

# Duquesne Light Company

Beaver Valley Power Station  
P.O. Box 4  
Shippingport, PA 15077-0004  
(412) 393-5206  
(412) 643-8069 FAX

GEORGE S. THOMAS  
Division Vice President  
Nuclear Services  
Nuclear Power Division

November 3, 1994

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

**Subject: Beaver Valley Power Station, Unit No. 1  
Docket No. 50-334, License No. DPR-66  
Simulation Facility Certification - NRC Form 474  
Update Information**

Reference: NRC Form 474, dated December 18, 1990  
"Simulation Facility Certification"

In the above reference, Duquesne Light Company identified exceptions to ANSI/ANS 3.5-1985 and Regulatory Guide 1.149. One of these exceptions, the plant process computer, was identified as not being replicated as part of the simulator because the installed computer was scheduled for replacement and because its main functions were computerized trending and monitoring.

The submittal identified our intention to install a simulator process computer 18 months after the final acceptance of a new plant process computer. In the interim, the monitoring and trending functions of the process computer would continue to be provided by the training instructors, as they have been since 1985 when the simulator was first placed in service. Training of operators on features of the process computer system would continue to be performed on the in-plant computer. In Section 1.2.3 of the above reference, the need to assess the training impact resulting from any future upgrade of the plant process computer was also identified.

The Unit 1 Simulator Certification Committee, which is comprised of representatives from Operations, Training, Engineering and Licensing, met on April 12, 1994 at which time they determined that the simulator process computer should be upgraded to visually simulate and replicate the Unit 1 plant process computer consistent with ANSI/ANS 3.5-1985. This upgrade associated with physical fidelity will be completed by March 31, 1995. The committee also concluded that ANSI/ANS 3.5-1985 does not require a working simulation of the plant process computer as part of the simulator.


ADD5

The Committee based its determination on the following:

1. The current plant process computer is used for periodic monitoring and trending of equipment and heat balance calculations.
2. The guidance of ANSI/ANS 3.5-1985 for physical fidelity will be achieved with the upgrade.
3. The simulator training program has had an excellent record over the last nine years and will continue using proven methods relative to the plant process computer.
4. The in-plant process computer will be utilized to train operators on the features of the computer system.
5. Information associated with annunciators, recorders, and computerized monitoring and trending of plant parameters driven by the plant process computer will continue to be provided in the simulator by the training instructors.
6. The UFSAR, Chapter 7, states that the plant process computer provides supplemental information for monitoring and is not required for safe operation of the unit.

This information is being provided as a status update and will be reflected in the quadrennial recertification scheduled for December 1994. Any questions concerning this topic may be directed to Ernie Chatfield, General Manager, Nuclear Support Unit, at (412) 393-5710.

Sincerely,



George S. Thomas

Attachment

cc: Mr. L. W. Rossbach, Sr. Resident Inspector  
Mr. T. T. Martin, NRC Region I Administrator  
Mr. G. E. Edison, Sr. Project Manager  
Mr. T. E. Murley, Director,  
Office of Nuclear Reactor Regulation

# SIMULATION FACILITY CERTIFICATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 120 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0138), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

INSTRUCTIONS. This form is to be filed for initial certification, recertification (if required), and for any change to a simulation facility performance testing plan made after initial submittal of such a plan. Provide the following information, and check the appropriate box to indicate reason for submittal.

FACILITY	Beaver Valley Power Station Unit 1	DOCKET NUMBER	50-334
LICENSEE	Duquesne Light Company	DATE	12/18/90

This is to certify that:

1. The above named facility licensee is using a simulation facility consisting solely of a plant referenced simulator that meets the requirements of 10 CFR 55.45.
  2. Documentation is available for NRC review in accordance with 10 CFR 55.45(b).
  3. This simulation facility meets the guidance contained in ANSI/ANS 3.5, 1985, as endorsed by NRC Regulatory Guide 1.149.
- If there are any exceptions to the certification of this item, check here ☒ and describe fully on additional pages as necessary.

