensees failed to satisfy NRC expectations in connection with the use of particular computer codes, MYAPCO, based (footnote continued)

The SBLOCA Appendix K analysis using RELAP5YA was completed, reviewed and approved by YAEC as of April 1993 during Maine Yankee's Cycle 13. This analysis was summarized by Yankee Atomic in YAEC-1868, "Maine Yankee Small Break LOCA Analysis," dated June 1, 1993. The RELAP5YA SBLOCA analysis was used by YAEC in preparing the CPAR for Maine Yankee's Cycle 14 in April 1993. This Cycle 14 CPAR was submitted to the NRC by MYAPCO in August 1993.

YAEC-1868 states that the analysis described therein satisfies the requirements of 10 C.F.R. §50.46 and complies with the 12 specific conditions established by the NRC's 1989 SER approving the RELAP5YA code for application to Maine Yankee. In making its determination to use RELAP5YA as its licensing basis SBLOCA analysis for Cycle 14 (and Cycle 15), it was MYAPCO's good faith understanding and belief that the RELAP5YA SBLOCA analysis completed by YAEC for Maine Yankee satisfied the conditions of the January 1989 RELAP5YA SER and complied with the requirements of 10 C.F.R. §50.46 and Appendix K.

MYAPCO has received and reviewed the "Yankee Atomic Small Break LOCA Technical Review Report" (the "Technical Review Report") prepared by the team of industry experts in the area of LOCA analysis (the "Technical Review Team") brought together by Duke Engineering & Services, Inc. (DE&S) for the purposes of providing an independent technical review of Yankee Atomic's small break LOCA evaluation model (RELAP5YA) as applied to Maine Yankee and determining compliance with 10 C.F.R. §50.46 and 10 C.F.R. Part 50 Appendix K requirements.[19]

Based on the Technical Review Team's understanding of NRC expectations, which understanding is described as being based on many years of LOCA-related licensing interactions, the Technical Review Team stated that it is standard industry practice that plant-specific applications of a generic SBLOCA code be performed so as to identify problems prior to submitting the code and evaluation model for NRC review and that any plant applications should be completed utilizing a process that meets the NRC's expectations prior to any implementation in the plant's licensing basis.[20] The Technical Review Team found that the NRC's intent in establishing the RELAP5YA SER conditions was to ensure that plant-specific applications of RELAP5YA would be reviewed and approved prior to implementation; that this is a standard process for approving LOCA methods applications to support plant licensees; and that variations on

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(continued footnote)

on its review and research, is not aware of any instance where the NRC has accused a licensee of a willful violation in connection with code-related noncompliance.

19 *See* Duke Engineering & Services, Inc.'s Response to the Nuclear Regulatory Commission's Demand for Information, dated February 27, 1998, Appendix C.

20 *Id.* at C-11.

this process are possible, but are subject to the approval of the NRC.[21] In fact, MYAPCO and Yankee Atomic did not submit YAEC's SBLOCA Appendix K analysis for Maine Yankee, as summarized in YAEC-1868, to the NRC for review and approval based on the NRC Project Manager's May 8, 1989 letter to MYAPCO and the resulting understanding and expectation that NRC review would be by future inspection.

The Technical Review Team found that several significant problems encountered by YAEC in the application of the RELAP5YA code to Maine Yankee were not brought to the NRC's attention, including the fact that the model had not demonstrated the ability "to run through the historical break spectrum up to 0.5 ft.[2],[22] The Technical Review Team stated that the NRC's expectation is that an Appendix K SBLOCA evaluation model must be capable of analyzing any break size within the plant's SBLOCA licensing basis and that the industry standard practice is consistent with the NRC's position on this issue. The Technical Review Team was clear that this does not mean that the model has to have been run for all break sizes, but, rather, that the model must be capable of analyzing all break sizes within the plant's SBLOCA licensing basis. It was the Technical Review Team's conclusion that the RELAP5YA evaluation model has not demonstrated the capability to analyze the historical Maine Yankee SBLOCA spectrum. The Technical Review Team indicated that sound engineering arguments can be used to meet NRC expectations in this regard, but that these engineering arguments should be communicated to the NRC and agreed upon prior to implementation in a plant-specific application.[23]

As stated above, MYAPCO agrees that industry standard practice is consistent with the NRC's expectation that an Appendix K SBLOCA evaluation model must be capable of analyzing any break size within the licensed break range, and MYAPCO agrees that, contrary to NRC expectations, the RELAP5YA evaluation model described in YAEC-1868 has not demonstrated the capability to analyze all break sizes on the Maine Yankee SBLOCA break spectrum. MYAPCO therefore agrees that the RELAP5YA Appendix K SBLOCA analysis did not meet the NRC's expectations concerning compliance with 10 C.F.R. §50.46.

However, MYAPCO states that this apparent violation did not result from careless disregard by MYAPCO of regulatory requirements. MYAPCO understood and believed at all relevant times that the RELAP5YA SBLOCA evaluation model used to calculate ECCS performance for Cycle 14 operations, and in the CPAR submitted to the NRC to support MYAPCO's reload analyses for Cycle 14, satisfied all regulatory requirements. While MYAPCO, as licensee, accepts responsibility for this failure to meet NRC expectations, MYAPCO relied upon Yankee Atomic, and the expertise of the YAEC

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21 *Id.*

22 *Id.*

23 *Id.* at C-18.

LOCA Group, to provide an acceptable evaluation model that met the conditions established by the RELAP5YA SER and satisfied the requirements of 10 C.F.R. §50.46 and 10 C.F.R. Part 50, Appendix K. As is typical of most licensees, MYAPCO did not have, and did not attempt to replicate, the LOCA expertise that it purchased from its vendor. MYAPCO acknowledges that, as licensee, it is responsible for adequate oversight of vendor performance, and ultimately responsible for any regulatory deficiencies in the LOCA analyses applied by YAEC to Maine Yankee. It is plain fact, however, that MYAPCO accepted and relied in good faith upon YAEC's representations and conclusion that YAEC-1868 complied with the SER conditions and met the requirements of §50.46 and Appendix K. MYAPCO respectfully suggests that it was entitled to rely on YAEC's expertise and on its engineering judgments and interpretations,[24] and that its reliance does not constitute, or even approach, careless disregard of its regulatory obligations. Indeed, given YAEC's otherwise strong performance on analytical codes supplied for Maine Yankee safety analyses, as previously found by the NRC, MYAPCO suggests that its reliance was reasonable and justified.[25]

The DE&S-sponsored Technical Review Team concluded that YAEC's interpretation of the requirements of 10 C.F.R. §50.46 and Appendix K, i.e., that identifying the limiting PCT within the range of break sizes evaluated and concluding that this was the limiting PCT for the small break spectrum based on the decreasing trend of PCT from smaller to larger break sizes, was consistent with YAEC's understanding that a SBLOCA analysis could satisfy all regulatory requirements without analyzing the full spectrum of break sizes in the small break range.[26] The Technical Review Team further found that, based on a broader knowledge of SBLOCA phenomena and the results of analyses performed using other codes, YAEC was confident that SBLOCAs for Maine Yankee continued to be bounded by LBLOCAs and that, based on this expectation, YAEC accepted the results from RELAP5YA as adequate for showing compliance with NRC regulations. The Technical Review Team stated its belief that, while this may indeed have been a correct conclusion, because it was based in part on information beyond demonstrated results of runs of the RELAP5YA code for Maine Yankee, the situation should have been communicated to the NRC prior to implementation.[27]

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[24] The DE&S-sponsored Technical Review Team found that the YAEC LOCA Group is knowledgeable about SBLOCA computer models and phenomena, and that the LOCA Group staff is technically qualified (Technical Review Report, p. C-14).

[25] *See* United States Nuclear Regulatory Commission Independent Safety Assessment of Maine Yankee Atomic Power Company, dated October 7, 1996, p. 70 ("The use of analytic codes for safety analyses was very good. Cycle specific core performance analyses were excellent.").

[26] Technical Review Report, p. C-17.

[27] *Id.* at C-18.

While MYAPCO has not had the opportunity to review the underlying OI report, it was MYAPCO's sense and impression throughout the investigation that a fundamental premise assumed by the investigators was that the YAEC LOCA Group had a code that they knew did not work or comply with NRC requirements, that the SBLOCA analysis ultimately described by YAEC-1868 was prepared in such a way as to obfuscate deficiencies in the analysis, and that YAEC and MYAPCO personnel sought to conceal the lack of regulatory compliance from the NRC.[28] MYAPCO respectfully states that this premise is without any basis in fact.

Based on its review of this matter, MYAPCO understands that YAEC LOCA Group engineers interpreted §50.46 to require only that the limiting break be identified and bounded, not that the analysis include a full range spectrum of break sizes. When the YAEC LOCA Group determined that the limiting break had been identified by the analysis using a sufficient number of break size calculations and supported by engineering judgment, the LOCA Group did not undertake to run additional analyses for break sizes larger than 0.35 ft.^{2} because they did not believe there to be a need or requirement to do so. Thus, the LOCA engineers' decision not to perform additional break size analyses was not based on a knowledge or belief that RELAP5YA would not work for break sizes above 0.35 ft.^{2}. Rather, it is MYAPCO's understanding that the LOCA engineers did not understand or believe there was reason to perform additional analyses for larger break sizes, and the LOCA engineers were not aware, one way or the other, whether the code was capable of analyzing the larger break SBLOCA transients using smaller and smaller time steps.[29]

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[28] Having been provided only with the synopsis of the OI report concerning these ECCS issues (Enclosure 1 to NRC December 19, 1997 letter to MYAPCO), MYAPCO assumes, but does not know, that this premise underlies, at least in part, OI's conclusion as stated by the synopsis that MYAPCO willfully violated 10 C.F.R. §50.46.

[29] As the NRC is aware, the RELAP5YA code stopped running (or "terminated") at the 0.35 ft.^{2} break size because it failed to reach numerical convergence at the time steps used in the analysis after the accumulator activated. The NRC's Demand for Information to YAEC and DE&S, dated December 19, 1997 ("Demand"), focuses on the statement that the RELAP5YA code "failed" when running the larger break sizes. It is MYAPCO's understanding that the word "failed" did not mean, as asserted in the Demand, that the code did not work or was incapable of operating. It is a term that describes the code's inability to perform the calculations necessary for numerical convergence at some time, and at some time step size, during the postulated transient. MYAPCO understands that the code also "failed" when running the calculations for break sizes smaller than 0.35 ft.^{2}. When that happened, the code was restarted with smaller time steps to complete the run. Sometimes this process had to be repeated more than once with decreasing time steps in order to complete the analysis of the transient. Thus, a successful analysis of a break size was occasionally completed only after one or more so-called "failures" of the code. Therefore, MYAPCO understands that the fact that the code "failed" during analysis of the 0.35 ft.^{2} break size transient was not an indication to the LOCA engineers that the (footnote continued)

This Apparent Violation Is Not Safety Significant.

The DE&S-sponsored Technical Review Team found that the comparison of all of the SBLOCA results for Maine Yankee (which are summarized in the Technical Review Report at pp. C-8 through C-10), including the YAEC RELAP5YA results, indicates that the PCTs for SBLOCA are less than 2200° F and that SBLOCA remains bounded by LBLOCA. The Technical Review Team concluded that there was no reduction in the safety of the plant (Technical Review Report, p. C-15). MYAPCO agrees.

