

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 50-293/81-37

Docket No. 50-293

License No. DPR-35 Priority -- Category C

Licensee: Boston Edison Company

800 Boylston Street

Boston, Massachusetts 02199

Facility Name: Pilgrim Nuclear Power Station

Investigation At: Plymouth, Massachusetts; Boston, Massachusetts; Atlanta, Georgia; New Orleans, Louisiana; Phoenix, Arizona

Investigation Conducted: November 24, 1981-January 7, 1982

Investigator: R. Keith Christopher
R. Keith Christopher, Investigator

3/3/82
date signed

Approved By: Robert T. Carlson
Robert T. Carlson, Director, Enforcement
and Investigation Staff

3/3/82
date signed

Investigation Summary: Investigation from November 24, 1981-January 7, 1982
(Report No. 50 293/81-37)

Areas Investigated: The investigation was conducted to determine the circumstances surrounding the licensee's submittal of a letter to the NRC dated October 19, 1979 which contained an apparent material false statement regarding the status of the Pilgrim Nuclear Power Station's compliance with the requirements of 10 CFR 50.44, and to further determine if the licensee intentionally withheld from the NRC information developed subsequent to its October 19, 1979 submittal indicating the Pilgrim Nuclear Power Station was in noncompliance with the requirements of 10 CFR 50.44.

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I. SUMMARY

This investigation was initiated to determine the circumstances surrounding the submittal of a letter from the licensee to the Nuclear Regulatory Commission's Office of Nuclear Reactor Regulation (NRR) dated October 19, 1979 which contained an apparent material false statement pertaining to the status of the Pilgrim Nuclear Power Station (PNPS) compliance with the requirements of 10 CFR 50.44, "Standards for Combustible Gas Control System in Light Water Cooled Power Reactors." In this letter, the licensee stated it had conducted an analysis demonstrating that compliance with 10 CFR 50.44 requirements had been met with existing plant equipment. This equipment consists of an existing standby gas treatment system and the drywell and torus purge and vent lines. Exhaust from both the torus and drywell is routed to the main stack via the standby gas treatment system, and nitrogen makeup is supplied via the purge lines. This arrangement serves to control hydrogen concentrations by a bleed and feed method. Interviews of present and former licensee corporate and plant personnel (including the author of the letter) determined that no formal analysis had actually been conducted to support the statement of compliance made in the October 19, 1979 letter to NRR. The conclusion was apparently based on a purge analysis only in which the maximum offsite doses were estimated and compared with the dose guidelines of 10 CFR 100 but did not consider the requirements of 10 CFR 50, Appendix A, General Design Criteria 41, 42 and 43 as required by 10 CFR 50.44. Further, it was determined that following an October 30, 1979 request from NRR for the analysis referenced in the October 19, 1979 letter, an evaluation was prepared of PNPS compliance with 10 CFR 50.44. This evaluation indicated PNPS was in noncompliance with 10 CFR 50.44 because a recent reactor habitability study had indicated that credit could not be taken for operator actions to satisfy the single failure and loss of power design criteria of General Design Criterion 41. This evaluation of PNPS compliance was prepared by the licensee's Nuclear Engineering Department (NED) and was formally transmitted to the licensee's Nuclear Operations Department (NOD) by internal memorandum on March 28, 1980. The NRC was not notified of the contents of this evaluation until May, 1981 following an NRR telephone request asking the licensee to respond to the NRC letter of October 30, 1979 which originally requested the analysis. It should also be noted that Amendment 35 to the PNPS Final Safety Analysis Report (FSAR), dated January 28, 1974, had already assumed for design purposes that the reactor building would be inaccessible for 45 days after a design basis loss of coolant accident (LOCA). Amendment 35 was submitted to the NRC as a result of the regulatory staff's review of the FSAR application and subsequent conclusion that a combustible gas control system was required for the Pilgrim station.

Interviews of NED personnel determined that the analysis had been reviewed and approved by the NED Fluid Systems Division Supervisor and the NED Manager prior to being transmitted to the NOD. The NED personnel interviewed said it was their understanding that this evaluation had been submitted to the NRC by the NOD Licensing Division. Interviews of NOD personnel responsible

for responding to the NRC request for the analysis stated their position to be that the evaluation, as received by NOD, was inadequate to support a statement of either compliance or noncompliance with 10 CFR 50.44. While the individuals interviewed denied intentionally misleading the NRC regarding the status of PNPS compliance with 10 CFR 50.44, they were unable to explain what happened to the evaluation after it was formally transmitted to NOD on March 28, 1980 or why these perceived inadequacies in the evaluation were not resolved and the results reported to the NRC per its request of October 30, 1979. All of the individuals interviewed regarding the reportability of the results of the evaluation stated that, in retrospect, it was their opinion that the evaluation and its conclusions should have been reported to the NRC to identify a potential item of noncompliance. The licensee's management personnel opined that the occurrence was an oversight caused by a lack of management control over the processing of NRC correspondence and requirements and not an intentional attempt to mislead the NRC regarding the status of PNPS compliance with 10 CFR 50.44.

II. PURPOSE OF INVESTIGATION

The purpose of this investigation was to determine the circumstances surrounding the licensee's submittal of a letter to the NRC dated October 19, 1979 which contained an apparent material false statement regarding the status of Pilgrim Nuclear Power Station's compliance with the requirements of 10 CFR 50.44, and to further determine if the licensee intentionally withheld from the NRC information developed subsequent to its October 19, 1979 submittal indicating PNPS was in noncompliance with 10 CFR 50.44.

III. BACKGROUND

On August 25, 1971 the Atomic Energy Commission's Division of Reactor Licensing (DRL) published the report of its Safety Evaluation (SER) of the application by BECo for a license to operate the Pilgrim Nuclear Power Station (PNPS). Section 4.1.2 of the SER entitled "Containment Atmosphere Control" concluded that the licensee should provide a hydrogen control system in addition to the purging system proposed by the licensee to maintain the concentrations of combustible gases below flammability limits. In response to this requirement, the licensee submitted, on January 28, 1974, Amendment 35 to its Final Safety Analysis Report proposing installation of the containment atmosphere dilution (CAD) system as a method to provide redundant means of nitrogen supply to the containment. In Section III, "Design Basis", of this amendment, it is assumed that the reactor building would not be accessible for 45 days after the design basis LOCA, and that the CAD and nitrogen makeup systems and their associated instruments/controls would be designed to allow remote operation from the main control room. However, by letter dated June 13, 1974 to the AEC's Directorate of Licensing the licensee advised that it had suspended work on the CAD system as described in Amendment 35 pending issuance of the revision to Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident", then under consideration by the AEC, following which the proposed CAD system would be reevaluated and modified as appropriate.

In September 1976 Regulatory Guide 1.7, Revision 1, was issued for comment and Revision 2 was issued in final status in November 1978. On October 27, 1978, 10 CFR 50.44 was published and became effective on November 27, 1978. 10 CFR 50.44 required that a means be established for control of hydrogen gas that may be generated following a loss of coolant accident. Additionally, all BWR/PWR power reactors fueled with cylindrical zircaloy clad oxide pellets were to have the capability to (1) measure hydrogen in the containment, (2) insure a mixed atmosphere, and (3) control combustible gas concentrations. For facilities in which the notice of hearing on the application for a construction permit was published before December 22, 1968 (as is the case for PNPS), a purging system is an acceptable means provided it could be shown that the combined radiation dose at the low population zone outer boundary met the dose guidelines of 10 CFR 100 and it could be shown that the purging system was designed to conform to the general requirements of 10 CFR 50, Appendix A, General Design Criteria 41, 42, and 43.

By letter dated March 14, 1979, the licensee was reminded that Regulatory Guide 1.7, Revision 2, was issued in final status in November 1978 and was requested to submit within 60 days a schedule for installation and testing of the CAD System, the work on which had been suspended in 1974 until Regulatory Guide 1.7 was issued. In a response dated June 6, 1979, the licensee advised that it no longer intended to install the CAD system and stated its intent to retain the inert containment atmosphere while a system that incorporated hydrogen recombination was evaluated. Furthermore, the licensee advised that a summary description of the proposed system and proposed schedule of implementation would be submitted by September 15, 1979.

In a letter to NRR dated October 19, 1979, BECo confirmed the CAD system would not be installed, requested deletion of Amendment 35, and further stated that based on analysis, PNPS met the requirements of 10 CFR 50.44 with existing equipment.

By letter dated October 30, 1979, NRR requested the licensee to submit within sixty days the analysis referenced in the October 19, 1979 letter which demonstrated conformance with 10 CFR 50.44. This request was not responded to until June 15, 1981 when the licensee provided an evaluation dated March 28, 1980. This evaluation was stated to be the documented basis for the licensee's letter of October 19, 1979. However, none of the documentation submitted demonstrated that an analysis had been performed prior to the October 19, 1979 letter to support the conclusions contained in that letter. The evaluation of March 28, 1980 stated that all 10 CFR 50.44 requirements were not met with existing equipment in that, as a result of a TMI-related reactor habitability study, it was determined that local operator action could not be credited to satisfy the single failure and loss of power criteria of 10 CFR 50, Appendix A, GDC 41. On June 16, 1981, the licensee submitted Licensee Event Report No. 81-021/01X-0 formally notifying the NRC of PNPS noncompliance with 10 CFR 50.44.

Subsequently, the licensee conducted from June 15, 1981 to July 16, 1981 an internal investigation regarding this incident. This licensee investigation did not reveal any willful intent to not comply with 10 CFR 50.44 or to not report the noncompliance with this regulation after it was identified. The investigation identified inadequate management controls over the work management systems, inadequate multidisciplinary reviews within the nuclear organization associated with the response to 10 CFR 50.44 and various other management related deficiencies that contributed to the failure to comply with 10 CFR 50.44.

IV. DETAILS

This portion of the report is prepared in two parts (Section A and Section B) to report independently on two aspects of the investigation. Section A addresses the results of the investigation into the circumstances surrounding the licensee's submittal of the letter dated October 19, 1979 (BECO letter No. 79-207) which contained an apparent material false statement to the effect that PNPS met the requirements of 10 CFR 50.44 with existing plant equipment. Section B addresses the results of the investigation to determine if the licensee intentionally withheld from the NRC an evaluation dated March 28, 1980 that concluded that PNPS was in noncompliance with 10 CFR 50.44.

A. EVENTS LEADING TO SUBMITTAL OF BECO LETTER NO. 79-207 OF OCTOBER 19, 1979

1. Sequence of Correspondence Concerning 10 CFR 50.44

- a. In response to the AEC Regulatory staff concerns raised over hydrogen generation in the containment following a loss of coolant accident and discussed in the PNPS Safety Evaluation Report, the licensee submitted Amendment 35 to the PNPS FSAR on January 28, 1974 proposing installation of the containment atmosphere dilution (CAD) system as a method to provide redundant nitrogen supply to the containment. The system was to be designed to assure control of combustible gas concentrations by maintaining oxygen concentrations below 5%.
- b. On June 13, 1974, the licensee advised that work on the CAD system as described in Amendment 35 was being suspended until Regulatory Guide 1.7, which would delineate methods of control acceptable to the NRC, was finalized.
- c. In September 1976, Regulatory Guide 1.7, Revision 1, was issued for comment.
- d. In November 1978, Regulatory Guide 1.7, Revision 2, was issued in final status.
- e. On November 27, 1978, 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light Water Cooled Power Reactors," became effective.
- f. On March 14, 1979, the Nuclear Regulatory Commission's Office of Nuclear Reactor Regulation (NRR) issued a letter to Mr. G. Carl Andognini, Manager, Nuclear Operations Department, BECo, which reminded the licensee that Regulatory Guide 1.7 was in final status and requested the licensee to submit within 60 days a schedule for installation of a

previously committed to CAD system in order to meet the requirements that PNPS have a hydrogen control system.

- g. On June 6, 1979, the licensee responded by letter to this request stating "Our current plans do not call for the installation of a CAD system. We intend to retain the present inerted containment atmosphere requirements, and we are evaluating a system that incorporates hydrogen recombination capability.... We will submit a summary description of our proposed system and our proposed schedule of implementation by September 15, 1979."
- h. On October 19, 1979, the licensee, over the signature of Mr. Paul McGuire, PNPS Plant Manager, submitted to NRR BECo letter No. 79-207 which confirmed that the CAD system would not be installed and requested that Amendment 35 to the PNPS FSAR be deleted from the docket. This document also stated the following with respect to 10 CFR 50.44:

"To determine what changes are currently required for post LOCA containment combustible gas control, we have evaluated the present station design with respect to 10 CFR 50.44. Based upon our analysis, we comply with 10 CFR 50.44 with existing equipment."

INVESTIGATOR'S NOTE: This letter was signed by Mr. Paul McGuire, PNPS Plant Manager, in the absence of Mr. G. Carl Andognini, BECo Nuclear Operations Superintendent.

2. Interview of Author of the BECo Letter No. 79-207 dated October 19, 1979

Mr. Howard Steiman, Senior Chemical Engineer, BECo, was interviewed on December 3, 1981 by the reporting investigator. In a sworn statement, Steiman acknowledged preparing BECo letter No. 79-207 of October 19, 1979 while assigned to the Nuclear Engineering Department and also acknowledged that at the time of the submission of the letter to the NRC there was no formal analysis done to support the statement of compliance. He explained that the statement was made based on a limited informal analysis in which offsite dose assessments were compared to dose guidelines of 10 CFR 100 and that the practicalities of reactor building accessibility and operator habitability were not considered. Also, he said that at that time he was not aware that Amendment 35 assumed the reactor building would not be accessible after a design basis loss of coolant accident. Steiman denied that there was any intent on his part to mislead the NRC regarding the status of PNPS compliance with 10 CFR 50.44, and stated that at the time he prepared the letter he believed the station was in compliance with 10 CFR 50.44 based on the informal analysis he had done.