NAME (or other identification) AND LOCATION OF SIMULATION FACILITY  
Beaver Valley Power Station Unit 1 Simulator  
Beaver Valley Training Center  
Shippingport, PA 15077

☒ SIMULATION FACILITY PERFORMANCE TEST ABSTRACTS ATTACHED. (For performance tests conducted in the period ending with the date of this certification)

DESCRIPTION OF PERFORMANCE TESTING COMPLETED (Attach additional page(s) as necessary, and identify the item description being continued.)

Initial Certification - See attached Transient Steady State, Malfunction and Normal Operating Tests.

☒ SIMULATION FACILITY PERFORMANCE TESTING SCHEDULE ATTACHED. (For the conduct of approximately 25% of performance tests per year for the four year period commencing with the date of this certification.)

DESCRIPTION OF PERFORMANCE TESTING TO BE CONDUCTED. (Attach additional page(s) as necessary, and identify the item description being continued.)

Refer To Enclosed Test Schedule.

☐ PERFORMANCE TESTING PLAN CHANGE. (For any modification to a performance testing plan submitted on a previous certification)

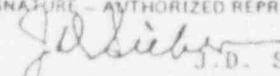
DESCRIPTION OF PERFORMANCE TESTING PLAN CHANGE (Attach additional page(s) as necessary, and identify the item description being continued.)

Not Applicable. Initial Submittal

☐ RECERTIFICATION (Describe corrective actions taken, attach results of completed performance testing in accordance with 10 CFR § 55.45(b)(5)(iv). Attach additional page(s) as necessary, and identify the item description being continued.)

Not Applicable. Initial Submittal

Any false statement or omission in this document, including attachments, may be subject to civil and criminal sanctions. I certify under penalty of perjury that the information in this document and attachments is true and correct.

SIGNATURE - AUTHORIZED REPRESENTATIVE  J.D. Sieber	TITLE Vice President Nuclear Group	DATE 12-20-90
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In accordance with 10 CFR § 55.5, Communications, this form shall be submitted to the NRC as follows:

BY MAIL ADDRESSED TO: Director, Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

BY DELIVERY IN PERSON TO THE NRC OFFICE AT: One White Flint North  
11555 Rockville Pike  
Rockville, MD

## Exceptions to ANSI/ANS 3.5 and/or Regulatory Guide 1.149

The following exceptions represent equipment function required by ANSI/ANS 3.5, which are not available in the Unit 1 Simulator. The training impact and/or plan to address their differences are as follows. Scheduled changes to the simulator will reduce the number of exceptions taken in future reports.

### 1. Unit I Plant Process Computer (P-250)

ANSI/ANS 3.5 Section 3.2.1 - Currently the Unit I plant process computer is not replicated on the simulator. The Unit I plant process computer is scheduled for replacement during the 1991 refueling outage. Training impact is limited to the inability to perform computerized monitoring and trending. These functions are currently provided by the training instructor. The replacement plant process computer hardware for the simulator has been ordered, and should be available for training within 18 months after plant acceptance. (Refer to Section 3.6 for planned completion)

### 2. Normal Plant Evolutions

ANSI/ANS 3.5 Section 3.1.1 (7) - Normal Plant Evolutions - The evolution of plant startup, shutdown and power operations with less than full coolant flow will not be performed as BVPS-1, is not licensed to, or have procedures to operate with less than full core flow.

### 3. E.R.F. Electrical Distribution/Turbine Water Induction Panel

ANSI/ANS 3.5 Sections 3.1.1 (3) and 3.2.1 Normal Operations and Panel Simulation - E.R.F. Electrical Distribution/Turbine Water Induction Panel is retired in place in the Unit I Control Room with the exception of 4 control switches for reheater excess vent valves. The panel is not installed in the simulator and the control switches are controlled by a Local Operator Action feature of the simulator. The four (4) reheater excess vent valve control switches change the vent path of the reheater and do not have any observable affect on any plant parameter. The panels and switches will not be installed.

