BOSTON EDISON COMPANY
800 BOYLSTON STREET
BOSTON, MASSACHUSETTS 02199

WILLIAM D. HARRINGTON
SENIOR VICE PRESIDENT
NUCLEAR

November 7, 1983

BECo 83-275

Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

License No. DPR-35
Docket No. 50-293

Subject: Response to Generic Letter 83-28

Dear Sir:

In Generic Letter 83-28, dated July 8, 1983, NRC requested that we submit the status of current conformance with the positions contained in that letter, and plans and schedules for any needed improvements for conformance with the positions. We requested an extension to April, 1984 to respond because of our participation in industry groups formed to address GL 83-28.

Our request was denied in an NRC letter dated October 19, 1983. That letter requested that we submit the requested information to the extent practical, provide commitments and schedules for items where final implementation is known, and to supply our plans and schedules for developing programs where needed.

The attachments accompanying this letter responds to the October 19, 1983 letter. We believe it satisfies your request.

A001
1/1

Should you require further information concerning this response, please contact us.

Very truly yours,

W.D. Harrington

PMK/mat

Attachments

cc: Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commonwealth of Massachusetts)
County of Suffolk)

Then personally appeared before me W.D. Harrington, who, being duly sworn, did state that he is Senior Vice President - Nuclear of Boston Edison Company, the applicant herein, and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Boston Edison Company and that the statements in said submittal are true to the best of his knowledge and belief.

My Commission expires: 4/14/89

Marian O'Camp
Notary Public

1.1.1 Restart of Pilgrim Station is acceptable only if the following criteria are satisfied:

1) The cause of the unscheduled reactor shutdown has been determined and appropriately corrected or the Operations Review Committee (ORC) has determined that the safety of equipment, site personnel, and the public are not threatened by a restart, based on an independent review (see response to 1.1.6).

2) Components within systems designed for automatic response to abnormal parameters did indeed respond properly to the appropriate initiating signals, or exceptions evaluated and approved by the appropriate administrative controls (ORC, Nuclear Engineering Department, Safety Evaluation).

3) The station manager, or his designated alternate, has given approval to commence restart.

1.1.2 Post-trip review activities are conducted by the on-duty Nuclear Operating Supervisor and Shift Technical Advisor under the direction of the Nuclear Watch Engineer. If the cause of the trip is not readily apparent, or cannot be determined beyond a reasonable doubt, the Chief Operating Engineer or Day Watch Engineer will take charge of the investigation until the cause of the trip has been determined. The individual in charge of the investigation will take responsibility for making appropriate recommendations to the station manager, or his designated alternate, based on the criteria of 1.1.1 above.

1.1.3 The qualifications of the facility staff are addressed in Section 6.3 of Pilgrim's Technical Specifications. This requires that the requirements of ANSI N18.1-1971, "Selection and Training of Personnel for Nuclear Power Plants" be met.

The Shift Technical Advisor is, as a minimum, qualified to the requirements described in NUREG-0737.

1.1.4 Output of the alarm typer on the plant process computer provides the primary information source for chronological reconstruction of the sequence of events surrounding a trip occurrence. Recorder strip charts are utilized for evaluation of long-term trends which may not be indicated by the alarm typer output. The balance of essential information is provided by plant personnel, whose combined knowledge is relied upon for reconstruction of human activities prior to and during the trip event (maintenance activities, operator actions, etc.).

1.1.5 Technical Specifications identify the trip settings for Reactor Protection, Containment Isolation, and Emergency Core Cooling Systems actuation. The information sources identified in 1.1.4 above indicate the presence of any

signals exceeding those trip settings. Expected plant behavior is based on system design responses described in the FSAR and on the experience and training of operators and supervisors.

1.1.6 If the post-trip task force identified in 1.1.2 above is unable to establish the cause of the trip, the Operations Review Committee is convened to provide independent assessment of the event. The ORC utilizes the same information as the task force. Both groups may call on the technical and engineering expertise of other personnel in the Nuclear Organization or other appropriate group, internal or external.

1.1.7 We are in the process of reviewing a draft INPO procedure concerning post-trip reviews for possible incorporation into a Nuclear Operations Procedure (NOP). Currently, Section 6 of NOP8301, "Conduct of Operations," deals with this issue (Attachment A).

1.2.1.1 The GE-PAC 4020 Process Computer System provides on-line monitoring of several hundred input points (digital, analog, and pulse) representing significant plant process variables. The system scans digital and analog inputs at specified intervals and issues appropriate alarm indications and messages if monitored analog values exceed predefined limits or if digital trip signals occur. It performs calculations with selected input data to provide the operator with essential core performance information through a variety of logs, trends, summaries, and other typewriter data arrays. The Sequence of Events printer responds to digital signals, the Data Recall Log is analog.

1.2.1.2 The monitored parameters are listed in Attachment B.

1.2.1.3 The log gives a time field for events in hours, minutes, seconds and then to the nearest 1/60 (.0166) second.

1.2.1.4 The format for displaying data and information is as follows:

Sequence of Events:

Time	Cycle	Point ID	Name	Status
XXXXXX	XX	XXXX		XXXX

Date Recall Log

Time	Point ID 1	Point ID 19
	(Value)	
XXXXXX	XXXXXX	XXXXXX

The Data Recall Log prints values preceding the event in black (2.5 minutes before event), values following the event are printed in red (2.5 minutes after the event).

1.2.1.5 The computer has core storage to record the status of the first 80 events in sequence for the NSS log and the first 20 events in sequence for the BOP log. The data is typed on the alarm typer. During this interval of time, (approx. 5 min.) all change of contact status is ignored. At the termination of the typer routine, the program rescans all digital points again and outputs any change of status on the typer, and reinitializes the program again.

The hard copy of the printout is controlled by the Document Control Group and is retained in the records vault at Pilgrim.

1.2.1.6 The power source for the process computer is non-interruptible and is non-Class IE.

1.2.2.1 As described above, the GE-PAC 4020 Process Computer System provides the major information source for assessing the time history of analog variables. Additionally, several variables (see 1.3 response) are recorded on strip-charts for trend evaluation.

1.2.2.2 The Data Recall Log monitors up to 38 preselected analog points, which are scanned continuously at 5-second intervals.

The Data Recall Log currently supplies information on the following:

APRM Channel "A"
APRM Channel "C"
Reactor Pressure
Core Plate P
Reactor Core Flow
Control Rod Drive Flow
Reactor Feedwater Flow "A" Loop
Reactor Feedwater Flow "B" Loop
Reactor Water Level (inches)
Outlet Steam Flow
Feedwater Temperature "A" Loop
Feedwater Temperature "B" Loop
Recirculation Flow "A" Loop
Recirculation Flow "B" Loop
Reactor Saturation Temperature
Calculated Seawater Flow
Hotwell Outlet Temperature
Drywell Temperature (64' elevation)
Suppression Chamber Level
Stator Cooler Header Inlet (°C)
Stator Cooler Header Outlet (°C)
Alternator Air to Cooler (°C)
Alternator Air from Cooler (°C)
Condensate Demineralizer Differential Pressure
Reactor Feedpump Suction Pressure
Condensate Pump Discharge Header
West Condenser Pressure (inches Hg)
East Condenser Pressure (inches Hg)

Reactor Building Closed Cooling Water System (RBCCW) "A" Loop Flow
RBCCW "B" Loop Flow
RBCCW Residual Heat Removal (RHR) Heat Exchanger Loop "A" Flow
RBCCS RHR Heat Exchanger Loop "B" Flow
RBCCW "A" Outlet Temperature
RBCCW "B" Outlet Temperature
Torus Pressure
Drywell Pressure
Service Water Loop "A" Flow
Service Water Loop "B" Flow

1.2.2.3 The above parameters are stored in a special Scan Table section of computer memory for 2.5 minutes. Upon occurrence of a designated plant trip event, the data currently in the Scan Table is transferred to a special Output Table and frozen, while the program continues to collect and save data at the same 5-second scan rate for the next 2.5 minutes. This five minutes of data is then displayed on the alarm typer. Strip chart information is continuously displayed, so that time history is dependent only on the requirements of the evaluation team (see 1.3 response).

1.2.2.4 The format for displaying data and information is standard for the GEPAC 4020 (see Response to 1.2.1.4).

1.2.2.5 Retention and retrievability is provided by the Document Control Group. The hard copy of the printout is controlled by this group and retained in the records vault at Pilgrim.