Steiman also stated that if he had done a proper analysis at the time he would have realized the plant was not in compliance, and said he would have stated as much at the time. Steiman said that the draft of the October 19, 1979 letter was reviewed by his supervisor (Mr. Wayne Merritt) and was then forwarded, in final form, from the Nuclear Engineering Department Manager (Stephen Rosen) to the Nuclear Operations Department. Steiman said he was not queried by anyone from the BECo staff either from NOD or NED regarding the contents of the October 19, 1979 letter and its statement of compliance with 10 CFR 50.44. The sworn statement of Mr. Steiman is appended to this report as Exhibit (1).

3. Interview of Mr. Wayne Merritt, Former Fluid Systems Division Supervisor, NED

Mr. Merritt was interviewed by the reporting investigator on December 8, 1981. He confirmed that during the time period in question he was the supervisor of Mr. Howard Steiman in the Fluid System Division of the BECo Nuclear Engineering Department. Merritt also noted at this time that he is no longer employed by the licensee. Merritt said he reviewed Steiman's draft of the October 19, 1979 letter. He said that at the time the primary criterion for the statement of compliance was the acceptable results of the offsite dose rate assessments per 10 CFR 100 rather than a point by point analysis of compliance with 10 CFR 50.44 requirements. Merritt acknowledged that this analysis was inadequate and did not consider operator habitability in reference to satisfying the single failure and loss of power criteria of 10 CFR 50, Appendix A, GDC 41. Merritt recalled that at the time he was confused as to what direction the combustible gas issue was going in light of the TMI experience and he felt that the post TMI standards would be much more stringent than the present 10 CFR 50.44 requirements. Merritt concluded that he did not, nor did he believe that anyone involved in the preparation and review of the October 19, 1979 letter, intend to deceive the NRC with respect to the status of PNPS compliance with 10 CFR 50.44. The sworn statement of Mr. Merritt is appended to this report as Exhibit (2).

4. Interview of Mr. Stephen Rosen, Former Nuclear Engineering Department Manager

Mr. Rosen was interviewed on December 15, 1981 by the reporting investigator. Rosen advised he is currently the Director of Analysis for the Institute of Nuclear Power Operations (INPO) but that during the time period in question he was Manager of the NED for Boston Edison Company. In a sworn statement, Rosen said he did not recall reviewing an analysis or documentation to support the statement of compliance with 10 CFR 50.44 in the October 19, 1979 letter to NRR. Rosen said normally he would not have reviewed documentation of this nature unless specifically requested to do

so. He said that since he did not review or request the analysis, he was not aware of the fact that an analysis to support the statement of compliance in the October 19 letter was not formally documented nor was he aware of what the conclusion of compliance was based on. Rosen said he approved the letter and its transmittal to the NOD based on the "green sheet review" for NRC correspondence which indicated that Mr. Wayne Merritt had already approved the document and its contents. Rosen denied that there was any intent on the part of NED personnel to mislead the NRC with respect to the status of compliance with 10 CFR 50.44 at PNPS, and conjectured that an inadequate "green sheet review" by both NED and NOD personnel contributed to the incident. The sworn statement of Mr. Rosen is appended to this report as Exhibit (3).

INVESTIGATOR'S NOTE: The "green sheet review" referred to by Mr. Rosen is a sign off process (per NOD Procedure 6.03, Control of NRC Correspondence) that is utilized to insure that all the cognizant managers review important correspondence before it is signed and mailed to the NRC.

5. Interview of Nuclear Operations Department Personnel Involved In Green Sheet Review of BECo Letter No. 79-207 of October 19, 1979

- a. Mr. James Keyes, Senior Licensing Engineer, NOD, was interviewed on December 9, 1981 by the reporting investigator. He said his responsibility with respect to the document was to insure that the letter as drafted by NED was in proper format and to insure that the green sheet review was carried out within the NOD. He said he accepted as fact that the NED had an analysis to support the statement of compliance in the letter of October 19, 1979 and did not question what type of analysis was done or what the basis was for the conclusion that PNPS was in compliance with 10 CFR 50.44. The sworn statement of Mr. Keyes is appended to this report as Exhibit (4).
- b. Mr. Edward Ziemianski, Management Services Group Leader was interviewed by the reporting investigator on December 2, 1981. Ziemianski advised that during the time period in question he held the position of Plant Support Group Leader and as such was involved in the activities pertaining to the issue of compliance with 10 CFR 50.44 including the licensee's letter No. 79-207 of October 19, 1979. With respect to that letter, Ziemianski said he would not have questioned whether or not the analysis referred to in the letter actually existed, nor would he have attempted to determine the details of such an analysis that led to the conclusion of compliance with 10 CFR 50.44. He said his sign off on the green sheet review would primarily have been based on the fact that the analysis was already approved by the NED Manager (Stephen

Rosen). Ziemianski said that after reviewing the letter he would provide it to the Licensing Division of NOD for development into a formal letter for signature prior to it being sent to the NRC. Ziemianski concluded that he did not believe there was any intent to mislead the NRC regarding compliance with 10 CFR 50.44, and attributed the incident to an inadequate management review of the letter prior to submittal to the NRC in addition to confusion as to what would actually be required to meet the requirements of combustible gas control in light of the TMI experience. The sworn statement of Mr. Ziemianski is appended to this report as Exhibit (5).

- c. Mr. Paul J. McGuire, former Plant Manager, PNPS was interviewed by the reporting investigator on December 16, 1981. McGuire advised that he is no longer employed by the Boston Edison Company but confirmed he was the Plant Manager at PNPS during the time period in question. In a sworn statement, Mr. McGuire said he signed BECO letter No. 79-207 of October 19, 1979 documenting compliance with 10 CFR 50.44 in the absence of Mr. Carl Andognini, the Manager of Nuclear Operations. McGuire said that at the time he signed the letter he was not aware of the basis for the analysis referred to in this letter and was not aware that PNPS was actually in noncompliance with 10 CFR 50.44. McGuire said that at that time he wasn't specifically aware of what 10 CFR 50.44 was, but signed the letter based on the fact that the green sheet review indicated previous acceptance of the document by the NED Manager, the Plant Support Group Leader, and the Licensing Engineer. McGuire concluded that, with respect to the preparation of this letter, he had no reason to believe there was any intent to willfully mislead the NRC regarding the status of compliance with 10 CFR 50.44. The sworn statement of Mr. McGuire is appended to this report as Exhibit (6).

6. Interviews of Additional Present and Former BECO Management Personnel Pertaining to the Circumstances Leading to the Submittal of BECO Letter No. 79-207 of October 19, 1979

- a. Mr. John Fulton, Senior Licensing Engineer, NOD, was interviewed on December 1, 1981 by the reporting investigator. In a sworn statement, Fulton said he was not directly involved in a review of the October 19, 1979 letter until subsequent to its submission to the NRC and was not aware of what the basis was for the statement that PNPS was in compliance with 10 CFR 50.44. He said his subsequent inquiries determined that there was no formal analysis conducted to document compliance with 10 CFR 50.44 prior to the submittal of the October 19, 1979 letter to NRR. Fulton said he made this determination as a result of discussions with the author of the letter (Howard Steiman). Fulton also opined that

operator's accessibility to the reactor building to satisfy the single failure and loss of power criteria of GDC 41 was not considered in the October 19, 1979 letter. Fulton said that prior to its transmittal to NOD, both Wayne Merritt (Supervisor of Fluid Systems) and Stephen Rosen (NED Manager) should have reviewed the analysis for acceptability. The sworn statement of Mr. Fulton is appended to this report as Exhibit (7).

- b. Individual A, who requested confidentiality, was interviewed by the reporting investigator on December 8, 1981. With respect to the October 19, 1979 letter, Individual A said he had no direct involvement in the preparation of that letter; however, an offsite dose calculation was done under his direction during this time frame to substantiate that following a containment venting, PNPS would remain within the dose guidelines of 10 CFR 100. Individual A opined that this was the "analysis" referred to in the October 19, 1979 letter to NRR. He concluded that prior to the submittal of the October 19, 1979 letter he was not requested to provide any further information or analysis data with respect to 10 CFR 50.44 and further opined that he had no reason to believe that anyone intended to mislead the NRC with respect to 10 CFR 50.44 compliance. The sworn statement of Individual A is appended to this report as Exhibit (8).
- c. Mr. G. Carl Andognini, former Superintendent, Nuclear Operations Department was interviewed on December 17, 1981 by the reporting investigator. Prior to beginning the interview, Andognini requested that his sworn statement regarding this issue be withheld from the public record.

Andognini stated he was absent from work during the time in which the October 19, 1979 letter was being reviewed for transmittal to the NRC. However, he stated that had he seen the letter and read its content he would not have questioned the analysis referred to in the letter or its conclusion of compliance with 10 CFR 50.44. Andognini said he would have checked the green sheet for the other management reviews and had he seen the concurrence of the NED management on this review sheet he would have signed his approval based on his reliance of the prior approval of the NED Manager. Andognini stated that he was not aware that PNPS was not in compliance with 10 CFR 50.44 nor did he have any reason to believe that the letter of October 19, 1979 was intended to deceive the NRC regarding the actual status of compliance with 10 CFR 50.44 at the time it was submitted. A sworn statement was obtained from Mr. Andognini but is being withheld from this report per his request.

- d. Mr. J. Edward Howard, Vice President - Nuclear was interviewed on December 3, 1981 and on January 7, 1982 by the reporting investigator. In a sworn statement, Howard said that at the time BECo letter No. 79-207 was submitted to the NRC stating PNPS compliance with 10 CFR 50.44 he was not personally aware of the basis for the statement of compliance and did not know what analysis was done to reach that conclusion. He said he was not involved in any discussions or review processes involving the issue of 10 CFR 50.44 compliance. Howard said that through subsequent inquiries he has determined that there was no formal analysis as indicated in the letter of October 19, 1979 that would justify the statement of compliance with 10 CFR 50.44. Howard commented that this was a situation which in his mind was completely unacceptable.

Howard opined that the problem arose on this requirement because of difficulties in trying to distinguish between the 10 CFR 50.44 criteria and the post TMI requirements which were believed to ultimately require a stricter standard than that previously permitted by 10 CFR 50.44. Howard said that he did not believe anyone knowledgeable of the October 19, 1979 letter intended to mislead the NRC as to the actual status of compliance with 10 CFR 50.44, and concluded that an inadequate management review of the October 19, 1979 letter permitted this document to be transmitted to the NRC. The sworn statement of Mr. Howard is appended to this report as Exhibit (9).

7. Document and Procedure Review

- a. Regulatory Guide 1.7, Revision 2, provides an analysis of hydrogen evolution following a postulated loss of coolant accident. This analysis also provides parameter values for assessing the radiological source term. This source term is based on the fission product distribution model values stated in the Regulatory Guide and these are consistent with the values stated in 10 CFR 100.11.
- b. Amendment 35 was submitted to the NRC on January 28, 1974 to supplement and amend the PNPS Final Safety Analysis Report (FSAR). This amendment (which the licensee requested be deleted from their docket in the October 19, 1979 letter) provides a description of the means and controls to be provided by PNPS to limit combustible gas concentration in the containment following a design basis loss of coolant accident. It was noted that Section III, "DESIGN BASIS," of this document states the following:

"For design purposes it is assumed that the reactor building will not be accessible immediately after the

postulated design basis LOCA but will be accessible 45 days later with a postulated dose rate of 760 mR/hr whole body and 10 R/hr thyroid."

"The CAD and Nitrogen Makeup Systems and their associated instruments will allow remote operation, calibration and test from the main control room."

- c. During reviews of various BECo office memoranda related to 10 CFR 50.44, an interoffice memorandum dated October 17, 1979 was found that was addressed to the author of the October 19, 1979 letter (H. Steiman). This memorandum contains an analysis entitled "Reactor Building Maintenance following a Design Basis Accident" that states "The only complete dose rate study for the reactor building is for airborne activity. Based on this dosage, access to the Reactor Building prior to 30 days for maintenance is not feasible." This memorandum is appended to this report as Exhibit (10).

INVESTIGATOR'S NOTE: The author of the October 19, 1979 letter (Howard Steiman) was questioned as to whether this information was a factor in his conclusion as to compliance with 10 CFR 50.44. Steiman stated his original determination of compliance was based on taking credit for local operator action and the information contained in these two documents (Amendment 35 and the memo of October 17, 1979) was not considered. Steiman did not recall the specific purpose for his receipt of the memorandum of October 17, 1979 but conjectured it was in reference to a study he was conducting regarding post accident sampling.

- d. Nuclear Operations Department Procedure No. 6.03, Control of NRC Correspondence, establishes methods for the control of correspondence between the Nuclear Operations Department (NOD) and the Nuclear Regulatory Commission regarding the licensee's operational nuclear power plant. Table 6.03-A in that procedure establishes review responsibilities of submittals to the NRC as follows:

- (1) Nuclear Operations Manager

Review for - interface with other activities, operations personnel commitments, policy considerations and cost/benefit.

- (2) Nuclear Engineering Manager

Review for - factual content, engineering acceptability, engineering personnel commitments, interface with other activities, cost/benefit. Performs and/or reviews safety evaluations.

(3) Station Manager and Station Organization

Review for - factual content, effect on station operations, station personnel commitment, interface with other activities.

(4) Plant Support Group Leader

Review for - plant support group personnel commitments, interface with other activities, factual content, proper review and followup assignment.

(5) Licensing Engineer

Review for - interface with other activities, schedules, regulatory requirements, followup responsibility.

(6) Vice President - Nuclear

Review for - company policy, cost/benefit, organizational commitment.