### 4. Radiation Monitoring System Control Console

ANSI/ANS 3.5 Section 3.2.1 - The Radiation Monitoring System Control Console which includes the steam generator blowdown radiation monitor is not installed in the simulator control room. After review of this console functions, it was determined to install this console and to integrate the steam generator blowdown radiation monitor. The steam generator blowdown radiation monitor is addressed in the emergency and abnormal procedures as an indicator for steam generator tube leaks. The training impact is a concern since the operator is unable to access the correct panel in the simulator. Administrative action to purchase and integrate the console has commenced. Expected integration to occur within 18 months after procurement is authorized.

### 1.2.1 Control Room Physical Arrangement

The physical arrangement of the simulator's control room duplicates the Beaver Valley Power Station Unit I controls area. The controls area is defined in Figure 1.2.1.1. The BVPS Unit I control room drawing is provided as Figure 1.2.1.2, and the simulator control room in Figure 1.2.3.

B.V.P.S. - O.M.  
Beaver Valley Control Room Area

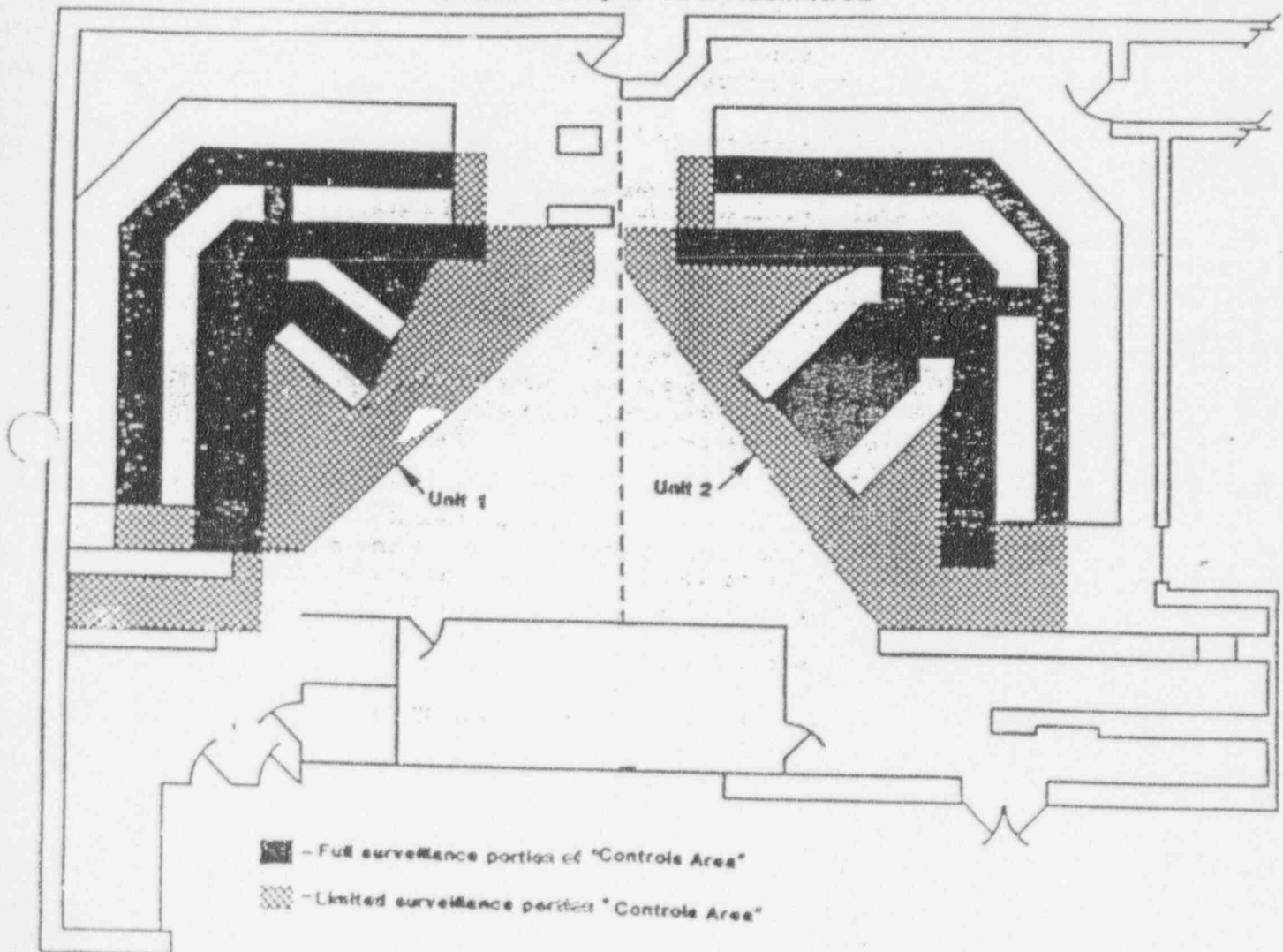
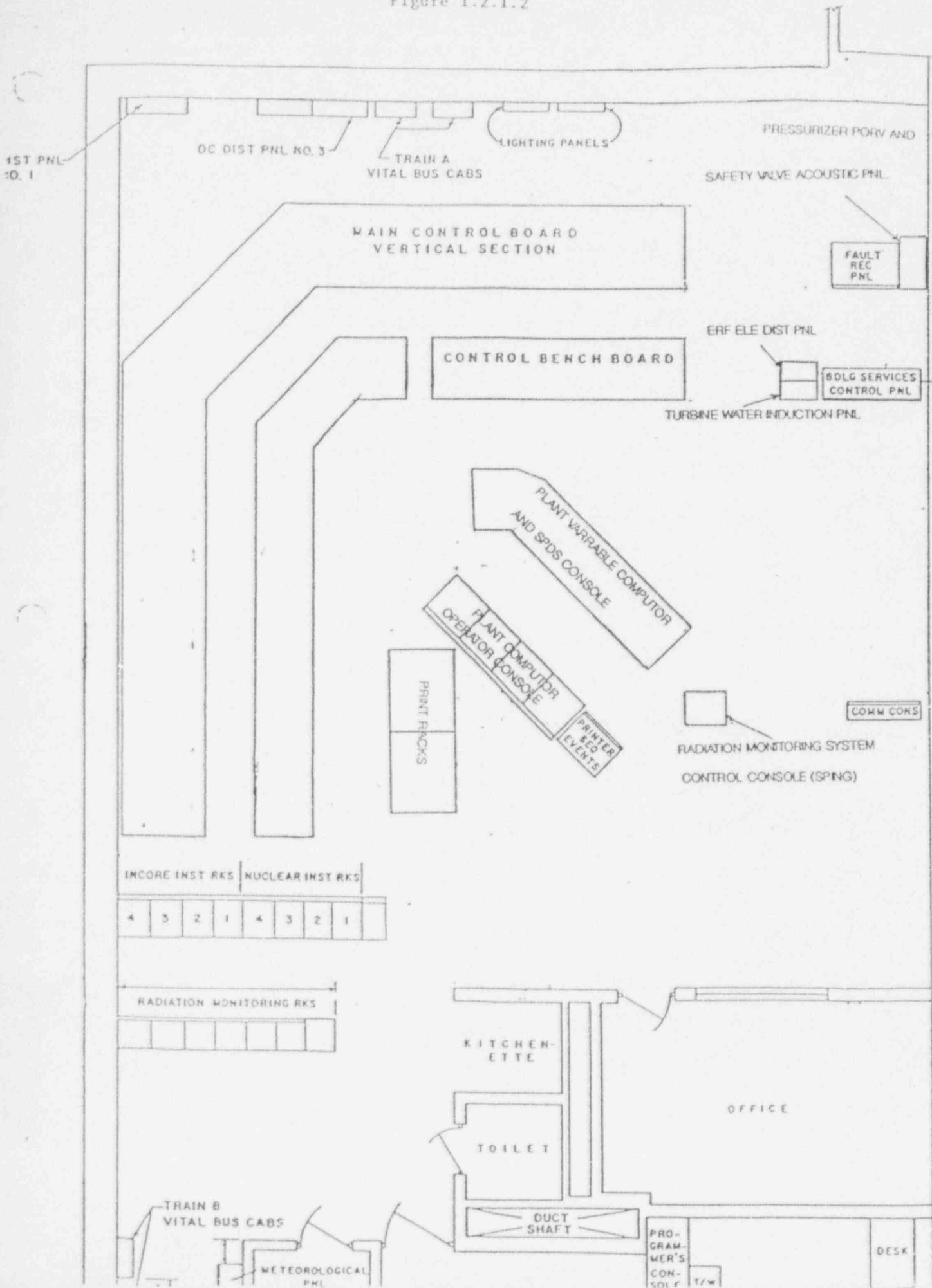


