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VICE PRESIDENT  
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September 7, 1988

Docket Nos. 50-277  
50-278

Mr. William T. Russell, Administrator  
Region I  
U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Subject: Peach Bottom Restart Testing

Reference: August 23, 1988 letter to W. T. Russell (NRC)  
from J. W. Gallagher (PECo)

Dear Mr. Russell:

Enclosed are fifteen copies of the "Peach Bottom Atomic Power Station Restart Power Testing Program" dated August 23, 1988. This document was submitted to you by the referenced letter; however, Figures 1 and 2 were erroneously not included. For completeness, additional copies of the entire document are enclosed.

If you have any questions, please feel free to contact us.

Very truly yours,

*JW Gallagher*

Enclosures

cc: Addressee  
T. P. Johnson, USNRC Senior Resident Inspector  
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PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

RESTART POWER TESTING PROGRAM  
(POWER ASCENSION)

AUGUST 23, 1988

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# RESTART POWER TESTING PROGRAM

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## I. INTRODUCTION

This document describes the Restart Power Testing (Power Ascension) Program for the return to service of Peach Bottom Atomic Power Station (PBAPS) Unit 2 from its seventh refueling and maintenance outage and the NRC shutdown order. The Restart Power Testing Program is to assure the safe return to full power of Unit 2 and will, in the process, be a further demonstration of the effectiveness of Philadelphia Electric Company programs, plans, and actions taken since the NRC shutdown order. This program description is intended to complement Sections I and II of the Plan for Restart of Peach Bottom Atomic Power Station, Revision 1, dated April 8, 1988, by providing the scope of the Unit 2 power ascension program.

This document describes the Restart Power Testing Program in the following sequence:

- o Restart Power Testing Logic Plan
- o Management Assessment Points
- o Restart Power Testing Organization and Responsibilities
- o Performance Assessment Process

The purpose of the Restart Power Testing program is to confirm that PBAPS Unit 2 can safely operate. Specifically, the Restart Power Testing Program will serve to confirm: (1) the

ability of the new plant management team to identify and address problems in a timely fashion, (2) the abilities and attitudes of station personnel to perform as a team to new standards and expectations, and (3) the operational condition of plant equipment following the extensive outage to upgrade the physical condition and reliability of Unit 2.

The performance assessment process to be used during the power ascension program is designed to use the new line organization complemented by a PBAPS Management Oversight Team . During the Unit 2 restart program, independent assessments of plant and people performance will also be conducted by the established independent Nuclear Quality Assurance groups and by utility industry observers. The PBAPS Management Oversight Team, lead by the PBAPS Site Vice President, will review the assessments by line management and the independent assessments in making its determinations on continuing power ascension. These determinations will occur at three points in the restart power testing program.

## II. Restart Power Testing Logic Plan

Philadelphia Electric has developed a Restart Power Testing Logic Plan which integrates plant power ascension activities with post-outage testing and performance assessment activities into a comprehensive program for achieving a safe transition from shutdown to 100% power. This plan only addresses the restart of Unit 2. A similar logic plan will be developed for Unit 3 at a later date. The bases for this plan and the sequence of the restart power testing activities are described in this section.

### A. Bases for Logic Plan

The Restart Power Testing Logic Plan is based upon achieving a safe transition from a shutdown to 100% power. The development of the logic plan has considered concerns, constraints, and objectives relative to equipment, programs and personnel. The principle items are as follows:

1. Equipment
  - a. Compliance with PBAPS Technical Specifications and associated surveillance testing requirements.
  - b. Testing of modifications installed during the outage which require nuclear steam.
  - c. Post-maintenance testing requiring nuclear steam.

- d. Verification of the operational readiness of equipment that has been out-of-service for an extended period.
- e. Performance of operational plant transient testing to verify plant response.

2. Programs

- a. Minimizing the potential impact of the ongoing Unit 3 outage on the Unit 2 restart testing program.
- b. Incorporating experience gained from previous PBAPS startups, concepts from NUREG 1275 and operating experience from other facilities.
- c. Emphasizing the orderly transition from a shutdown plant to an operating plant.
- d. Proof testing of revised procedures.
- e. Controlling the restart power testing through overall program procedures and a detailed schedule.