1.2.2.6 The power supply to the process computer is non-interruptible and non-Class IE.

1.3 The following is a list of instrumentation available in the main Control Room which may be used as needed for the assessment of unscheduled shutdowns:

1) PR-3392 Condenser Vacuum Strip Chart (reads in inches of mercury).

2) PR-3050 Turbine Main Steam Pressure (850-1050 PSIG).

3) VR-3000 Turbine Vibration Trip T/G at 12 mils.

4) 640-26 Two pen recorder: black pen records vessel level 0"-60"; the red pen records feedwater flow $0\text{-}10\times10^6$ lbs/hour.

5) 640-27 Two pen recorder: black pen records wide range vessel pressure 0-1500 PSIG; red pen records reactor steam flow $0\text{-}10\times10^6$ lbs/hour.

6) 640-28 Two pen recorder: black pen records turbine steam flow $0\text{-}10\times10^6$ lbs/hour; red pen records narrow range pressure 950-1050 PSIG.

7) 750-10 A, B, C, D APRM Neutron Flux 0-125%, Two pen recorder for 6 channels of APRM.

1.4 General Electric has been contracted to replace the existing plant process computer, with expected completion by the end of 1986.

2.1.1 Safety-related systems, structures, and components (SS&C) are identified in the Pilgrim Nuclear Power Station (PNPS) Q-List which is described in the item 2.2.1.2 response. Documents (Purchase Orders, Maintenance Requests) used to control activities associated with the Q-Listed equipment are identified as "Q" and subject to the requirements of 10CFR50, Appendix B and the Boston Edison Quality Assurance Manual (BEQAM) (see response to 2.2.1.4). Components which are required to function for a reactor trip are identified in the Q-List and are, therefore, controlled at a quality level consistent with their safety-related functions.

2.1.2 Records documenting the original qualification and testing of existing safety-related equipment are retained as quality assurance records and controlled in accordance with the 10CFR50, Appendix B, Criterion XVII requirements described in Boston Edison's Quality Assurance Manual (BEQAM), Volume II. This encompasses documentation for equipment which serves a reactor trip function.

Nuclear Operations Procedure (NOP83A1) defines Pilgrim's Technical Group as responsible, when requested, for station evaluations of, among other externally generated information, Bulletins, Circulars, Service Information Letters, and Technical Information Letters.

We realize that there is an effort by GE (through the BWROG) and a NUTAC (see 2.1.3) on vendor interface which may require changes to our existing systems. We shall inform the NRC of plans for such changes, if necessary, after we have assessed what GE and the NUTAC have provided to us.

2.1.3 We are participating in the Nuclear Utility Task Action Committee (NUTAC) on vendor interface, which is expected to provide results and recommendations in February, 1984. We wish to review this material, assess what impact it has on current BECo programs and procedures, and develop appropriate commitments and schedules. Based on the NUTAC's February date, we shall provide our commitments and date of completion in April, 1984.

2.2.1.1 Components within systems classified as safety-related are themselves considered safety-related if they function in some capacity to assure (1) the integrity of the reactor coolant pressure boundary, (2) the capability to shut down the reactor and maintain it in a safe shutdown condition, or (3) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guideline exposure of 10CFR Part 100. This will henceforth be referred to as a safety-related function.

This criteria is applied as follows:

1. Civil Structures which are required to maintain their integrity to assure performance of a safety-related function are considered safety-related. This includes all elements of the structure which are essential to maintenance of its structural integrity. A safety-related structure may provide its assurance of safety either (a) directly (Reactor Building perimeter provides Secondary Containment), (b) indirectly through support of safety-related equipment

(specific block walls), or (c) indirectly through housing of safety-related equipment, such that failure of the structure could threaten the performance of a safety-related function (Main Control Room perimeter).

2. Mechanical piping and components which are considered safety-related have been and are designed and installed in accordance with Seismic Class I design requirements. This includes those systems or portions of systems which either directly serve a safety-related function or are in such close proximity to safety-related equipment that failure of the pressure boundary could potentially affect a safety-related function. For those Class I portions of the former type, the Functional Class I Breaks are clearly identified on Piping and Instrument Diagrams (P&ID's) and/or piping isometrics, whereas those Class I portions of the latter type are identified in piping isometrics (with notes on P&ID's to indicate that some portions are Class I). All mechanical piping and components determined to be Seismic Class I are designated as safety-related either passively (pressure boundary only) or actively. Also considered safety-related are the supports and hangers which provide the Seismic Class I protection.

3. For each mechanical component above that serves its safety-related function by actively responding to some electrical stimulus, the electrical assemblies critical to the performance of that safety-related function are considered safety-related. This includes such items as cables, penetrations, junction boxes, conduits, cable trays, panels (and associated internals), supports, and power supplies.

4. Power supplies to safety-related devices are traced back to the originating emergency supply (Battery, Diesel Generator) through applicable switchboards, transformers, switching and breaking devices (including controllers), Motor Control Centers, Distribution Panels, Special Local Control Panels, and all of the associated cables, junction boxes, etc. which are required to transmit power between these stations.

2.2.1.2 Operable safety-related SS&C's are identified in the PNPS Q-List. This list was originally developed by Bechtel from a criteria similar to that described in 2.2.1.1. In February, 1983, BECo completed an effort to verify the contents of the Bechtel-generated list against the latest approved engineering drawings and against the criteria of 2.2.1.1. This assured accuracy of the Q-List for completed plant design changes, as reflected in those engineering drawings. Plant design changes which have been implemented, but are not yet reflected on engineering drawings, and hence are not yet incorporated into the PNPS Q-List, are described in PDC packages which identify the work controls applicable to the associated SS&C's. These are dispositioned on a case-by-case basis. A system is now in effect to identify safety-related SS&C's on a Bill of Materials in the design phase of plant changes.

Validation of the results of the February, 1983 effort was made through independent review by representatives from each engineering discipline, Operations, Maintenance, and Quality Assurance prior to its release. Subsequent revisions are validated by independent and well-documented engineering reviews of requests for Q-List revision.

2.2.1.3 BEQAM, Volume II is applied to all activities affecting safety-related SS&C's. Activities falling within the scope of the QA Program categorically include: designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, training, and modifying. Any procedure, maintenance request, work order, purchase order, design change, or other document used to control one of the above activities is required by procedure to indicate either "Q" or "Non-Q" control of the applicable activity. Since safety-related SS&C's are identified in the PNPS Q-List, any activity associated with a Q-Listed item is designated as a "Q" activity and controlled appropriately in accordance with the QA Program work controls.

2.2.1.4 The Boston Edison Quality Assurance Program is defined in the Boston Edison QA Manual (BEQAM), Volume II, and applies to quality-related and quality assurance activities.

The BEQAM requires that structures, systems, and components designated as safety-related, and other items for which the Vice Presidents agree to use the QA Program management controls, be identified on the Q-List. The Q-List is the "information handling system" referred to in NUREG-1000. The BEQAM requires that the Q-List be established and maintained by the Nuclear Engineering Manager.

The Nuclear Engineering Manager implements this responsibility through NED Procedure 6.07, "Maintaining the Q-List." The Q-List is controlled, and the latest revision is distributed to the locations of use.

Three in-process checks are done by the Quality Assurance Department to ensure proper routine use of the Q-List.

1. Plant Design Change Review

The QAD reviews and approves all proposed plant modifications according to QAD Procedure 3.02, "Review of Plant Design Changes and Major Field Revision Notices." All changes are designated safety-related (Q), or non-safety-related (non-Q) according to the Q-List Classification of the system or component being modified.

The validity of the Q or non-Q designation is checked by comparing each system or component to be modified with the Q-List. Associated drawings, safety evaluations, and available procurement documents are also checked for consistent Q or non-Q designations.

The QAD is required to signify approval by signing the Plant Design Change or Major Field Revision Notice.

2. Procurement Document Review

The QAD reviews and approves all preliminary procurement documents according to QAD Procedure 4.01, "Review of Preliminary Procurement Documents Prepared by BECo." All procurement documents are designated Q or non-Q according to the Q-List classification of the item or end use of the service being purchased.

The validity of the Q or non-Q designation is checked by comparing each item or end use service application to be purchased with the Q-List.

The QAD is required to signify approval by signing the preliminary procurement document.

3. Maintenance Request Review

Currently, the Operations Quality Control (OQC) Group reviews all Maintenance Requests for work at Pilgrim Station under the BECo QA Program using QC instruction 5.01, Revision 1, "Quality Control Review of PNPS Maintenance Requests." A checklist is used to ensure proper review and classification of the work based on Station procedures and the PNPS Q-List.

