

NIAGARA MOHAWK POWER CORPORATION

47-188-91

NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

02-LOT-001-283-2-00 Revision 6

TITLE: PROCESS COMPUTER SYSTEM

	<u>SIGNATURE</u>	<u>DATE</u>
PREPARER	<u>[Signature]</u>	<u>5-17-91</u>
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Summary of Pages

(Effective Date: 5/21/91)

Number of Pages: 31

<u>Date</u>	<u>Pages</u>
April 1991	1 - 31

THIS LESSON PLAN IS A GENERAL REWRITE

**MASTER**

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

VERIFICATION: \_\_\_\_\_

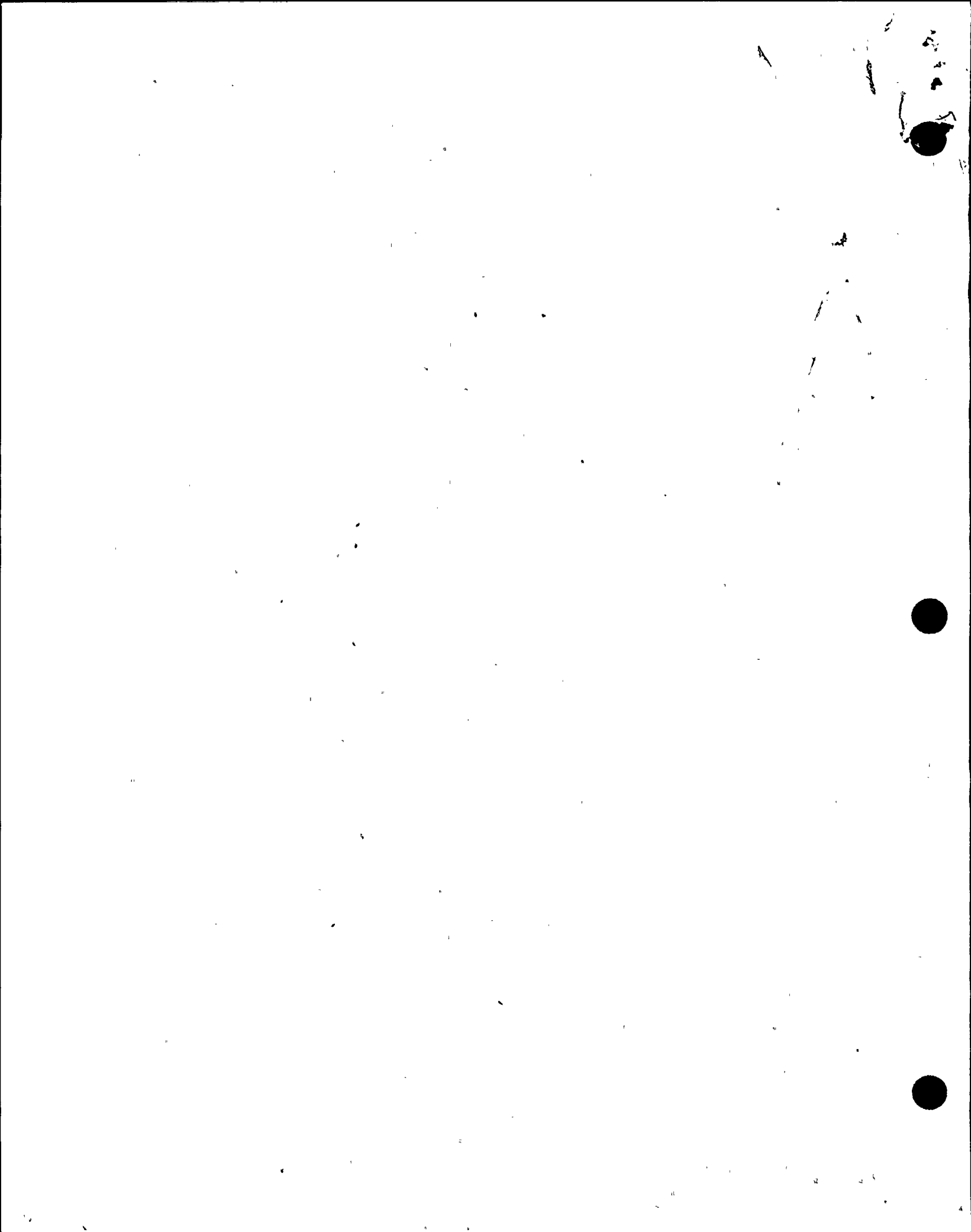
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**DOCUMENT**

