Generic Letter 82-33

BOSTON EDISON
General Offices
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Chief Operating Officer

February 10, 1987
BECo 87-021

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

License DPR-35
Docket 50-293

Additional Information Concerning Regulatory Guide 1.97

References:
1. Letter from Mr. W. D. Harrington to Mr. D. B. Vassallo, dated November 1, 1984 (BECo 84-187)
2. Letter from Mr. J. A. Zwolinski to Mr. W. D. Harrington, dated December 12, 1985 (BECo 1.85.372)
3. Letter from Mr. D. B. Vassallo to Mr. W. D. Harrington, dated March 26, 1985 (BECo 1.85.098), Safety Evaluation of Environmental Qualification of Equipment Important to Safety at Pilgrim Nuclear Power Station

Dear Sir:

Generic Letter 82-33 required each licensee to review the accident monitoring instrumentation available at their facility and to compare this instrumentation with the recommendations of Regulatory Guide 1.97. The results of Boston Edison's review and comparison for the Pilgrim Nuclear Power Station were provided by Reference 1. A report reviewing our submittal prepared by your consultant, EG&G Idaho, Inc., was forwarded to us by Reference 2. This letter provides the requested response to the open items in the report and includes additional information pertaining to Boston Edison's compliance with the intent of Regulatory Guide 1.97. In order to meet our long term program commitment to complete all Regulatory Guide 1.97 modifications before restart from Refueling Outage 8, it is requested that the NRC complete their review of this additional information by April 30, 1987.

Methodology for Evaluation of Regulatory Guide 1.97 Compliance

As described in Reference 1, Section I-3, Evaluation Methodology, Boston Edison has committed to meeting the intent of Regulatory Guide 1.97, Revision 3, by using an evaluation methodology which is consistent with the graded approach used in the regulatory guide. Specifically, the design and

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qualification criteria listed in Regulatory Guide 1.97 were prioritized by applying weighting factors to quantitatively identify the degree of importance of each criterion. These weighting factors were developed based on both engineering judgement and discussions with the NRC, and were consistently applied to all applicable accident monitoring instrumentation to evaluate the degree of compliance. For each applicable instrumentation variable, the sum of the weighting factors for satisfied criteria was compared to the conformance index number to determine if that variable successfully meets the intent of Regulatory Guide 1.97. The conformance index number was selected to preclude not satisfying any two major design and qualification criteria. Note that where the Reference 1 submittal identified a need for additional information for a particular criterion, the applicable variable was conservatively evaluated to have failed to meet that criterion. Thus, a variable may have been found to sufficiently meet the intent of the regulatory guide, even with the lack of information on a particular criterion.

From the open items listed in the Reference 2 report, it is not clear that this evaluation methodology is fully understood and accepted. Although this letter responds to all Reference 2 open items, including the need for more information and/or justification for deviation for a particular criterion, it should be understood that the variables in question were found acceptable using the above evaluation methodology, in spite of a particular lack of information or failure to meet a criterion. Acceptance of this evaluation methodology, using the threshold acceptance criteria approach, is fundamental to the favorable review of our Regulatory Guide 1.97 compliance evaluation provided in Reference 1.

Environmental Qualification of Category 2 Variables

As stated in Reference 1, Section II-3, Environmental Qualification, Boston Edison takes exception to the Regulatory Guide 1.97 recommendation that all Category 2 accident monitoring instrumentation be environmentally qualified. The intent of Regulatory Guide 1.97 is interpreted to be that where more than one instrument provides the monitoring function for a particular Regulatory Guide 1.97 key variable, only one of the instruments is required to be environmentally qualified. The plant safety functions monitored by all Category 2 variables at Pilgrim are redundantly monitored, either directly or indirectly, by Category 1 variables. Because Boston Edison has committed to apply environmental qualification to all Category 1 variables, environmental qualification of Category 2 variables is unnecessary and is not planned. Although this does not fully meet the recommendations of the regulatory guide, this interpretation is considered to meet the requirements of 10CFR50.49, Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants, and the intent of Regulatory Guide 1.97.