The OQC Group does not review Maintenance Requests for work performed by contractors under their own BECo-approved QA programs.

In addition to the in-process checks, the QAD performs random surveillance inspections and periodic scheduled audits of all QA Program related activities. The preparation, validation, and routine use of the Q-List is within the scope of these inspections and audits. Details of these functions are as follows:

1. Periodic Audits

Planned periodic audits are performed to verify that procedures for preparation, validation, and routine use of the Q-List have been followed and are effective. These audits are performed by qualified personnel not having responsibilities in the areas being audited and using written checklists according to QAD Procedure 18.01. Audit results are documented and reviewed by management, and followup action on deficient areas is taken.

QA audits evaluate the entire Q-List update process to assure that:

- Required changes are forwarded to the Systems and Safety Analysis (S&SA) Group (via a DRN, Revision to "Q" Request (RQR), Plant Design Change Bill of Materials, etc.), which is responsible for maintaining the Q-List.

- An index is maintained by the S&SA Group of requested changes received.

- o Requested changes are reviewed and approved by appropriate personnel for inclusion in a Q-List revision.

- o The Q-List is updated, as required, to reflect approved Q-List changes.

- o The Q-List is controlled and distributed to required personnel.

2. Surveillance Inspections

Currently, surveillance inspections of various plant activities are performed by the OQC Group on a random, unscheduled basis in accordance with QAD Procedure 10.03 and QC Instructions 7.02 and 10.04. Checklists are generally not used. Selection criteria is not formalized expect as delineated in QAD Procedure 10.03. Surveillance inspection reports are issued to document these surveillances.

Based on recommendations from the NRC and INPO, a draft change to QAD Procedure 10.03 has been prepared to redefine the scope, purpose, and implementation of the surveillance (monitoring) function. The QAD Procedure will require that surveillances be scheduled and unscheduled, random and selective, and with sufficient detail to effectively monitor and report the conditions at PNPS. The surveillances are performed in support of, and as supplements to, audits and inspections to provide quality assurance coverage of station in-process activities. The scope of monitoring includes verification that procedures for preparation, validation, and routine use of the Q-List have been followed.

This expanded surveillance would be both planned (on a monthly basis), and unplanned (e.g., response to INPO SOER's, NRC I&E Information Notices and Circulars, and other relevant nuclear industry reports and information).

2.2.1.5 Attachment C provides a sample Production Order for the purchase of safety-related equipment.

2.2.1.6 The Boston Edison Nuclear Organization recognizes three levels of major classification, "Q", "non-Q" and 1/Q (See Attachment A, NOP8301, Section 5 for further definition). The "Q" designation applies to all safety-related equipment and activities. The PNPS Q-List identifies safety-related SS&C's at a level which does not recognize the classification of piece-parts within listed assemblies. These are generally dealt with on a case-by-case basis, however, the Organization recognizes a level within "Q" of those piece-parts which are not engineered for specific nuclear application and require no vendor-certified qualifications testing. These are designated as Commerical Quality Control Items and are specifically identified in a section of the Q-List. Quality Controls are being established in Specifications for these items.

2.2.2 Addressed above in our response to 2.1.3.

3.1.1 Plant maintenance at Pilgrim is done in accordance with the requirements of Procedure 1.5.3, "Maintenance Requests" and is tracked by the Maintenance Request (MR) form which reflects 1.5.3. This procedure is in accordance with ANSI 18.7 (1976).

The MR process incorporates a series of steps and check-offs prior to beginning maintenance. These steps are to ensure that the necessary disciplines (Operations, Maintenance, Quality Control, and Fire Protection, as necessary), may review the request and designate any steps or procedures necessary to satisfy existing requirements.

The specific issue of post-maintenance testing is determined by both the Maintenance Staff Engineer (MSE) and the Operating Supervisor (OS). The OS determines what tests are required prior to beginning work, for example, testing a redundant system prior to removing its duplicate for maintenance. The parameters for acceptance are contained in Technical Specifications or surveillance procedures.

The OS also determines what tests must be performed before the system can be returned to service. In some cases, where QC has indicated necessary during the MR review, QC must be notified prior to the performance of the test.

After the OS has made his determination, the Watch Engineer reviews the MR and, should the Watch Engineer disagree, the MR is returned to the OS for resolution prior to the start of work.

Post-maintenance testing other than for surveillance is determined by the MSE. This testing is to demonstrate that the maintained item performs in accordance with procedures or vendor information.

We believe this process allows appropriate determinations to be made by those most familiar with plant conditions at the time work will take place. We also believe this process adequately ensures appropriate post-maintenance testing; therefore we plan no further action at this time.

3.1.2 As part of our Performance Improvement Plan, we instituted a Procedure Update Program (PUP) for operations and maintenance procedures. The PUP is a one time effort. After completion of PUP, future revisions to procedures and Vendor Manuals are to be handled by existing organization procedures in an ongoing, timely manner. At this time, the PUP is ongoing, and is expected to be completed by October 31, 1984.

The PUP has been implemented using a systems approach, with work assigned and scheduled by the PNPS Operations Department Management. System procedure update priorities are determined by cognizant operations personnel based on their experience and knowledge of plant systems.

The inputs to this program are listed below:

- Plant Design Change Information
- 1.C.6 Independent Valve Verification Requirements

- o Operator Experience Feedback
- o Training Department Feedback
- o INPO Recommendations
- o Modification Management Group Feedback
- o Procedure Classification Changes (Safety-related or Non-safety related determination)
- o Vendor Manual Information

The vendor manual validation process is being incorporated into a Nuclear Organization Procedure. This NOP is in its review cycle and is expected to be emplaced by January 1, 1984.

We believe the PUP, while not specifically initiated in response to Generic Letter 83-28, satisfactorily addresses its concerns.

3.1.3 Surveillance frequencies contained in Pilgrim's Technical Specifications for both the Reactor Protection System and other systems were initially formulated using vendor information and established probability techniques.

As operating experience and new information has developed, we have amended the Technical Specifications, after careful review and with NRC concurrence, to emplace changes which would enhance safety.

We are considering an evaluation of relevant nuclear industry and Pilgrim failure rate data to assess appropriate actions concerning Technical Specification post-maintenance testing requirements.

3.2.3 Addressed above in 3.1.3.

3.2.1 Addressed above in our response to 3.1.1.

3.2.2 Addressed above in our response to 3.1.2.

3.2.3 Addressed above in our response to 3.1.3.

4.5 PNPS performs on-line functional testing of the reactor protection system, including independent testing of the diverse trip features. Initiating circuitry is tested in accordance with appropriate Technical Specification requirements. For this testing, the logic is checked from process parameter input through to the actuating device.

General Electric, through the BWROG, is reviewing the adequacy of existing surveillance and the periodic testing of Backup Scram Valves.

The results of this effort is expected in March, 1984. After reviewing GE's recommendations and results, we shall submit any appropriate actions and completion dates. Based on March, 1984 as our receipt from GE of their findings, we will submit our results in June, 1984.

The results of the BWROG may also indicate a need to change Technical Specifications, and we will assess such recommendations at that time. However, we wish to reinforce our response in 3.1.3 of this letter that our Technical Specifications is a "living" document which has been and continues to be refined by operating experience.

ATTACHMENT A

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Edison

NUCLEAR OPERATIONS PROCEDURE MANUAL

Title CONDUCT OF OPERATIONS

PROCEDURE NO. NOP8301

	DATE: 4/11/83	4/29/83	6/17/83
PREPARED:	[signature]	TMB	TMB
SUBMITTED: (Department Manager)	NA	NA	NA
CONCURRENCE: (QA Manager)	[signature] for HT Bowman	[signature]	HTB
APPROVAL: (VP Nuc Ops)	[signature]	TMB	TMB

Concur: JE Howard
Vice President Nuclear Engineering & QA

WD Harrington
Sr. Vice President - Nuclear

CONDUCT OF OPERATIONS

1.0 References

1.1 ANSI N18.7 - Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants.

1.2 Regulatory Guide 1.33 - Quality Assurance Program Requirements (operation).

2.0 General

Boston Edison Co. is responsible for assuring that the facility is operated within the requirements of the license, Technical Specifications, rules, regulations, and Orders of the NRC and for the actions of their employees.