The apparent violations relating to Operating Cycles 14 and 15 (Apparent Violations C and D) regarding the capability of RELAP5YA to analyze the complete traditional SBLOCA spectrum have minimal safety significance from an enforcement context. In regard to the actual and potential safety consequences, it has been demonstrated that the limiting SBLOCA break had been identified, and further that this limiting SBLOCA break is less severe than the LBLOCA event. Regardless of the computer code used to do the analysis for SBLOCA -- whether RELAP5YA, CE, or certain scoping analysis -- SBLOCA has always been shown to be less limiting than LBLOCA. Since operating limits to ensure safe operation are set using limiting events, Maine Yankee has always operated with LOCA-related operating limits set using an NRC-approved LBLOCA code. Accordingly, while this apparent violation has regulatory significance, it is not safety significant.

(continued footnote)

code was not capable of analyzing the larger breaks, including a full analysis of the 0.35 ft.^{2} transient, but, rather, it was an indication that numerical convergence was not achieved at the time steps used. In fact, the LOCA engineers had already gleaned the relevant information from the terminated 0.35 ft.^{2} run -- that is, the cladding temperature at accumulator actuation for that break size was shown to be lower than the cladding temperatures at actuation for smaller break sizes, thus providing evidence upon which the engineers drew the conclusion that PCTs for the 0.35 ft.^{2} break size would be lower than PCTs for the smaller break sizes. The larger break sizes analyzed for the study described in YAEC-1868 required use of even smaller time steps for RELAP5YA to achieve numerical convergence and calculate the transient, which increased the effort and time to complete the analysis. MYAPCO understands that, due to the resources required to continue the analysis, along with all of the empirical, physical and analytical evidence supporting the judgment that the limiting break had already been bounded, the YAEC LOCA Group concluded that additional break size runs were not necessary.

If the NRC concludes that this apparent violation is an appropriate subject of enforcement action, MYAPCO respectfully suggests that this violation should be assigned, at most, Severity Level IV.[30]

D. MYAPCO Response to Apparent Violations Relating to Inability to Analyze Entire Break Spectrum for Cycle 15 (Apparent Violation D)

Summary Statement of Apparent Violation D:

MYAPCO failed in the Cycle 15 CPAR to use an acceptable evaluation model to calculate ECCS performance. The codes used by MYAPCO failed to satisfy the requirements of 10 C.F.R. §50.46 because the analyses were not capable of calculating or reliably calculating cooling performance for the portion of the break spectrum between 0.35 $ft.^2$ and at least 0.6 $ft.^2$

Summary Statement of Response to Apparent Violation D:

MYAPCO acknowledges that, contrary to NRC expectations and industry standard practice, the RELAP5YA SBLOCA evaluation model described in YAEC-1868 has not demonstrated the capability to analyze all break sizes on the Maine Yankee SBLOCA break spectrum and that, as a result, the analysis did not meet NRC expectations concerning compliance with 10 C.F.R. §50.46.

Discussion:

For the same reasons addressed by MYAPCO's response to Apparent Violation C, MYAPCO acknowledges that, contrary to NRC expectations and standard industry practice, the RELAP5YA SBLOCA evaluation model described by YAEC-1868, and relied upon in the Cycle 15 CPAR, has not demonstrated the ability to analyze all break sizes within the licensed break range, and that, as a result, MYAPCO failed to meet NRC expectations concerning 10 C.F.R. §50.46 compliance. MYAPCO's response to Apparent Violation C is incorporated by reference herein.

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30 MYAPCO respectfully states that, given the lack of published guidance regarding 10 C.F.R. §50.46, particularly so prior to the publication of NRC Information Notice 97-15 "Reporting of Errors and Changes in Large Break Loss-of-Coolant Accident Evaluation Models of Fuel Vendors and Compliance with 10 C.F.R. §50.46(a)(3)" (April 4, 1997), it would be unjust to cite MYAPCO for escalated enforcement action.

E. **MYAPCO Response to Apparent Violation Relating to Incomplete and Inaccurate Core Performance Analysis Reports (Apparent Violation E).**

Summary Statement of Apparent Violation E:

The CPARs used by MYAPCO to support its Cycle 14 and Cycle 15 operations relied upon and incorporated YAEC-1868, "Maine Yankee Small Break LOCA Analysis," which contained inaccurate and incomplete statements material to the NRC, in violation of 10 C.F.R. §50.9(a). These statements concealed that the complete break spectrum had not been analyzed and that, contrary to 10 C.F.R. §50.46(a)(1), there was a portion of the break spectrum between 0.35 $ft.^2$ and 0.6 $ft.^2$ for which no acceptable code was capable of reliably calculating cooling performance.

Summary Statement of Response to Apparent Violation E:

MYAPCO denies this violation. While YAEC-1868 contains erroneous statements which, when viewed alone, do not accurately reflect the range of the SBLOCA break spectrum analyzed, the report, when read as a whole, cannot be fairly characterized as incomplete or inaccurate in any material respect.

Discussion:

Enclosure 4 to the Regional Administrator's December 19, 1997 letter states as Apparent Violation E that the CPARs used by MYAPCO to support its Cycle 14 and Cycle 15 operations, which were submitted to the NRC on August 25, 1993 and December 1, 1995, respectively, relied upon and incorporated YAEC-1868, "Maine Yankee Small Break LOCA Analysis," which was not complete and accurate in all material respects in violation of 10 C.F.R. §50.9(a).[31] MYAPCO denies this violation because, while YAEC-1868 contains erroneous statements which, when viewed alone, do

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[31] In its responses to Apparent Violations C and D, above, MYAPCO has acknowledged its use of, and reliance on, the RELAP5YA SBLOCA analysis described by YAEC-1868 during Cycle 14 and 15 operations, and in the Cycle 14 and Cycle 15 CPARs. MYAPCO has agreed with the NRC's position that MYAPCO's reliance on the RELAP5YA SBLOCA evaluation model documented in YAEC-1868 failed to meet NRC expectations regarding compliance with the requirements of 10 C.F.R. §50.46 and 10 C.F.R. Part 50, Appendix K because the RELAP5YA evaluation model has not demonstrated the capability to analyze all break sizes within Maine Yankee's SBLOCA licensing basis. Accordingly, while Apparent Violation E also cites to 10 C.F.R. §50.46(a)(1) and 10 C.F.R. Part 50, Appendix K, MYAPCO's response to this apparent violation is directed solely to the allegations pertaining to 10 C.F.R. §50.9(a).

not accurately reflect the range of the break spectrum analyzed by the evaluation model,[32] the document, when read as a whole, cannot be fairly characterized as incomplete or inaccurate in any material respect.

As determined by the Technical Review Team, the compliance statements and the supporting analyses in YAEC-1868 could be understood by a *knowledgeable engineer not trained in the LOCA licensing process* as a logical basis for compliance, and, therefore, YAEC-1868 could be understood by a knowledgeable engineer not trained in the LOCA licensing process to be complete and in compliance with NRC regulations.[33] However, as further found by the Technical Review Team, the scope of the analysis as contained within YAEC-1868 is characterized accurately, the amount of technical information included was appropriate for a person knowledgeable in the field, such as an NRC reviewer, to understand the results of the analysis, and it is likely that the compliance statements and supporting analyses in YAEC-1868 would be understood by an NRC reviewer.[34] Perhaps most significantly, the Technical Review Team concluded that YAEC-1868 was understandable to its intended audience and that it was suitable as a licensing submittal in support of Maine Yankee.[35]

MYAPCO agrees with the Technical Review Team's conclusion that YAEC-1868 adequately discloses and describes the results of the analyses, including the break spectrum analyzed, the termination (or "failure") of the 0.35 $ft.^2$ break case, and YAEC's judgment as to why the analyses and results satisfied regulatory requirements. MYAPCO respectfully suggests that the problems and resulting apparent violations arose, not because YAEC-1868 was incomplete or inaccurate, but because the report was not submitted by Maine Yankee or YAEC to the NRC for review and approval. The Technical Review Team concluded that, had YAEC-1868 been submitted to the NRC, it is likely that interaction and dialogue between YAEC and the NRC concerning the compliance statements and supporting analyses would have ensued. Maine Yankee believes that, had its personnel responsible for NRC interaction recognized the need for increased communication with the NRC concerning SBLOCA issues generally, and specifically concerning the assumptions, judgments and techniques employed by YAEC in the analysis presented by YAEC-1868,[36] areas of misunderstanding with regard to NRC expectations and regulatory compliance would have been identified and resolved.

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32 *See, e.g.*, the Abstract of YAEC-1868 which states that "[e]valuations were performed over a complete range of break sizes . . . ."

33 Technical Review Report, p. C-20.

34 *Id.*

35 *Id.*

36 As discussed above, MYAPCO relied upon YAEC, in particular the expertise of the YAEC LOCA Group, to provide a SBLOCA evaluation model that met the (footnote continued)

Based on the foregoing, MYAPCO denies that the Cycle 14 and Cycle 15 CPARs submitted to the NRC, which relied upon and incorporated YAEC-1868, were incomplete or inaccurate in any material respect in violation of 10 C.F.R. §50.9(a).

This Apparent Violation Is Not Safety Significant.

Even if the NRC disagrees with MYAPCO's position that no violation occurred, MYAPCO respectfully states that this apparent violation relating to Operating Cycles 14 and 15 had minimal safety significance. From a safety perspective, there were no adverse actual or potential safety consequences resulting from this issue. It has been demonstrated that the limiting SBLOCA had been identified, and further that this limiting SBLOCA break is less severe than the LBLOCA event. Regardless of the computer code used to do the analysis for SBLOCA, whether RELAP5YA, CE, or a scoping analysis, SBLOCA has always been shown to be less limiting than LBLOCA. Because operating limits to ensure safe operation are set using limiting events, Maine Yankee has always operated with LOCA related operating limits set using an NRC-approved LBLOCA code. MYAPCO does acknowledge, however, that if this issue is cited as a violation, it could have some limited level of regulatory significance, albeit historical in its usefulness.

F. MYAPCO Response to Apparent Violation Related to Improper Application of the Alb-Chambre Correlation for Cycle 14 (Apparent Violation F).

Summary Statement of Apparent Violation F:

During Cycle 14 operations, and in the Cycle 14 CPAR, MYAPCO calculated ECCS performance for SBLOCAs with an unacceptable evaluation model, in violation of 10 C.F.R. §50.46(a)(1). The nodalization model of YAEC-1868 incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of penetration and the cross flow resistance factor, and which as a result unacceptably overpredicted cooling performance and overstated the conservatism of RELAP5YA.

(continued footnote)

requirements of 10 C.F.R. §50.46 and Appendix K, and that satisfied the conditions in the RELAP5YA SER. While MYAPCO recognized its vendor-oversight responsibilities, MYAPCO did not have, and did not attempt to replicate, the LOCA expertise that it purchased from YAEC, and MYAPCO respectfully suggests that it was entitled to rely upon the YAEC LOCA expertise, and upon YAEC's judgments and interpretations concerning LOCA issues. As a result of its reliance, MYAPCO understood and believed in good faith that the methodology described by YAEC-1868 satisfied all regulatory requirements. MYAPCO's understanding and belief in this regard does not, however, fairly or inevitably lead to the conclusion that the information contained in YAEC-1868 is incomplete or inaccurate in any material respect.