Figure 1.2.1.1



Figure 1.2.1.2



Beaver Valley Power Station  
Unit 1 Simulator

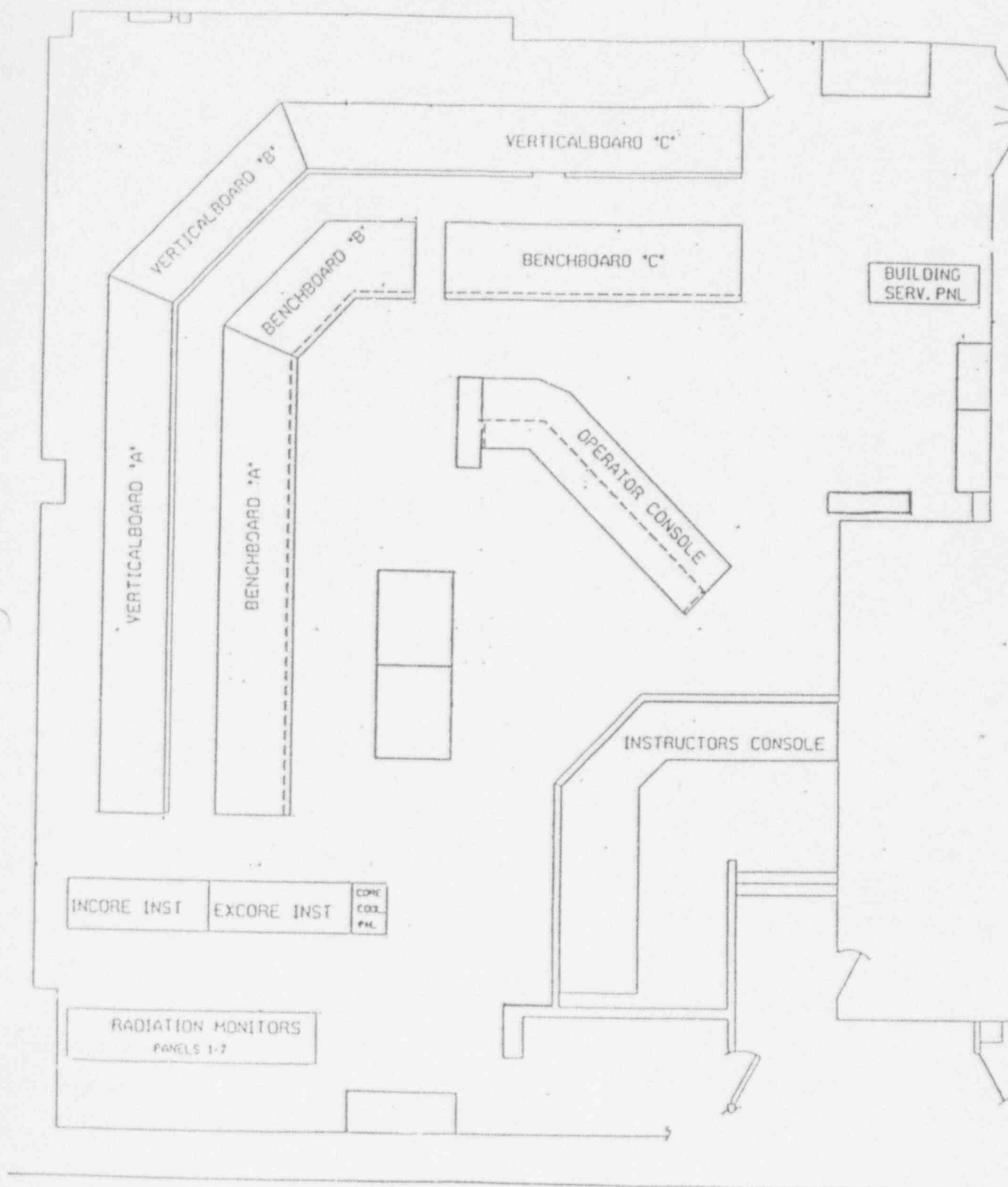


Figure 1.2.3



1.2.1A Panel/Equipment Not Included in Controls Area

The following are layout or major panel differences between the Unit I controls area and the Unit I simulator.

1. Plant P-250 computer operator console and associated support equipment.
2. Electrical Fault Monitoring Panel.
3. Pressurizer PORV and safety valve acoustic monitoring panel.
4. ERF electrical distribution/turbine water induction panel.
5. Radiation monitoring system control console.
6. Sequence of events computer printer.

#### 1.2.1B Resolution of Control Area Differences

##### 1. Plant Process Computer (P-250)

The simulator was ordred without a fully scoped plant process computer because the Unit I plant had intended to upgrade the plant computer hardware. The simulator plant process computer hardware is only partially modeled. Also not installed are the alarm and trend typewriters, which interface though the P-250 computer. Not all parameter trends are available to the operator while training with the simulator. Examples of some of the parameter trends used during normal operation are:

- a. Main generator hot gas temperatures
- b. Main feed pump motor temperatures

However, any data needed by the operators, is provided by the computer engineer, role-played by the simulator instructor. The current scope of the plant computer installation does not impact the operators ability to correctly use emergency or abnormal procedures.

Unit I is to install a new plant computer system during the next refueling outage scheduled in the spring of 1991. The Unit I simulator be upgraded to replicate the new computer system. The new hardware will be installed in the simulator following installation in Unit I. This acton is being tracked by CR 0093.

15/10/89

2. Electrical Fault Monitoring Panel