3. Personnel

- a. Training of affected personnel on significant power ascension activities.

- b. Emphasizing the revised and enhanced line management team for monitoring and controlling performance.
- c. Proof testing revised organization and communications.
- d. Conducting hot license training required for cold licensed operators.
- e. Assessment of personnel performance.

#### B. Summary Description of Power Ascension

A sequence of power ascension steps, associated tests and assessments will bring the plant from shutdown to 100% power. The detailed logic sequence is summarized in Figure 1 and includes the following scope:

- 1. Normal startup activities from a refueling outage
  - a. Plant readiness checklist per General Plant Procedures
  - b. Checklist of required surveillance testing
  - c. Routine tests performed on non-safety related equipment
- 2. Acceptance testing of modifications for which final testing requires nuclear steam. This includes



verification of: new vessel level instrumentation, off-gas system modifications, feedwater heater replacement, alternate shutdown controls and motor operated valve differential pressure testing among others. Pre-operational testing of those modifications will have been completed to the extent possible prior to use of nuclear steam.

3. Post-maintenance testing where the final verification requires nuclear steam is principally associated with operating steam systems at pressures or flow rates in excess of the capacity of the installed auxiliary boilers or where auxiliary boiler steam cannot be provided. Overspeed trip testing of the HPCI and RCIC steam turbines is being completed prior to startup.
4. Two contingent shutdowns have been scheduled into the power ascension sequence. The first is scheduled after a drywell and system leakage inspection at approximately 500 psig. An outage will be initiated only if leakage is found which requires a shutdown to repair.

The second contingent outage is scheduled at approximately 35% power to provide a window to perform repairs or correct problems that may be identified during the post-synchronization review of plant

performance. This contingent outage will be initiated only if necessary.

5. Three management assessment points have been included in the logic plan. These are discussed in more detail in Section III.
6. Control system stability testing and tuning of the major control loops (feedwater flow, feedwater heater level control, steam pressure and recirculation flow) will be performed at various power levels to verify the overall response characteristics are acceptable and to preclude unnecessary challenges to safety systems during operational transients.
7. Following completion of the control system tuning checks, several transient tests will be performed to confirm the capability of the controls to respond to transients without a reactor scram occurring. This testing will include a feed pump trip, a recirculation pump runback, and a recirculation pump trip. This testing will be performed at approximately 70% power. A turbine trip is scheduled concurrent with the contingent outage from 35%, if required.
8. Two special procedures, SP-1166, Program Controls for Restart Power Testing-Post Cycle Seven and SP-1167, Unit 2 Post Cycle Seven Restart Power Testing, are being written to describe the power ascension program.

process, including assessments of performance by a PBAPS Management Oversight Team and industry observers, and provide overall control of the restart power testing sequence. These special procedures reference other specific plant procedures as needed and direct the general sequence of the logic plan.

### III. MANAGEMENT ASSESSMENT POINTS

Philadelphia Electric Company line nuclear managers will assess personnel, programs, and plant systems performance throughout the restart power testing program. To focus management attention on the assessment process, the restart power testing program contains three specific points to formally assess plant systems and personnel performance before continuing power ascension.

#### A. Bases for Power Ascension Assessment Points

Due to the extended outage, the reconstituted operating shift teams, and the renewed corporate commitment to safe, quality nuclear operations, Philadelphia Electric management has established predetermined assessment points for review of the performance of equipment, personnel and management processes. These assessment points were chosen at intervals in the power ascension sequence based on plant operating characteristics. Vice President-PEAPS approval will be obtained before the plant power level is increased beyond each assessment point.

The self-assessment process that will provide the basis for requesting NRC authorization to restart is discussed in detail in separate documentation and is not considered as an assessment point in the Restart Power Testing Program.