B. EVENTS SUBSEQUENT TO THE SUBMITTAL OF BECo LETTER NO. 79-207 OF OCTOBER 19, 1979

1. Sequence of Correspondence Concerning 10 CFR 50.44

- a. In response to the licensee's letter of October 19, 1979, wherein the licensee documented compliance with 10 CFR 50.44 with existing equipment, the Division of Operating Reactors, NRR, requested by letter dated October 30, 1979 that the licensee submit within 60 days an analysis of the existing equipment which demonstrated conformance with 10 CFR 50.44. The analysis was to include sufficient detail to enable NRR to evaluate compliance with respect to 10 CFR 50 Appendix A, Criteria 41, 42, and 43.
- b. The licensee's formal response to this request was received via BECo letter No. 81-127 dated June 15, 1981. Enclosure A to this letter contained an evaluation of PNPS compliance with 10 CFR 50.44. This evaluation, dated March 28, 1980, was stated by the licensee to be the evaluation which documented the basis for the October 19, 1979 letter. Enclosure B to the June 15, 1981 letter contained what the licensee described as "...the detailed evaluation of said compliance performed subsequent to discussions with you and members of your staff to respond to your letter of October 30, 1979. The results of this recently performed evaluation demonstrate that though rapid access for brief periods of time is possible, the calculated upper limit dose rates may preclude personnel

access for the extended periods of time protected as necessary to perform equipment maintenance to assure the single failure criterion is satisfied." The licensee further advised in this document that "the system modifications which would have resulted from this awareness were in fact developed and installed during the 1980 refueling outage as a result of the lessons learned from TMI."

The introduction to the licensee evaluation of 10 CFR 50.44 dated March 28, 1980 states:

"Compliance with 10 CFR 50.44 depends on maintaining combustible gas control while meeting the dose requirements of 10 CFR 100 for post accident cases, and meeting General Design Criterion (GDC) 41, GDC 42, and GDC 43."

This evaluation further states:

"This analysis is the basis for the conclusion in Reference (a) that Pilgrim meets 10 CFR 50.44 with existing equipment. Subsequently, it was found that one of the assumptions in Reference (a) was incorrect. It was assumed that local operator action could be used for satisfying single failure and loss of power design criteria. A recent Reactor Building habitability study, a result of the TMI Lessons Learned implementation efforts, has demonstrated that the Reactor Building may be inaccessible after an accident. The Reactor Building area dose rates may be too high to permit personnel entry. Because timely operator access for local action cannot be guaranteed, all 10 CFR 50.44 requirements are not met with existing equipment."

This evaluation was formally transmitted to the Nuclear Operations Department Manager via NED memorandum 80-404 dated March 28, 1980 over the signature of the NED Manager (Stephen Rusen). This memorandum indicated that the analysis was previously provided to the NOD on February 22, 1980. The NED memorandum (80-404) and the March 28, 1980 evaluations are appended to this report as Exhibit (11).

INVESTIGATOR'S NOTE: "Reference (a)" in the above paragraphs refers to licensee letter No. 79-207 of October 19, 1979.

2. Interview of Author of Licensee 10 CFR 50.44 Evaluation dated March 28, 1980

Mr. Howard Steiman, Senior Chemical Engineer, said that after the BECo Licensing Division received the request for the analysis to support compliance with 10 CFR 50.44, he was assigned by his supervisor (Wayne Merritt) to prepare a formal analysis to demonstrate compliance with 10 CFR 50.44. Steiman said that in this analysis he reached the conclusion that PNPS was not in compliance with 10 CFR 50.44. Steiman said he based his conclusion on the results of a recent reactor building habitability study which was performed as a result of the TMI Lessons Learned effort. According to Steiman, the study concluded that because of high area dose rates in the reactor building, local operator action could not be credited for satisfying the single failure and loss of power design criteria of 10 CFR 50, Appendix A, GDC 41.

Steiman said he prepared several "rough drafts" of this evaluation which were distributed to both NED and NOD personnel for review and comment. He said his first draft was distributed for review in the early part of November 1979. He also stated that the final version of this evaluation, which was approved by his supervisor and the NED Manager prior to being formally transmitted to NOD, reiterated his conclusion that PNPS was not in compliance with 10 CFR 50.44. Steiman said he received no further questions on the evaluation after it was transmitted to the NOD. He also said that he was not a party to any discussions regarding the necessity of reporting noncompliance with 10 CFR 50.44 to the NRC. He concluded that he did not believe there was an attempt to withhold this information from the NRC as much as there was an issue to formulate a valid and correct analysis prior to making a decision as to whether or not PNPS was in compliance with 10 CFR 50.44. Mr. Steiman's sworn statement is appended to this report as Exhibit (1).

3. Interviews of Present and Former NED Personnel Involved in Preparation of 10 CFR 50.44 Evaluation dated March 28, 1980

- a. Mr. Wayne Merritt, former Supervisor, Fluid Systems Division, said that after receipt of the NRC request for the 10 CFR 50.44 analysis in support of BECo letter No. 79-207 of October 19, 1979, he assigned Mr. Steiman the task of preparing a formal analysis to support the October 19, 1979 letter. Merritt said Steiman initially assumed credit for operator action to satisfy the single failure and loss of power criteria of 10 CFR 50, Appendix A, GDC 41 but as a result of the TMI related reactor building habitability study he learned that the reactor building would be inaccessible because of high dose rates. Merritt also said it was his recollection that Mr. Ziemianski (Plant Support Group Leader), NOD, had informed Steiman that Amendment 35 to the FSAR had already made this assumption even without the TMI dose rate information. Therefore, the conclusion was reached within NED that PNPS was not in compliance with 10 CFR 50.44.

According to Merritt, the conclusions of this evaluation were initially reported to the NOD on February 22, 1980 and that same evaluation was formally transmitted to the NOD Manager on March 28, 1980 over the signature of the NED Manager (Stephen Rosen). Merritt also stated that at the time of the transmittal to NOD, both he and Mr. Rosen concurred with Steiman's conclusion regarding the status of compliance with 10 CFR 50.44. He also stated that when the evaluation was transmitted to NOD over Mr. Rosen's signature on March 28, 1980, he (Merritt) assumed that this analysis was to be forwarded to the NRC. According to Merritt, after the evaluation was sent to NOD, he received no further comments or questions on the evaluation and assumed that it was acceptable. Merritt concluded by stating that he was not aware of any discussion that occurred within either the NED or the NOD regarding the issue of reporting noncompliance, and that the responsibility for reporting noncompliance rested with the Licensing Division within NOD. Mr. Merritt's sworn statement is appended to this report as Exhibit (2).

- b. Mr. Stephen Rosen, former Nuclear Engineering Department Manager said that as the NED Manager he approved the 10 CFR 50.44 evaluation that was transmitted to NOD on March 28, 1980, and that at the time this evaluation was transmitted, it was his expectation that the analysis would be forwarded to the NRC by the NOD Licensing Division. Rosen said he recalled no discussions taking place with NOD regarding the validity of the evaluation done by Steiman, and said he was not a party to any discussions in which the subject of reportability of noncompliance with 10 CFR 50.44 was discussed.

Rosen said that, as noted in the transmittal memorandum dated March 28, 1980, he was of the opinion that the evaluation's conclusions were reportable to the NRC. He also clarified that, per BECo policy, communications with the NRC were the responsibility of the Licensing Division of the NOD. Rosen concluded that to the best of his knowledge there was no request from the NOD for any further review of the conclusions reached in the 10 CFR 50.44 evaluation after it was transmitted to the NOD on March 28, 1980 over his signature. Mr. Rosen's sworn statement is appended to this report as Exhibit (3).

- c. Individual A stated that the reactor building habitability study referred to in the 10 CFR 50.44 evaluation prepared by Mr. Steiman was conducted under his direction pursuant to the requirements of NUREG-0578, Section 2.1.6b (Design Review of Plant Shielding of Spaces for Post Accident Operations). Individual A said the purpose of this analysis was to determine areas in which shielding modifications would be required to enhance operator accessibility to plant systems after an accident. Individual A said he first became aware during the latter part of 1979 that 10 CFR 50.44

compliance relied on taking credit for local operator action, and that this created a conflict with the results of the reactor building habitability study.

Individual A recalled that at the time, he reviewed Steiman's evaluation of 10 CFR 50.44 at the request of the NED Manager, and was in agreement with the conclusion stated in that evaluation that indicated operator access may not be available to satisfy the single failure and loss of power criteria of 10 CFR 50, Appendix A, GDC 41. According to Individual A, modifications as recommended in the habitability study were implemented at the direction of the NOD and NED Managers. Individual A also said it was his understanding that when the 10 CFR 50.44 evaluation was transmitted to NOD on March 28, 1980, it was completed and accepted by the Nuclear Operations Department and it was his assumption that this evaluation would be submitted to the NRC by the NOD Licensing Division. Individual A concluded that he did not believe there was any intent on anyone's part to withhold or provide false information to the NRC regarding the status of compliance with 10 CFR 50.44 for the purpose of benefiting Boston Edison Company. However, he could provide no logical explanation as to why this evaluation and its identification of apparent noncompliance was not reported to the NRC. Individual A's sworn statement is appended to this report as Exhibit (8).

4. Review of BECo Shielding Review Report (Reactor Building Habitability Study)

This shielding review was prepared and completed in January 1980 as part of the reactor building habitability study conducted in response to the requirements of Section 2.1.6b of the NRC's NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations." This review was directed towards identifying the locations of vital areas and equipment in spaces around systems that may, as a result of an accident, contain highly radioactive materials. The objective of this review was to determine areas where personnel occupancy might be unduly limited and safety equipment unduly degraded by the radiation fields during post accident operation of these systems.

Section 3 of the licensee's report, entitled "Plant Accessibility and Recommended Modifications", reached the following conclusion with respect to reactor building accessibility:

"A review of personnel accessibility to the reactor building indicates that entry to most areas will be practically precluded for the first 30 days following the postulated accident due to high radiation fields. Maintenance during this time period on plant systems necessary for cold shutdown would be severely limited under present conditions...

...In the event of a postulated single failure, operator action to position certain valves will be necessary to vent the primary containment to atmosphere via the standby gas treatment system in order to maintain the analyzed combustible gas concentration inside containment to less than explosive levels. Due to high radiation levels in the vicinity of these valves, modifications of the valves and the control systems should be made to obviate the requirement for operator accessibility."

The conclusions of this report suggested that the area radiation assessments resulting from this review be utilized in developing post accident procedures and appropriate modifications.

INVESTIGATOR'S NOTE: According to internal BECo correspondence examined by this investigator, this analysis was provided to the Vice President-Nuclear on January 1, 1980 and to the Nuclear Operations Department Manager on January 2, 1980, both over the signature of the NED Manager.

5. Interviews of Present and Former Licensee Personnel Regarding Review of 10 CFR 50.44 Evaluation of March 28, 1980

- a. Mr. John Fulton, Senior Licensing Engineer, said that after he received the October 30, 1979 letter from the NRC requesting the analysis to support compliance with 10 CFR 50.44, he contacted Howard Steiman of the NED to obtain the analysis. Fulton said that at the time he was told by Steiman that there was no formal analysis done and no written documentation to support the statement of compliance in the October 19, 1979 letter. Fulton said that, at that time, he initiated action by requesting NED to provide an analysis that would respond to the NRC request. He said a draft of this evaluation was disseminated within NOD and NED for comment in early November 1979. According to Fulton, this draft was returned to NED in order to have NOD comments incorporated in the evaluation prior to its submittal to the NRC. Fulton stated that while it was clear in the March 28, 1980 evaluation that the NED position was that PNPS was not in compliance with 10 CFR 50.44, he, and to his recollection Mr. Ziemianski (Plant Support Group Leader) and Mr. Andognini (Nuclear Operations Department Manager), did not believe the analysis was sufficient to prove or disprove whether or not PNPS was in compliance with 10 CFR 50.44. Fulton said he did not recall specifically sending this analysis back to NED for additional work but felt it must have been sent back in order to get their additional comments incorporated into the evaluation. However, in subsequent interview, Fulton acknowledged that it did not appear that the analysis was returned to NED after it was transmitted to NOD on March 28, 1980.

Fulton denied that there was a conscious management decision to not report the noncompliance with 10 CFR 50.44 to the NRC, and

said he did not recognize the necessity to report the questionable status of compliance with 10 CFR 50.44 until he reviewed what he considered to be an adequate analysis to resolve the question of whether PNPS was or was not in noncompliance. Fulton said he felt the analysis to comply with the NRC October 30, 1979 letter should have been done without the benefit of the information obtained as a result of the TMI studies. Fulton had no explanation for why this 10 CFR 50.44 issue was not resolved or as to why the evaluation was never forwarded to the NRC. He acknowledged, in retrospect, that the evaluation of 10 CFR 50.44 should have been reported to the NRC. He also said that while the licensing group had the responsibility for assigning outstanding correspondence to responsible groups, they (Licensing Division) had no authority to insure timely responses. Further, he opined that the cause of this incident was contributed to by the fact that the licensee lacked a tracking mechanism to monitor the status of open items with the NRC to insure timely followup of outstanding items. Mr. Fulton's sworn statement is appended to this report as Exhibit (7).