The Watch Engineer has the authority and responsibility to direct all activities of Pilgrim Station that effect safe operation. Transfer of authority and responsibility to plant staff members above the Watch Engineer level shall be predetermined. Transfer of this authority and responsibility for routine shift turnover and emergency conditions shall be documented.

The safety and general welfare of employees, general public and the facility shall be of prime concern during the operational phase of Pilgrim Station. The watch engineer has the authority to shut the reactor down when, in his judgement, continued operation would jeopardize the health and welfare of the general public or the safety of plant equipment. In an emergency, any licensed operator has the same authority.

3.0 Shift Turnover

Shift turnover shall be diligently performed in a conscientious professional and thorough manner. As a minimum, shift turnover sheets are to be prepared by the off-going shift and information transferred to the on-coming personnel shall include:

- o status of Safety-systems
- o off-normal lineups
- o annunciator status
- o major work in progress
- o status of surveillance testing
- o planned operational activities including power maneuvers

Shift responsibility remains with the off-going personnel until the on-coming shift personnel have individually accepted, in writing, responsibility for their watch station.

Shift change should be a dedicated task. Other planned activities should be minimized during turnover.

4.0 Shift Records

Each operating station, e.g., watch engineer, shift supervisor, control room operator, shift chemist, shift HP, shall keep a journal or log of the significant activities of their operating station. These shall be reviewed frequently by appropriate managers.

Shift records such as operating log books, data sheets, check lists, recorder charts, computer printouts, and maintenance requests that describe or record operating information and actions must be legible, accurate, complete and understandable.

When these records require correction, a single line shall be drawn through the incorrect data in a manner such that it will not be obliterated. The correct data will be in a space adjacent to the lined out data along with the date and initials of the person making the correction.

5.0 Control and Status of Plant Systems and Equipment

Measures shall be established and implemented to assure that:

- Only licensed operators are permitted to manipulate the controls that directly affect reactivity (10CFR50.54 (i))

- Licensed operators are required to be present at the controls at all times during the operation of the facility (10CFR50.54 (k))

- Operation of mechanisms and apparatus other than controls which may indirectly affect the power level or reactivity of a reactor shall only be accomplished with the knowledge and consent of an operator licensed in accordance with Part 55 (10CFR50.54 (j))

- A licensed senior operator shall be present at the facility or readily available on call at all times during its operation, and shall be present at the facility during initial startup and approach to power, recovery from an unplanned or unscheduled shut-down or significant reduction in power, and refueling or as otherwise prescribed in the facility license (10CFR50.54(m)).

- *Reasonable action that departs from a condition of the License/ Technical Specifications may be taken in an emergency when such action is immediately needed to protect the public health and

*Revision

safety and no action consistent with License/Technical Specification conditions that can provide adequate or equivalent protection is immediately apparent. Prior to taking these permitted actions (which may be contrary to License/Technical Specification conditions) approval, as a minimum, shall be by a licensed senior operator (10CFR50.54 (x),(y)).

*Notification of protective actions taken in accordance with 10CFR 50.54 (x) and (y), shall be made to the NRC Operations by telephone. When time permits, the notification must be made before protective action is taken; otherwise, the notification must be made as soon as possible thereafter (10CFR50.72(c)).

- The NRC licensed individual shall observe all applicable rules, regulations and orders of the Commission, whether or not stated in the license (10CFR55.31 (d))

NRC licensed individuals are responsible for taking timely and proper actions so as not to create or cause a hazard to "safe operation of the facility" (i.e. actions or activities, including failure to take action, related to the facility which would have an adverse affect on the health and safety of the public, plant workers or the individuals).

NRC licensed individuals shall comply with the requirements pertaining to the operation of the facility and manipulation of its controls and with radiation safety procedures implementing 10CFR20.

The status of plant systems and equipment shall be continuously monitored. Monitoring methods and techniques employed at Pilgrim include, but are not limited to personnel tests/inspections/examinations, annunciations, indicating lights, indicators, recorders and CRT/computer.

Measures shall also be established for indicating the operating status of structures, systems, and components of the station.

Operators shall have confidence in the instrument readings/annunciations and response to these indications are to be as specified in the applicable procedure/instruction. Should the indication not meet specified operating parameters, or be suspect for any reason, an alternate means of monitoring should be implemented until such time as the adverse, or suspected adverse condition is rectified. In the unique event that alternate means is not available, the most conservative value is to be assumed.

*The station systems, structures, and components are divided into three categories. These are Q, non-Q, and 1/Q. A list for Q systems, structures, and components is provided as defined by the BEQAM.

A second list is provided by the Station Manager and is the 1/Q list. The remainder of the systems, structures, and components are non-Q and are not specifically listed.

*Modification is any change to a station system, structure, or component that requires a change to a controlled design document. A modification for Q and non-Q can only be implemented by an approved design change or Temporary Modification.

*Maintenance is the act of maintaining, i.e., keeping the existing state of repair, efficiency, and quality. Maintenance for Q and non-Q can only be implemented by an approved Maintenance Request (MR).

*For 1/Q systems, structures, and components, any level of quality is sufficient if the system, structure, or component is capable of performing its intended function and the modification and maintenance work controls specified herein do not apply.

*Permission to release any system or equipment for maintenance or testing shall be given by the SRO in charge of the watch. The granting of the permission shall be documented. Prior to granting release of equipment, a determination shall be made to assure that equipment or a system may be released, how long it may be released, and what functional testing of redundant system is required prior to and during the out-of-service period. Upon completion of such activity or, when a change in the scope of such activity is contemplated, the SRO in charge of the watch shall be notified.

*Equipment removed from service for maintenance will be identified by tags. The tags will be placed at locations where the equipment could be operated. Tags may only be placed by qualified individuals from the group responsible for the operation of the equipment. Tags placed on control room components shall be placed so as not to obstruct instruments, controls or indicating lights. Equipment released for testing or returned to service after testing need not be so identified. The test status of equipment (i.e., when the last test was performed or when next test is to be performed) will be identified in plant surveillance records.

*Temporary modifications shall be identified by tags placed at the location of the modifications. Current status of temporary modifications shall be maintained in a log. Installation or removal of temporary modifications shall be verified (see Note (1) next page) by a second person having knowledge in the system being modified or by a functional test which will prove the installation or removal.

*All Q-listed equipment which has failed required tests or lacks documentation attesting to its operability will be identified as being deficient and logged in the Control Room logbook and/or the

Operators Shift Turnover sheet. When Q-listed equipment is lacking proper documentation, it is considered to be inoperable unless otherwise resolved under the guidance of the BECo QA Manual.

Technical Specifications Action Statements are entered when items required to be operable by limiting conditions for operation are known to be inoperable. Items may be determined inoperable (1) during use, (2) during a surveillance test, or (3) when surveillance requirements are not performed within the specified time intervals (after applying the allowable tolerance). Action Statements are entered under item (3) when the surveillance requirements should have been performed rather than at the time it is discovered that tests were not performed.

*When an ECCS, ECCS Subsystem, RPS or Primary Containment Isolation System is placed back into service after maintenance or testing has been performed, an independent verification (see Note (1) below) that equipment has been placed in its proper configuration shall be made by a qualified person. All station system alignments will be verified prior to startup after each refueling outage. In addition to this, all ECCS, PCIS and RPS will be verified independently by a second qualified person. A qualified person is defined as a person who would be qualified to perform the initial component alignment.

*Note (1):

Independent verifications may be performed by:

a. Direct method - checking appropriate equipment and/or controls.

or,

b. Indirect method - observation of indicators and/or status lights.

*An independent verification need not be performed if a person has the potential of receiving greater than 25 mrem whole body while performing the verification.

The status of safety-related (Q-List) systems shall be maintained at all times, and abnormal system alignment should be avoided except when absolutely necessary.

6.0 Unit Trips/Reactor Shutdown

All unit trips shall be thoroughly investigated, and a report prepared and submitted to the Station Manager. Cause of the trip shall be determined, and means to preclude repetition shall be implemented. Likewise, challenges to safety systems and personnel errors are to be investigated and corrective action implemented to prevent recurrence.

Personnel actions responsible for unit trips, reduced capacity factor, reportable occurrences, and actions taken outside of plant

*Revision

instructions or Technical Specifications shall be thoroughly investigated and reported to the Station Manager. Personnel, whose flagrant, careless, or repetitive erroneous actions shall be subject to disciplinary action.

When a condition exists that the reactor must be shutdown in order to comply with the station license (PNPS Technical Specification), actions shall be initiated so that the specified condition is attained within the prescribed time period.