The equipment mounted within the panel is for reviewing post electrical distribution faults. The system uses magnetic tape for recording and must be read off-site.

The electrical fault monitoring equipment has no training value or direct impact on operations during normal or emergency procedures. The committee determined that there would be no training value in panel installation.

3. Pressurizer P.O.R.V. and Safety Valve Acoustic Monitoring Panel

This panel houses interface equipment between field-mounted acoustic monitors and control room area alarms and indication. The panel also supplements the plant's annunciator system with its own local alarm, alarm reset and acknowledge push-buttons. Alarm reset functions are performed by the simulator instructor via a local operator action (LOA). The committee directed that the local panel alarm has limited training value. The Pressurizer P.O.R.V. Valve Acoustic Monitoring panel that require operator actions are addressed in alarm response procedures. The committee directed that a simulation of the noise generated by a lifting valve be installed. This additional feature of the Unit I Simulator is tracked by CR 77.

4. Emergency Response Facility (E.R.F.)/Turbine Water Induction Panel

This one panel has controls mounted on both sides. One side is the E.R.F. black diesel controls and indication. On the other side of the panel is mounted the turbine water induction equipment. The design change for water induction has been cancelled and the ERF distribution panels are being phased out. The panel will be retired in place. Located on the turbine water induction panel are switches for heater excess vent valves. These switches are addressed in normal operations procedures for turbine start up. This function is performed by using a local operation (LOA) feature of the simulator. The committee determined that the panel need not be installed as there is no impact on training.