- b. Mr. James Keyes, Senior Licensing Engineer, said the NED analysis provided to NOD on March 28, 1980 was the first documented correspondence completed by NED on this subject. He said prior drafts of this analysis were questioned by the NOD because they brought into consideration a habitability study performed after the October 19, 1979 letter. Keyes stated his opinion that the October 19, 1979 letter needed to be closed out before introducing new information into the analysis. Keyes said that, to his knowledge, there was never any consideration given to an issue of reporting noncompliance with 10 CFR 50.44. Keyes said he could only conjecture that this issue was not perceived as an immediately reportable item because it was not actually being pursued by the NRC, nor were there any immediate safety considerations due to the plant being in an outage (January 5-May 19, 1980). Also, modifications to bring PNPS into compliance were in progress and were scheduled for completion prior to startup. Keyes did state that transmittal of the analysis from NED to NOD on March 28, 1980 was at the Managers' level because that version was considered to be the final accepted version of the analysis. Mr. Keyes' sworn statement is appended to this report as Exhibit (4).
- c. Mr. Edward Ziemianski, Management Services Group Leader said that at the time he was the Plant Support Group Leader and was involved in the review of 10 CFR 50.44. He said he first learned that there was no formal analysis conducted to support the October 19, 1979 letter after the NRC request of October 30, 1979 was received. Ziemianski recalled that the NOD Department (via the Licensing Division) requested the NED to prepare an analysis that would support BECo's statement of compliance in the October 19, 1979 letter. He said that, to the best of his recollection, several

drafts of the evaluation were prepared by Steiman and were commented on by himself and possibly the NOD Manager (Andognini). Ziemianski said there was general agreement within NOD that the evaluation was inadequate and did not support either compliance or non-compliance with 10 CFR 50.44, and was thus sent back to NED in order to have their comments and questions addressed in the evaluation.

Ziemianski said a formal evaluation document was transmitted to NED under an NED memorandum dated March 28, 1980. He maintained that, in his opinion, the evaluation was still inadequate to support a statement of compliance or noncompliance with 10 CFR 50.44. He also explained that the information obtained from the reactor building habitability study regarding operator access was, in his opinion, not pertinent to this evaluation in that Amendment 35 to the FSAR had already made that assumption.

Ziemianski said that because they (the Nuclear Operations Department) did not think the analysis was adequate it was not forwarded to NRR to respond to the October 30, 1979 request. He said there was no formal mechanism by which the analysis would have been returned to NED for further work and stated that, in retrospect, it did not appear that the analysis had ever been returned to NED for resolution.

Ziemianski said that he could not explain why NRR was never notified of the status of 10 CFR 50.44, and said he did not recall having discussions with anyone in NED or NOD regarding the necessity of informing the NRC of the potential noncompliance with 10 CFR 50.44. He denied that there was any intent to withhold this information from the NRC for any reason. Ziemianski attributed the failure to report noncompliance with 10 CFR 50.44 to a lack of a systematic process to formally assess the reportability of engineering or analytical issues or of issues discovered by the offsite engineering offices. Mr. Ziemianski's initial sworn statement is appended to this report as Exhibit (5).

In a second sworn statement submitted by Ziemianski (Exhibit 12 pertains) he advised that to the best of his recollection he did not have any detailed discussions with the Nuclear Operations Department Manager relative to the status of compliance with 10 CFR 50.44 regarding the evaluation in question. He explained that while the memorandum transmitting this evaluation was addressed to the NOD Manager, he most probably forwarded the evaluation to him (Ziemianski) for action without actually examining or analyzing its contents. He said that while he did not feel he was in a position to make an absolute decision as to the acceptability of the evaluation, he had input into the document and to all documents of this nature. He reiterated his opinion that the evaluation was inadequate to submit to the NRC.

- d. Mr. G. Carl Andognini, former Superintendent, Nuclear Operations Department said he did not recall ever seeing the memorandum dated March 28, 1980 that transmitted the NED evaluation of 10 CFR 50.44 to NOD nor did he recall seeing the evaluation or being made aware of its contents. He also said he recalled not having any discussions with anyone regarding the status of compliance with 10 CFR 50.44 or of the need to report noncompliance with the regulation as a result of this evaluation. Andognini said a coordinator acted for him on most documents requiring action or signature on his part and most documents of this type were screened prior to his receiving them for signature. He said the Plant Support Group Leader (Ziemianski) fulfilled this role.

Andognini stated that based on his current review of the evaluation in question he could not understand why no action was taken to report the potential noncompliance. He said if there was a question of adequacy relative to the evaluation it should have been brought to his attention so he could resolve the issue through discussions with the NED Manager. Andognini did note that, according to his personnel records, he was absent from his duties from March 27, 1980 through the first week of April 1980 and that Mr. Ziemianski would have reviewed his mail and would have taken whatever actions he deemed necessary for him.

Andognini concluded that this outstanding item (NRC Request October 30, 1979) should have been identified as still open on the computer printouts that tracked outstanding items with the BECo system; however, he conjectured that this system did not provide for independent audit of the items that would have assured identifying this item in a much more expeditious fashion. As was stated earlier in this report, Mr. Andognini's sworn statement is being withheld from this report per his request.

- e. Mr. J. Edward Howard, Vice President - Nuclear provided a sworn statement on January 7, 1982 in which he acknowledged that he was on distribution for the NED evaluation dated March 28, 1980, but stated he had no recollection of reviewing that evaluation or of being made aware of the fact that PNPS was potentially in non-compliance with 10 CFR 50.44. He said he is routinely placed on distribution for these types of documents but said his review is normally limited to insuring that the document had the appropriate distribution and review control. Regarding this evaluation, Howard stated "Had I read this analysis, I still do not feel that it would have triggered a concern on my part relative to non-compliance with 10. CFR 50.44 because in my mind 50.44 set a less than adequate standard than would be required after the TMI-2 accident and both standards were referenced in the analysis." He also said that based on his current review of the NED evaluation, it was now his opinion that this document and its conclusions should have been forwarded to the NRC regardless of whether or not there was BECO staff agreement on the evaluation.

Howard concluded that while he could not cite a specific reason or excuse for the noncompliance not being reported to the NRC, he did not, nor did he believe that anyone in the Nuclear Operations Department of BECo intended to withhold the information from NRR for the purpose of continuing power generation at PNPS or for any other reason, either financial or personal. Mr. Howard's sworn statement is appended to this report as Exhibit (9).

- f. Mr. Paul McGuire, former Plant Manager, PNPS when interviewed said that in reference to the March 28, 1980 evaluation done by the NED he was not informed or communicated with on this matter and was not aware that PNPS was in noncompliance with 10 CFR 50.44. McGuire opined that the Plant Support Group who apparently reviewed the evaluation did not, in his mind, have the technical ability to make a decision as to the adequacy of the evaluation and that a determination of reportability should have been made by the plant Operating Review Committee (ORC). McGuire further opined that a lack of communication between the plant and NED was the cause of this incident. He explained that the Plant Support Group screened everything from the NED to determine if the plant should or should not be informed or consulted with on certain information. McGuire concluded that while he did not believe the information regarding noncompliance with 10 CFR 50.44 was willfully withheld from the NRC he believed that management lacked the appropriate control to assure adequate flow of information from the NRC. Mr. McGuire's sworn statement is appended to this report as Exhibit (6).
- g. Mr. Alton Morisi, Manager, Nuclear Operation Support Group, was interviewed on December 2, 1981 by the reporting investigator. Morisi said he recalled having no involvement in either the BECo letter of October 19, 1979 or in any followup to the NRC request of October 30, 1979 for the BECo analysis that supported the October 19, 1979 letter. He said he had no knowledge as to what the rationale was for not reporting the apparent noncompliance with 10 CFR 50.44 as identified in the March 28, 1980 analysis. He denied possessing any information that indicated there was any intent to withhold the status of compliance with 10 CFR 50.44 from the NRC. Morisi said his only direct involvement in the issue of compliance with 10 CFR 50.44 occurred in June of 1981 when the noncompliance was identified and the NRC formally notified by LER. Mr. Morisi's sworn statement is appended to this report as Exhibit (13).

6. Review of BECo Documents Relating to NED Analysis dated March 28, 1980

A review of BECo files containing correspondence related to 10 CFR 50.44 indicated that a 10 CFR 50.44 evaluation was received in the BECo Nuclear Records Center on December 12, 1979. This evaluation also documented that "PNPS does not meet the loss of power and redundancy

criteria with existing equipment with consideration of post accident doses. Modifications will be performed to insure loss of power operability and redundancy." The basis of this statement on the copy of the evaluation located in the Nuclear Records Center was contained in an apparent draft cover memorandum to the evaluation which stated that, as a result of post accident shielding and accessibility studies, modifications would be needed to respond to NUREG-0578 concerns, and also indicated that these design modifications would assure compliance with 10 CFR 50.44

The proposed changes discussed in the document included a design change to the containment venting system to provide single failure protection independent of operator access to the vent valves.

INVESTIGATOR'S NOTE; A cover sheet to the memorandum and 10 CFR 50.44 evaluation in the Nuclear Records Center indicated that this particular draft was received by the Office of the Vice President, Nuclear on October 22, 1979 and by the Nuclear Operations Department on October 31, 1979.

A draft of the 10 CFR 50.44 evaluation was reviewed by the investigator. It indicated the evaluation was provided to NOD and to the NED Manager on January 10, 1980. This draft was marked and edited for comment by various personnel from NOD and NED. Of relevance in this draft was a comment concerning the results of the TMI containment habitability study as it related to 10 CFR 50, Appendix A, GDC 41 criteria. The comment, made by the Plant Support Group Leader (E. Ziemianski), indicated that, in his opinion, the information obtained from the habitability study was not relevant to the analysis. According to notes on this draft evaluation, it was returned to NED sometime subsequent to January 10, 1980. Regarding the status of this draft evaluation, comments attributed to Mr. Ziemianski on this draft were quoted as follows, "We find that this analysis is still not in a condition which we feel is acceptable to NOD and the NRC."

7. Operational Status of PNPS

From October 1, 1979 to January 5, 1980, the PNPS was operated at power for 97 days out of a possible 97 days. From January 5, 1980 to May 19, 1980, the PNPS was in a major refueling and plant modification outage and was returned to power on May 21, 1980.

INVESTIGATOR'S NOTE: In November 1980, the Electric Light and Power Magazine, a news magazine of electric utility management and technology named BECo the outstanding electrical utility based on the strength of its financial and operational performance of 1979. PNPS was cited in this award for its 83% capacity factor of PNPS during 1979.

8. Additional Inquiry Relative to BECO Compliance With 10 CFR 50.44

Between May 14, 1979 and June 1, 1979, NRC Region I inspectors conducted an unannounced inspection at PNPS to assure that certain factors contributing to the incident at TMI did not exist at PNPS (refer to Inspection Report 50-293/79-09 for details).

As a result of this inspection, three items of noncompliance were identified relating to procedures specifying valve position, procedures specifying valve locking, and valves being documented locked in the wrong position. Of concern was the finding that the drywell nitrogen makeup valves that were required to be locked open were actually locked closed.

The licensee responded to the items of noncompliance in this report on October 21, 1979 via BECO letter No. 79-192. In the licensee's response to two of the items of noncompliance (identified as Items A and C in the response) which did not address the status of the nitrogen makeup valves specifically, the licensee stated "Appendix A (valve list) of all 2.2 procedures will be checked against the P&IDS and each will be updated as necessary. At the present time all safety systems have been checked and we are in compliance in this area. All systems will be checked and we will be in full compliance by June 1, 1980."

Regarding the nitrogen makeup valves being locked in the closed position (required open) the licensee was cited against 10 CFR 50, Appendix B, Criterion XIV, "Inspection, Test and Operating Status." In the licensee response (Item B of the response) to the noncompliance, the licensee did not address a verification of the actual and/or correct position of the valves. Their response to this item of non-compliance stated:

"The two NPO's involved in these two incidents were admonished to be more careful in the future when filling out surveillances to assure that anything under surveillance that is not as stated must be flagged on the surveillance sheet and brought to the attention of the Watch Engineer. We are presently in compliance in this area."

INVESTIGATOR'S NOTE: The nitrogen makeup valves in question are part of the nitrogen purge vent system required to be in compliance with 10 CFR 50.44. The following interviews were conducted in an attempt to determine what the licensee had actually done to verify the actual position of the valves prior to preparing their response to the above identified items of noncompliance.

9. Interviews of Licensee Personnel Involved in the Response to NRC Inspection Report No. 50-293/79-09

- a. Mr. Edward Cobb, Principal Engineer, Operations, was interviewed by the reporting investigator on January 6, 1982. Cobb confirmed that the valves referenced in Inspection Report No. 50-293/79-09 were the 1" manually operated nitrogen block valves. He advised that the Piping and Instrumentation Diagram (P&ID) originally indicated that these nitrogen valves should be in the open position while the plant was running but that due to excessive nitrogen leakage in the containment, an Operating Review Committee approved change to the 2.2 Procedures modified the valve position to closed. He said that a memorandum should have been submitted to update the P&ID following the procedure change; however, to his knowledge, P&ID updates were running as much as 3 years behind the actual changes in the plant.

Cobb advised that to the best of his recollection he provided the majority of the input to BECo letter No. 79-192 which responded to the NRC Inspection Report and items of noncompliance. He said that, as he could recall, there was no actual walkdown on any of the valves using either the P&IDs or the valve list to the 2.2 procedures. He said the P&IDs were compared against the valve list for the emergency core cooling system prior to the response being submitted and that the long term intent was to check all of the P&ID's against the valve list (including the nitrogen valves) to insure that they were in compliance. Cobb said if a discrepancy was found during these reconciliations between the P&ID's and the valve list, a determination would have been made as to how the plant was actually running and either the P&ID or the valve list would be changed to conform to the plant operating conditions.

With respect to BECo's response to the 10 CFR 50, Appendix B, Criterion XIV citation Cobb said there was no verification of the position of the nitrogen makeup valves at the time of the response because these valves were not considered to be safety related. Cobb said that, in his mind, the citation called for reprimanding the plant operators who did not accurately verify the valve list with the actual valve position and for insuring that all operating personnel were reinstructed on the requirements of the surveillances. Cobb said the valve position of the nitrogen makeup valves in question would have been verified by June 1, 1980 as stated in the BECo response.

- b. Mr. Derwood Hughs, Jr., Sr. Nuclear Training Specialist was interviewed on January 6, 1982 by the reporting investigator. Hughs stated that to his recollection the nitrogen makeup valves (manual 1" valves) were placed in the closed position because the nitrogen leakage into the containment from the various plant

leakoffs negated the need to have the nitrogen valves open for makeup. For this reason, the operating procedure (2.2.70) was changed in April, 1979 to close the valves to conform with the actual operating condition of the plant.