The Reference 2 report states that the review of the environmental qualification of accident monitoring instrumentation is beyond the scope of the review of Regulatory Guide 1.97 compliance and should be addressed in accordance with 10CFR50.49. However, such review was also found by the NRC to be beyond the scope of 10CFR50.49 (Reference 3). For this reason, it is requested that review of Boston Edison's interpretation of environmental

qualification requirements for accident monitoring instrumentation be included in the scope of your review of our Regulatory Guide 1.97 compliance.

Clarification of Commitments on Specific Variables

Further review has resulted in the need to clarify or alter our commitments made concerning the following accident monitoring instrumentation.

1. Safety/Relief Valve Position Indication

   The guidance originally provided in NUREG-0737, TMI Action Plan Item II.D.3, indicated that the safety/relief valve position indication system at Pilgrim should be environmentally qualified. Subsequently, Regulatory Guide 1.97 designated safety/relief valve position indication to be a Category 2 variable, and further recommended that all Category 2 variables be environmentally qualified. However, because Boston Edison takes exception to the environmental qualification of Category 2 accident monitoring instrumentation, as described above, safety/relief valve position indication instrumentation is no longer considered to require environmental qualification.

2. Radiation Exposure Rate (inside buildings or areas where access is required to service equipment important to safety)

   The evaluation of this variable in Reference 1 found that the existing range of 10^{-5} to 10^{-1} R/hr did not meet the recommended range of 10^{-1} to 10^{4} R/hr specified in Regulatory Guide 1.97. Reference 1 stated that this instrumentation would be improved to increase the range to meet the Regulatory Guide 1.97 range recommendation. Upon later investigation, it was determined that no vendors could be located to provide instrumentation that could cover the 9 decade range needed to meet both the normal and accident monitoring ranges.

   As an alternative, Boston Edison plans to use the existing area radiation monitors and supplement them, on an as-needed basis, with portable radiation monitoring equipment that exists onsite. Because the portable radiation monitoring equipment is fully capable of covering the range of radiation exposure comparable to the emergency condition allowable exposure limits (25 R for health, safety, and property protection and 75 R for life saving), this alternative to hardware modifications meets the intent of Regulatory Guide 1.97, i.e., to monitor access areas required to service equipment important to safety.

3. Primary Containment Isolation Valve Position (ZS9068A and B)

   Reference 1 stated that Position Switches ZS9068A and B on the HPCI condensate drain pot drain valves would be upgraded to add a redundant safety-related power source and to provide new position switches. Further investigation has determined that these primary containment isolation

valves exist on lines which terminate inside the suppression pool, below the water surface during both normal and accident conditions. Consequently, these valves are not relied upon to prevent the escape of containment air to atmosphere, and therefore are not required to operate to maintain containment integrity as defined by Regulatory Guide 1.97. For this reason, no modifications are currently planned to these position switches for compliance with the intent of Regulatory Guide 1.97.

4. Core Spray Flow

Reference 1 stated that the core spray flow indication will be upgraded to install a redundant internal power supply. Further investigation has determined that although the existing internal power supply is from one source (E/S 1450-6), each output from this source is independent and isolated. Thus, the existing internal power supply meets the loop availability criteria for a Category 2 variable, as specified in Regulatory Guide 1.97. For this reason, no modifications are currently planned to the internal power supply for the core spray flow indication.

Response to Open Items Identified During Review of Regulatory Guide 1.97 Compliance

Boston Edison's response to the open items identified in Section 3 of the Reference 2 report is attached.

If we can be of further assistance in the course of your review of our compliance with the intent of Regulatory Guide 1.97, please contact us.