#### B. DESCRIPTION OF ASSESSMENT POINTS

Three assessment points are planned during the Restart Power Testing Program. Examples of the types of activities that will be conducted during each of the evaluation periods are described below. At each assessment point, line management will review (1) test results, (2) root cause evaluations of reportable or significant operating events, (3) the performance of people, equipment and procedures and (4) the effectiveness of significant corrective actions taken during the preceding period of power ascension. Further, line management will identify additional corrective actions as required. These line management assessments will be reported to the PBAPS Management Oversight Team at the assessment points. The PBAPS Management Oversight Team will also review the assessments performed by the Nuclear Quality Assurance organization and the industry observers.

#### Assessment Point 1

The first assessment point will be after the turbine generator is synchronized and loaded to about 35% power. Assessment Point 1 will review the results of reactor startup, heatup to rated pressure, operation of the HPCI and RCIC pumps at both 150 psig steam and rated conditions, initial roll and synchronization of the turbine generator, and control system stability tests at approximately 35% power. This power level provides a stable condition with all systems configured for power operation, all feedwater heaters in service and two feed pumps

available for reliability. Baseline data for control system stability checks for this power level exist from previous startups.

Evaluations of activities such as those described above will enable management to assess initial equipment performance, personnel performance in a variety of disciplines, interface and coordination between the disciplines and the management processes under dynamic plant conditions.

If the results of testing and evaluations at the 35% assessment point warrant an outage to improve plant performance, an outage will be initiated during the assessment period. Such an outage may include a turbine trip to confirm the proper integrated plant response.

#### Assessment Point 2

The second assessment point will be after a series of tests at approximately 70% reactor power. Between Assessment Points 1 and 2, a number of tests and plant activities, such as bringing equipment on line to support increasing power, will provide an opportunity for evaluation of equipment and personnel performance. The types of activities and tests that will be undertaken during this period include the following:

- o System stability checks on feedwater flow control, feedwater heater level control, pressure controller, and recirculation flow control.
- o Recirculation pump runback
- o Feedpump trip
- o Recirculation pump trip

This assessment period will include several power level changes and other operational events during which performance will be evaluated.

### Assessment Point 3

At nominal 100% power, the final series of reactor engineering tests, calibrations, and control system stability checks in the power ascension program will be performed. Evaluations conducted between Assessment Points 2 and 3 will largely focus on routine operating activities such as coordination of surveillances, anticipation and correction of problems, and the conduct of routine and preventive maintenance. In addition, operating activities such as recirculation flow adjustments and control rod manipulations to achieve 100% power provide an opportunity to evaluate the coordination between operations personnel and reactor engineers.

#### IV. RESTART POWER TESTING ORGANIZATION AND RESPONSIBILITIES

The PBAPS organization for return to operation is comprised of five elements as follows:

- A. The Operations Section
- B. Other site organizations
- C. The corporate nuclear organizations
- D. The independent assessment groups
- E. The PBAPS Management Oversight Team for power ascension

The first four elements are essentially the organizations that would support restart from any extended PBAPS outage and will remain functioning after the restart test program. The fifth element is an extension of Philadelphia Electric's management oversight processes. The PBAPS Management Oversight Team will provide additional attention to assessment of performance at each of the assessment points. The unique functions of this temporary organization are described in Sections IV.E. and V.A. below.

##### A. Operations Section

The Operations Section organization has been augmented by the addition of a Restart Power Testing Manager to develop the



test sequence, coordinate and develop procedures and plan the integration of all startup activities during program development. Shift Test Coordinators are assigned to focus on the preparation for non-routine testing and on data collection, reduction, and evaluation. They will coordinate the plant system testing program under the direction of the Shift Managers during startup. The Shift Test Coordinators have Senior Reactor Operator license experience or have been BWR simulator certified and have recent experience in responsible power ascension positions at other BWR plants.

A BWR control system expert with significant experience in aligning and testing BWR controls equipment will be assigned to oversee the planning and procedure development and to support the performance of control systems tuning checks and plant transient tests.

This organization is summarized in Figure 2 and will provide clear accountability for all operational activities including testing.

#### **B. Other Site Organizations**

Other site organizations will be in place to support the startup through their existing resources. Personnel with critical skills will be provided to respond to operational needs at any time.

### C. Corporate Nuclear Organizations

Other corporate nuclear organizations will be in place to support the startup through their existing resources. Backshift and weekend coverage of critical skills will be provided or available on short notice to support operational needs.