Hughs recalled that as a result of the items of noncompliance in IE Inspection Report No. 50-293/79-09 he was assigned to check the P&ID's against the procedures and valve checklist. With respect to the manual nitrogen makeup valves he recalled determining that the P&ID showed the valves in the locked open position while the valve checklist showed the valves locked closed. Hughs said he submitted a design change notice to the P&ID to reflect the change of the valve positions during operation from open to closed. Hughs recalled that, as per the response to NRC Inspection Report No. 50-293/79-09, he was under a deadline of June 1, 1980 to complete the P&ID and procedure reconciliation. Hughs said that this task did not include an actual walkdown of the valves unless there was a specific question about a valve position. A walkdown such as this was not conducted on the nitrogen makeup valves in question.

- c. James Keyes, Sr. Licensing Engineer, NOD, was interviewed on January 7, 1982 by the reporting investigator regarding the licensee's response to the items of noncompliance identified in NRC Inspection Report No. 50-293/79-09. With regard to the Item B response by the licensee, Keyes said he reviewed the draft response prepared at the plant and that he added the last sentence which stated "We are presently in compliance in this area." He said this statement was added to indicate that corrective action had been taken with respect to insuring that the operators conducting surveillances had been properly instructed in the correct procedures of doing the surveillances, and was not meant to imply that any valve position verifications had been conducted. Keyes said it was his interpretation of Item B that the citation pertained to the tagging procedures and not to valve positions. Keyes concluded that since these valves were not considered safety related, the verification of valve position would be completed by June 1, 1980 during the review of all non-safety related systems as stated in the response to the items of non-compliance.

V. STATUS OF INVESTIGATION

The status of this investigation is closed.

VI. EXHIBITS

1. Sworn statement of Howard Steiman - 12/3/81
2. Sworn statement of Wayne Merritt - 12/8/81
3. Sworn statement of Stephen Rosen - 12/15/81
4. Sworn statement of James Keyes - 12/9/81
5. Sworn statement of Edward Ziemianski - 12/2/81
6. Sworn statement of Paul McGuire - 12/16/81
7. Sworn statement of John Fulton - 12/1/81
8. Sworn statement of Individual A - 12/4/81
9. Sworn statement of J. Edward Howard - 1/7/82
10. BECo Reactor Building analysis dated 10/17/79
11. NED Memorandum No. 80-404 - 3/28/80
12. Second sworn statement of Edward Ziemianski - 1/6/82
13. Sworn statement of Alton Morisi - 12/2/81

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 5

Place: Boston, Massachusetts
Date: December 3, 1981

DRAFT STATEMENT

I, Howard Steiman, hereby make the following voluntary statement to Mr. Keith Christopher, who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is preparing this statement for me at my request.

As background information, I am in the position of Senior Chemical Engineer with the Boston Edison Company. I transferred from the Nuclear Engineering Division to the Fossil Generation Division in July 1980 in order to take a supervisory position.

The 10/19/79 letter from BECo to the NRC states that based on our analysis we comply with 10 CFR 50.44 with existing plant equipment. At the time of the submission of this letter, there was no formal analysis done to support this statement. The informal analysis was based on an offsite dose assessment. This analysis was incomplete because it did not consider the practicalities of reactor building habitability. The contents of Amendment 35 including reactor building habitability were not considered in this analysis. Amendment 35 to my knowledge was not prepared to satisfy 10 CFR 50.44 requirements. This assessment that was done was designed to find out if it was possible to use a purge system for combustible gas control at Pilgrim I. The result showed that we could use the purge system with the existing LPZ at that time.

EXHIBIT 1

After BECo received the NRC's March 14, 1979 letter requesting a schedule for CAD installation, I was assigned by my supervisor, Wayne Merritt, to look at what type of system to install. We, as an organization, (Nuclear Operations and Engineering) started to look at options such as hydrogen CAD and air CAD, however, no formal installation plans were made. During this time the TMI accident occurred and at this point, it was my opinion that an oxygen control system was more appropriate than a hydrogen control system for combustible gas control at Pilgrim because it was a BWR.

At this time, I took the lead in exploring other options such as, hydrogen recombination with an inerted primary containment atmosphere. During the spring and summer of 1979, representatives of Engineering and Operations met to try and select a suitable system. The first meeting resulted in the opinion that the best option was an inerted containment with hydrogen recombination. There was later a second meeting in which the more senior members of the Operations Department were present and no consensus could be reached on combustible gas control. To my recollection, this meeting occurred during the time frame that the NRC was sent a letter dated 6/6/79 that stated that BECO was studying the various options. At the time of these meetings, the 50.44 issue as related to compliance, was not a concern as much as what the TMI retrofits would require. In my opinion, the organization felt that the 50.44 requirements would be incorporated into the post TMI requirements. This is my opinion because 50.44 would have allowed a deinerted containment and that no longer seemed appropriate. What I am saying, is that the 50.44 requirement allowed a less than 1% core average metal-water reaction and this assumption did not appear to be born out by the TMI accident.

At this time, the 50.44 requirements were not getting much attention because I was handling the TMI modifications and was spread pretty thin. As a result, the analysis for the 10/19/79 letter documenting compliance with 50.44 was both informal and incomplete. At the direction of my supervisor, (Wayne Merritt), I wrote the original draft of the 10/19/79 letter. As I recall, this letter was transmitted for comment to Nuclear Operations (Steve Rosen to C. Andornini), in the summer of 1979. Prior to this transmittal, the letter was reviewed by my supervisor. In the 10/19/79 letter, I requested that Amendment 35 be dropped because I felt the post TMI requirements would dictate new requirements for combustible gas control. I do not know how the Operations Department reviewed this document as I received no additional questions from them prior to formal submittal of the letter on October 19, 1979.

After BECo received the NRC request for the 10/19/79 analysis, I was assigned by Wayne Merritt to prepare an formal analysis that would demonstrate compliance with 50.44. At the time I submitted the draft of 10/19/79, I believed that the station was in compliance with 50.44. This belief was based only on the limited analysis I had done on the offsite dose assessments that was prepared by the Systems Safety Analysis Group. If I had done a proper and complete formal analysis, I would have realized we were not in compliance and would not have written the letter stating that we were in compliance.

On the analysis that I was formally requested to prepare, I was assisted by Mr. Jim Ashkas of the Systems Safety Analysis Group. I prepared the initial handwritten draft myself sometime in late 1979. To the best of my knowledge, this

was circulated within the Engineering Department only for review. There were at least two more drafts that were written by myself and Jim Ashkar. These were circulated through the Operations Department for comment. I received comments, mostly in the form of questions on the draft. After meetings to resolve the questions, the last draft was formally submitted to Operations under Office Memo 80-404 to Carl Andognini on 3/28/80. I am not aware of any subsequent action on this document.

In this document, I stated we were not in compliance with 50.44. This opinion was based on a reactor building habitability consideration that was identified to me by the Systems Safety and Analysis Group as a result of a reactor building habitability study. This 3/28/80 document was reviewed and approved by both S. Rosen and Wayne Merritt prior to being submitted to Operations. I do not know if there were further discussions on the analysis between my supervisors and Operations personnel.

I do not know to what extent there were discussions relative to whether or not the NRC should be notified about the 50.44 question. In my opinion, the Licensing people would have been responsible for notifying the NRC if it was deemed necessary. I did reiterate my position in this document that in my opinion we were not in compliance with 50.44 in March 1980. I explained to my supervisors that the initial analysis was incomplete and therefore incorrect.

It is my opinion that Mr. Merritt and Rosen agreed with my analysis or they would not have signed off on the transmittal of 3/28/80. I do not believe that there was an wilfull attempt on the part of BECo management to withhold information

or to mislead the NRC regarding the status of 50.44. I believe the issue was to formulate a valid and correct analysis prior to making a decision as to whether or not we were in compliance with 50.44. In my position, I had no responsibility for contact with the NRC and I would have no direct involvement in any reporting situations to the NRC.

I have read the foregoing statement consisting of five typed pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge, recollection and belief. I declare under penalty of perjury that the foregoing is correct and true.

Original signed by Howard Steiman, 12/3/81, 4:55 p.m.

Subscribed and sworn to me before this 3rd day of December, 1981, in Boston, Massachusetts.

Original signed by R. Keith Christopher, 12/3/81, 4:56 p.m.

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 3

Place: Boston, MA
Date: December 8, 1981

DRAFT STATEMENT

I Wayne J. Merritt, hereby make the following voluntary statement to R. Keith Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is typing this statement for me at my request.

I am currently employed as an engineer with Chas. T. Main Engineering Corp. I terminated Boston Edison Company employment on 11/25/81. My position had been Manager - Nuclear Engineering.

My basis for the statements in the 10/19/79 letter was an informal, but documented, analysis done by Mr. Steiman in the Kepner-Tregoe Decision Analysis format. The primary criterion for acceptable results was the off-site dose rate per 10 CFR 100, rather than a point-by-point analysis of compliance to 10 CFR 50.44. This analysis did not consider habitability as referenced in Amendment 35. In retrospect, this was an inadequate analysis because it was not per Appendix B. However, based on this limited analysis, I felt we were in compliance with 50.44.

Following the NRC request for the analysis, I asked Mr. Steiman to formally document the analysis to satisfy the NRC request. During the preparation of this analysis, he assumed operator action could be credited in meeting the single failure criterion because the secondary containment was assumed to be accessible.

EXHIBIT 2

At this point he knew that TMI doses would render the containment inaccessible; but TMI doses were not part of the 50.44 regulation. Therefore he felt he had a valid conclusion. Subsequent to this point, Mr. Ziemianski informed Howie and me that Amendment 35 concluded that the containment would be inaccessible (even without TMI doses). This finding invalidated the assumption that operator accessibility was valid, and therefore we were not in compliance with 50.44. This condition of non-compliance was reported to NOD on February 22, 1980, as stated in NED memo 80-404, dated 3/28/80. Mr. Rosen and I concurred with Howie's conclusion that "access....cannot be guaranteed." The NOD attitude was "prove to me (NOD) conclusively that we are not in compliance." I felt there was sufficient basis at this time that we were not in compliance with 50.44. I assumed that the 3/28/80 analysis, agreed on by NOD, would be sent to the NRC to meet the commitment. After my 3/28/80 memo with the analysis, I got no further comments or questions on it from NOD so I assumed all was acceptable. I do not think they (NOD) intentionally withheld information regarding this non-compliance from the NRC. At that time I was not particularly sensitive to the reporting requirements and I do not know to what degree NOD discussed reporting this non-compliance.

I have read the foregoing statement consisting of 2 handwritten pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct.

Original signed by Wayne J. Merritt 12/8/81, 8:00 p.m.

Page 3 of 3

Subscribed and sworn to before me this 8th day of December 1981, 8:00 P.M.,
Boston, Mass.

Original signed by R. Keith Christopher, 12/8/81, 8 P.M.

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 3

Place: Atlanta, Georgia
Date: December 15, 1981

DRAFT STATEMENT

I, S. L. Rosen, hereby make the following voluntary statement to R. K. Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. This statement is being typed for me at my request.

As background information, I am currently Director of Analysis for the Institute of Nuclear Power Operations. I joined INPO on June 1, 1980. Prior to that, I was employed by Boston Edison Company from June 1969 until late May 1980 and was Nuclear Engineering Department Manager when I left Boston Edison.

With respect to the 10/19/79 Boston Edison Company letter to the NRC regarding "Containment Atmospheric Control System" I do not recall reviewing the analysis referred to in paragraph 2 of the letter and would not normally have reviewed such calculations unless such a review was requested by anyone involved. Since I did not review the analysis, I was not ware of its contents or of the fact that it was not formally documented. I relief on the correspondence review sheet showing signatures by H. E. Steiman and W. J. Merritt.

With respect to Amendment 35 to the FSAR, I do not recall any personal involvement in the formulation of the paragraph on page 10 referring to reactor building access. From November 1973 until July 1975, I was assigned to responsibilities on Pilgrim 2 at the Prudential Building and therefore was not involved in the finalization of the details of Amendment 35 in January 1974.

EXHIBIT 3

With respect to the 10/19/79 letter, there was no intent to deceive or mislead NRC with respect to compliance with 10 CFR 50.44. I was in agreement with the Boston Edison Company NED Analysis transmitted to NOD via NED 80-404 dated 3/28/80 and expected NOD to transmit it to NRC. I left the employ of Boston Edison Company in late May 1980 and do not recall any further actions taken by NOD in the period between 3/28/80 and the end of May 1980. I don't recall any specific discussions with NOD management about the validity of the calculations or discussions with NOD management relative to 50.44 compliance. I was not a party to any discussions wherein failure to report as required by NRC regulatory was considered.

As noted in the 3/28/80 transmittal memo for the analysis I was of the opinion that the content was reportable to NRC. Per Boston Edison Company policy, licensing communications with NRC were the responsibility of the NOD. To the best of my knowledge and recollection, there was no formal request by NOD for any additional review by myself regarding the conclusions in the analysis transmitted on 3/28/80. I did not discuss -- to the best of my knowledge and recollection the status of Boston Edison Company compliance with 50.44 after the 3/28/80 memo.

To some degree, the circumstances at the time (post-TMI modifications and the refueling outage workload) may have contributed to the apparent lack of follow-up by Boston Edison Company management.

I have read the foregoing statement consisting of three handwritten/typed pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct.

Original signed by S. L. Rosen 12/15/81, 4:15 P.M.

Subscribed and sworn to before me this 15th day of December, 1981, at 4:15 P.M., in Marietta, Georgia.

Original signed by R. Keith Christopher, 12/15/81, 4:15 P.M.

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 4

Place: Boston, MA
Date: December 9, 1981

DRAFT STATEMENT

I, James Keyes, hereby make the following voluntary statement to R. Keith Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is preparing this statement for me at my request.