Very truly yours,

James M Lydon

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Attachment: Response to Open Items Identified During Review of Regulatory Guide 1.97 Compliance

cc: U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Senior NRC Resident Inspector
Pilgrim Nuclear Power Station

Attachment

Response to Open Items Identified During Review of Regulatory Guide 1.97 Compliance

The following additional information is supplied in response to the open items identified in Section 3.3, Exceptions to Regulatory Guide 1.97, of the Reference 2 report.

3.3.1 Seismic Qualification

The Reference 2 report requested that the licensee show that the seismic qualification for each of the variables listed in Appendix A of the report is in accordance with the station's seismic design criteria.

As stated in Reference 1, Section II-4, Seismicity, Boston Edison is deferring the review of the seismic qualification of accident monitoring instrumentation for Regulatory Guide 1.97 pending the resolution of Unresolved Safety Issue A-46, Seismic Qualification of Equipment at Operating Nuclear Power Stations, and the issuance of the generic letter. Boston Edison is continuing, where deemed appropriate, to use IEEE Standard 344-1975 as seismic qualification requirements for present and future electrical equipment modifications.

3.3.2 Neutron Flux

In acknowledging that an environmentally qualified drive unit for the neutron flux instrumentation is currently not available in the industry, the Reference 2 report concludes that the existing instrumentation is acceptable for interim operation. However, the licensee should follow industry development of this equipment, evaluate newly developed equipment, and install Category 1, environmentally qualified instrumentation to cover the recommended range when it becomes available.

Boston Edison repeats its position provided in Reference 1 that this variable is not considered to be a key variable and a Category 2 classification is appropriate. This position conforms to the BWR Owner's Group recommendation for this variable.

3.3.3 Reactor Coolant System Soluble Boron Concentration

The Reference 2 report states that the post-accident sampling system (PASS) will be used to monitor this variable, which is recommended by Regulatory Guide 1.97 to have a range of 0 to 1000 parts per million (ppm). Additional information on this capability is requested by Reference 2. It is noted that specific review of the PASS is being conducted separately as part of the NRC review of NUREG-0737, Item II.B.3.

The emphasis in Regulatory Guide 1.97 for this variable is on the analysis of grab samples of the reactor coolant system and the ability to analyze for soluble boron concentration in the range of 0 to 1000 ppm for verification that the safety function of the standby liquid control system is being accomplished. At Pilgrim, grab samples are collected from the PASS and the soluble boron concentration is determined by laboratory analysis, using Pilgrim Station Procedure 7.11.1, Analysis of Liquid Samples for Boron (By Spectrophotometry) Under Accident Conditions. This procedure is specifically written for the analysis of boron after sodium pentaborate has been injected

into the reactor during an accident condition. The method of analysis is applicable for concentrations of 0 to 15 mg/L boron; however, because samples can be diluted to a known degree, the range can be extended to cover the Regulatory Guide 1.97 recommended range. The quantity of boron injected into the reactor is expected to produce a concentration of 700 ppm boron, which is well within the Regulatory Guide 1.97 recommended range.

3.3.4 Coolant Level in Reactor

The Reference 2 report requests further justification for the deviation in range from the two overlapping sets of Category 1 instrumentation used at Pilgrim (covering 205 to 505 inches and 432 to 532 inches) and the Regulatory Guide 1.97 recommended range of the bottom of the core support plate to the lesser of the top of the vessel or the centerline of the main steamline (at Pilgrim, 186 to 604 inches).

The variable range provided at Pilgrim gives the operator reactor vessel level indication that encompasses the automatic and manual actions that may be required to restore and maintain vessel water level and provide core cooling. All safety functions the operator must perform or be informed of relating to reactor vessel water level under both accident and post-accident conditions fall within the existing indicated range of 205 to 532 inches. In addition, Regulatory Guide 1.97 defines this variable as one that provides information about the accomplishment of plant safety functions for following the course of an accident. But level indication below active fuel and greater than the high level trip setpoint of ECCS does not contribute to this effort. The Pilgrim Station reactor vessel water level range is sufficiently great to keep instruments on scale, utilizing overlapping ranges, at all times when information is required about the accomplishment of plant safety functions for following the course of an accident. The existing level indication range at Pilgrim is considered to meet the intent of the recommendations of Regulatory Guide 1.97.