Summary Statement of Response to Apparent Violation F:

MYAPCO denies this violation based on the findings and conclusions of the DE&S-sponsored Technical Review Team comprised of industry experts in the area of LOCA analysis.

Discussion:

In Enclosure 4 to the Regional Administrator's December 19, 1997 letter, the NRC states as Apparent Violation F that MYAPCO, during Cycle 14 operations (from October 14, 1993 through January 25, 1995), and in the Cycle 14 CPAR submitted to the NRC on August 25, 1993, calculated ECCS performance for SBLOCAs with an unacceptable evaluation model in violation of 10 C.F.R. §50.46(a)(1). More specifically, the NRC alleges that RELAP5YA as applied to Maine Yankee was not an acceptable evaluation model because the nodalization model of YAEC-1868, "Maine Yankee Small Break LOCA Analysis," incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of penetration factors and the cross-flow resistance factor. The NRC asserts that these deficiencies resulted in overprediction of core cooling performance and overstatement of the conservatism of the RELAP5YA model.

MYAPCO denies this violation.

As found by the DE&S-sponsored Technical Review Team, early applications of the RELAP5YA SBLOCA evaluation model to Maine Yankee identified excessive ECCS bypass relative to what was expected based on scaled test facility data and the results of other codes.[37] In their efforts to obtain reliable results applying RELAP5YA to Maine Yankee, and to make the ECCS penetration into the vessel lower plenum more physical, the YAEC LOCA Group tried various modeling approaches. Eventually an artificially large loss coefficient was introduced in the junction connecting the two volumes representing a split reactor vessel lower downcomer. The value of this loss coefficient was varied to obtain a balance between the expected ECCS penetration and the effect on steam venting via the break. After running calculations using various loss coefficients, a value of 600 was selected as an appropriate value. The amount of ECCS penetration obtained with this modeling approach was confirmed based, in part, on the Alb-Chambre correlation. This correlation, which is an empirical calculation of the penetration factor of the injected ECCS water penetrating the downcomer annulus into the lower plenum, was applied to confirm that the amount of ECCS penetration predicted by RELAP5YA was conservative.[38]

The Technical Review Team concluded that the YAEC LOCA Group's approach was an acceptable compensation for a RELAP5YA code deficiency, and that the use of a loss coefficient value of 600 obtained an amount of ECCS penetration that was consistent

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37 Technical Review Report, p. C-21.

38 *Id.*

with industry experience.[39] Although they could not definitively confirm their conclusion, the Technical Review Team concluded that this modeling approach is not expected to result in an overprediction of core cooling.[40]

MYAPCO understands, based on its review of this issue, that a calculational error was made by a YAEC engineer in the application of the Alb-Chambre correlation and that this arithmetic error was not identified during the YAEC quality assurance process.[41] The Technical Review Team found that the results of the arithmetic error made in the application of the Alb-Chambre correlation in no way invalidated the selection of the loss coefficient utilized by YAEC, and the Technical Review Team further found that the arithmetic error was one which would not call attention to itself because the final result of the calculation with the error was in the range of the expected result that complete penetration was predicted.[42] The correlation can produce results in excess of the value of 1 (in this case a value of 8), which have the meaning of complete ECCS penetration. The Technical Review Team found that a person performing a quality assurance review is influenced by the result based on experience and expectations and that errors encountered in this situation are the most difficult errors to recognize and identify.[43] The Technical Review Team found that a correct application of the Alb-Chambre correlation without the arithmetic error would have produced negative values indicating complete ECCS bypass, and that this result would have been immediately recognized by YAEC as non-physical for the SBLOCA conditions of interest. The cause of the non-physical result would have been traced to excessively conservative input values. More reasonable values would then have been inputted to the correlation, and reasonable and valid results indicating significant ECCS penetration would have resulted.[44] Based on these findings, the Technical Review Team concluded that, although an arithmetic error occurred in the application of the Alb-Chambre correlation, the modeling which incorporated the loss coefficient with a value of 600 remains valid and, accordingly, the results of the error in applying the Alb-Chambre correlation did not result in invalid input to the RELAP5YA SBLOCA analyses.[45]

As discussed above, the Technical Review Team concluded that the use of the Alb-Chambre correlation as a confirmation of the modeling approach which included the

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39 *Id.*

40 *Id.*

41 *Id.* at C-21 - C-22.

42 *Id.*

43 *Id.* at C-22.

44 *Id.*

45 *Id.*

junction loss coefficient of 600 in the reactor vessel downcomer was reasonable given the available data and the deficiency of the code. While the Technical Review Team acknowledged the literal correctness of YAEC's determination that the value of the downcomer junction loss coefficient was an input to the evaluation model, the Technical Review Team concluded that, due to the non-physical value used and the significance of this input parameter, YAEC should have recognized the approach as a model change requiring NRC approval.[46] The Technical Review Team also concluded that, had there been a submittal of the RELAP5YA SBLOCA applications to the NRC, this modeling approach would have been discussed and reviewed, and this model could have been approved by the NRC in this form or with some revision.[47]

Based on the findings of the Technical Review Team, MYAPCO acknowledges the existence of an apparent arithmetic error made in the application of the Alb-Chambre correlation, but denies that the results of this error in any way invalidated the selection of the loss coefficient utilized by the YAEC engineers. Contrary to the NRC's statement of the apparent violation, this calculational error did not result in unacceptable overprediction of cooling performance or overstatement of the conservatism of the RELAP5YA SBLOCA model. MYAPCO therefore denies that YAEC's error in the application of the Alb-Chambre correlation caused MYAPCO, during Cycle 14 operations and in the Cycle 14 CPAR, to use an unacceptable SBLOCA evaluation model in violation of the requirements of 10 C.F.R. §50.46(a)(1).

This Apparent Violation Is Not Safety Significant.

As discussed above, the factual predicate for this apparent violation (as well as for Apparent Violation G) has been shown to be incorrect. When the facts underlying the apparent violation are properly characterized, it has been shown that the error that did occur did not result in overprediction of ECCS cooling performance. Accordingly, the apparent violations relating to Operating Cycles 14 and 15 (Apparent Violations F and G) regarding use of the Alb-Chambre correlation had no actual consequences, potential consequences, and no regulatory significance, therefore these issues have no safety significance.

G. MYAPCO Response to Apparent Violation Related to Improper Application of the Alb-Chambre Correlation for Cycle 15 (Apparent Violation G).

Summary Statement of Apparent Violation G:

MYAPCO calculated ECCS performance for SBLOCAs in the Cycle 15 CPAR with an unacceptable evaluation model, in violation of 10 C.F.R. §50.46(a)(1). The nodalization model of YAEC-1868 incorrectly applied the Alb-Chambre correlation, which caused incorrect calculations of

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46 *Id.*

47 *Id.*

penetration and the cross flow resistance factor, and which as a result unacceptably overpredicted cooling performance and overstated the conservatism of RELAP5YA.

Summary Statement of Response to Apparent Violation G:

MYAPCO denies this violation based on the findings and conclusions of the DE&S-sponsored Technical Review Team comprised of industry experts in the area of LOCA analysis.

Discussion:

MYAPCO denies this violation for the reasons stated in its response to Apparent Violation F, which is incorporated herein by reference.

H. MYAPCO Response to Apparent Violation Relating to Reduced Steam Generator Pressure for Cycle 14 (Apparent Violation H)

Summary Statement of Apparent Violation H:

MYAPCO violated 10 C.F.R. §50.46 by its reliance on an unacceptable SBLOCA evaluation model (the Best Estimate plant-specific evaluation model described in the YAEC report dated August 1, 1990) to calculate ECCS performance in preparing an analysis of a decrease in steam generator pressure, performed pursuant to the requirements of 10 C.F.R. §50.59.

Summary Statement of Response to Apparent Violation H:

MYAPCO agrees with and acknowledges this violation. This violation arose out of good faith errors and an imperfect understanding of, and lack of sophistication in dealing with, license basis issues.

Discussion:

Enclosure 4 states as Apparent Violation H that MYAPCO violated 10 C.F.R. §50.46(a)(1) by relying on an unacceptable SBLOCA evaluation model (the Best Estimate (BE) plant-specific evaluation model described in the YAEC August 1, 1990 summary report) to calculate ECCS cooling performance in preparing a 10 C.F.R. §50.59 analysis of a decrease in steam generator pressure.

No allegation of willful misconduct is made by the NRC's statement of this apparent violation. However, the NRC's December 19, 1997 letter indicates that the apparent violations associated with the ECCS analyses "collectively represent a potentially significant lack of attention or carelessness toward licensed responsibilities and a failure to conduct adequate oversight of a vendor, resulting in the use of services of defective or indeterminate quality." Accordingly, out of an abundance of caution,

MYAPCO below addresses the issue of willfulness in connection with this apparent violation.

MYAPCO agrees with the NRC's statement of Apparent Violation H, i.e., that MYAPCO's use of the BE model to calculate ECCS cooling performance in preparing a 10 C.F.R. §50.59 review of decreased steam generator pressure failed to comply with the requirements of 10 C.F.R. §50.46(a)(1). MYAPCO, however, disagrees with any allegation or suggestion that this violation arose out of careless disregard of regulatory requirements by MYAPCO personnel. An objective review of relevant facts demonstrates that this violation resulted from good faith errors and an imperfect understanding of, and lack of sophistication in dealing with, license basis issues, which was characteristic of the industry at the time. This violation did not grow out of any reckless indifference to, or careless disregard of, regulatory obligations.

Based on its recognition of reduced steam generator pressure resulting from tube fouling, MYAPCO, in service requests issued on October 23, 1990 (SR M-90-155) and November 5, 1990 (SR M-90-158A), requested that YAEC evaluate the impact of reduced steam generator pressure on safety analyses.[48, 49] YAEC's response to these service requests required analyses by YAEC's Transient Analysis Group (TAG), and Radiological Engineering Group, as well as the LOCA Group. Based on its review of this matter, MYAPCO does not believe that there was contemplation or recognition by MYAPCO personnel at the time of these service requests that the requested analyses would (or should) form the basis of a 10 C.F.R. §50.59 evaluation.[50]

In response to SR M-90-155, YAEC prepared a January 25, 1991 memorandum, entitled "Impact of Low Steam Generator Pressure on LOCA Analysis" (LOCA 91-04), which analyzed the impact of reduced steam generator pressure on the "[l]icensing large break and small break LOCA analyses" using the Best Estimate (BE) SBLOCA analysis described by YAEC's August 1, 1990 memorandum (LOCA 90-110). YAEC incorrectly

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48 In addition to MYAPCO's recognition of potential impact on the safety analyses of the decreasing steam generator pressure due to fouling of the steam generator tubes, MYAPCO sought YAEC's evaluation in connection with its consideration of plant operations at reduced steam generator temperatures in order to minimize steam generator tube degradation. *See* SR No. M-90-155.

49 The Technical Review Team found that the analyses requested by the MYAPCO service requests were scoping analyses. The large break LOCA had always been the limiting LOCA for Maine Yankee. It appears that recognition of LBLOCA as limiting influenced MYAPCO's approach to reviewing the effect of reduced steam generator pressure on the SBLOCA analysis. It appears that this may have led, in part, to the decision to conduct scoping or confirmatory-type analyses for SBLOCA.