### D. Independent Assessment Groups

As discussed in greater detail in the PBAPS Restart Plan, Philadelphia Electric has three organizations which perform independent reviews of nuclear group performance. These are:

PBAPS Quality Assurance Division  
Independent Safety Engineering Division  
Performance Assessment Division

Independent performance feedback from these groups will be used by line management during Unit 2 restart and provided to the PBAPS Management Oversight Team at each assessment point.

### E. PBAPS Management Oversight Team

During power ascension, an additional organization will provide a focus for management oversight. The PBAPS Management Oversight Team will formally assess plant and people performance at each of the assessment points.

The PBAPS Management Oversight Team members are:

- (1) Vice President - PBAPS, Chairman
- (2) PBAPS Plant Manager
- (3) PBAPS Project Manager
- (4) PBAPS Support Manager
- (5) PBAPS Training Superintendent
- (6) PBAPS Quality Assurance Manager
- (7) Limerick Operations Superintendent
- (8) Performance Assessment Division Manager
- (9) Nuclear Engineering Division Manager

#### V. PERFORMANCE ASSESSMENT PROCESS

During each of the three test periods in the Restart Power Testing Program, line management will assess the performance of equipment, people and programs; and identify necessary corrective actions to ensure continued safe and reliable operation. A PBAPS Management Oversight Team will review the results of line management assessments, input from the independent assessment groups and a performance analysis from industry observers in determining the acceptability for continued operation and power escalation.

This section describes the role and process of the PBAPS Management Oversight Team for reviewing the performance of plant equipment and systems, people, and programs, including teamwork and attitudes at each assessment point.

#### A. PBAPS Management Oversight Team

At each assessment point, evaluations of equipment, people and program performance will be presented to the PBAPS Management Oversight Team. These evaluations will consist of line management assessments, Performance Assessment Division evaluations, Nuclear Quality Assurance reviews, and independent peer reviews. The PBAPS Management Oversight Team will identify any additional corrective actions that are prudent prior to proceeding beyond each assessment point. The Team will also review corrective actions from previous assessment points to ensure their effectiveness. The PBAPS Management Oversight Team will be supported by utility industry observers who will provide the independent peer reviews of people and program performance. Upon consensus agreement of the PBAPS Management Oversight Team to continue power ascension, the Vice President - PBAPS will so notify senior management and the NRC site resident inspector.

#### B. Plant Equipment and Systems

As part of the line management process, a Test Review Group comprised of a representative of the nuclear steam supply vendor and site engineers will evaluate the results of non-routine tests and report the results of their analysis of equipment and systems performance to the Plant Operations Review Committee (PORC). The PORC will provide its analysis of the plant performance to the Plant Manager and the PBAPS Management Oversight Team. Test

results will be factored into an overall evaluation of the plant's readiness to proceed beyond the assessment point. This evaluation will consider the following in addition to test results:

1. Root cause analysis of reportable and significant events.
2. Status of maintenance to support continued operation and power escalation.
3. Status of procedures and technical evaluations to support continued operation and power escalations.
4. Plant equipment performance indicators.

#### C. People and Programs

Staff and programs are in place at PBAPS to provide continuing line management performance analysis and self-assessment of people and programs. In addition, during power ascension, the special PBAPS Management Oversight Team will provide further assurance that the people and programs are performing satisfactorily.

Line management assessments of the people and programs will consider trends from the Management-By-Walking-Around program, housekeeping inspections, reporting and corrective action programs, human performance evaluations, the maintenance program,

radiological occurrences, quality findings, procedure suggestions and programmatic performance indicators.

The PBAPS Management Oversight Team will consider the line management assessments, the input from the independent assessment groups and the analysis by industry observers on people and program performance. These evaluations are designed to confirm satisfactory personnel and program performance in the power ascension program and the acceptability for continued safe and reliable operation.

#### D. Program Closure

Upon completion of testing at 100% power and the evaluation by the PBAPS Management Oversight Team, a final report of the Restart Power Testing Program will be prepared to summarize the test results and identify lessons learned for applicability to the Unit 3 restart and future refueling outages. These program results will be reviewed by the Nuclear Review Board in addition to line management.