3.3.5 Reactor Coolant System Pressure

The Reference 2 report requests that the reactor coolant system pressure (i.e., reactor pressure vessel pressure) instrumentation be modified to achieve full redundance and independence, including redundant power sources and recorders.

The Boston Edison evaluation contained in Reference 1 identified these deviations and stated that the instrumentation will be upgraded by providing connection to redundant safety-related power sources Y3 and Y4 via safety-related cable. Although Boston Edison originally stated in Reference 1 that a redundant recorder would not be installed because of the compensating recording capabilities planned for the safety parameter display system (SPDS), a method has been devised to provide a redundant recorder in the control room. A plant design change is currently in progress to utilize spare pressure recorder channels on the post-accident monitoring Panels C-170 and C-171 for recording reactor coolant system pressure. In addition, one indicator will be added in each of these panels for indication of reactor pressure. The signals for this instrumentation will be obtained from the new analog trip cabinets and shall meet all the criteria recommended by Regulatory Guide 1.97.

3.3.6 Drywell Sump Level and Drywell Drain Sumps Level

The Reference 2 report concludes that Boston Edison's Category 3 instrumentation provided for these variables is appropriate and acceptable.

3.3.7 Primary Containment Isolation Valve Position

The Reference 2 report concludes that the deviations identified by Boston Edison in Reference 1 for Position Switches ZS8000 and ZS8001 (isolation of torus makeup line from the condensate storage tank), and the 580 control rod drive directional control valves are acceptable.

3.3.8 Radiation Level in Circulating Primary Coolant

Radiation level measurements to indicate fuel cladding failure are provided by the PASS, which is being reviewed by the NRC as part of their review of NUREG-0737, Item II.B.3. The Reference 2 report concludes that the alternative instrumentation provided by Boston Edison for this variable is acceptable.

3.3.9 Containment and Drywell Hydrogen Concentration

The Reference 2 report states that the NRC has completed their review of NUREG-0737, Item II.F.1.6 for Pilgrim and has concluded that the instrument range of 0 to 10 percent for this variable is acceptable.

3.3.10 Containment and Drywell Oxygen Concentration

The Reference 2 report requests that Boston Edison provide justification for not supplying power for this instrumentation using Class 1E power sources, as recommended by Regulatory Guide 1.97.

After further investigation, it has been determined that the two redundant oxygen analyzers at Pilgrim are powered from independent, redundant, Class 1E power distribution systems that receive power from both onsite and offsite sources. This provides full compliance with the power source criteria recommended in Regulatory Guide 1.97.

3.3.11 Effluent Radioactivity

In Reference 1, Table 3, Boston Edison found this variable to be in conformance with the intent of Regulatory Guide 1.97, notwithstanding the need for additional information on range compliance and the acceptance of the instrument loop availability with justification. The Reference 2 report requested that Boston Edison provide the recommended instrument range and improved instrument loop availability.

As described in detail in the body of this letter, Methodology for Evaluation of Regulatory Guide 1.97 Compliance, a variable may be found to adequately meet the intent of the regulatory guide, even if one design criterion is not met. Such is the case for the effluent radioactivity variable, because although the instrument ranges nearly match the Regulatory Guide 1.97 recommended range of 10^{-6} to 10^{3} μCi/cc, they do not in all cases meet it. For information purposes, the following table presents the calculated

ranges of the effluent radioactivity instrumentation at the three release points at Pilgrim: the main stack, the reactor building vent, and the turbine building vent. Note that because no normal effluents pass through the turbine building vent, the high range monitor does not overlap any other effluent radioactivity monitor. The ranges were calculated assuming sampling at a time one-hour post-LOCA and are given both in terms of the actual composition of isotopic mix in the expected effluents at Pilgrim and in terms of the Xe-133 equivalent to yield the same offsite whole body gamma dose rate.