5. Radiation Monitoring System Control Console (Sping)

This console gathers and processes data from three ventilation particulate monitors, three ventilation noble gas monitors and the steam generator blowdown monitor.

These particulate and noble gas radiation monitors are not addressed in any normal or emergency operating procedures. The steam generator blowdown radiation monitor was later installed on this console due to a recent plant modification which added a new blowdown system. This steam generator blowdown radiation monitor is addressed in the Unit I emergency operating procedures and abnormal procedures as an

indicator for steam generator tube leaks or rupture. The committee recommended the installation of the SPING Radiation Console with the features required to use this blowdown radiation monitor. (CR-149)

6. Sequence of Events Computer Printer (SER)

The Sequence of Events Computer Printer is a high speed sequence recorder which has 1400 digital inputs and 200 thermocouple analog inputs. The digital inputs operate on contact change of state and print in sequence to the nearest 2 milliseconds.

There are no normal or EOP procedures that address the use of the Sequence of Events Computer/Printer. This system is used primarily as a diagnostic tool for post plant upsets, and therefore, has limited training value. Information to support training is provided by the simulator instructor during simulator operations. The committee did not recommend the installation of the SER, as instructor supplied information adequately replaces the hardware, based upon training experience and feedback from the Unit 1 operations staff.

### 1.2.2 Control Area Equipment Differences

The Beaver Valley Power Station Unit I simulator controls area comparison was conducted using actual plant photographs and check sheets for each control switch, controller, indicator recorder and meter.

A detailed review of hardware, meters, recorders controllers, control switches, indicators annunciators and other displays that would function during normal, abnormal and emergency evolutions were reviewed by the committee.

The committee's review of control board switches included the following details:

- Switch type

- Label color, wording, letter size

- Location

- Available positions

The committee's review of indicators, recorders and meters included the following details:.

- Correct scale
- Correct engineering units
- Label color, wording, letter size
- Calibration sticker color
- Location
- Pointer color and shape
- Placement of operator aids

A review of each annunciator window and status light was conducted with the following details reviewed for each:

- Annunciator location
- Wording and wording size
- Annunciator window color (green or red)
- Status light color

The committee concluded that none of the differences are of a significance that would cause an operator to take any different action in the simulator than in the Unit I control room. The committee did recommend that actions be taken to correct some minor differences in scale demarcations and lettering. These actions are being tracked by the Simulator Discrepancy Reporting and Resolution System.



### 1.2.3 Systems

The Beaver Valley Power Station Unit 1 Simulator models most of Unit 1 control room operated systems. The following systems are not modeled or not fully modeled in the Simulator. These systems provide information to the control room operator during normal, abnormal or emergency operating procedure usage.

1. Fire Protection
2. Sping
3. Plant Variable Computer
4. Plant Computer System P-250
5. Pressurizer PORV and safety (Acoustic Monitor)
6. Sequence of Events Recorder
7. Safety Parameter Display System (SPDS)
8. Liquid Waste
9. Gaseous Waste
10. CTMT Wide Range H<sub>2</sub> Analyzer
11. Main Generator Systems
12. Auxillary Building Ventilation

### 1.2.3 (Con't)

In order for the operator to take expected actions during normal, abnormal and emergency operations during simulator training and evaluation sessions, the committee reviewed systems controlled from the control room or system interfaces that would be observable to the control room operator.

Their recommendations are as follows:

1. Fire Protection

Add deluge valve operation and it's effects. (CR-132)

2. Sping

Add Sping console and interactively model steam generator blow down rad monitor.

3&4. Plant Variable Computer

Access the P-250 upgrade to determine training impact of removing current P-250 features then upgrade PVC to Unit I. (CR-93)

5. Pressurizer PORV and Safety Valve Acoustic Monitoring Panel

Research methods available to simulate noise of liting PORV or safety. (CR-77)

6. Sequence of Events Recorder

The committee found that the current method of simulation was adequate.