For informational purposes I am currently working for Boston Edison Co. as Sr. Lic. Eng. (3-1/2 yrs.). This job encompasses in part the assigning of incoming NRC correspondence to the various departmental disciplines for resolution.

The October 30, 1979 letter in question was typical of such correspondence and was assigned to NED for closeout. During the closing out of the item it was discovered that no "formal" analysis as indicated in the October 19, 1979 (#79-20) was available.

The analysis mentioned in the October 19, 1979 letter was assumed to be available by the Operations Department. In other words when the Engineering Department (Engineer through Manager) signed off on any green sheet, the responsibility for Engineering input was placed on the Engineering Department. In turn Operations was responsible for Operations, etc... My responsibility as

Licensing Engineer for this item was placing the draft Engineering response into grammatical form and processing the "green sheet." This means bringing the letter to each individual listed on the sheet and insuring that any comments the individual may have are adequately resolved prior to moving onto the next signature.

I accepted the fact that the Engineering Department had an analysis and was not aware of the basis for that analysis.

The 3/28/80 analysis (NED 80-404) performed by NED was the first documented piece of correspondence completed by NED on this subject. Prior to this several handwritten/draft typed versions were questioned by the Operations Department because they brought into consideration a habitability study performed (per TMI 0737) after our October 19, 1979 letter (which stated we were in compliance at that time). This letter and statement needed to be closed out, before introducing new information into an analysis.

At no time was there ever any consideration given as to reporting vs non-reporting a potential item of non-compliance. Upon Operations receipt of the 3/28/80 memo there was again no deliberate, conscious effort made in terms of not reporting a non-compliance. In retrospect I can only offer conjecture as to why it was not perceived as an immediate reportable item and offer the following:

- The issue was not being actively pursued by NRR for closeout
(due dates had slipped and NRC project manager was not bringing to light (as is typically the case for hot items))

- PNPS was in shutdown refueling mode and therefore no safety considerations were immediate
- Modifications to bring BECo into compliance were in progress and were scheduled for completion prior to startup.

The level of authority for making a reportability type decision rested with Mr. G. C. Andognini, Superintendent, NOD, however I do not know to what extent Mr. Andognini had been informed on this issue prior to the 3/28/80 memo.

The 3/28/80 memo itself was transmitted at the Managers level because it was considered the final version of the analysis. It did not provide the BECo compliance with 50.44 in terms of our October 19, 1979 letter as requested by Operations, and as such was difficult to use for a "direct" response to the NRC October 30, 1979 letter, but was acceptable in terms with the then current compliance with 50.44.

I do not recall any discussions or decisions made as to the need to report this to the NRC as an item of non-compliance.

I have read the foregoing statement consisting of 4 typed pages. I have made and initialed any necessary corrections and have signed by name in ink in the margin of each page. This statement is the truth to the best of my knowledge

and belief. I declare under penalty of perjury that the foregoing is true and correct. Executed on December 9, 1981 at 3:25 p.m.

Original signed by James D. Keyes 12/9/81 3:25 p.m.

Subscribed and sworn to before me this 9th day of December, 1981, at 3:25 p.m.,
Boston, Mass.

Original signed by R. Keith Christopher 12/9/81 3:25 p.m.

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 3

Place: Pilgrim Nuclear Power Station
Date: December 2, 1981

DRAFT STATEMENT

I, Edward Ziemianski, hereby make the following voluntary statement to Mr. Keith Christopher, who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is preparing this statement for me at my request.

As background information, I am currently in the position of Management Services Group Leader for Boston Edison Company. I've been in this position since November 1980 and prior to that I was the Plant Support Group Leader.

Since I was promoted to the position of Plant Support Group Leader late in 1979, I was involved in the 50.44 requirements and I believe I would have reviewed the BECo letter of October 19, 1979. At that time, I would not have questioned whether or not the analysis as stated in that letter actually existed because the source information for the letter was provided by our NED. I do not recall in what manner I received this particular source information for review, but I often received the source information with a simple cover letter (memorandum) from the Engineering Department Manager to the Nuclear Operations Department Manager. I, in turn, would normally have provided that source information to the Licensing Engineer for development of a formal BECo letter.

At the time, the Nuclear Operations Department received the NRC October 30, 1979 request for the 50.44 analysis, our department (probably J. Fulton) went back to the Engineering Department in order to obtain the analysis. Through discussions with H. Steiman and others, we determined that there was no formal analysis

documented per NED procedures that would satisfy the NRC request. My recollection is that the discussions with the Engineering personnel center around the fact that calculations were performed which indicated that the dose rates would be less than 10 CFR 100 limits. I felt these calculations were unverified in that they were not formally reviewed and documented. I believe we (the Nuclear Operations Department) directed the Engineering Department to prepare an analysis to support what the BECo said in the October 19, 1979 letter. As I recall, Steiman subsequently produced a draft analysis which was commented on by myself, J. Fulton, possibly Carl Andognini and others in the Nuclear Fuels Division. We were in general agreement that the analysis was inadequate and did not support either compliance or noncompliance with 50.44. I, and I believe others in NOD, made comments on the draft and sent it back to Engineering asking them to incorporate our comments in the analysis and address our questions. A memorandum dated 3/28/80 forwarded a more formal, typed analysis document to our department from Engineering. However, we still maintained that this document (the 3/28/80 memo) was totally inadequate to support a statement that we are or are not in compliance with 50.44. I also recall commenting that the Reactor Building habitability study referred to in the March 1980 document was immaterial in that Amendment 35 had already made this assumption. Because we (the Operations Department) felt the analysis was inadequate, it was not forwarded to NRR and was again referred back to Engineering because we believed that our substantive comments were not adequately, if at all, addressed. While the Operations Department had the final responsibility for responding to the NRC request for the analysis, I can not explain why we did not notify them of the questionable status of the analysis. We believed that the issue would have been readily resolved and a response would have been sent to NRR in the near future. I do not recall any discussions by anyone regarding any necessity to inform the NRC of a potential

noncompliance. I have no reason to believe that a conscious decision was made to withhold a potential noncompliance from the NRC. Our position, as I can best recall, was that the analysis was inadequate to respond either positively or negatively regarding our compliance with 50.44.

During this time period, there was no systematic process to formally assess reportability requirements of engineering related, ie, analytical, issues to the NRC regional office particularly if, or when the issue was discovered in the off-site engineering offices. Because of this and the pressures involved in the 1980 outage, I believe we unintentionally failed to adequately followup on this issue of reporting the status of the 50.44 analysis. I would restate that there was never any consideration given to the reporting the issue to the NRC Regional Office because the question was not raised.

I do not believe we had a tracking mechanism to trigger a compliance review of 50.44 or other items of the same time period; this weakness has been identified and we (the BECo) are in the process of attempting to correct this weakness.

I have read the foregoing statement consisting of three typed pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is correct and true. Executed on December 2, 1981 at 1845.

Original signed by E. Ziemianski 12/2/81 1845

Subscribed and sworn to me before this 2nd day of December, 1981, at Pilgrim Nuclear Power Station.

Original signed by K. Christopher 12/2/81 1845

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 3

Place: New Orleans, LA
Date: December 16, 1981

DRAFT STATEMENT

I, Paul J. McGuire, hereby make the following voluntary statement to Keith Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me.

Prior to joining UESC, I was employed Boston Edison Co. as Plant Manager at the Pilgrim Nuclear Station up until 8/30/80.

The referenced transmittal, dated 10/19/79 (79-207) letter was signed by me for G. C. Andognini who was absent on the day in question, based on the signed off green sheet received from Engineering. I was not aware of the basis for the analysis nor was I aware that the plant was in non-compliance with 10 CFR 50.44. I do not believe that it was anyone's intention to misrepresent the facts.

In reference to the 3/28/80 analysis done by NED, I was not informed nor communicated to on this matter, and I was not aware that the plant was in non-compliance. In my opinion, PORC per section 6.0 of the Technical Specification should have reviewed this analysis to determine its reportability. The

EXHIBIT 6

Plant Support Group did not have the technical ability to make these decisions. I do not recall any discussions with the Plant personnel on the reportability of the subject analysis, and do not know the basis of the decision not to report the NED analysis.

In my opinion, the established communications between the Plant and NED was the cause of this situation. The Plant Support Group screened everything from NED to determine whether the plant should be informed on certain matters. I feel that enough indirect pressure from upper management to keep the unit on the line influenced enough decisions to permit this situation to occur whether consciously or not. The fact that management did not establish the necessary process to prevent this from happening can be attributed to the cause of this event. The qualifications of the Plant Support Group to disseminate information is also at question, again this shows lack of management controls. I do not believe anyone willfully aloud (sic) this situation to occur, but I believe the environment that management established is the cause.

In my opinion, many items were delayed from being done if it was known that other modifications would have to be done in the future. In other words, decision were not made to do things when it appeared that it could delay unit startup or cause the unit to be shutdown. Based on what I have heard concerning this issue, it is typical of other things that happened while I was employed by BECo.

Page 3 of 3

(I have read the foregoing statement consisting of two handwritten pages which was written by myself as I discussed its content with K. Christopher of the NRC. I declare under penalty of perjury that the foregoing is true to the best of my recollection.)

ORIGINAL SIGNED BY PAUL J. MC GUIRE 12/16/81, 9:10 A.M.

Subscribed and sworn to before me this 16th day of December 1981, 9:10 A.M.,
New Orleans, LA.

ORIGINAL SIGNED BY R. KEITH CHRISTOPHER, 12/16/81, 9:10 A.M.

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 5

Place: Pilgrim Nuclear PS
Date: December 1, 1981

DRAFT STATEMENT

I, John Fulton, hereby make the following voluntary statement to Mr. Keith Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is preparing this statement for me at my request.

As background information, I am currently the Senior Licensing Engineer for the Pilgrim Nuclear Power Station. I joined the Boston Edison Company in 1970 and was subsequently promoted to the above position on October 22, 1979.

Mr. Christopher has asked me to provide the formal analysis upon which the October 19, 1979 letter from BECo to the NRC was formulated providing the statement that Pilgrim Station was in compliance with 10 CFR 50.44 with existing equipment. Based on my view, there had not been a formal analysis conducted to document the compliance prior to the submittal of the October 19, 1979 letter. After I reviewed the October 30, 1979 letter from the NRC requesting the analysis, I contacted Mr. H. Steiman from our Nuclear Engineering Department and asked him for the analysis. He advised me that there was no formal analysis and that the statement was made based on a series of meetings and memos between the Engineering and Operations Department. There was no formal written documentation for this analysis and I did not know what their basis was for stating we were in compliance with 50.44.

EXHIBIT 7

It is my opinion that operator habitability as referenced in Amendment 35 was not considered at that time during this analysis. Individuals who should have been involved in this analysis would have included Mr. W. J. Merritt and S. L. Rosen. Mr. Rosen should have had the formal approval authority for this analysis prior to it being submitted to the Operations Department.

While I was not familiar with the circumstances surrounding the submission of October 19, 1979, I initiated action to followup on the NRC October 30, 1979 letter requesting the formal analysis. At that time, Steiman provided us (the Operations Department) with a draft 50.44 letter that should have been in response to the NRC letter of October 30, 1979. This draft was reviewed by myself, Mr. Carl Andognini and Mr. Ed Ziemanski. This draft copy was received by us for review in early November, 1979 at which time we all made comments on the draft including questions regarding operator habitability as well as other issues. This document was then returned to the Engineering Department in order to incorporate our comments prior to submittal to the NRC. The written draft dated 3/28/80 was formally provided to the Operations Department on March 31, 1980. This final document was prepared by Mr. Steiman and was reviewed by Mr. Merritt and approved by Mr. Rosen of the Engineering Department. This document which was done at the request of the Operations Department (Mr. Andognini) was to fulfill the need of a documented analysis in response to the NRC letter of October 30, 1979. Subsequent to receiving this document, both myself and I believe Mr. Ziemanski and Mr. Andognini reviewed this document in its final form and it was our opinion that the analysis was inadequate to support the statement in the analysis that we could not meet the requirements of 50.44 with existing equipment. While it is clear in the 3/28/80

analysis that the Engineering position was that we were not in compliance, I and I believe also Mr. Ziemianski and Mr. Andognini did not believe that the analysis was sufficient to prove or disprove the statement particularly since they had earlier stated in the October 19, 1979 letter that we were in compliance. While I do not recall specifically, this analysis was returned to the Engineering Department at which time they were asked to rework the analysis and incorporate our comments that were made on the original draft. As I recall the position as stated by the Engineering Department (Rosen and Merritt) was that even if we were not in compliance at that time, we would be in compliance prior to restart following the TMI modifications to the purge and vent lines implemented during the 1980 refueling outage.

At the time that we reviewed this analysis of 3/28/80, there was to the best of my recollection no conscious management decision regarding a need to either report or not report the status of compliance with 50.44 to the NRC. I did not recognize a necessity to report this question of compliance until I had received an adequate analysis to support the statement that we were or were not in compliance. At the time that the 3/28/80 analysis was returned to Engineering, I recall requesting specific information from them specifying what the requirements for operator action were. It was our opinion that the Engineering Department should adequately justify their position as stated in the analysis prior to making an NRC notification. I also believe there was further discussion between Mr. Andognini and Mr. Rosen on this issue, however, I am not aware of the details of those discussions. The ultimate responsibility as to whether or not to make a report of this issue to the NRC rested with Mr. Andognini and I do not think he felt the engineering analysis suitably justified its position sufficiently to require reporting.

After the analysis was returned to the Engineering Department, no further action took place on this issue until early 1981. At that time, I had a discussion with Mr. Mark Williams of the NRC at which time we agreed to close out the still open item. I believe this issue remained open in the system for several reasons: (1) There did not appear to be any great importance attached to this issue by the NRC or BECo at the time; and, (2) We lacked a tracking mechanism within our organization which monitored the status of open items and followup of regulatory requirements, and elevated questionable issues to higher authorities for resolution. I did not, nor do I have any reason to believe that anyone purposely withheld information from the NRC regarding noncompliance with 50.44.