The cause of a scram or an unexplained power reduction must be investigated and determined before the reactor is returned to power. Following any scram for which the cause cannot be determined quickly and without reasonable doubt, the Chief Operating Engineer or the Day Watch Engineer shall proceed to the site and take charge of the investigatory process until such time as the cause of the scram is known.

Essential in the investigation process is the encouragement of employees to reveal their specific actions at the time of the unit trip or shutdown. Disciplinary action shall be tempered when forthrightness is evident in the investigation.

Operating personnel shall be encouraged to express their concern or suggestions on how to improve performance whether it be from a viewpoint of safety, hardware, or personnel duties and responsibilities.

Permission to startup the reactor and the systems required for power operation, or to shut the reactor down for planned maintenance or refueling, will be issued by the Station Manager or his designated alternate.

7.0 Instructions, Procedures, Drawings

The use of procedures shall comply with the Tech. Specs. and with Reg. Guide 1.33.

Instructions, procedures or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Adherence to procedures is an essential ingredient of good station performance and configuration control. Adherence recognizes that procedures are not blindly followed without exercising good judgment. Individuals must recognize when adherence to procedures will result in degrading conditions and in emergencies take appropriate action utilizing their knowledge and judgment. In these instances the individual should seek help and advice and whenever time permits the procedure must be changed or, if one does not exist, a procedure must be provided. In all cases where evolutions were performed without a procedure or deviations from a procedure were performed, the event shall be evaluated by appropriate levels of management.

8.0 Temporary Procedures (TPs)

Approved temporary procedures may be issued to direct operations during testing, refueling, maintenance and modifications. These are necessary to provide guidance in unusual situations not within the scope of the normal procedures and to ensure orderly and uniform operations for short periods when the plant, a system or a component of a system is performing in a manner not covered by existing detailed procedures or has been modified or extended in such a manner that portions of existing procedures do not apply. Temporary procedures shall include designation of the period of time during which they may be used and shall be subject to the appropriate review process. These TPs are reviewed and approved in the same manner as permanent PNPS procedures or as temporary changes to procedures.

9.0 Temporary Changes to Procedures (SRO changes)

Temporary changes to procedures may be appropriate when immediate implementation is necessary. These "SRO changes" are allowed providing 1) the intent of the original procedure is not altered and 2) the change is approved by two members of the plant management staff, one of whom holds a Senior Reactors Operator's (SRO) license.

These "SRO changes" shall be administratively controlled so as to allow for proper reviews, within a specific time frame, subsequent to implementation.

10.0 Control Room Work Atmosphere

Strict discipline and attendance to instruments and alarms as well as proper behavior shall be exercised in the Control Room at all times. Non-technical material and audio/video entertainment devices are not permitted in the Control Room. Eating is permitted only if it does not detract from attendance of the controls, and is limited to those positions which must remain in the Control Room due to license requirements or operational considerations.

The Watch Engineer is responsible for overall Control Room Supervision. Access to the Control Room shall be limited to persons who have a need or requirement to be there. Examples are as follows:

- Persons required to perform duties in the Control Room.
- Persons who provide technical support to Operations.
- Persons who are required during emergencies.
- Persons requiring authorization for tests, maintenance, or monitoring.

Operators shall be cognizant of changes in instrument indications and annunciations that detect abnormal conditions or changes in equipment performance. Logged parameters should be compared to previous readings to detect any trends in equipment performance.

11.0 Communications

All communications, both verbal and written, shall be clear and precise.

All verbal communications of a directive nature (i.e., verify valve position, re-position valves, etc.) shall be repeated back by the receiver to the sender prior to the directions being carried out. If the directions are complex or involve more than a routine evolution, the receiver shall be required to write the directions down and repeat them back to the sender.

The text of written communications shall contain only essential information and shall be factual, specific, concise, comprehensive, and nonambiguous. It shall be clearly worded as to be readily understandable by personnel responsible for the described activity.

12.0 Behavior Observation

Supervisors shall be aware of and observe employees and contractors for aberrant behavior, including argumentative hostility toward authority, irresponsibility, poor reaction to stress, and suspicion of being under the influence of alcohol or drugs while on Company property.

A Continual Behavior Observation Training brochure/package will be prepared by the Nuclear Training Department and provided to supervisors so as to give them guidance on situations to be aware of and what actions to take. As a minimum, the following two basic situations/actions will be addressed:

12.1 Situation #1

A change in personality or behavior is noted where there is no immediate threat of changes.

Action:

- Call the situation to the attention of the Station Manager.
- The Station Manager should then discuss the situation with the VPNO and the Medical Department.

12.2 Situation #2

An individual displays a significant degree of aberrant behavior that is considered to be a threat to plant or personal safety.

Action:

- Ensure that the individual will cause no harm to himself/herself, others or equipment by talking with them and if necessary subduing them.

- Request Security Assistance.

- Arrange for transportation to the hospital.

- Notify Station Manager.

- The Station Manager should notify the VPNO and the Medical Department.

*13.0 Overtime Guidelines

In an effort to prevent situations where fatigue could reduce the ability of operations personnel to keep the reactor in a safe condition, the following guidelines has been adopted in regards to shift staffing and the use of overtime:

o Adequate shift coverage should be maintained without routine heavy use of overtime.

o An individual should not be permitted to work more than 16 hours straight (excluding shift turnover time).

o An individual should not be permitted to work more than 16 hours in any 24-hour period, nor more than 24 hours in any 48-hour period, nor more than 72 hours in any seven day period (all excluding shift turnover time).

o A break of at least eight hours should be allowed between work periods (including shift turnover time).

o The use of overtime should be considered on an individual basis and not for the entire staff on a shift.

Recognizing that unusual circumstances may arise requiring deviation from these shift staffing overtime guidelines, such deviation shall, as a minimum, be authorized by the Station Manager. The primary consideration in such authorization shall be that significant reductions in the effectiveness of operating personnel would be highly unlikely.

*Revision

ATTACHMENT B

APPENDIX 2

GEPAC 4020 I/O LIST

ANALOG INPUTS

DIGITAL INPUTS

ANALOG INPUTS (0-160mv)

SIGNAL	NO. OF SIGNALS	POINT ID
LPRM Level	120	A000-A119
APRM Level	6	B000-B005
RBM A&B	2	B006-B007
TIP Level, A-D	4	B008-B011
Reactor Pressure	1	B013
Reactor Core Pressure Drop	1	B014
Total Jet Pump Flow (Core Flow)	1	B015
Recirculation Drive Flow, Loops A1,A2,B1,B2	4	B016,B038,B039,B060
Control Rod Drive System Flow	1	B017
Reactor Feedwater Inlet Flow, A&B	2	B018, B019
Cleanup FLow, A & B	2	B020, B021
Recirculation Pump Motor Power A&B	2	B022, B023
Reactor Water Level	1	B024
Reactor Outlet Steam Flow	1	B025
Cleanup System Temp, inlet & outlet	2	B026, B027
Reactor Feedwater Inlet Temp., A1,A2,B1,B2	4	B028-B031
Recirculation Inlet Temp., Loops A1,A2,B1,B2	4	B052-B055
Main Transformer Hot Spot Temp.	1	E001
Aux. Transformer Hot Spot Temp., 1&2	2	E002, E003
Startup Transformer Hot Spot Temp., 1&2	2	E004, E005
Shutdown Transformer Hot Spot Temp.	1	E006
345 Kv Switchyard 1, Line 342 V,A,W,VAR	4	E007-E010
345 Kv Switchyard 1, Line 355 V,A,W,VAR	4	E011-E014
Isolated Phase Bus Air Temp.	1	E015
Recirc. Pump Motor Winding Temp., 1&2	2	E016, E017
Recirc. Pump M-G Set Winding Temp., 1&2	2	E018, E019
Drain Cooler Temp., Drain A,B	2	F000, F001
Condensate Demin. Diff. Pressure	1	F002
Steam Seal Header Pressure	1	F003
Gland Seal Condenser Pressure	1	F004
Reactor Bldg. Vent Exhaust Diff. Press.	1	F005
Barometric Pressure	1	F006
Reactor Feedpump Suction Press.	1	F007
Reactor Feedpump Discharge Press., A,B,C	3	F008-F010
Condensate Pump Discharge Header Press.	1	F011
Condenser pressure, west & east	2	F012, F013
Feedwater Heater Extraction Press 1A-5A,1B-5B	10	F014-F023
Air Ejector Offgas Flow	1	F024
Makeup Water Flow To Demin. Water Storage Tank	1	F025
Radwaste Chemical Waste Tank Level, A&B	2	F026, F027
Reactor Bldg. Closed Cooling Water Flow, A&B	2	F028, F029
RHR Cooling Water Flow, A&B	2	F030, F031
RHR Water Flow, A&B	2	F032, F033
Ejector Condensate Outlet Temp.	1	F034
Drain Cooler A-B Inlet Temp.	1	F035
Gland Seal Condensate Outlet Temp.	1	F038
Sea Water Inlet Temp., 1-1 & 1-2	2	F039, F040
Sea Water Outlet Temp., 1W,2W,3E,4E	4	F041-F044
Condenser Hotwell Outlet Temp., east & west	2	F045-F046
Heater Inlet Temp. (E&W), 1st-5th points	10	F047-F056