50 As discussed below, MYAPCO personnel did not recognize the need for a 50.59 review until late 1992 when suggested by the NRC Resident Inspector.

characterized the BE model as Maine Yankee's licensing basis SBLOCA analysis. YAEC concluded in LOCA 91-04 that Maine Yankee's operation with a lower steam generator pressure of 775 psig would not invalidate the conclusions of the "current [SBLOCA] licensing basis analysis" and recommended that the issue be reanalyzed if a new licensing basis analysis was performed.[51]

On January 28, 1991, YAEC transmitted to MYAPCO a memorandum entitled "Impact of Lower SG Pressures on the Safety Analysis" (NED 91-18). This memorandum, which is indicated as closing out Service Requests M-90-155 and M-90-158A, attached as references three separate analyses prepared by YAEC concerning the steam generator pressure issue, including the January 25, 1991 memorandum (LOCA 91-04). NED 91-18 stated that YAEC had "evaluated the impact of reduced steam generator pressure on the safety analysis" and concluded that the Maine Yankee plant could operate with a reduced steam generator pressure as low as 775 psig and an average core inlet temperature as high as 551.3° F, with certain changes to the primary code safety valve operability criterion.

On April 9, 1992, MYAPCO issued another service request to YAEC (SR M-92-42) pertaining to the reduced steam generator pressure issue. SR M-92-42 asked YAEC to "[d]etermine the minimum steam generator pressure that can be supported by analysis." MYAPCO indicated that a target value of no greater than 743 psig actual pressure was desirable and also requested that YAEC provide the "uncertainties that should be used with the computer and MCB [main control board] indications of steam generator pressure." The "justification" for the project is identified as "ensur[ing] that operation with the governor valves wide open is bounded by the analysis."[52] The service request form indicates that YAEC accepted the work on May 4, 1992 and projected completion of the work by July 30, 1992. YAEC indicated in the response section of the service request form that the "first portion of the request [i.e., determination of the minimum steam generator pressure supported by analysis] will be completed after the revised SBLOCA model is completed" and that the second component of the service request had already been completed and documented by memorandum TAG-MY-92-30, dated April 17, 1992.

In a May 29, 1992 memorandum entitled "Steam Generator Pressure and Heat Transfer Coefficient Monitoring" (TAG-MY-92-035), YAEC described "a method which can be used at Maine Yankee to monitor two key parameters: the full power steam

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51 Based on its review of the LBLOCA licensing basis analysis, YAEC determined that reduced steam generator pressure would lead to improved results (i.e., decreased peak cladding temperatures).

52 This operating configuration lowered steam generator pressure further and lowered the operating temperatures in the reactor coolant system.

generator pressure and the overall heat transfer coefficient (UA)."[53] This memorandum referenced NED 91-18 and noted that the development of the described methodology had been requested by MYAPCO as a follow-up to NED 91-18. The "Safety Evaluation" section of TAG-MY-92-035 stated that "[t]his memo is safety related."

In June 1992, Maine Yankee implemented a method of monitoring operating parameters for steam generator heat transfer. MYAPCO's reactor engineering staff prepared this monitoring program based on the analyses provided by YAEC in response to the 1990 service requests (NED 91-18) and on the methodology described by YAEC's May 29, 1992 memorandum (TAG-MY-92-035). *See* Maine Yankee Memorandum dated June 4, 1992, "Transmittal of Changes to Reactor Engineering Operating Information" (REOI-92.14); Maine Yankee Memorandum dated June 5, 1992, "Transmittal of Changes to Reactor Engineering Operating Information" (REOI-92.15). Based on its review of this matter, MYAPCO does not believe that its reactor engineering personnel considered the need for a 10 C.F.R. §50.59 review in connection with implementation of the monitoring program.

MYAPCO's review of this matter indicates that Maine Yankee personnel did not contemplate or recognize the need for a 10 C.F.R. §50.59 evaluation until in or around the Fall of 1992. At that time, the NRC Resident Inspector suggested that a 10 C.F.R. §50.59 review was necessary to review the change in operating conditions resulting from the reduced steam generator pressure. MYAPCO responded by briefing the Resident Inspector on this issue[54] and initiating a formal Technical Evaluation (TE 027-93).

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[53] This memorandum (TAG-MY-92-035) actually provided three such methods "to verify that these parameters [were] within the safety analysis envelope."

[54] Resolution of this issue was discussed in positive terms in the NRC Resident Inspector's Inspection Report 50/309/93-02 (2/25/93). The cover letter noted ". . . good overall performance, including . . . a thorough engineering review of the effects of decreased steam pressure on plant safety." The body of the Inspection Report stated:

> From 1989 to the present, Maine Yankee has observed gradual degradation of steam generator steam pressure. During that period, pressure decayed from 845 psig to 790 psig, as a result of fouling of the steam generator tube heat transfer surfaces. Maine Yankee engineering staff performed an analysis to demonstrate that plant operation with steam pressure as low as 738 psig did not invalidate design basis assumptions. Engineering staff found that steam generator steam pressure affected three design basis accidents: loss of load, steam generator tube rupture, and a control element assembly withdrawal accident.

The inspectors concluded that the engineering staff thoroughly analyzed the effects of reduced steam pressure on the assumptions in the accident analysis. It is noteworthy that the Inspection Report only refers to those events that were formally re-analyzed (e.g., loss of load), as opposed to "confirmatory" calculations or events (footnote continued)

TE 027-93 included a 10 C.F.R. §50.59 evaluation of the reduced steam generator pressure issue. The Technical Evaluation was commenced on January 30, 1993.

The reactor engineer who prepared TE 027-93 and the incorporated 50.59 review was the same engineer who had, in June 1992, prepared the monitoring program based on the YAEC analyses documented by NED 91-18 and TAG-MY-92-035. In preparing TE 027-93 and the incorporated 50.59 review, the MYAPCO engineer again relied upon and referenced NED 91-18 and TAG-MY-92-035, which, as noted above, relied in part on the BE SBLOCA analysis and incorrectly characterized this methodology as MYAPCO's licensing basis SBLOCA analysis.[55]

Based on its review of this matter, MYAPCO understands that the reactor engineer who prepared TE-027-93 and the 50.59 review did not consult with YAEC personnel concerning MYAPCO's use of the YAEC analyses in support of the 10 C.F.R. §50.59 determination. At the time of his 50.59 review, the MYAPCO engineer did not understand or recognize that the YAEC analyses referenced by both the Technical Evaluation and the 50.59 review relied in part upon the non-licensing basis BE SBLOCA analysis.

YAEC's Appendix K SBLOCA calculation (MYC-1530 "Maine Yankee Cycle 13 Small Break LOCA analysis") was completed, reviewed and approved as of April 5, 1993. On April 12, 1993, YAEC issued memorandum TAG-MY-93-012, entitled "Steam Generator Pressure and Heat Transfer Coefficient Monitoring - Cycle 13."[56] This memorandum, which is indicated as closing out Service Request M-92-42 (issued April 9, 1992), documented YAEC's reanalysis of the SBLOCA component of the reduced steam generator pressure issue using the newly completed Appendix K SBLOCA evaluation model. TAG-MY-93-012 provided a single general

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(continued footnote)

disposed of by inspection. It appears that the knowledge and recognition that the LBLOCA had always been the limiting LOCA for Maine Yankee may have influenced the NRC Resident Inspector's perspective on the evaluation of reduced steam generator pressure on the SBLOCA analysis.

55 The "Conclusion/Recommended Disposition" section of TE 027-93 stated as follows:

> As documented in MYP-91-0098 and MYP-92-0605, the degradation of steam generator UA and the loss of pressure does not affect any of the safety analysis licensing basis. Administrative requirements are necessary to ensure operation within the steam pressure and UA assumptions; and to establish primary code safety operability criteria.

56 This memorandum (TAG-MY-93-012) was transmitted to Maine Yankee on April 22, 1993 (*See* MYP 93-0460)

method for monitoring steam generator pressure and overall heat transfer coefficient so as to ensure that these operating parameters were within the envelope assumed in the safety analysis.[57] As an attachment to TAG-MY-93-012, YAEC provided MYAPCO with information to support a 10 C.F.R. §50.59 review and referenced the Appendix K SBLOCA calculation.

In January 1994, MYAPCO revised TE 027-93 (See TE 027-93, Rev. No. 1, January 13, 1994). The Technical Evaluation was revised to add the April 12, 1993 memorandum (TAG-MY-93-012; MYP 93-0460), which described the new monitoring method. Accordingly, in the final Technical Evaluation, as revised, the referenced SBLOCA analysis was the RELAP5YA Appendix K SBLOCA analysis.

As stated above, MYAPCO agrees with the NRC's conclusion that MYAPCO's use of the BE SBLOCA model in support of the January 1993 50.59 review of decreased steam generator pressure was a violation of the requirements of 10 C.F.R. §50.46(a)(1). This violation did not result from careless disregard by MYAPCO of its regulatory obligations, but, rather, was given rise to by good faith errors and MYAPCO personnel's imperfect understanding of license basis issues which Maine Yankee believes was typical of the industry during the time period relevant to this apparent violation. At this time, licensees, including MYAPCO, were not as sophisticated in understanding and addressing license basis issues as they are today.

While not excusing the subject violation, MYAPCO respectfully suggests that several observations are useful to place these events in perspective. First, MYAPCO's use of the non-licensing basis SBLOCA analysis in support of the January 1993 50.59 review did not arise out of any intent to "work around" the 10 C.F.R. §50.59 requirements. The MYAPCO engineer who prepared the 50.59 evaluation was not aware that the YAEC analyses relied upon a non-licensing basis SBLOCA model or that there was any restriction on the use of these analyses that rendered them inappropriate for use in support of the 50.59 review.

Second, it is clear that MYAPCO's approach to the decreasing steam generator pressure issue was pro-active and safety focused. While process errors occurred in MYAPCO's efforts to address this issue, MYAPCO and YAEC were intent on understanding and mitigating any potentially adverse safety effects that could result due to the pressure reduction.

Third, this apparent violation concerning the use of an unacceptable (that is, not NRC approved in accordance with 10 C.F.R. §50.46) SBLOCA evaluation model to support a 10 C.F.R. §50.59 analysis related to decreasing steam generator pressure had no

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[57] While the three methods to determine the acceptability of a steam generator pressure/UA condition, as described by YAEC's May 29, 1992 memorandum (TAG-MY-92-035) remained conservative, the single general method for monitoring these parameters was simpler and provided additional margin.

safety significance. The Best Estimate SBLOCA evaluation model which formed the basis for the acceptability of operating with lower steam generator pressure produced results more conservative than the Appendix K evaluation model.[58] This was demonstrated when the Appendix K evaluation model was used to allow even lower steam generator pressure than had been allowed using the BE model. Furthermore, by the time the document which was based on the 50.59 review which referred to the BE SBLOCA analysis was actually approved, an Appendix K model analysis was approved, and could have been used if the original error in characterizing the BE model as the licensing basis had been recognized.