After the open item was discussed, I sent a memo to Mr. Merritt in the Engineering Department requesting that they provide us with the 50.44 analysis as we had originally requested. At that time, they prepared the analysis as documented in the June 15, 1981 letter to the NRC when it was formally determined that we were not in compliance with 50.44.

I do not know how the original 50.44 requirement was handled by the station at the time it took effect in 1978 and I can not provide direct information as to any other activities that may have occurred regarding this issue prior to my taking the position of Licensing Engineer in late October, 1979.

I have read the foregoing statement consisting of 5 typed pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct. Executed on December 1, 1981 at 1630.

Original signed by John Fulton 12/1/81 1630

Subscribed and sworn to before me this first day of December, 1981, at Pilgrim Nuclear Power Station

Original signed by Keith Christopher 1630 12/1/81

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 4

Place: Boston Edison Co.
Date: December 4, 1981

DRAFT STATEMENT

I, Individual (A), hereby make the following voluntary statement to R. Keith Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is typing this statement for me at my request.

Personal information deleted.

With respect to the October 19, 1979 letter to the NRC I had no direct involvement in the preparation of that letter. Analysis done under my direction which was an offsite dose calculation may be the "analysis" referred to in this letter. I recall that during this time frame I provided a calculation to H. Steiman at his request that was to substantiate the offsite dose assessment following a containment venting. This was to demonstrate compliance with 10 CFR Part 100. There was a formal calculation done by (deleted) and approved by myself. I was not requested to provide any other analysis regarding the 10 CFR 50.44 issue at that time.

EXHIBIT 8

My Group (deleted) did subsequently initiate a Reactor Building Habitability Study pursuant to NUREG 0578 2.1.6.B. This analyses was to determine any modification required regarding Post Accident Operator inaccessability to required Plant Systems. The conclusion of this study was that several plant modifications were recommended including modifications to the containment vent system for combustibile gas control. This study and recommendations were forwarded from Steve Rosen to Carl Andognini and the TMI Project.

Around the end of 1979 I first became aware that the 10 CFR 50.44 analysis required operation action and was therefore in conflict with results of the habitability study being completed about that time. I was made aware of this through verbal conversation with H. Steiman. About that time I reviewed Steiman's analysis as Steve Rosen requested for presentation and format. I commented on the Document to enhance the flow of the report. I do know that the habitability study referred to in this document was the study done by my group in response to NUREG 0578 Item 2.1.6.B. I was in agreement with the conclusions stated in Steinmans evaluation that indicated operator access may not be available and therefore one of the criteria required to comply with 10 CFR 50.44 could not be satisfied. This is consistent with the recommendations made in the habitability study. Therefore appropriate modification as recommended in the habitability study were implemented at the direction of both the Operations Superintendent (Andognini) and the Engineering Manager (S. Rosen).

It was my understanding that based on no further request for input that the 10 CFR 50.44 evaluation dated 3.28.80 was complete and accepted by the Operations Dept. I recall discussions of which I was not a part regarding the clarify of the analysis presented. The discussions were at least between the licensing group and the mechanical engineering Group (Merritt).

I was not aware that the conclusions of the habitability study were in question and it was on this basis that modifications required to meet 10 CFR 50.44 were to be made.

I assumed the 50.44 evaluation would be submitted to the NRC as requested. I am not aware of the circumstances surrounding its subsequent submittal to the NRC.

It was apparent throughout the period in question that there was no purposefull intent on the part of anyone in BECo Management to withhold or provide false statements regarding compliance with 10 CFR 50.44.

I do not believe there was an understanding on the part of the involved engineers that we were not in compliance with 50.44 at the time of submittal of the Oct 19, 1979 letter to the NRC. I am not aware of any obligations that were purposely missed with regards to scheduling of analysis, plant modifications or submittals to the NRC for the purpose of benefiting BECo.

I request that my identity regarding this statement be withheld from public disclosure, and request my name not be referenced in subsequent reports.

I have read the foregoing statement consisting of 4 handwritten pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct.

Original signed by Individual (A)

Subscribed and sworn to before me on this 12th day of December, 1981, at Boston, Mass.

Original signed by R. Keith Christopher, 12/12/81

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 6

Place: Boston, Massachusetts
Date: January 7, 1982

DRAFT STATEMENT

I, J. Edward Howard, hereby make the following voluntary statement to R. K. Christopher who has identified himself to me as an investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me.

As background, I currently hold the position of Vice President-Nuclear for Boston Edison Company and was in that position during the timeframe in questions (November 1978 through March 1980).

As I recall, when 50.44 became effective in November 1978 our Nuclear Engineering Department was considering several different options to decide which would best serve Pilgrim Station's need for a combustible gas control system that would meet the requirements of 50.44. Several such considerations were hydrogen recombiner installation and the feasibility of operating without an inert containment.

At the time 50.44 became effective I am now unsure as to what the status of compliance was with 50.44. During this time period the TMI accident occurred which resulted in the shifting of our resources to following up the new post-TMI requirements. In my opinion the 50.44 requirements would now be considered inadequate and a lesser standard than what would ultimately be required. To my knowledge there were no concerns or considerations at that time as to whether

or not the Station was actually in compliance with 50.44.

With respect to BECo letter of October 19, 1979 stating that Pilgrim met the requirements of 50.44 with existing equipment, I was not aware of the basis for that statement of compliance and do not know what analysis was done to reach that conclusion. Further, I do not believe that I was involved in any discussions or decisions relative to the issuance of that letter. I have subsequently learned that there was no formal analysis as indicated by the letter that would justify the statements made in the letter of October 19, 1979. I consider this type of action to be completely unacceptable.

I believe the problem arose on this requirement because of the difficulties encountered in trying to distinguish between the 50.44 criteria and the post-TMI requirements. I do not know who actually formulated the October 19, 1979 letter (at that time) but in my mind there was obviously an inadequate management review of the document that permitted it to get to the NRC in that form.

I was not aware of what events took place to followup the NRC letter of October 30, 1979 requesting our analysis to support our compliance with 50.44 (at that time). This correspondence would have been routed to our Licensing Division who would assign followup responsibility. In this case it would have gone to our Nuclear Engineering Department for preparation of the response. I do not know why the NRC request was not responded to in a timely manner; it appears that it somehow "fell through the crack".

With respect to the Nuclear Engineering Department analysis of compliance with 50.44 that was transmitted to Nuclear Operations Department on March 28, 1980, it is true that I was on distribution for that document. However, I have no recollection of reviewing that analysis or of being made aware of the fact that we were potentially in non-compliance with 50.44. I am routinely placed on distribution for these type of documents, however, my review at that point is primarily limited to ensuring that the document had the appropriate distribution and review control. Had I read this analysis I still do not feel that it would have triggered a concern on my part relative to non-compliance with 50.44 because in my mind 50.44 set a less than adequate standard than what would be required after the TMI accident and both standards were referenced in the analysis.

Based on my current review of the Nuclear Engineering Department analysis, it appears that this document and its conclusions should have been forwarded to the NRC regardless of whether or not there was BECo staff agreement regarding the adequacy of the analysis. I think our Licensing Branch should have submitted the status of the analysis to the NRC with an explanation that the issue was still pending a technical resolution.

I cannot cite a specific reason or excuse for why the apparent non-compliance was not reported to the NRC but I did not nor do I believe anyone in the Nuclear Department intentionally withheld from the NRC the fact that Pilgrim Station was in apparent non-compliance with 10 CFR 50.44 in order to assure continued power generation or for any other reason either financial or personal. I believe that the mistakes made by us on this issue were compounded over confusion as to what standards were actually going to be required in terms of 50.44 versus post-TMI modification requirements.

Regarding compliance with 50.44, I had no discussion or meeting with anyone on the BECo staff regarding the need to report or not report the status of 50.44 and I was not aware of the fact that the Pilgrim Station was not in compliance with 50.44 until June of 1981.

In my opinion, one of the causes of this 50.44 issue was an inadequate process on our part for followup of new NRC regulations and requirements and I believe that the actions taken by my staff were taken in order to determine what should actually be done to assure compliance rather than any attempt to withhold information from the NRC identifying a potential non-compliance.

Since beginning my position with this Company, I have never experienced any pressure from my upper management to do anything necessary to keep Pilgrim Station on line for financial reasons at the expense of operating safety and within regulatory requirements. When I or my operating staff were not satisfied with the nature of plant operation a shutdown would be initiated. These decisions to shutdown were made within my staff and the upper BECo management was never advised of a shutdown or consulted with regarding a potential shutdown until after we had made our operating decision.

The award received by BECo in 1979 as the operating Company of the year in no way influenced any operating decision at the plant and did not affect our handling of the 50.44 compliance issue or any decisions regarding necessity to shut the unit down. Our guidelines for plant operations were our existing

technical specifications and established regulatory requirements in comparison with the day-to-day operating parameters being analyzed at the plant. These specifications and requirements were our only criteria for operating and operating decisions were never affected by financial considerations or any type of corporate management pressure.

Our primary method for assuring that outgoing correspondence was accurate was our "green sheet review process" which required various levels of management review of all outgoing correspondence. It is apparent from this incident that this review process was either not understood or was not clearly defined as to what management review responsibilities were. We are currently attempting to strengthen the "green sheet process" through training our personnel in its use and importance. I personally relied on this green sheet review process to satisfy myself that outgoing correspondence was correct.

In conclusion, I would say that during this time period we were in the midst of an extended outage involving a large number of modifications as a result of the TMI accident. Our organization was overwhelmed as a result of trying to meet the multitude of requirements with a staff that was not established to handle this increased workload. This caused a shifting of work priorities on a daily basis and a continual shifting of personnel to meet these priorities. I believe these factors were in large part responsible for our inadequate response to the 50.44 issue.

I have read the foregoing statement consisting of 3 handwritten/typed pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct.

Original signed by J. Edward Howard, 1/7/82, 2:35 p.m.

Subscribed and sworn to before me this 7th day of January, 1982, at 2:35 P.M.

Original signed by R. Keith Christopher, 1/7/82, 2:35 P.M.

OFFICE MEMORANDUM

→ Roomy D

To HES
FS&MC Prepared by EW JonassenDate 10/17/79 Reviewed by JW Ashkar

CC: Nuclear Records Center

Approved by _____

RECORD CATEGORY:

UNIT APPLICABILITY:

PNPS FILE NUMBER:

1-5.7

S51A-79-41

Title: Reactor Building Maintenance Following
A design basis accident.

The only complete dose rate study for the reactor building is for airborne activity. Based on this dose only, access to the Reactor Building prior to 30 days for maintenance is not feasible.

This is based on the following assumptions-

1. The maximum acceptable dose rate from airborne activity is 2.5 REM/Hour
2. 1.5 %/day Primary Containment leak rate
3. 100% of core noble gas activity is airborne in the PC
4. Only noble gases are leaked to the reactor building
5. A 4000 CFM ^{ventilation} clean-up rate in the reactor building is in effect

Close out
Task # 4906

Note- If a less severe accident occurs entrance to the reactor building would be sooner than 30 days. Also, access may be possible if the containment leakage is less than the design value.

EXHIBIT 10

OFFICE MEMORANDUM

Edison COMPANY

To G. C. Anagnini Prepared by H. E. Steiman *HEA*
Date 3/28/80 Reviewed by W. J. Merritt *WSM*
cc: Nuclear Records Center Approved by S. L. Rosen *SLR*
NED 80-404
J. E. Howard
J. W. Ashka *JA* Title: PILGRIM STATION UNIT #1
10CFR50.44 EVALUATION

RECORD CATEGORY
UNIT APPLICABILITY
PNPS FILE NUMBER

At the request of Mr. J. M. Fulton, we enclose a typed version of the 50.44 evaluation that was given to NOD on February 22, 1980. This evaluation incorporated NOD comments and was sent to NOD for transmittal to the NRC. We assumed that the official NED approval would be via the green approval sheet for NRC correspondence.

/cic

Action Required: YES X NO
Response Required: YES NO X
Attachment

RECEIVED

MAR 31 1980

Nuclear Operations

3/28/80

PILGRIM NUCLEAR POWER STATION, UNIT #1
10CFR50.44 EVALUATION

INTRODUCTION:

Compliance with 10CFR50.44 depends on maintaining combustible gas control while meeting the dose requirements of 10CFR100 for post accident cases, and meeting General Design Criterion (GDC) 41, GDC 42, and GDC 43. Since the notice of hearing for the Pilgrim construction permit was published before December 22, 1968, purging, as defined in 10CFR50.44, is an acceptable means of maintaining combustible gas control provided the above criteria are met.

This analysis is the basis for the conclusion in Reference (a) that Pilgrim meets 10CFR50.44 with existing equipment. Subsequently, it was found that one of the assumptions of Reference (a) was incorrect. It was assumed that local operator action could be used for satisfying single failure and loss of power design criteria. A recent Reactor Building habitability study, a result of the TMI Lessons Learned implementation efforts, has demonstrated that the Reactor Building may be inaccessible after an accident. The Reactor Building area dose rates may be too high to permit personnel entry. Because timely operator access for local action cannot be guaranteed, all 10CFR50.44 requirements are not met with existing equipment. Modifications are in progress to upgrade the system so that Pilgrim will comply with 10CFR50.44. These modifications are being implemented as quickly as possible.

Also, it is noted that an existing nitrogen repressurization system (shown in FSAR Figure 5.2-8a) and an existing containment oxygen monitoring system are not included in this evaluation. They are not designed to meet Seismic Class I requirements and are not redundant.