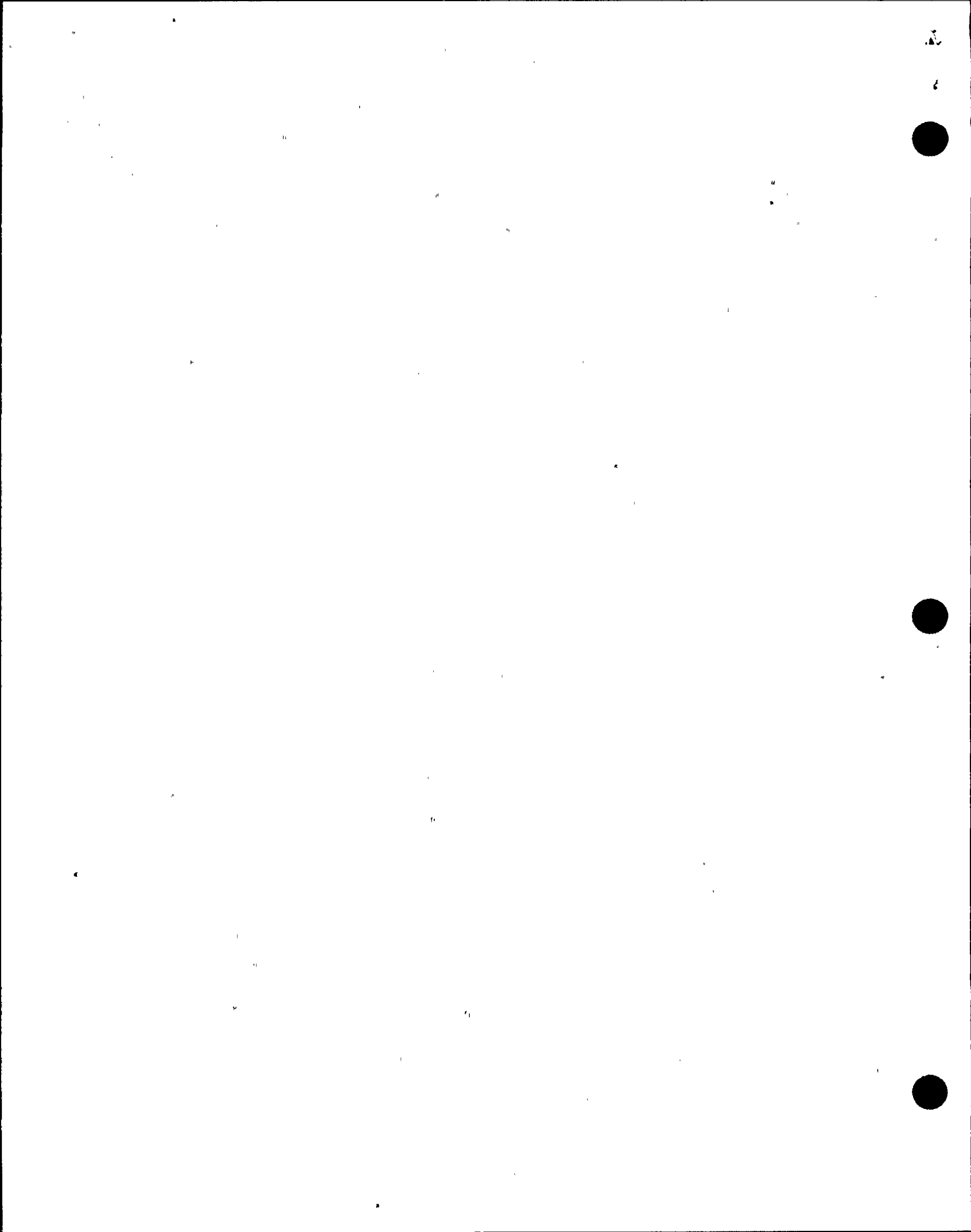
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I. TRAINING DESCRIPTION

- A. Title of Lesson: Process Computer System
- B. Lesson ~~At~~ <sup>Start</sup> Description: This lesson contains information pertaining to the Process Computer System. The scope of the training is defined by the learning objectives and in general covers the knowledge required of a Licensed Control Room Operator.
- C. Estimate of the Duration of the Lesson: 2 hours
- D. Method of Evaluation, Grade Format and Standard of Evaluation: Written exam, passing grade of 80% or greater.
- E. Method and Setting of Instruction:  
This lecture should be conducted in the classroom.
- F. Prerequisites:
1. Instructor:
    - a. Certified in accordance with NTP-16
  2. Trainee:
    - a. Initial License Candidate - In accordance with the eligibility requirements of NTP-10
    - b. Licensed Operator Requal - In accordance with the requirements of NTP-11
- G. References:
1. OP-91A Process Computer
  2. 3D Monicore Manual GEK-97228A
  3. PMS Operating Instructions GEK-83340, S&W #7,400-5119
  4. FSAR Section 7.7.1.6 Process Computer System
  5. Technical Specifications, Table 6.2.2-1
  6. PN2Y86MX161
  7. PN2Y87MX035
  8. PN2Y87MX111
  9. PN2Y87MX148
  10. PN2Y87MX199
  11. PN2Y88MX117
  12. PN2Y88MX190
  13. Station Nuclear Engineering Manual Volume II (NEDE-24810-Volume 2)
  14. 3D Monicore Monitor and Predictor NEDE-31307P-F, Rev. 6