The Technical Review Team noted that the effect of reduced steam generator pressure on the SBLOCA results for the magnitude of steam generator tube fouling and plugging that was being evaluated would not be expected to be significant.[59]. This is particularly true given that the analyses of record showed the SBLOCA PCTs to be lower than the LBLOCA PCTs. The Technical Review Team concluded that an evaluation could have been justified without any SBLOCA analysis, and that an evaluation could also have been justified using the BE analysis methodology provided that sufficient qualification was included, and provided that the analysis of record was not replaced.[60]

As noted above, the NRC's statement of this apparent violation does not allege that this violation involved careless disregard by MYAPCo of its regulatory obligations. The Regional Administrator's December 19, 1997 letter, however, suggests that all of the apparent violations (A through H) associated with the ECCS analysis "collectively" reflect a carelessness toward licensed responsibilities. MYAPCO respectfully suggests that the factual record demonstrates that there is no legitimate basis upon which to conclude that this violation involved careless disregard by MYAPCO of regulatory

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58 The BE analysis had calculated PCTs approximately 500° F higher than the Combustion Engineering SBLOCA analysis upon which the Maine Yankee plant was licensed. The PCT of 1980° F calculated using the BE analysis was still less than the 10 C.F.R. §50.46 acceptance criteria and less than the limiting LBLOCA PCTs. Thus, use of the BE model was a more conservative approach to analyzing SBLOCA issues associated with reduced steam generator pressure.

59 Technical Review Report, p. C-24.

60 *Id.* The Technical Review Team disagreed with the NRC's position that only approved Appendix K evaluation models can be used in performing some scoping safety evaluations, including input to 50.59 evaluations. The Technical Review Team found that models such as Best Estimate models can be appropriately used provided that the application does not replace the analysis of record, and provided that the use of the analysis method is clearly stated and justified (Technical Review Report, p. C-24). The Technical Review Team further noted that, if there is any doubt regarding the appropriateness of such an application, the NRC should be consulted prior to implementing the results of the analysis (Technical Review Report, p. C-24).

requirements. MYAPCO believes that this violation is appropriately characterized, at most, as a Level IV violation.

This Apparent Violation Is Not Safety Significant.

Consistent with the discussion in MYAPCO's response to this apparent violation, MYAPCO respectfully states that this violation had no safety significance.

II. MYAPCO'S RESPONSE TO APPARENT VIOLATION ASSOCIATED WITH PROVIDING INACCURATE INFORMATION TO THE NRC RELATIVE TO THE CAPACITY OF THE ATMOSPHERIC STEAM DUMP VALVE (OI REPORT NO. 1-96-025) (ENCLOSURE 5)

Summary Statement of Apparent Violation:

MYAPCO, on March 18, 1986, submitted to the NRC a Procedures Generation Package (PGP) which contained a materially inaccurate statement regarding Atmospheric Dump Valve bypass capacity, in violation of Section 186 of the Atomic Energy Act of 1954, as amended.

Summary Statement of Response to Apparent Violation:

MYAPCO agrees that the PGP submitted to the NRC on March 18, 1986 contained a materially inaccurate statement, but denies that this self-identified error constitutes a violation of Section 186 of the Atomic Energy Act of 1954, as amended.

Discussion:

The synopsis of the investigative report prepared by the NRC Office of Investigations (OI) in connection with this matter (OI Report No. 1-96-025), which is provided as Enclosure 2 to the Regional Administrator's December 19, 1997 letter, states that OI concluded that MYAPCO "willfully provided inaccurate information regarding the capacity of the ASDV to the NRC in the 1986 submittal of the PGP." In apparent reliance on OI's conclusions, the NRC states in its December 19, 1997 letter that

> it appears that, in violation of NRC requirements, MYAPCo willfully provided materially inaccurate information regarding the capacity of the Atmospheric Steam Dump Valve (ASDV) to the NRC in a March 1986 submittal of the Procedures Generation Package (PGP), which incorporated by reference revised Emergency Operating Procedures (EOPs). Facility personnel knew at the time of the 1986 submittal of the PGP that the ASDV had a capacity of 2½%, and not 5% as reflected in the submittal.

Enclosure 5 to the NRC's December 19, 1997 letter alleges that MYAPCO, in apparent violation of Section 186 of the Atomic Energy Act of 1954, as amended, "submitted a Procedures Generation Package on March 18, 1986, which contained a

materially inaccurate statement. Specifically, the licensee stated that the Atmospheric Dump Valve (ADV) had a 5% bypass capacity when in fact it had a 2½% capacity." Enclosure 5 indicates that the inaccurate statement was material to the NRC because the relief capacity relates to the ability to adequately achieve core cooling.

MYAPCO acknowledges that the PGP submitted to the NRC on March 18, 1986 contained a materially inaccurate statement. MYAPCO disagrees with and denies the conclusions stated by the synopsis of the OI report, and echoed by the NRC's December 19, 1997 letter, that MYAPCO willfully provided this inaccurate information concerning the ADV capacity to the NRC. Moreover, based on the information discussed below, MYAPCO denies that its provision of this inaccurate information to the NRC rises to the level of egregiousness to be fairly characterized as a violation of Section 186 of the Atomic Energy Act of 1954, as amended (the "Act"), based on the current NRC usage of that provision.[61]

In February 1996, while preparing for an INPO audit, MYAPCO's then EOP Coordinator learned that, on March 18, 1986, MYAPCO had submitted a procedures generation package (PGP) that incorrectly stated the capacity of the plant's atmospheric steam dump valves and thus provided an incorrect result for the plant's ability to recover from an Inadequate Core Cooling (ICC) event. By memorandum dated February 29, 1996, the EOP Coordinator notified MYAPCO management of the submittal error and of the fact that the NRC had not previously been made aware of the error.[62] This finding was promptly provided to the NRC by telephone notification on March 1, 1996, followed by a letter dated March 4, 1996. MYAPCO committed to conduct a full investigation of the matter.

MYAPCO conducted a comprehensive investigation concerning the issue of individual responsibility for the March 1986 submittal to the NRC of the PGP containing inaccurate information.[63] MYAPCO also chartered a comprehensive Plant Root Cause

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61 The NRC has indicated that Section 186 of the Act is reserved for the most egregious acts involving material false statements. *See* 52 Fed.Reg. 7432, 7436; "Proposed Rule" for 10 C.F.R. §50.9, March 11, 1987. In order to be found in violation of Section 186, there must be a submittal to the NRC by a licensee that contains false information material to the NRC, and the information must, at a minimum, be provided to the NRC by the licensee in careless disregard of its truthfulness.

62 Memorandum of R.A. Hathaway to S. Smith, "Inability to recover from an ICC situation in FR-C. 1/2 Due to MY's ADV being less than the 5% capacity assumed in the Westinghouse ERGs," dated February 29, 1996.

63 Memorandum from Thomas A. Schmutz (Morgan, Lewis & Bockius LLP) to M.A. Lynch, "EOP Investigation," dated July 9, 1996.

Evaluation.[64] Both the individual responsibility report and the plant root cause evaluation report were provided by MYAPCO to the NRC upon their completion. Based upon these investigations, which involved extensive interviews and document reviews, MYAPCO concluded that, acting through a non-supervisory employee, MYAPCO had submitted a PGP on March 18, 1986 that contained an inaccurate statement.

MYAPCO further concluded that no MYAPCO employee engaged in deliberate misconduct. MYAPCO did conclude, however, that the submittal to the NRC of the PGP containing erroneous information was the result of judgmental error on the part of the non-supervisory MYAPCO employee ("Employee A") that violated both the NRC's and MYAPCO's expectations concerning the provision of accurate and complete information to the NRC. Based on its investigation, MYAPCO concluded that no employees with the exception of Employee A had knowledge or reason to know that the PGP submittal contained an inaccuracy at the time of its transmittal to the NRC. Nor did any other employee have any knowledge or reason to know after the submittal that the submittal contained a factual error.

MYAPCO concluded that Employee A did not submit the factual error in an effort to deceive or mislead the NRC. Employee A considered that the development of the EOPs and the Technical Guidelines was an "evolutionary process," and he believed that it was recognized both within MYAPCO and the NRC that the information in the PGP would change and evolve over time and that the EOPs and the PGP would be revised. Employee A noted that corrections were being made on a daily basis and that, in light of the PGP's status as an evolving document, he considered the PGP submitted to the NRC in March 1986 simply a "snapshot" of MYAPCO's status and progress at that point in time and reflective of an ongoing process. While MYAPCO does not approve of or condone his action or his logic,[65] Employee A's view in this regard appears to be supported by the NRC's Safety Evaluation Report (SER) concerning the PGP in which the NRC instructed MYAPCO that it should revise the PGP in certain respects or provide justification as to why the revisions were unnecessary. The NRC's letter to MYAPCO transmitting the SER stated: "The revision and/or justification should be retained for subsequent review by the staff and no further submittals are required."

With respect to the issue of willfulness, it is critical to recognize that there was never any attempt to conceal this information or the fact that the EOPs for the ICC event were inadequate. In 1989, in preparation for an expected NRC audit of MYAPCO's

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64 Plant Root Cause Evaluation Report #209, "Incorrect Value for Atmospheric Steam Dump Capacity Sent to the NRC in the Emergency Operating Procedure Generation Package," report date July 3, 1996 (Rev. 0) and August 21, 1996 (Rev. 01).

65 As discussed below, Employee A was disciplined by MYAPCO, and, in a meeting with MYAPCO management, advised that his judgment and actions failed to comply with company and NRC expectations concerning the provision of accurate and complete information to the NRC.

EOPs, MYAPCO contracted with General Physics Corporation (General Physics) to perform an audit of the EOPs. In the report of its findings, General Physics stated that the recover strategy for Inadequate Core Cooling and Degraded Core Cooling events would not work because of the inadequate capacity of the steam dump valve. General Physics made a number of recommendations in its report to address the inadequate valve capacity.

As a result of the General Physics's audit, MYAPCO's EOP Steering Committee, which had been recently formed, included as an agenda item at its first meeting the "inability of the atmospheric steam dump to reduce S/G pressures."[66] As reflected by the EOP Steering Committee Minutes of June 29, 1989, the EOPs for the ICC event were discussed, and the Committee decided to revise the procedures to provide, among other things, direction to the operators to "locally lift the steam generator code safety valves."[67]

Based on the General Physics EOP audit, Employee A prepared an action plan of items identified in the General Physics audit which required further attention prior to or in conjunction with the upcoming NRC audit (the "EOP Audit Action Plan").[68] The EOP Audit Action Plan specifically identified the supplemental analysis prepared by YAEC which found that the "recovery strategy used in FR-C.1 and FR-C.2 will not work if the main condenser is unavailable."[69] In discussing the status of the issue, the EOP Audit Action Plan stated that the matter was under review by the EOP Steering Committee and that the "current plan" was to add an atmospheric dump valve as written in Service Request 89-12.[70]

In July 1989, the NRC conducted an on-site audit of the Maine Yankee EOPs over an approximate 2 week period. During the course of its audit, the NRC was provided with the General Physics audit report of May 1989, the EOP Audit Action Plan prepared by MYAPCO Employee A in response to the General Physics audit, and the "EOP Philosophy Steering Committee Minutes" for the June 29, 1989 meeting.[71] None of these documents expressly noted the error in the original PGP submittal to the NRC, but the documents did discuss and disclose the difficulty with the EOPs associated with

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66 EOP Steering Committee Agenda at p. 3 (June 27, 1989).

67 EOP Steering Committee Minutes at p. 1 (June 29, 1989).

68 EOP Audit Action Plan, dated July 14, 1989.

69 *Id.* at 1-2.

70 *Id.* at 2.