Effluent Radioactivity Monitor Response Ranges,
Halogen and Noble Gas Mix, One-hour Post-LOCA

Location	Monitor	Actual Mix (μCi/cc)	Xe-133 Equivalent to Yield Same Offsite Whole Body Gamma Dose Rate (μCi/cc)
Main Stack	Low Range	1.2×10^{-5} to 1.2×10^{0}	1.3×10^{-4} to 1.3×10^{1}
	High Range	9.9×10^{-2} to 9.9×10^{3}	1.0×10^{0} to 1.0×10^{5}
Reactor Building Vent	Low Range	1.5×10^{-6} to 1.5×10^{-1}	2.5×10^{-5} to 2.5×10^{0}
	High Range	2.1×10^{-2} to 2.1×10^{3}	3.6×10^{-1} to 3.6×10^{4}
Turbine Building Vent	High Range	1.7×10^{-3} to 1.7×10^{2}	3.1×10^{-2} to 3.1×10^{2}

The instrument loop availability of the effluent radioactivity monitoring systems installed at Pilgrim is considered to be acceptable based on the dependability of the power supply provided. The system power is a reliable supply that is fed directly by its own 480/120V, 3 KVA control power transformer from a 120 VAC safeguard power supply. Power is supplied from a diesel generator in the event of a complete loss of offsite power. In addition, individual power routing is provided, with no power interface between local display units and control room monitors. As described in the body of this letter, Environmental Qualification of Category 2 Variables, no environmental qualification is considered to be necessary for this Category 2 variable.

3.3.12 Condensate Storage Tank Level

The Reference 2 report requests that Boston Edison identify the extent of the deviation in range and provide justification or alternatives for the deviation.

Reference 1 identified the need to determine the range of the condensate storage tank level instrumentation, as compared to the Regulatory Guide 1.97 recommended range of the top to the bottom of the tank. After further investigation, it has been determined that the range of the level sensors is 0 to 40 feet, which corresponds exactly with the recommended range of top to

bottom of the condensate storage tank. Thus, this instrumentation fully complies with the range recommended in Regulatory Guide 1.97.

3.3.13 Drywell Atmosphere Temperature

The Reference 2 report requests that Boston Edison provide justification for the deviation from the Regulatory Guide 1.97 recommended range of 40 to 440°F and provisions for the electrical isolation between instrument channels.

Although the drywell atmosphere temperature range of 0 to 400°F at Pilgrim does not correspond exactly with the Regulatory Guide 1.97 recommended range, it does provide sufficient range for monitoring the anticipated design temperature of 280°F, as described in the Final Safety Analysis Report (FSAR), and the identified peak temperature of approximately 340°F, as described in the Emergency Operating Procedures. For this reason, the instrument range at Pilgrim is considered to be acceptable.

As described in detail in the body of this letter, Methodology for Evaluation of Regulatory Guide 1.97 Compliance, a variable may be found to adequately meet the intent of the regulatory guide, even if one design criterion is not met. Such is the case for the drywell atmosphere temperature variable, because although no electrical isolation devices are provided for this variable, the sum of the weighting factors for the criteria found in conformance exceeds the conformance index number. Thus, this variable was found to adequately meet the intent of Regulatory Guide 1.97 and no modifications to install electrical isolation devices are planned.

3.3.14 Drywell Spray Flow

The Reference 2 report requests the extent of and justification for the deviation from the Regulatory Guide 1.97 recommended range of 110% of the required drywell spray design flow.