7. Safety Parameter Display System (SPDS)

Determine why; it is necessary to depress the "SHIFT" key in order to page when using the simulator's SPDS - correct if possible. (TR-324)

8&9. Liquid Waste and Gaseous Waste

The committee found these systems to be adequate in present scope.

Assess?

1.2.3 (Con't)

10. Hydrogen Analyzer

After the analyzer is started (via LOA feature), a set value is recorded - committee suggested that a calculated value be recorded based on LOCA size and activity. (CR-143)

11. Main Unit Generator

Include "Backfeed" feature and the means to monitor generator gas temperatures with the new plant computer upgrade. (CR-154)

12. Ventilation System

Considering adding feature for vibration cutout for containment fans. (CR-154)

Items 6, 8, 9 - The committee found these systems to be adequate in present scope.

#### 1.2.4 Simulator Control Room Environment

The Beaver Valley Power Station Unit 1 Simulator replicates the Unit 1 control room environment with differences as noted. The plant communication systems that an operator needs to communicate with an auxiliary operator or other in-plant support activities are present and operational in the simulator. This communication equipment includes Bell Telephone, plant paging system, PAX phone and system operator phone. The plant's radio system is physically simulated but not operable. All annunciator panels are operable and have identical tones as the Unit 1 panels.

1.2.4A

Existing differences in Controls Area Environments are:

BVPS-1 Simulator

1. Computer flooring
2. Limited AC emergency lighting
3. Fluorescent lighting
4. Unit II simulator will be installed in a separate building
5. Small video camera and several small overhead microphones
6. Phones - 1 Bell, 1 system operator
7. No noise upon CREBAPS initiation

BVPS Unit I

Carpet covered  
DC emergency lighting  
Non-glaze full spectrum tube lighting  
Unit II control room separated by glass partition  
Four large overhead T.V. cameras  
Phones - EPP direct ringdown (2), Mansfield (1), Red NRC phone (1), Bell phones (4)  
Air in-rush noise upon CREBAPS initiation

1.2.48 Resolution of Environment Differences

1. The actual control room floor was fully carpeted in 1988 to reduce overall noise. The simulator floor is standard computer flooring, and has remained uncovered. Committee determined that there was no training impact involved with this item and recommended no further action.
2. Simulated emergency lighting is limited to partially deenergizing normal fixtures. This adequately lowers lighting levels during evolutions involving losses of associated power sources. Committee recommended no further action.
3. Actual control room fluorescent fixtures were recently relamped using non-glaze, full spectrum tubes. As a result, the existing simulator ambient light level is relatively brighter. However, this does not detract from training. Committee recommended no further action.
4. Since the Unit II simulator was not planned as part of the original Unit I simulator building layout. The Unit II simulator will be located in an adjacent building. Since simulator exercises involve phone or page communication between units, visual contact is not necessary. Committee recommended no further action.
5. The simulator video camera and microphones are used to record crew performance for reviews and critiques. The four large cameras in the actual control room were originally used for remote ERF (Emergency Response Facility) viewing of controls during abnormal/accident conditions.

1.2.4B (Con't)

These cameras are currently retired in place. The size and appearance difference does not affect operator line-of-sight. Committee determined there was no training impact and recommended no further action.

6. Although the simulator telephone capability is less than the control room, adequate equipment to all support activities (via instructor booth) is supported. Currently, plans are to install multiple phone channels to simulate calling specific groups; this will enhance the simulator instructor's ability to act as these groups/individuals. Also, the committee recommended that a non-functional Red NRC phone be acquired, if available, and installed on the communications console.
7. Control Room Emergency Bottled Air Pressurization System (CREBAPS) actuation in the control room yields a noticeable sound. CREBAPS actuations on the simulator result in changes in associated control and indications. The committee felt that the lack of audible noise upon initiation had limited training impact. The committee recommended the installation of simulated noise. (CR-77)