71 NRC Inspection Report 50-309/89-81 at 20 (October 27, 1989). The NRC's Inspection Report specifically states that the NRC reviewed the General Physics audit report, the EOP Audit Action Plan and the EOP Philosophy Steering Committee Minutes of June 29, 1989.

an ICC event, including the reason for the difficulty. This information is not provided in an effort to justify or excuse the inclusion of the erroneous information in the PGP submitted to the NRC in March 1986. Rather, it is emphasized solely to demonstrate that there was no effort or intent by MYAPCO to conceal from the NRC information concerning the problems with the ICC procedures. Maine Yankee respectfully suggests that the providing of this information to the NRC audit team belies any suggestion of an effort or desire by MYAPCO personnel to deceive or mislead the NRC.

The factual record demonstrates that the difficulties being encountered with the ICC EOPs were widely recognized throughout MYAPCO. These issues are well documented and were the subject of several Service Requests. As noted above, while a significant number of MYAPCO employees were involved in the development of the PGP materials submitted to the NRC, and were later involved in matters pertaining to the resolution of the technical issues raised by the valve capacity discrepancy, MYAPCO concluded as a result of its investigation that, except for the non-supervisory employee identified herein as Employee A, no MYAPCO employee had knowledge or reason to know that the PGP submittal contained an error at the time of its transmission to the NRC or to know of the factual error after the PGP was submitted to the NRC.[72, 73]

Indeed, MYAPCO suggests that there is no reason why MYAPCO personnel would want to conceal either the error in the submittal or the resulting problems with the EOPs. Because of the low probability of an ICC event (on the order of 10^{-7} per year), and the fact that the ICC event is outside the plant design basis, it seems probable that the NRC would not have demanded completely effective EOPs for such an event.

Immediately upon learning in March 1996 that it had made a submittal to the NRC in March 1986 which contained inaccurate information, MYAPCO management treated this issue with utmost seriousness and took immediate corrective actions. While MYAPCO believed that the valve size discrepancy had minimal safety significance, it recognized the regulatory significance of this matter and dealt with it in a manner consistent with that recognition. The issue was immediately identified for the NRC, and MYAPCO committed significant resources to a thorough investigation of the matter. In addition, MYAPCO provided plant personnel with a training session on NRC regulations.

With respect to the non-supervisory employee (Employee A), based on the amount of time (10 years) that had elapsed, the lack of any deliberate misconduct, the

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[72] Obviously, MYAPCO personnel became aware of the submittal error as a result of the EOP Coordinator's identification and documentation of the issue in February 1996.

[73] MYAPCO is aware that Employee A has alleged that he discussed with one or more members of MYAPCO management the linkage between the ADV capacity discrepancy and the fact that the erroneous information had been included in the PGP submitted to the NRC. Based on its investigation concerning this issue, MYAPCO has not identified any evidence that supports this allegation.

lack of safety significance, and the fact that there was no known similar action or occurrence by the employee, MYAPCO determined that the appropriate level of discipline was a letter to the employee's personnel file and a meeting with MYAPCO management regarding the importance of, and company and NRC expectations concerning, accuracy of all information provided to the NRC.

Based on the foregoing, MYAPCO respectfully suggests that the submittal of the PGP containing the factual error concerning ADV capacity does not support a finding of MYAPCO's deliberate intent to violate, or careless disregard of, NRC regulations. While MYAPCO understands based on communications with the NRC that Section 186 of the Act has been cited in connection with this apparent violation because the apparent violation occurred before the promulgation of 10 C.F.R. §50.5, MYAPCO contends that the actions and events underlying this violation certainly do not rise to the level of egregious misconduct involving material false statements for which violations of Section 186 of the Act are reserved. MYAPCO respectfully suggests that this event should not be treated as more than an inadvertent submittal that violated 10 C.F.R. §50.9(a), and that it should be treated, at worst, as a Level IV violation.

This Apparent Violation Has, At Most, Minimal Safety Significance.

MYAPCO respectfully suggests that this apparent violation has, at most, minimal safety significance. This conclusion is based on the fact that there was no actual safety consequence, no potential safety consequence, and minimal historical regulatory significance. The event with respect to which the ADV capacity is most significant is the beyond design basis ICC event. As noted above, the ICC event has an estimated frequency of 10^{-7} per year. MYAPCO's belief and understanding concerning the marginal safety significance of this event is based on the facts that the reporting error had no bearing on the performance of design basis events and that Maine Yankee identified the discrepancy and took appropriate corrective action.

Enforcement Based on This Apparent Violation is Time Barred

Pursuant to 28 U.S.C. §2462, the commencement by the NRC of any enforcement proceeding against MYAPCO, based on the Apparent Violation stated by Enclosure 6, to impose and/or collect a civil penalty under section 234 of the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2282 (the "Act"), is time barred. The time bar established by 42 U.S.C. §2282 is not restricted to a civil action brought by the Attorney General, on the request of the NRC, to collect a civil penalty pursuant to 42 U.S.C. §2282(c). The five-year limitations period applies equally to the commencement of any proceeding under section 234 of the Act to *assess or impose* a civil penalty based on an alleged violation occurring outside the five-year limitations period. *See 3M Company v. Browner*, 17 F.3d 1453, 1457-59 (D.C. Cir. 1994). The five-year limitations period applicable to the NRC's statement of Apparent Violation associated with providing materially inaccurate information to the NRC in the PGP submitted to the NRC in March 1986 expired no later than March 1991. Even if the NRC were to construe the limitations period as not commencing until the NRC on-site audit of the Maine Yankee EOPs in July 1989, the five-year limitations period would have expired no later than July 1994.

III. MYAPCO'S RESPONSE TO APPARENT VIOLATIONS ASSOCIATED WITH SAFETY SYSTEM LOGIC TESTING (OI REPORT NO. 1-96-043) (ENCLOSURE 6)

Statement of Apparent Violation A:[74]

Technical Specification 5.8.2 states, in part, that written procedures be established, implemented, and maintained to control, among other things, activities concerning testing of safety related equipment.

Item 12 of Attachment C to Procedure No. 0-16-3, "Work Order Process," defines a Functional Test Instruction (FTI) as instructions that define the evolutions or operations necessary to prove functionality or operability of a component, system, or structure.

Precaution 3.1 of Work Order 96-02928-00, Attachment A, "Functional Test for P-14A/S on A Train SIAS and Bus 5 Undervoltage," and Work Order 96-02929-00, Attachment A, "Functional Test for P-14 B/S on B Train SIAS and Bus 6 Undervoltage," states that if any step cannot be completed as specified in the FTI, then the Field Engineer must be contacted and any deviation from this FTI must be authorized in accordance with Procedure 0-16-3.

Deviations to FTIs are permitted through the use of Minor Technical Changes (MTC) as described in Item 13 of Attachment C to Procedure No. 0-16-3.

However, on August 22, 1996, Step 5.3.3 of WO 96-02928-00 and WO 96-02929-00 could not be performed as written, and the licensee failed to resolve the discrepancy by making a Minor Technical Change. Specifically, Step 5.3.3 provided that at Maine Control Board (MCB), Section C, open circuit continuity be verified at 86-RASA-2(YAF) using a volt-ohm meter (VOM) across the 5-5C contacts. The field test engineers could not verify the open contacts with a VOM because of resistance in the circuit caused by a bulb and resistor wired into the circuit. Instead of making a MTC to permit visual verification, the field engineers verified open circuit continuity visually and signed Step 5.3.3 as satisfactorily completed.

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[74] Apparent Violations A and B are restated verbatim from Enclosure 6 to the NRC's December 19, 1997 letter.

Statement of Apparent Violation B:

10 C.F.R. § 50.9(a) provides in part that information required by the Commission's regulations to be maintained by the licensee to be complete and accurate in all material respects.

10 C.F.R. Part 50, Appendix B, Criterion XVII, "Quality Assurance Records," requires, in part, that records of tests affecting quality be maintained.

However, on August 22, 1996, the licensee created test records that were materially inaccurate. Step 5.3.3 of WO 96-02928-00 and WO 96-02929-00 provided that at MCB, Section C, open circuit continuity be verified at 86-RASA-2(YAF) using a volt-ohm meter (VOM) across the 5-5C contacts. The field test engineers could not verify the open contacts with a VOM because of resistance in the circuit caused by a bulb and resistor wired into the circuit. Instead, the field test engineers verified open circuit continuity visually and signed Step 5.3.3 as satisfactorily completed. These inaccuracies were material because the tests concerned functionality or operability of safety-related components.

Summary Statement of Response to Apparent Violations A and B:

MYAPCO agrees with the violations as stated by Enclosure 6. The subject actions by the Maine Yankee field engineers were based on exercise of their engineering judgment and do not evidence a deliberate or willful intent to violate Maine Yankee technical specifications or NRC requirements.

Discussion:

The synopsis of the underlying OI report (OI Report No. 1-96-043) indicates OI's conclusion that the two MYAPCO field engineers "falsified test records by deliberately violating technical specification required procedures that controlled safety related testing." Based on OI's conclusions, the NRC states in its December 19, 1997 letter that "it appears that MYAPCo willfully violated Technical Specification 5.8.2 and 10 C.F.R. §50.9(a)."

Based on its review of the documents and events described by these apparent violations, MYAPCO agrees with the apparent violations stated by Enclosure 6. MYAPCO, however, disagrees with the NRC's statement that MYAPCO willfully violated TS 5.8.2 and 10 C.F.R. §50.9(a). MYAPCO similarly disagrees with OI's conclusions that the MYAPCO field engineers deliberately violated procedures required by MYAPCO's technical specifications. While the actions of the field engineers based on exercise of their engineering judgment failed to meet company expectations regarding procedural adherence, MYAPCO respectfully suggests that an objective review of the factual record underlying these apparent violations does not support a conclusion that the

MYAPCO field engineers deliberately intended to violate Maine Yankee technical specifications or regulatory requirements.

MYAPCO procedures require that work be stopped and the field engineer contacted if work cannot be performed as prescribed in a work order. In the events described by these apparent violations, the individual engineers performing the work were, in fact, the field engineers. The field engineers were intimately familiar with the Functional Test Instructions and the intent of the specific work order procedural steps in question.

The intent of Step 5.3.3 in the subject work orders was to verify that contacts 5-5C are open, which verification should have been performed with the VOM used as a "go-no-go" indication of positive contact position. After the engineers' unsuccessful attempts to use the VOM, work was stopped, the issues were analyzed and understood, and an alternate visual inspection was performed to verify the open circuit continuity. In each instance, engineering judgment was used to establish that the intent of the work order step had been met. The alternate visual verifications of the open contact position provided the same positive verification of the contact position and did not reduce the effectiveness of the procedure step. The field engineers, on each occasion, initialed the work order step as satisfactorily completed based on their engineering judgment that the intent of the step was satisfied. The field engineers did not, however, generate Minor Technical Changes to the FTIs as required by MYAPCO procedure. The failure by the field engineers to comply with MYAPCO's procedures was clearly a judgmental error, but there is no indication that the non-compliance grew out of a deliberate intent to violate, or careless disregard of, either MYAPCO procedures or NRC regulatory requirements.

Based on its review of this matter, MYAPCO has identified several potential causes for the human error, all of which pertain to the environment and conditions at the time of these events:

- The field engineers were functioning in a dual role, both performing the work and performing oversight for the work orders. This dual function placed the field engineers in a position where the implementation of the MTC process was cumbersome and possibly confusing. This dual role also established a procedural trap by mixing and blurring lines of responsibility and authority.