The existing instrument range of 0 to 10,000 gpm for flow transmitters FT-1051A and B in the containment spray and torus spray branch lines of the residual heat removal (RHR) system does not correspond exactly with the Regulatory Guide 1.97 recommended range of 0 to 10,450 gpm, which is equivalent to 110% of the required drywell spray design flow (see FSAR Figure 6.4-3). However, the RHR system flow transmitters FT-1049A and B are also available and fully overlap the upper range of the containment and torus spray flow measurement. FT-1049A and B provide a range of 0 to 20,000 gpm in each RHR train and are also Category 2, Type D variables. Thus, the identified deviation in range is considered to be acceptable based on the overlap provided by redundant instrumentation. As described in the body of this letter, Environmental Qualification of Category 2 Variables, no environmental qualification is considered to be necessary for this Category 2 variable.

3.3.15 Main Steamline Isolation Valves' Leakage Control System Pressure

The Reference 2 report requests that Boston Edison provide information to show compliance with the Regulatory Guide 1.97 recommendations for this variable.

This Category 2 Type D variable is not applicable to Pilgrim, because no designated leakage control system exists on the main steamline isolation valves.

3.3.16 Reactor Core Isolation Cooling (RCIC) System Flow, Low Pressure Coolant Injection (LPCI) System Flow, and Cooling Water Flow to Engineered Safety Feature (ESF) System Components

The Reference 2 report requests Boston Edison to identify the extent of deviation for these variables from the Regulatory Guide 1.97 recommended range of 0 to 110% of design flow. For each deviation, supporting justification or alternatives for these deviations is requested.

In Reference 1, Boston Edison identified these variables as acceptable with justification in the EQ/Range column of Table 3 based on Boston Edison's position on the environmental qualification of Category 2 variables. This position is more fully discussed in the body of this letter, Environmental Qualification of Category 2 Variables. The ranges of these variables fully meet the Regulatory Guide 1.97 recommended ranges, as shown below.

Variable	Existing Instrument Range	RG 1.97 Recommended Range (110% of design flow)
RCIC Flow	0 to 500 gpm	0 to 484 gpm
LPCI Flow	0 to 20,000 gpm (in each train)	0 to 15,840 gpm
Cooling Water Flow to ESF Components	0 to 3,000 gpm (in each train)	0 to 2,970 gpm

3.3.17 Standby Liquid Control System Flow

The Reference 2 report requests that Boston Edison provide information to show compliance with the Regulatory Guide 1.97 recommendations for this variable.

This Category 2, Type D variable is not applicable to Pilgrim. The standby liquid control system (SLCS) is a manually initiated system and flow measuring devices are not provided for this system at Pilgrim. Other parameters can be used to verify the proper functioning of this system, including pump discharge header pressure and SLCS storage tank level.

3.3.18 Standby Liquid Control System Storage Tank Level

In Reference 1, Table 2, Boston Edison provided justification for downgrading this variable from Category 2 to Category 3. The Reference 2 report requests that Boston Edison identify the specific deviations from the Category 2 recommendations for this variable and justify those deviations.

All of the design and qualification criteria recommended by Regulatory Guide 1.97 for this variable fully comply with both Category 2 and 3 criteria without justification; except for range and loop availability, which are acceptable with the following justification.

The SLCS tank level instrumentation range is from 9 to 135 inches above the tank inside bottom. This range adequately covers the General Electric specified level range of 9 to 121.25 inches and allows the monitoring of SLCS tank level from Technical Specification required levels down to the effective bottom of the tank. Monitoring of SLCS tank level above the upper range provides no additional useful information. In addition, Technical Specifications require that SLCS tank level be verified at least once each day, which provides further assurance that the correct level is maintained. For these reasons, the existing instrumentation is considered to adequately meet the intent of the Regulatory Guide 1.97 recommended range of top to bottom of the tank.

The instrument bus power source for the single channel level transmitter meets the Regulatory Guide 1.97 criteria for a reliable power source for Category 2, Type D variables. The use of a single instrument transmitter and control room indicator is justified because the SLCS is a backup to the reactor protection system and thus is less important to safety.