ANALOG INPUTS (0-160mv)

SIGNAL	NO. OF SIGNALS	POINT ID
Heater Outlet Temp. (E&W), lst & 3rd points	4	F057-F060
Heater Drain Temp. (Train A&B), lst-5th points	10	F061-F070
Reactor Bldg. CCW Serv. Water Inlet Temp. A&B	2	F071-F072
Reactor Bldg. CCW Serv. Water Outlet Temp. A&B	2	F073-F074
Reactor Bldg. CCW Heat Exch. Inlet Temp, A&B	2	F075-F076
Reactor Bldg. CCW Heat Exch. Outlet Temp, A&B	2	F077-F078
RHR CW Inlet Temp., A&B	2	F079, F080
RHR CW Outlet Temp., A&B	2	F081, F082
RHR Water Inlet Temp. to Heat Exch. A&B	2	F083, F084
RHR Water Outlet Temp., Heat Exch. A&B	2	F085, F086
Sea Water Pump Level, A&B	2	F087, F088
Radwaste Disch. Heat Tracing Flow	1	F089
Reactor Feedwater Diff. Press., A&B	2	F092, F093
Generator Voltage	1	G000
Generator Stator Current, Phase A,B,C	3	G006-G008
Main Transformer Net Amps	1	E000
Generator Gross Power	1	B012
Generator H_2 Seal Oil Temp.	1	G002
Generator Field Voltage	1	G004
Generator Field Amps	1	G005
Generator VARs	1	G001
Generator Stator Temp., Phase A,B,C	3	G009-G011
Stator Cooling Header Inlet Temp.	1	G012
Stator Cooling Header Outlet Temp.	1	G013
Generator Collector Air Inlet Temp.	1	G014
Generator Collector Air Outlet Temp.	1	G015
Alterex Stator Winding Temp., 1-3	3	G016-G018
Alternator Air Inlet & Outlet Temp., Point 1	2	G019, G020
Diesel-Generator Winding Temp., 1&2	2	G022, G023
Alterex Diode Cooling Water Outlet Temp.	1	G024
Reactor Feedpump MOtor Winding Temp., 1,2,3	3	G025-G027
Condensate Pump Motor Winding Temp., 1,2,3	3	G028-G030
Sea Water Pump Motor Winding Temp., 1&2	2	G031, G032
Ejector Radication Monitor	1	M000
Stack Gas Radiation Monitor	1	M001
Radwaste Discharge Radiation Monitor	1	M003
Radwaste Disch. to Circulating Water PH	1	M004
Reactor Bldg. Vent. Exhaust Temp.	1	M005
Reactor Bottom Head Water Temp.	1	M077
Relief Valve Temp. for Leak Detection	6	M006-M010,M078
Drywell Containment Temp., 1-7	7	M011-M017
Suppression Chamber Temp., Points 1,2,3	3	M018-M020
Drywell Containment Dew Point, 1-7	7	M021-M024,M065-M067
Reactor Vessel Metal Temp., 1-8	8	M025-M032
Plant Heating Steam Flow	1	M033
Pressure Torus - Torus Reference Vessel	1	M034
Pressure Drywell - Drywell Reference Vessel	1	M035
Reactor Feedwater Conductivity, A&B	2	M037, M048
Reactor Feedwater PH, A&B	2	M038, M049
Reactor Feedwater Turbidity, A&B	2	M039, M080
Condensate Demin Water to FW Heaters O_2 Content	1	M036

ANALOG INPUTS (0-160mv)

SIGNAL	NO. OF SIGNALS	POINT ID
Wind Direction	1	M040
Wind Velocity	1	M041
Reactor Bldg. CCW Serv. Water Flow, A&B	2	M042, M043
Generator H_2 Pressure	1	M044
Radwaste Disch. Flow to Circ. Water Disch., A&B	2	M045, M046
Total Condensate Flow	1	M047
Reference Vessel Metal Temp., 1-8	8	M050-M057
Ambient Temp.	1	M058
Offgas Temp.	1	M064
Suppression Chamber Dew Point, 1-3	3	M068-M070
Suppression Chamber Level	1	M071
Radwaste Monitoring Tank Level, Tanks A,B,C	3	M072-M074
Refueling Floor Vent. Exh. Rad. Mon.	1	M079
Turbine Steam Pressure	1	T000
Turbine First Stage Pressure	1	T001
Low Pressure Turbine Inlet Press., 1-4	4	T002-T005
Turb.-Gen. Oil Temp. to Cooler	1	T006
Turb.-Gen. Oil Temp. from Cooler	1	T007
Reactor Feedpump Bearing Temp., 1,2,3	9	W000-W008
Reactor Feedpump Motor Temp., 1,2,3	6	W009-W014
Condensate Pump Motor Temp., 1,2,3	6	W015-16,W018-19,W021-22
Condensate Pump Motor Thrust Brg. Temp., 1,2,3	3	W017,W020,W023
Sea Water Pump Motor Temp., 1&2	4	W024,W025,W027,W028
Sea Water Pump Motor Thrust Brg. Temp., 1&2	2	W026, W029
Control Rod Drive Pump Motor Temp., 1&2	4	W030, W033
Turbine Bearing Temp.	2	W034-W037
Turbine Thrust Bearing Drain Temp.	2	W038, W039
Turbine Generator Oil Drain Temp., 1-8	8	W040-W047
Alterex Oil Drain Temp.	2	W048, W049
Recirculation M-G Set Motor Bearing Temp., A&B	4	W050-W053
Recirculation M-G Set Gen. Bearing Temp., A&B	4	W054-W057
Recirc. M-G Set Impeller/Runner Brg. Temp., A&B	8	W058-W065
Recirc. Pump Motor Thrust Brg. Temp., A&B	2	W066, W067
Recirc. Pump Cavity Seal Temp., A&B	4	W068-W071

DIGITAL INPUTS (CONTACTS except *)

SIGNAL	NO. OF SIGNALS	POINT ID
Steam Line High Flow, A,B,C,D	4	D558-D561
Steam Line Leak Detection, A,B,C,D	4	A504-A507
Scram Discharge Volume Not Drained	1	A515
Refueling Interlock	1	A516
Control Rod Timer Malfunction	1	A517
Rod Out Block	1	A542
RPIS Inoperative	1	A558
Rod Drift Alarm	1	A546
Rod Selected and Driving	1	A547
Control Rod Withdrawal	1	A548
RWM Block	1	A518
SRM Detector Retracted	1	A519
SRM High Count	1	A520
SRM Inoperative	1	A521
IRM Detector Not in Full Position	1	A522
IRM Downscale	1	A523
IRM Inoperative	1	A524
IRM High Flux	1	A525
SRM Bypassed	1	A533
IRM Bypassed	1	A534
IRM Flux Trip Hi-Hi, A-H	8	A550-A557
APRM Downscale	1	A526
APRM High Flux	1	A527
APRM Inoperative	1	A528
Flow Converter Upscale/Inoperative	1	A529
RBM Downscale	1	A530
RBM High Flux	1	A531
RBM Inoperative	1	A532
APRM Bypassed, A-F	6	A535-A540
RBM Bypass	1	A541
Flow Converter Comparator ALarm	1	A543
APRM Flux Hi-Hi, A-F	6	D544-D549
Rod Sequence Select, A&B	2	A549-A550
Shutdown Margin Select	1	A551
RWM Operating	1	A552
Low Power Level Alarm	1	A556
Low Power Level Set Point	1	A557
System Diagnostic	1	A561
RWM Rod Select Permissive Echo	1	A553
RWM Rod Withdraw Permissive Echo	1	A554
RWM Rod Insert Permissive Echo	1	A555
Disch. Vol. High Water Level Scram Trip, A-D	4	D500-D503
Condenser Low Vacuum, A-D	4	D504-D507
Isolation Value Not Fully Open, A-D	4	D508-D511
Drywell High Pressure, A-D	4	D512-D515
Reactor High Pressure, A-D	4	D516-D519
Reactor Water Low Level, A-D	4	D520-D523
Steam Line High Radiation, A-D	4	D524-D527
Reactor Neutron Mon. Trip, A-D	4	D528-D531
Reactor Scram, A,B	2	D534,D535
Stop Valve Closed, A-D	4	D536-D539