PROJECT : UNIT 2 RESTART POWER TESTING

VERSION : 00

TARGETS :

TIME N.C. : 16AUG88  
 FORECAST END : 31DEC88  
 REQUIRED END : 01JAN89

LEGEND

- Activity Durm.
- Critical Durm.
- Actual Progress

SHOWING FORECAST DATES

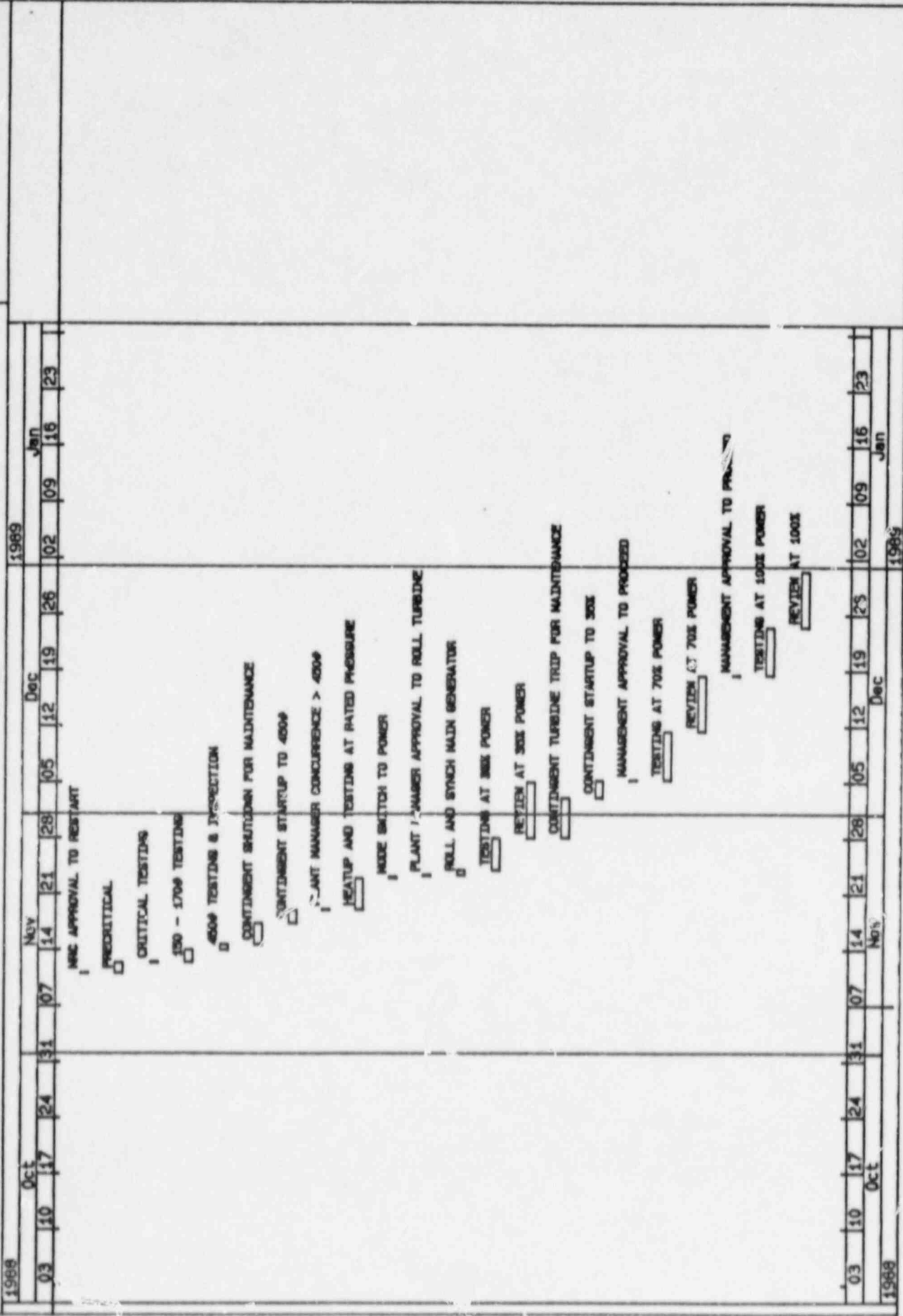


FIGURE 1



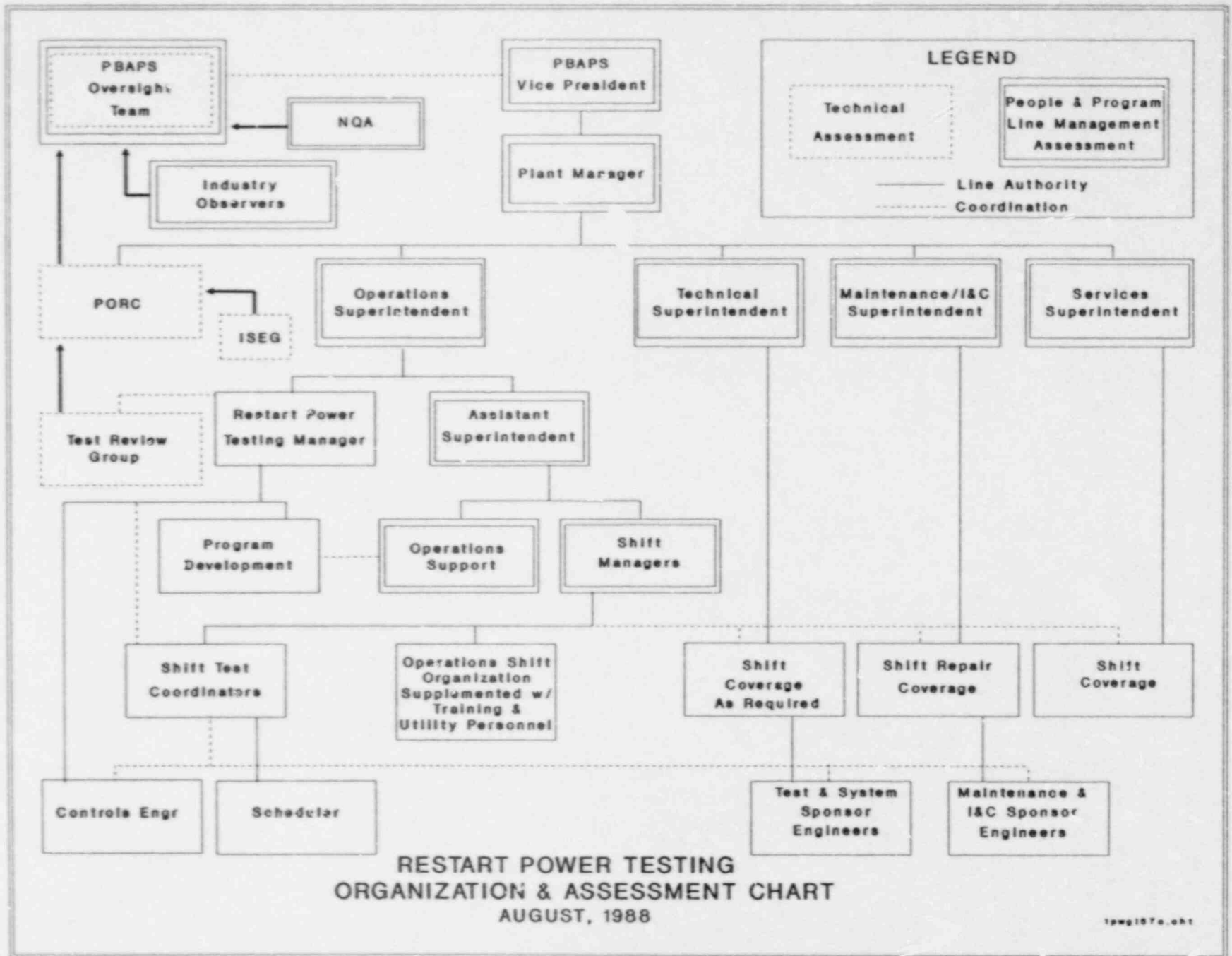


FIGURE 2