- The location of the contacts provided physical and electrical safety limitations for use of the specified tools. Visual observation was simple to perform in order to verify the desired condition.

- Expectations for procedure adherence within the engineering organization were not continuously emphasized to the degree and extent those expectations were emphasized in other plant organizations.

Immediately upon recognizing the field engineers' failure to implement the work order technical steps as written, and to follow MYAPCO procedures, Plant Engineering Department supervisory personnel took corrective action, which included the initiation of Corrective Action Request No. 96-036-0 (initiated August 29, 1996). That Corrective Action Request identified the following "deficiency": "Work Order technical instructions were not implemented as written." The following corrective actions were performed:

- An engineering review of the FTIs was performed to ensure the desired results had been obtained and to ensure the visual verification did not invalidate the test.

- A MTC was backfitted into the FTIs to ensure the test record reflected what actually occurred in the field.

- The PED Electrical and I&C Section Head convened a meeting at which the group's engineers were advised concerning the event and the deficiency findings, specifically relating to procedure compliance.

- Training was provided to the entire engineering staff regarding the requirements of 10 C.F.R. §50.9(a). This training was provided at a later date and was not specifically tied to this event.

While acknowledging these violations arising from the engineers' non-compliance with plant procedures, MYAPCO emphasizes these errors were caused by the engineers' exercise of inappropriate judgment. There is no legitimate basis upon which to conclude that these events evidence a deliberate intent to violate, or careless disregard, of regulatory requirements. MYAPCO respectfully suggests that these violations should appropriately be treated as Non-Cited Violations, which are below the level of significance of Severity Level IV violations, and that these Non-Cited Violations are not the appropriate subject of escalated enforcement action.

This Apparent Violation Is Not Safety Significant.

While MYAPCO acknowledges the regulatory significance of this event, the apparent violations had no immediate safety significance. As discussed above, the event involved verifying that a set of electrical contacts were open. The original step called for use of a VOM (Volt Ohm Meter) to verify an open circuit. In fact, visual examination was substituted. In this case, knowledgeable personnel made the decision to substitute the methodology based upon difficulty in using the VOM and obviousness by visual inspection that the contacts were open. Had the methodology change been processed as required, the same personnel involved could have approved the change. Since the methodology substitution was made by qualified, knowledgeable personnel and confirmed that the electrical contacts were open, the event has no safety significance. The FTI, as performed, met the original intent and demonstrated the required actuation of the logic circuit. Plant safety was never compromised due to the judgmental error of the Field Engineers.

IV. SPECIAL CIRCUMSTANCES

Maine Yankee believes that a fair and objective evaluation of the factual record, and of enforcement precedent, should cause the NRC to conclude (1) that the violations associated with the safety system logic testing (Enclosure 6) are not the appropriate subject of escalated enforcement action; (2) that the violation associated with the ADV event (Enclosure 5) should be recognized as a licensee-identified and reported violation and treated, at most, as a Severity Level IV violation; and (3) that the violations and/or failures to meet NRC expectations arising out of the RELAP5YA SBLOCA analyses issues (Enclosure 4; Apparent Violations C, D, and H)[75] should be treated as Level IV violations. In the event the NRC determines otherwise (or concludes that any of Apparent Violations A.1, A.2, B.1, B.2, E, F and G constitute citable violations), Maine Yankee respectfully suggests that the NRC's exercise of enforcement discretion is appropriate for the reasons discussed immediately below and in Maine Yankee's detailed responses to the apparent violations (Attachment C).

A. Safety System Logic Testing.

These apparent violations (Enclosure 6) stemmed from a lack of procedural adherence in the field, which Maine Yankee acknowledges. However, as discussed in detail in Attachment C, the actions of the employees were not willful. Moreover, the actions were those of non-supervisory field engineers. Upon learning of the deficiency, Maine Yankee supervisory personnel initiated a Corrective Action Request and took immediate remedial action commensurate with the significance of the event, including:

- an engineering review of the Functional Test Instructions
- a correction of the work order records, through a "backfitted" Minor Technical Change, made within days of the procedure non-compliance
- meeting with workers to discuss the event and management expectations concerning procedure compliance.

In summary, based on the NRC's treatment of similar violations, the specific facts and circumstances of this event, and the absence of willfulness, this event should not be treated as an escalated enforcement action. If the NRC concludes that this event is the appropriate subject of formal enforcement action, Maine Yankee respectfully states that the exercise of enforcement discretion is clearly in order.

B. Atmospheric Steam Dump

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[75] For the reasons discussed in Attachment C, Maine Yankee denies the remainder of the apparent violations pertaining to the ECCS analyses issues cited in Enclosure 4.

Because of the volume of information provided to the NRC in this submittal, as well as by the previous submittals, documents and reports provided to the NRC in 1996, Maine Yankee will not engage in an extended discussion of the multiple mitigating factors present here. Maine Yankee respectfully suggests that, given the absence of deliberate misconduct and willfulness, the self-identification by Maine Yankee, the immediate reporting once identified, the immediate and thorough corrective actions, the age of the violation, the isolated nature of the violation, and the marginal safety significance, at most this event should be treated as a Level IV violation. In the event the NRC determines it appropriate to characterize this violation as more significant than Level IV, Maine Yankee respectfully suggests that the NRC's exercise of enforcement discretion is in order.

C. ECCS Analyses/RELAP5YA

As discussed in Maine Yankee's cover letter, these events have been the object of intense, prolonged, and costly investigation. Thousands of pages of records and transcripts have been accumulated regarding this issue. Maine Yankee does not attempt to restate the facts here. In response to certain of the apparent violations, Maine Yankee has acknowledged errors and mistakes that resulted in failures to meet NRC expectations and, in limited instances, regulatory non-compliance. Maine Yankee has denied the remainder of the apparent violations cited by Enclosure 4 and believes that no violations should be found by the NRC with regard to those denied apparent violations. Maine Yankee respectfully suggests that, even with regard to the acknowledged deficiencies, no escalated enforcement action is warranted, and that exercise of enforcement discretion by the NRC is in order because of the special circumstances involved.

First, the shortcomings identified in connection with the RELAP5YA issues grew out of communication deficiencies and Maine Yankee's insularity and isolation -- the latter of which root cause was previously identified in the ISAT (Independent Safety Assessment team) Report. The findings of the ISAT are themselves the subject of a pending enforcement action. Issuance by the NRC of additional Notices of Violation in connection with this event will have the effect of punishing Maine Yankee again for essentially these same deficiences.

Second, given that the primary purpose of the NRC's enforcement policy is deterrence, and given the ultimate fate of Maine Yankee, no additional citation or civil penalty can accomplish, by way of message, what has already been visibly, clearly and effectively communicated to the industry. As a result of the RELAP5YA allegations and all that flowed from those allegations, including increased regulatory scrutiny and the loss of confidence by the regulator, Maine Yankee, and the industry as a whole, surely understand the importance of avoiding isolation, the critical importance of keeping abreast of evolving regulatory standards, and the necessity to do both with respect to contractor oversight. The message of deterrence communicated by the permanent shutdown of Maine Yankee will not be enhanced by any further enforcement action.

Third, because of the inordinate attention this allegation has generated, it is sometimes easy to forget that, by and large, Maine Yankee's performance over the years

was that of a good plant. Until the NRC's Independent Safety Assessment (ISA) in 1996, Maine Yankee generally received good to superior SALP scores from the NRC.

Fourth, Maine Yankee's generally good performance, and its changes and improvements in management since the ISA, continue as it has embarked on decommissioning. Indeed, Maine Yankee has beat a steady retreat from any isolation it may have previously operated under and is increasingly looked to and sought after as an innovator and leader in decommissioning activities.

Unlike some utilities which have taken years to recognize and deal with management weaknesses, Maine Yankee implemented timely corrective action for the root cause problem of isolation by achieving an almost complete change in senior management within a few short months of receiving the ISAT report. Recognizing the problem and the need for immediate and timely action, Maine Yankee, with the NRC's concurrence , took the unprecedented step of seeking an alliance with Entergy Nuclear, Inc., a subsidiary of Entergy Operations, a recognized industry leader. We suggest that a full and objective review of Maine Yankee's actions leads to the conclusion that Maine Yankee acted swiftly and effectively to address the primary root cause underlying the ISA issues and the RELAP5YA matter.

Fifth, the ISA team conducted a thorough evaluation of the thirteen analytical computer codes (other than RELAP5YA) supplied by Yankee Atomic for Maine Yankee safety analyses. The ISA team concluded that the codes were properly used and that all of the 66 NRC safety evaluation report (SER) conditions specified for these codes were met.[76] Based on the ISA team's findings in this regard, Maine Yankee suggests that it is a fair conclusion that Maine Yankee acted reasonably in relying on, and having confidence in, Yankee Atomic's technical expertise. While Maine Yankee acknowledges its vendor oversight responsibilities and the importance of the vendor oversight requirements, Maine Yankee believes it would be unjust for the NRC to punish Maine Yankee given its reasonable reliance on the code work of a vendor, who, upon close scrutiny of the NRC, was found to be strong and competent.

Sixth, MYAPCO respectfully suggests that, in addition to its errors and mistakes that resulted in failures to comply with NRC expectations and in regulatory non-compliance, a fair and objective review also makes clear that errors made by the NRC contributed to certain of the issues that are the focus of the ECCS apparent violations. NRC investigations and reports concerning NRC actions associated with the Maine Yankee ECCS issues document actions and omissions by NRC staff that, at a minimum, contributed to the confusion and communications breakdowns that underlie

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[76] The ISA report stated that "[t]he use of analytic codes for safety analyses was very good" and that "[c]ycle specific core performance analyses were excellent." *See* Independent Safety Assessment of Maine Yankee Atomic Power Company, dated October 7, 1996, p. 70.

several of the apparent violations.[77] MYAPCO does not address the NRC's role in an effort to excuse its own deficiencies, but, rather, to provide what it believes to be critical context necessary to a full and fair review of these issues, particularly in light of the NRC's conclusion that certain of the ECCS apparent violations involved careless disregard by MYAPCO personnel. MYAPCO believes that the findings documented by the OIG report and the NRR Task Group report are relevant because of the causal role played by communications difficulties.

Additionally, MYAPCO believes that the informal nature of NRC guidance concerning LOCA analysis contributed to the RELAP5YA issues that are the subject of the apparent violations. Unlike virtually all other areas of NRC regulation, the NRC's expectations and guidance for LOCA analysis are not published. Rather, the NRC's expectations and guidance are learned and absorbed through years of communications, interactions, and experience with NRC LOCA reviewers. This lack of formal, published NRC guidance regarding LOCA analysis issues renders understandable, although not acceptable, that Yankee Atomic and Maine Yankee personnel reached conclusions and adopted approaches that failed to meet NRC expectations and to comply with NRC interpretations of certain aspects of the requirements associated with 10 C.F.R. §50.46.

Finally, while the NRC's enforcement policy does not expressly address the degree to which a licensee's cooperation should be considered in according some enforcement discretion, Maine Yankee believes it would be appropriate for the NRC to recognize the cooperation of Maine Yankee, its employees, and its vendor in connection with this matter. This cooperation occurred not only in connection with OI's lengthy review of these issues, but also in connection with the investigation that followed the NRC referral of the RELAP5YA matter to the Department of Justice (DOJ). While that investigation, which was closed by DOJ in September 1997, exacted a tremendous personal toll on the lives of many Maine Yankee employees, the cooperation of Maine Yankee and its personnel was unwavering.