DIGITAL INPUTS (CONTACTS except *)

SIGNAL	NO. OF SIGNALS	POINT ID
T-G Load Rejection Scram Trip, A-D	4	D540-D543
Reactor Manual Scram, A,B	2	D532, D533
Reactor Full Scram	1	D562
Generator Differential Trip	1	D580
Generator Neutral Overvoltage Trip	1	D582
Generator Negative Sequence Overcurrent Trip	1	D583
Generator Loss of Field Trip	1	D584
Generator Overcurrent Distance Trip	1	D586
Gen. Startup Overcurrent and Overvoltage Trip	1	D587
Unit Differential Trip	1	D581
Aux. Transformer Differential Trip	1	D588
Aux. Transf. Ground Overcurrent Trip	1	D589
Aux. Transf. Overcurrent Trip	1	D590
Generator Overexcitation	1	D585
Startup Transf. DIfferential Trip	1	D591
Startup Transf. Ground Overcurrent Trip	1	D592
Startup Transf. Overcurrent Trip	1	D593
Generator Startor Coolant Trip	1	D594
Thrust Bearing Wear Trip	1	D595
Vaccuum Trip, 1,2	2	D596, D597
Emerg. Turbine Manual/Overspeed Trip	1	D598
Reactor High Water Level Trip	1	D599
Closed Turbine Valves Generator Protection	1	D600
Moisture Separator High Level, Tank A-D	4	D601-D604
*Main Generator Watt-Hour Gross Output	1	Y503
*Main Transformer Watt-Hour Net Output	1	Y504
Refueling Floor Vent. Exhaust Radiation	1	D607
Main, Aux., Startup Transf. and Gen. Watt-Hr.	30	E504-E533
Loss Generator Potential Transf., 1,2	2	E500, E501
Loss Main and Startup Transf. Pot. Transf.	2	E502, E503
Condensate Demin Effluent Strainer Diff Press Hi	1	F500
Condensate Demin Regeneration Trouble	1	F501
Condensate Demin Exhausted	1	F502
Condensate Demin Effluent Conductivity Hi	1	F503
Cleanup Sludge Rec. Tank Level Hi, Tanks 1&2	2	F504, F505
Cleanup Backwash Rec. Tank Level Hi/Low	2	F506
Condensate Pump 1,2,3	3	F508-F510
Reactor Feedpump 1-1, 1-2, 1-3	3	F511-F513
Sea Water Pump 1-1, 1-2	2	F514, F515
Makeup Demin. Anion Regen Tank D Cond. Hi	1	F516
Makeup Demin. Mixed Bed Disch. Cond. Hi	1	F517
Radwaste Clean Waste Tank A,B Level Hi/Low	4	M510-M513
Radwaste Trtd Wtr Holdup Tank A-D Level Hi/Low	8	M514-M521
Torus and Drywell Abs. Press.	19	M540-M558
Instrument Servo Motor Disabled	1	M562
Drywell or Suppression Chamber Status	2	M560, M561
Control Rod Selected	8	Z500-Z507
Control Rod Position	10	Z508-Z517
TIP Machine Ready A-D	4	A562-A565
TIP Guide Tube LSD, A-D	4	Z518,Z522,Z526,Z530

DIGITAL INPUTS (CONTACTS except *)

SIGNAL	NO. OF SIGNALS	POINT ID
TIP Tube Address, A-D	4	Z519,Z523,Z527,Z531
TIP Machine, A-D		Z520,Z524,Z528,Z532
TIP MSD, A-D	4	Z521,Z525,Z529,Z533
*TIP Core Top	1	Y500
*TIP Core Position	1	Y501

* Pulse data signal

Attachment C

PRODUCTION ORDER NO. 3277

TRANSACTION 10

WITHDRAWAL REQUISITION NO. _____

DEPT. CODE 68

A PRODUCTION ORDER WAS ISSUED FOR THE MATERIAL WANTED ☒ YES

REQUISITION DATE _____ 19____

FOR Boston Edison Co. NUCLEAR ENGINEERING DEPT.

PROD. ORDER DATE May 23, 1983

ADDRESS RFD #1 ROCKY HILL RD PLYMOUTH, MASS 02360

APPROVED BY S. Da Silva

WITHDRAWAL APPROVAL _____ EMP NO. X2216

ENGINEER D.P. Richard

ESTIMATED COST $50,000

QQC NO. _____

AUTH NO. 80580

USING DEPT - INSERT BELOW WHEN AND WHERE MATERIAL WILL START TO BE REQUISITIONED FROM STORES

DEPT. DATE Sept. 23, 1983

LOCATION Plymouth

CONTROL NO. _____

DATE REC'D _____

U.C.C. #1☐ #2☐ #3☐ #4☐

ITEM NO.	QUANTITY WANTED	UNIT	MATERIAL LOCATION	REFERENCE	DESCRIPTION USE SEPARATE ATTACHED SHEETS FOR DETAIL ORDERING SPECIFICATIONS PLEASE PRINT	STOCK SYMBOL	LOC.	QUANTITY ISSUED	WORK ORDER SERIAL	ACCOUNT CODE	SUB CODE	COST AREA
1	32	ea			Provide the 32 Nuclear Safety Related-Quality Category "Q" RTD assemblies specified on the attached data sheets, (Attachment 1). The RTD assemblies are to be qualified in accordance with IEEE 323-1974 and 344-1975 as depicted in the Weed Instrument Co. Test Plan/Procedures Numbers 548-8854-2-A, 548-8854-2-B, 548-8854-2-C, 548-8854-2-D, & 548-8854-2-E. The assemblies are to be qualified using Weed Co. conduit sealant, part no. 0102-004-0012. The Test Report indicating the qualified life of the RTD's is to be submitted for Boston							

QA REVIEWED QA RESULTS ATTACHED 5/25/83

STOCK DIVISION BECo. Form 3659

COUNTED AND ISSUED BY:

SIGNED _____ EMP. NO. _____

ABOVE SHIPPED ON TEAMING TICKET

NO. _____ DATE _____ 19____

RECEIVED THE ABOVE

SIGNED _____ EMP. NO. _____

DATE _____ 19____

PRODUCTION ORDER NO. 3299

TRANSACTION 10

A PRODUCTION ORDER WAS ISSUED FOR THE MATERIAL WANTED ☒ YES

WITHDRAWAL REQUISITION NO. _____

DEPT. CODE _____

REQUISITION DATE _____ 19____

FOR _____

PROD. ORDER DATE _____ 19____

ADDRESS _____

APPROVED BY _____

WITHDRAWAL APPROVAL _____ EMP NO. _____

ENGINEER _____

ESTIMATED COST _____

OQC NO. _____

AUTH. NO. _____

USING DEPT - INSERT BELOW WHEN AND WHERE MATERIAL WILL START TO BE REQUISITIONED FROM STORES

DEPT. _____

DATE _____

LOCATION _____

CONTROL NO. _____

DATE REC'D _____

U.C.C. #1☐ #2☐ #3☐ #4☐

ITEM NO.	QUANTITY WANTED	UNIT	MATERIAL LOCATION	REFERENCE	DESCRIPTION USE SEPARATE ATTACHED SHEETS FOR DETAIL ORDERING SPECIFICATIONS PLEASE PRINT	STOCK SYMBOL	LOC.	QUANTITY ISSUED	WORK ORDER SERIAL	ACCOUNT CODE	SUB CODE	COST AREA
					Edison's approval. This purchase order is contingent upon the Test Report being accepted by Boston Edison.							
					Shipping Requirements: Shipping, packaging, handling, and storage shall be in accordance with level B of ANSI N45.2.2.							
					Cleaning Requirements: The level of cleanliness of all RTD's shall meet the criteria set forth by ANSI-N45.2.1, Class B.							
					Identification Requirements: Each assembly shall have a stainless steel name tag securely attached to							