SYSTEM DESCRIPTION:

The present primary containment combustible gas control system is a purging system. It consists of an existing Standby Gas Treatment System (SGTS) and the Drywell and Torus purge and vent lines. The SGTS is shown in FSAR Figure 5.3-2. The Drywell and Torus purge and vent lines are shown in FSAR Figure 5.2-8a. As shown, exhaust from both the Torus and Drywell can be routed to the Main Stack via the SGTS. Makeup is supplied via the purge lines. Hence, hydrogen concentration is controlled below flammability limits (4 volume percent as required in Regulatory Guide 1.7) by a bleed and feed method (purge method as defined in 10CFR50.44). Since calculations indicate that the Drywell would reach approximately 4 volume percent hydrogen in about 14 hours and the Torus would reach approximately 4 volume percent hydrogen in about 22 hours without combustible gas control, this method was judged acceptable because of the ample time for implementation.

DOSES:

Dose calculations were based upon a continuous 50 cfm purge from the primary containment starting 2 hours after the accident and continuing for 30 days. A continuous constant rate purge was selected to simplify calculations. Fifty cfm was selected as a reasonable approximation of the higher and lower purge rates required. With these assumptions, calculations show that the Pilgrim LPZ doses would be within 10CFR100 limits.

Purging is not required immediately after an accident. Calculations indicate that the Drywell reaches approximately 3 volume percent hydrogen about 4 hours after an accident. Hence, no purging should be required within 2 hours after an accident.

GDC 41:

GDC 41 requires the system to be redundant, to have leak detection capabilities, to provide isolation and containment, and to function after a loss of power. Pilgrim complies with this criterion assuming operator action can be used for satisfying loss of power and random single failure criteria.

As shown in FSAR Figure 5.2-8a, the primary containment vent lines (2") and purge lines (20") have flow paths from the containment to the Seismic Category I SGTs. The exhaust from the primary containment can be routed to either SGTs unit (the 2" line would be used). Each SGTs is 100 percent redundant. FSAR Section 5.3.3.4-2 and FSAR Figure 5.3-2 show these flow paths and describe the SGTs. Hence, with credit for appropriate local operator action, system redundancy is obtained.

The SGTs units are arranged so that the fans draw rather than push gases through the filter trains. Hence, leakage is controlled inward rather than outward for untreated gases. Flow indication and filter system differential pressure indication are provided. Therefore, if gross leakage occurred, it would be detected quickly by sudden changes in these parameters. Hence, leakage is controlled.

Containment and isolation capabilities are provided by the Primary Containment Isolation System (shown in FSAR Figure 5.2-8A and described in FSAR Section 5.2.4.6). Hence, reliable isolation is provided.

Local operation of vent and makeup lines were proposed to satisfy redundancy and loss of power criteria. Since calculations indicated

purging is not required immediately after an incident, local valve control was judged acceptable. Calculations indicate that without combustible gas control, Drywell hydrogen concentrations of approximately 3 volume percent and approximately 4 volume percent would be reached about 4 hours and 14 hours, respectively, after an accident. Thus, the time for operator action appeared acceptable.

GDC 42 and GDC 43:

Inspection and testing of the present Containment Atmospheric Control System is described in Sections 4.7A and 4.7B of the Pilgrim Technical Specifications. It is noted that the SGTS is designed to draw rather than push gases through the filter trains. Hence, leakage is controlled inward rather than outward for untreated gases.

COMBUSTIBLE GAS MONITORING:

The existing containment combustible gas monitoring system consists of two redundant, remotely operable, seismically qualified hydrogen analyzers. Several local test points are also available at which grab samples could be obtained. The hydrogen analyzers can continuously monitor Drywell hydrogen concentration and have a remote readout in the main Control Room. Test points include both Drywell and Torus locations. Since the increase of combustible gas concentration in the containment due to radiolysis is relatively slow and has been modeled (Regulatory Guide 1.7), an appropriate sampling frequency could be determined.

CONTAINMENT MIXING:

Significant combustible gas concentration stratification within the Drywell or the Torus is not expected. Organizations such as Energy Incorporated

and General Electric have investigated containment mixing. Energy Incorporated has estimated less than 0.1% variation in hydrogen concentration in the Drywell and expects good mixing will take place in the Torus because of thermal gradients (Reference (b)). Energy Incorporated's conclusions are supported by GE's evaluation of mixing in the containment around their BWR 6. General Electric believes that a very small temperature (T) or concentration (C) difference is sufficient to promote good mixing ($T = 2.6 \times 10^{-50} F$ or $C = 4.3 \times 10^{-8}$ in the containment around a BWR 6). GE also believes that the analysis used on the containment around a BWR 6 will also apply to a Mark I Containment. Based upon the above analysis, in the open Pilgrim BWR Mark I containment, no significant combustible gas concentration stratification is expected within the Drywell or Torus.

HYDROGEN GENERATION:

Hydrogen generation estimates are based upon the requirements of 10CFR50.44 and Regulatory Guide 1.7. In accordance with 10CFR50.44, the amount of hydrogen generated by a fuel cladding and water reaction was obtained by using the larger of:

1. 5 times the total amount of hydrogen calculated in the last Pilgrim reload submittal (in compliance with 10CFR50.46(b)(3)).
2. An average core wide cladding penetration of 0.23 mils.

In the last Pilgrim 1 reload submittal, GE calculated an average metal water reaction percentage of 0.13% (also confirmed by Reference (c)). Five times 0.13 is 0.65 percent cladding interaction. A 0.23 mil average cladding penetration is equivalent to 0.68 percent cladding interaction. Hence, the 0.23 mil average cladding penetration was used. All hydrogen

generated by the core metal-water reaction was assumed to be released immediately. Radiolytic hydrogen generation rates and accumulation curves were calculated by GE (Reference (d)). GE used AEC Safety Guide 7 to generate their curves. These assumptions are the same as those used in Regulatory Guide 1.7.

The calculation methods used for hydrogen concentration calculations were verified by Bechtel (References (e) and (f)) with independent calculations.

Hydrogen inputs from corrosion for Pilgrim (no chemical spray) are minor (References (e) and (f)). Hence, their absence will not introduce a significant effect.

REFERENCES

- (a) BECo Letter #79-207 dated 10/19/79, Containment Atmospheric Control System.
- (b) Supplement No. 1 to Dresden Station Special Report No. 39 and QAD Cities Special Report No. 14.
- (c) GE Letter No. SSX:79-64
- (d) 7/13/73 letter, W. J. Neal (GE) to S. A. Giusti (Bechtel)
- (e) BLE-459 dated 9/25/75
- (f) ELB-2604 dated 6/24/75

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 3

Place: Pilgrim Station
Date: January 6, 1982

DRAFT STATEMENT

I, Edward Ziemianski, hereby make the following voluntary statement to R. K. Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me. Investigator Christopher is typing this statement for me at my request.

With respect to my involvement in the BECO responses to NRC correspondence which require Station input such as items of non-compliance I, in my position would act as the focal point at the plant for all requirements submitted to the plant by our Licensing Division (J. Fulton). Upon receipt of such correspondence, I (through my staff) would normally assign the responsibility to the plant Department which is associated with the particular NRC correspondence in question. That Dept. would be expected to respond to my staff with respect to corrective actions, and what would be done to ensure compliance and to prevent recurrence of the same situation. Response time to these Dept. assignments are basically set by the NRC deadlines set for licensee response. Should a Dept. fail to respond in a timely manner, I will if necessary, advise my supervisor (R. Machon) to initiate a response from the Dept. Once this responses have been received by my staff it is reviewed by appropriate Station management (DNOM & NOM) and then forwarded to our Licensing Branch to be incorporated into a response to the NRC.

Regarding the BECO NED analysis of 10 CFR 50.44 which was transmitted to NOD by memo on 3.28.80 I, to the best of my recollection did not have any detailed discussions with C. Andognini, (my supervisor at the time) regarding the adequacy of the analysis which in retrospect appeared to place the plant in non-compliance with 50.44. We may have discussed some aspects of the issue but not to the extent

that Andognini ever became directly involved in the issue of compliance with 50.44.

While the memo and the analysis in question was transmitted to Mr. Andognini, he most probably forwarded the analysis by initialing the upper right corner and forwarded it to me for follow up action without actually examining or analyzing its contents. I in turn would have forwarded it to Jack Fulton for the action. At the time I don't feel I was in the position to make the absolute decision as to the acceptability of the analysis but I certainly had input to the preceding draft and I was able to voice my opinion on its contents. For the reasons I stated in my previous statement I and I believe J. Fulton believed the analysis to be inadequate to support a conclusion as to whether we were or were not in compliance. In retrospect it appears that information should have been submitted to the NRC with clarifying information stating our questions as to the adequacy of the analyses and the need to further resolve the issue.

I thought that we (the Operations Dept.) actually sent the questioned analysis back to NED for resolution but at this time it would appear that we did not. There was no formal mechanism in place (other than the green sheet sign off for completed correspondence) to send the questioned analysis back to NED for resolution and at that time I was overwhelmed with the project dealing with the pipe hangers issue. This situation may have contributed to the 50.44 issue slipping through the crack but in no way was there any intent on my part to withhold the status of 50.44 from the NRC.

Our handling of the 50.44 issue in late 1979 was in no way related to or affected by the fact that BECo was being considered as company of the year largely in part due to the unit availability of Pilgrim Station. While it cannot be denied the BECo top mgt desired to be No. 1 in generating capacity (per the PAB inspection) this desire in no way influenced our handling of the 50.44 issue.

With respect to the involvement of the operating committee (ORC) on the reportability of 50.44 it is true that the ORC reviews items for consideration as to reportability of potential non-compliance. However, in this case, because of fragmentation between corporate and plant staffs this item was apparently never submitted to the ORC for review. This weakness is being corrected and was also identified by the NRC PAB team.

In conclusion I reiterate that there was no intent on my part or to my knowledge anyone elses to intentionally withhold this information on 50.44 from the NRC.

I have read the foregoing statement consisting of 4 handwritten pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct.

Original signed by Edward Ziemianski, 1/6/82, 10:05 A.M.

Subscribed and sworn to before me this 6th day of January 1982, 10:05 A.M.,
Pilgrim Station.

Original signed by R. Keith Christopher, 1/6/82, 10:05 A.M.

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION I

Page 1 of 3

Place: Pilgrim Nuclear Power Station
Date: December 2, 1981

DRAFT STATEMENT

I, Alton Morisi, hereby make the following voluntary statement to Keith Christopher who has identified himself to me as an Investigator with the U. S. Nuclear Regulatory Commission. I make this statement freely with no threats or promises of reward having been made to me.

As background information, I am currently in the position of Manager, Nuclear Operations Support Department for Boston Edison Company. I have been in that position since September 1980. Prior to that, I was the Power and Control Systems Group Leader within the Nuclear Engineering Department.

My involvement with (if any) the BECo letter to the NRC dated October 19, 1979 in which it was stated that compliance with 10 CFR 50.44 had been met with existing plant equipment would have been with respect to electrical design, etc. I am not familiar with an analysis that was done to support that letter or as to any rationale or processes involved with this issue at that time. Specifically, I do not recall if operator habitability as referenced in Amendment 35 was considered when the October 19, 1979 letter was submitted.

I have no recollection of involvement in the handling and followup to the NRC letter of October 30, 1979 requesting the BECo analysis in support of its letter of October 19, 1979. I have no recollection as to why this request of the NRC was not responded to. It is my understanding, that at the time there existed within the Nuclear Operations Department, a Licensing group to handle all correspondence from the NRC. It is also my understanding that Mr. Andognini would initially receive NRC correspondence and then would assign the followup

to one of his Licensing personnel. It is my understanding that this organization for tracking NRC correspondence did not possess a sophisticated system for tracking work against schedules to meet licensing commitments.

I am not aware of the circumstances surrounding the analysis dated 3/28/80 in terms of why it was initiated, who did the analysis, and what further action was taken on that analysis. I do not recall what the BECo rationale was at that time for not reporting the apparent noncompliance with 50.44 to the NRC as identified in that analysis. I believe the responsibility for making the decision as to whether or not to report the item rested with either Mr. Andognini or Mr. Rosen. I am not aware of, nor do I have any reason to believe that a management decision was made to intentionally withhold this information from the NRC. It is my opinion that most of the personnel involved in this issue, ie, Mr. Rosen and Mr. Andognini, et al, believed that we were in compliance with 50.44 and that the TMI modifications that were being installed during the 1980 outage would also meet the requirements of 50.44. Again, I do not know the rationale for the apparent noncompliance that apparently existed between November of 1978 when 50.44 went into effect and March 1980 when the TMI modifications were installed.

To the best of my recollection, my first direct involvement in the 50.44 issue occurred around late May or early June 1981 when I was made aware by my staff that an analysis was required by the NRC regarding 50.44. The letter I signed on 6/15/81 was based on a compilation of information from a variety of sources to include data provided by H. Steiman that was apparently compiled during his initial research of the 50.44 issue that was done prior to the BECo letter of October 19, 1979. I signed this letter of June 15, 1981 based on review of the two separate analyses that were attached to this letter. These documents were submitted in an effort to provide all information we had on the 50.44 issue.

Based on my limited knowledge of this issue, I have no reason to believe that the information developed during the analysis dated March, 1980, was intentionally withheld from the NRC. I believe the thinking at that time was most probably that the requirements would be met by the TMI modifications prior to startup.

I have read the foregoing statement consisting of 3 typed pages. I have made and initialed any necessary corrections and have signed my name in ink in the margin of each page. This statement is the truth to the best of my knowledge and belief. I declare under penalty of perjury that the foregoing is true and correct. Executed on December 2 at 1:15 p.m.

Original signed by A. Morisi 12/2/81 1:15 p.m.

Subscribed and sworn to me before this 2nd day of December, 1981, at Pilgrim Nuclear Power Station.

Original signed by K. Christopher 12/2/81 1:15 p.m.