V. CONCLUSION

Sections I through III of this Attachment C state MYAPCO's responses to the apparent violations identified by Enclosures 4, 5 and 6 to the NRC's December 19, 1997 letter to MYAPCO. As indicated by its specific responses, MYAPCO agrees with certain of the apparent violations cited by the NRC, but denies the remainder of those apparent violations.

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[77] *See* Office of the Inspector General Event Inquiry, Case No. 96-04S, "NRC Staff's Actions Related to Regulation at Maine Yankee," May 8, 1996 (the "OIG report"); *see also* SECY-97-042, "Response to OIG Event Inquiry 96-045 Regarding Maine Yankee," (February 18, 1997), Attachment 1 "Report of the Maine Yankee Lessons Learned Task Group," (December 5, 1996) (the "NRR Task Group report").

In its December 19, 1997 letter formerly transmitting to MYAPCO the notices of these apparent violations, the NRC requests that MYAPCO, as part of any docketed response for enforcement conference presentation address "why the NRC should not consider that certain apparent violations described herein were not [sic] the result of willfulness, deliberateness and/or careless disregard, on the part of [MYAPCO] personnel." As indicated by its responses to the apparent violations, MYAPCO does not believe that a full and fair review of the factual record underlying these matters supports a conclusion that any of the apparent violations cited by the NRC resulted from deliberate violation or careless disregard by MYAPCO personnel of regulatory requirements and obligations.

APPENDIX 1

LEGAL ANALYSIS OF WILLFULNESS

The NRC's December 19, 1997 letter to MYAPCO, the synopses of the Office of Investigations (OI) reports underlying the ECCS and ADV apparent violations (Enclosures 1 and 2), and certain of the apparent violations themselves allege "willfulness" by MYAPCO personnel in connection with the apparent violations. As set forth in MYAPCO's responses to the apparent violations, MYAPCO acknowledges and agrees with certain of the cited violations. MYAPCO, however, disagrees that any of the apparent violations resulted from willful misconduct on the part of MYAPCO personnel. Set forth below is a discussion of the legal standards that must be applied when analyzing the question of willfulness. MYAPCO respectfully suggests that application of these legal principles to the relevant facts supports MYAPCO's position that none of the apparent violations arose out of willfulness on the part of MYAPCO personnel.[1]

The NRC Enforcement Policy states that willfulness "embraces a spectrum of violations ranging from deliberate intent to violate or falsify to and including careless disregard for requirements."[2] Thus, at one end of the "willfulness" spectrum are violations involving a "deliberate intent to violate or falsify."[3] Deliberate misconduct is an "intentional act or omission that the person knows: (1) would cause a licensee to be in violation of any rule, regulation, or order, or any term, condition, or limitation, of any license issued by the Commission, or (2) constitutes a violation of a requirement, procedure, instruction, contract, purchase order or policy of a licensee, contractor or subcontractor."[4] Thus, in order for a violation to be "deliberate," there must be intentional action or conduct and a knowledge that such action or conduct violates an NRC requirement.

At the other end of the "willfulness" spectrum are violations that result from careless disregard.

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1 It appears that, with the exception of the apparent violation pertaining to the atmospheric steam dump valve (ADV) matter (Enclosure 5), the NRC has used the term "willful" in the context of exercising its enforcement discretion to escalate any base civil penalty associated with the core violation.

2 NRC Enforcement Policy IV (C), 60 Fed.Reg. 34,381, 34,385 (1995).

3 *Id.*

4 10 C.F.R. §50.5. While section 50.5 is not cited by the NRC as the basis for any apparent violation, its definition of "deliberate misconduct" is instructive.

> Careless disregard has been described as a showing of disregard for a governing statute or an indifference to its requirements . . . . A finding of careless disregard indicates that the person acted with reckless indifference to the requirement, or with disregard (or utter unconcern) of the consequences or whether there was compliance. This recklessness involves, at a minimum, an unconcern as to whether a requirement was or will be violated, or a situation in which the individual blinds himself or herself to the realities of whether a violation has occurred or will occur.[5]

Consistent with these characterizations of the "careless disregard" standard, the United States Supreme Court has held that if an individual makes a reasonable and good faith effort to determine what constitutes a violation of the law, then he cannot be acting with careless disregard.[6] The NRC has itself acknowledged that people may make mistakes while acting in good faith.[7]

The NRC has made several pronouncements of what is not careless disregard:

- "Careless disregard" is not simple error, misjudgment, miscalculation, ignorance, or confusion.[8]
- "Careless disregard" is not mere negligence.[9]

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5 55 Fed.Reg. 12,374, 12,375 (April 3, 1990). *See also*, 52 Fed.Reg. 49,362, 49,365 (Dec. 31, 1987) ("The concept of 'careless disregard' goes beyond simple negligence . . . [it] connotes a reckless disregard or callous . . . indifference toward one's responsibilities or the consequences of one's actions.") Thus, careless disregard does not require a conscious decision to violate a known requirement. Careless disregard requires that the violator act with indifference (beyond mere negligence) to the applicable requirement.

6 *Trans World Airlines, Inc. v. Thurston*, 469 U.S. 111, 128-30 (1985).

7 56 Fed.Reg. 40,664, 40,667.

8 56 Fed. Reg. 40664, 40677 (August 15, 1991) (discussion of final 10 C.F.R. §50.5 rule - discussing what is not willful and therefore not careless disregard).

9 NRC Enforcement Policy, § VIII. See also the Statement of Considerations accompanying promulgation of the final 10 C.F.R. § 50.9 rule: "[t]he concept of 'careless disregard' goes beyond simple negligence . . . [and] connotes a reckless disregard or callous . . . indifference toward one's responsibilities or the consequences of one's actions." 52 Fed. Reg. 49362, 49365 (Dec. 31, 1987). The Federal courts have also clearly stated that "careless disregard" is more than mere negligence (as opposed to "gross" negligence, which can, under certain circumstances, constitute willful behavior). *See Capital Packing Co. V. United States*, 350 F.2d 67, 78-79 (10th Cir. 1965) (willful (footnote continued)

- "Careless disregard" is not good faith incorrect understandings, misapprehensions, or incorrect interpretations of regulations.[10]

- "Careless disregard" of a requirements cannot be found in the absence of an "explicit requirement."[11]

The NRC's construction of the "careless disregard" standard is particularly instructive in the context of the subject apparent violations where regulatory requirements are extremely complex and the NRC has publicly acknowledged that (a) its regulations have been subject to differing interpretations, and (b) it needs to provide additional guidance concerning these regulations.[12] In Information Notice 97-15, the NRC acknowledged that there is some confusion throughout the nuclear industry about the requirements imposed under 10 C.F.R. §50.46, and advised its licensees about several other potential violations of 10 C.F.R. §50.46 involving two other nuclear fuel vendors (Siemens Power Corporation and General Electric Company) arising out of interpretations of 10 C.F.R. §50.46 which were different than those of the NRC staff.

It is a well-established legal principle that a company whose employees make a good faith attempt to interpret applicable regulatory requirements, and act in accordance with a reasonable interpretation of those requirements, does not engage in a willful failure to comply, or act with careless disregard, even if an agency or court subsequently disagrees with the company's interpretation. *See Trans World Airlines v. Thurston*, 469 U.S. 111, 129 (1985) (TWA did not engage in willful violation of Age Discrimination in Employment Act (ADEA) because "TWA officials acted reasonably and in good faith in attempting to determine whether their plan would violate the ADEA"); *See also McLaughlin v. Richland Shoe Co.*, 486 U.S. 128, 135 n. 13 (1988) (if a company "acts reasonably in determining its legal obligation it cannot be deemed willful"); *Brock v. Guffy, Hubbell, McGhee, P.C.*, 1985 WL 17583 (W.D. Va.) (defendant's violations of Fair Labor Standards Act were not intentional and did not

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(continued footnote)

conduct takes the form of an "intentional misdeed or such gross neglect of a known duty as to be the equivalent thereof . . . .").

10 *See Wrangler Laboratories, Larsen Laboratories, Orion Chemical Company and John Larsen*, LBP-89-39, 30 NRC 746, 780 (1989); *see also Georgia Power Company, et al.* (Vogtle Electric Generating Plant, Units 1 and 2; Hatch Nuclear Plant, Units 1 and 2), DD-93-8, 37 NRC 314, 332 (1993), *vacated on other grounds by* 38 NRC 1 (1993).

11 *Certified Testing Laboratories, Inc.*, LBP-92-2, 35 NRC 20, 43-44 (1992).

12 *See* NRC Information Notice 97-15, "Reporting of Errors and Changes in Large Break Loss of Coolant Accident Evaluation Models of Fuel Vendors and Compliance with 10 C.F.R. §50.46(a)(3)", April 14, 1997.

constitute careless disregard of the Act because the Act's overtime requirements were complex and defendant made a good faith attempt to interpret the Act and apply the overtime requirements).[13]

MYAPCO respectfully suggests that application of these legal standards to the relevant facts underlying the apparent violations demonstrates that there is no basis for a finding that MYAPCO personnel deliberately violated, or carelessly disregarded, NRC requirements.[14]

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[13] *See also, Wrangler Laboratories, Larsen Laboratories, Orion Chemical Company and John P. Larsen*, LBP-89-39, 30 NRC 746, 780 (1989), *rev'd on other grounds by* 33 NRC 305 (1991) (a licensee's "serious albeit defective" efforts to comply with NRC regulations were sufficient to defeat a conclusion of willful violation of NRC requirements or careless disregard of regulations under 10 C.F.R. Part 2, Appendix C); *Reich Geo-Physical, Inc.*, ALJ-85-1, 22 NRC 941, 957-58, 962 (1985) (because licensee had a reasonable basis for believing it was not violating NRC requirements, it could not be charged with careless disregard or, concomitantly, a willful violation.). *See also Georgia Power Co.* (Vogtle Electric Generating Plant, Units 1 and 2; Hatch Nuclear Plant, Units 1 and 2), DD-93-8, 37 NRC 314, 332 (1993), *vacated on other grounds by* 38 NRC 1 (1993) (Technical Specification violation was not willful because licensee had employed a reasoned and deliberative, albeit incorrect, process regarding compliance with its requirements).

[14] MYAPCO's conclusion regarding the lack of any willfulness on the part of its employees is consistent with the findings made by the law firm of Winston & Strawn in its assessment of whether the actions and conduct of any former Yankee Atomic personnel constituted willful misconduct. *See* Duke Engineering & Services, Inc.'s Response to the Nuclear Regulatory Commission's Demand for Information, dated February 27, 1998, Appendix D ("Report to Duke Engineering & Services, Inc. on Allegations of Willfulness Related to the U.S. Nuclear Regulatory Commission December 19, 1997 Demand for Information"). Winston & Strawn determined that, while in certain instances there may have been inadequate analysis associated with the SBLOCA analysis, any such deficiencies did not result from either deliberateness or careless disregard by Yankee Atomic personnel. MYAPCO believes that, while errors and mistakes were made by its employees, none of these shortcomings grew out of deliberateness or careless disregard by MYAPCO personnel.