STOCK DIVISION BECo Form 3659

COUNTED AND ISSUED BY:

SIGNED _____ EMP. NO. _____

ABOVE SHIPPED ON TEAMING TICKET

NO. _____ DATE _____ 19____

RECEIVED THE ABOVE

SIGNED _____ EMP. NO. _____

DATE _____ 19____

PRODUCTION ORDER NO. 3297

TRANSACTION 10

WITHDRAWAL REQUISITION NO. _____

DEPT. CODE _____

A PRODUCTION ORDER WAS ISSUED FOR THE MATERIAL WANTED ☒ YES

REQUISITION DATE _____ 19__

FOR _____

PROD. ORDER DATE _____ 19__

ADDRESS _____

APPROVED BY _____

WITHDRAWAL APPROVAL _____ EMP NO. _____

ENGINEER _____

ESTIMATED COST _____

OQC NO. _____

AUTH. NO. _____

USING DEPT - INSERT BELOW WHEN AND WHERE MATERIAL WILL START TO BE REQUISITIONED FROM STORES

DEPT. _____

DATE _____

LOCATION _____

CONTROL NO. _____

DATE REC'D _____

U.C.C. #1☐ #2☐ #3☐ #4☐

ITEM NO.	QUANTITY WANTED	UNIT	MATERIAL LOCATION	REFERENCE	DESCRIPTION USE SEPARATE ATTACHED SHEETS FOR DETAIL ORDERING SPECIFICATIONS PLEASE PRINT	STOCK SYMBOL	LOC.	QUANTITY ISSUED	WORK ORDER SERIAL	ACCOUNT CODE	SUB CODE	COST AREA
					it which is embossed with the Instrument No. indicated on the applicable data sheet. Lettering shall be at least 1/4 inch in size and visible after the assembly is installed.							
					Documentation Requirements:							
					1. One set of dimensional and electrical reproducible drawings shall be submitted for Boston Edison's approval before fabrication.							
					2. Four sets of instruction manuals, including details of installation, operation, preventative maintenance and maintenance shall be submitted to Boston Edison upon drawing approval. Handling							

STOCK DIVISION BECo. Form 3659

COUNTED AND ISSUED BY:

SIGNED _____ EMP. NO. _____

ABOVE SHIPPED ON TEAMING TICKET

NO. _____ DATE _____ 19__

RECEIVED THE ABOVE

SIGNED _____ EMP. NO. _____

DATE _____ 19__

PRODUCTION ORDER NO. 3299

TRANSACTION 10

A PRODUCTION ORDER WAS ISSUED FOR THE MATERIAL WANTED ☒ YES

WITHDRAWAL REQUISITION NO. _____

DEPT. CODE _____

REQUISITION DATE _____ 19____

FOR _____

PROD. ORDER DATE _____ 19____

ADDRESS _____

APPROVED BY _____

WITHDRAWAL APPROVAL _____ EMP NO. _____

ENGINEER _____

ESTIMATED COST _____

OOC NO. _____

AUTH. NO. _____

USING DEPT - INSERT BELOW WHEN AND WHERE MATERIAL WILL START TO BE REQUISITIONED FROM STORES

DEPT.

DATE _____

LOCATION _____

CONTROL NO. _____

DATE REC'D _____

U.C.C. #1☐ #2☐ #3☐ #4☐

ITEM NO.	QUANTITY WANTED	UNIT	MATERIAL LOCATION	REFERENCE	DESCRIPTION USE SEPARATE ATTACHED SHEETS FOR DETAIL ORDERING SPECIFICATIONS PLEASE PRINT	STOCK SYMBOL	LOC.	QUANTITY ISSUED	WORK ORDER SERIAL	ACCOUNT CODE	SUB CODE	COST AREA
					and storage requirements shall also be included.							
					3. The Qualification Test Report is to be submitted upon placement of the purchase order. A Certificate of Compliance is to be provided to this report with each shipment of equipment.							
					The equipment is to be supplied by:							
					Weed Instrument Co., Inc.							
					P.O. Box 300							
					707 Jeffrey Way							
					Round Rock, Texas 78664							
					on or before Sept. 23, 1983.							

STOCK DIVISION BECo. Form 3658

COUNTED AND ISSUED BY:

SIGNED _____ EMP. NO. _____

ABOVE SHIPPED ON TEAMING TICKET

NO. _____ DATE _____ 19____

RECEIVED THE ABOVE

SIGNED _____ EMP. NO. _____

DATE _____ 19____

PRODUCTION ORDER NO. 3299

TRANSACTION 10

WITHDRAWAL REQUISITION NO. _____

DEPT. CODE _____

A PRODUCTION ORDER WAS ISSUED FOR THE MATERIAL WANTED ☒ YES

REQUISITION DATE _____ 19____

FOR _____

PROD. ORDER DATE _____ 19____

ADDRESS _____

APPROVED BY _____

WITHDRAWAL APPROVAL _____ EMP NO. _____

ENGINEER _____

ESTIMATED COST _____

QQC NO. _____

AUTH. NO. _____

USING DEPT - INSERT BELOW WHEN AND WHERE MATERIAL WILL START TO BE REQUISITIONED FROM STORES

DEPT. _____

DATE _____

LOCATION _____

CONTROL NO. _____

DATE REC'D _____

U.C.C. #1☐ #2☐ #3☐ #4☐

ITEM NO.	QUANTITY WANTED	UNIT	MATERIAL LOCATION	REFERENCE	DESCRIPTION USE SEPARATE ATTACHED SHEETS FOR DETAIL ORDERING SPECIFICATIONS PLEASE PRINT	STOCK SYMBOL	LOC.	QUANTITY ISSUED	WORK ORDER SERIAL	ACCOUNT CODE	SUB CODE	COST AREA
					This equipment is designated "Q" Nuclear Safety Related and 10CFR Part 21 is applicable. The applicable portions of Weed Instrument Co. Quality Assurance Program shall apply. QA requirements are detailed on Attachment 2.							
					The equipment system number is 50.							
					This equipment is required by PDCR # 81-04D.							

STOCK DIVISION BECo. Form 3859

COUNTED AND ISSUED BY:

SIGNED _____ EMP. NO. _____

ABOVE SHIPPED ON TEAMING TICKET

NO. _____ DATE _____ 19____

RECEIVED THE ABOVE

SIGNED _____ EMP. NO. _____

DATE _____ 19____

Attachment 1 pages 1 thru 32

INSTR. NO. TE5021-01A

P.O. NO. 22027

SHEET NO. 1

PDCR NO. 81-04D

DATE ____ BY ____

REV. ____ ____

____ ____

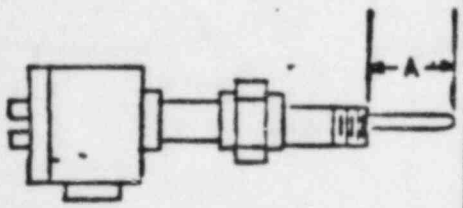
RESISTANCE TEMPERATURE DETECTORS

SPECIFICATION SHEET

LOCATION TORUS SHELL (TELEDYNE DWG. B-5229)

SERVICE SUPPRESSION POOL TEMPERATURE MONITORING

DETAIL:



GENERAL	MANUFACTURER	Weed Instrument Co., Inc.
	MODEL	SP612D-1B-C-6-.240-22-0-0
	TYPE	100 ohm Platinum .00385
	FORM: DUPLEX/ SINGLE	Dual Element
	CONN. TYPE	1/2" - 14 NPT
	" A" DIMENSION	14 1/2 inches
	ACCURACY	±0.25% or ±1/2°F
ELEMENT	NO. OF WIRES	3 wires/element
	WIRE SIZE	18 AWG
	SHEATH MATERIAL	316 SS
	INSULATION MATERIAL	Mg O
	SHEATH O.D.	.240 inches
HEAD	ENCLOSURE	General Purpose
	CONDUIT SIZE	3/4" NPT
	TERMINAL BLOCK	6 point
	MATERIAL	316 SS
ACC.	UNION	Yes
	SPRING-LOAD	Yes
	THERMOWELL	Furnished by Graver
	THERMOWELL DWG. NO.	Graver Dwg. 22800NA-MA-16
	P&ID	M-227 (Sheet 1)
	ELECTRICAL DRAWING	SK-E-81-04D-1

NOTES:

1. This assembly is Nuclear Safety Related-Quality Category "Q".

PRO. ORD # 3299