3.3.19 High Radioactivity Liquid Tank Level

The Reference 2 report requests that the licensee identify the deviation from the Regulatory Guide 1.97 recommended range of top to bottom of the high radioactivity liquid tank. Justification for any deviation in range should be provided.

In Reference 1, Boston Edison identified the need to confirm the range of the radwaste tank level instrumentation. After further investigation, the range has been confirmed to conform to the Regulatory Guide 1.97 recommended range of top to bottom of the tank. The level transmitter range is 0 to 144 inches and corresponds to the bottom to top measurement of this 12-foot high tank.

3.3.20 Status of Standby Power

The Reference 2 report requests that the licensee identify all deviations from the Regulatory Guide 1.97 recommended range, stated to be plant specific. In addition, the report requests justification for all deviations in range and for not providing environmental qualification for this Category 2 variable.

Boston Edison complies with the Regulatory Guide 1.97 recommended range of plant specific with the purpose of monitoring system status. Justification for not providing environmental qualification for this Category 2 variable is based on the position clarified in the body of this letter, Environmental Qualification of Category 2 Variables.

3.3.21 Secondary Containment Area Radiation

The Reference 2 report requests that the licensee provide information to show compliance with the Regulatory Guide 1.97 recommendations for this Category 2, Type E variable.

This variable is not applicable to Pilgrim and compliance with the Regulatory Guide 1.97 recommendations is not necessary. The exposure rate in the secondary containment will be largely dependent on the radioactivity in the primary containment and the fluids flowing through the emergency core cooling system (ECCS) piping. Local radiation exposure rate monitors could only

provide ambiguous indications because there are a large number of pipes in widely scattered locations. The noble gas effluent monitors will provide a more appropriate means of detecting any breach of containment. This position is in concurrence with the BWR Owner's Group position concerning this variable.

3.3.22 Particulates and Halogens - All Identified Release Points, Airborne Radiohalogens and Particulates, Plant and Environs Radiation, Plant and Environs Radioactivity

The Reference 2 report requests that the licensee provide information to show compliance of these variables with the recommendations of Regulatory Guide 1.97. Deviations from the recommendations should be identified and supporting justification or alternatives to the deviations should be provided.

The emphasis in Regulatory Guide 1.97 for these variables is on the use of portable sampling capability, as opposed to hardwired capability. For this reason, these variables were not included in the variable list contained in Reference 1. However, as described below, the provisions made for monitoring these variables are considered to meet the intent of the Regulatory Guide 1.97 recommendations.

a. Particulates and Halogens - All Identified Release Points

This variable has been interpreted by Boston Edison as measurement of a representative sample of radioactive iodines and particulates that may accompany gaseous effluents following an accident. For the main stack and reactor building vents, iodine and particulates in the effluents during accident conditions are sampled through use of a particulate filter and a charcoal-base iodine collection chamber, installed ahead of the routine effluent monitor sampling lines. For turbine building releases under accident conditions, iodines and particulates are sampled through use of a portable air sample pump and a filter. Station procedures specify that samples be transported to the onsite radiochemistry lab for analysis. However, if sample transport or analysis is not practical due to high radiation levels, a nomogram is provided which permits an estimation of the filter radioactivity. Effluent concentrations are then determined by dividing the measured/estimated filter radioactivity by the total sample flow, and releases to the atmosphere and offsite dose rates are determined through use of a computerized station procedure.

b. Airborne Radiohalogens and Particulates, Plant and Environs Radiation, Plant and Environs Radioactivity

Air sampling stations are located at various positions both onsite and offsite to monitor for radioactive particulates and gaseous iodine. These stations sample the environs continuously to provide a running background which will make it possible to distinguish significant radioactivity introduced into the environment by station operation.

3.3.23 Accident Sampling (Primary Coolant, Containment Air and Sump)

The Reference 2 report states that this variable is to be monitored at Pilgrim by the post-accident sampling system (PASS), which is beyond the scope of this review and is being addressed by the NRC as part of their review of NUREG-0737, Item II.B.3.