## II. REQUIREMENTS

- A. AP-9, Administration of training
- B. NTP-10, Training of Licensed Operator Candidates
- C. NTP-11, Licensed Operator Requalification Training
- D. NTP-12, Unlicensed Operator training

## III. TRAINING MATERIALS

### A. Instructor Materials:

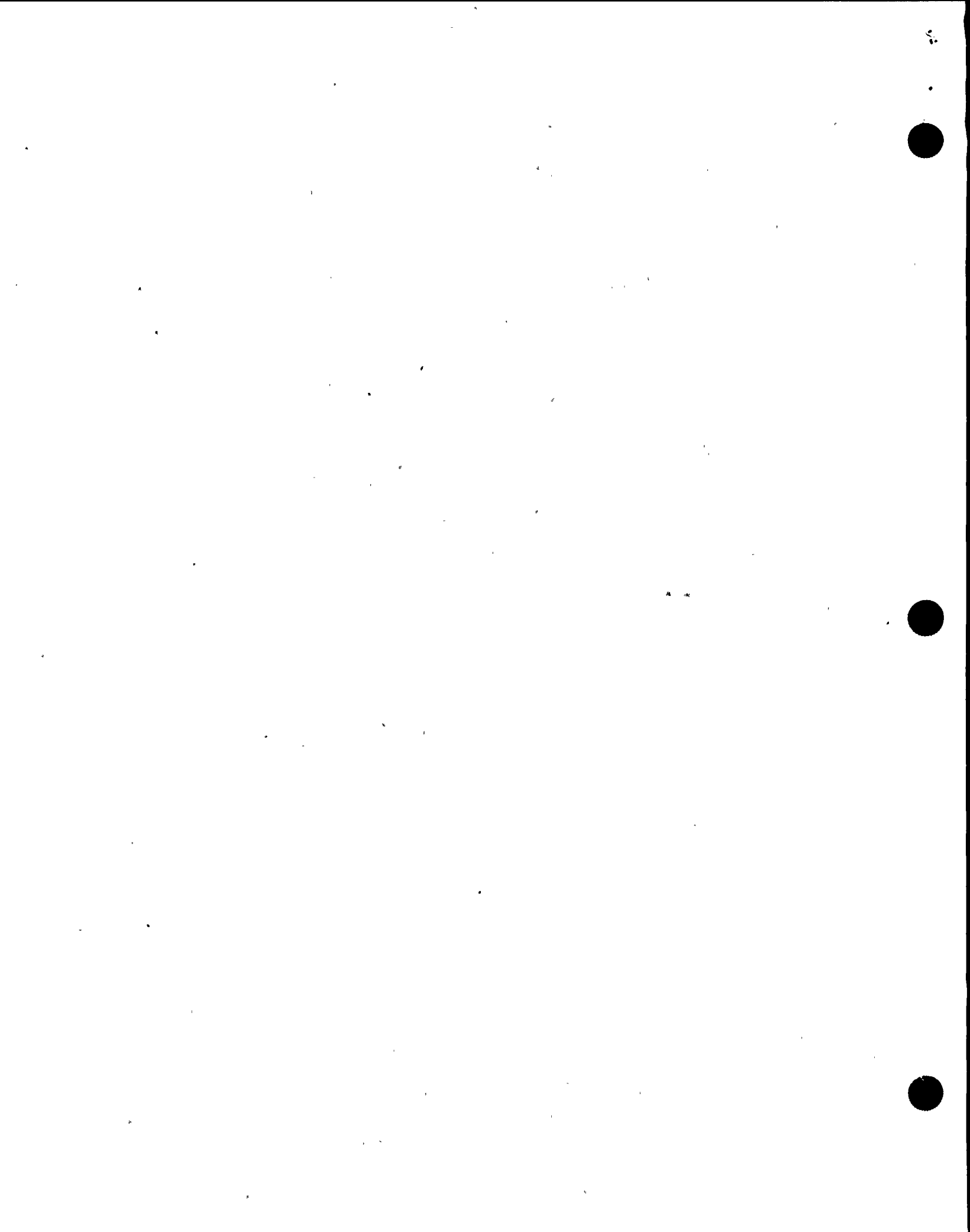
- 1. Classroom
- 2. Lesson plan
- 3. TR
- 4. Transparency package
- 5. Overhead projector
- 6. Applicable references
- 7. Trainee handouts
- 8. Board markers

### B. Trainee Materials:

- 1. Handouts (can include text, drawings, objectives, procedures, etc.)
- 2. Pens, pencils, paper
- 3. Course Evaluation Forms

## IV. EXAMS AND MASTER ANSWER KEYS

- A. Exams will be generated and administered as necessary.
- B. Exams and Master Answer Keys will be on permanent file in the records room.



V. LEARNING OBJECTIVES:

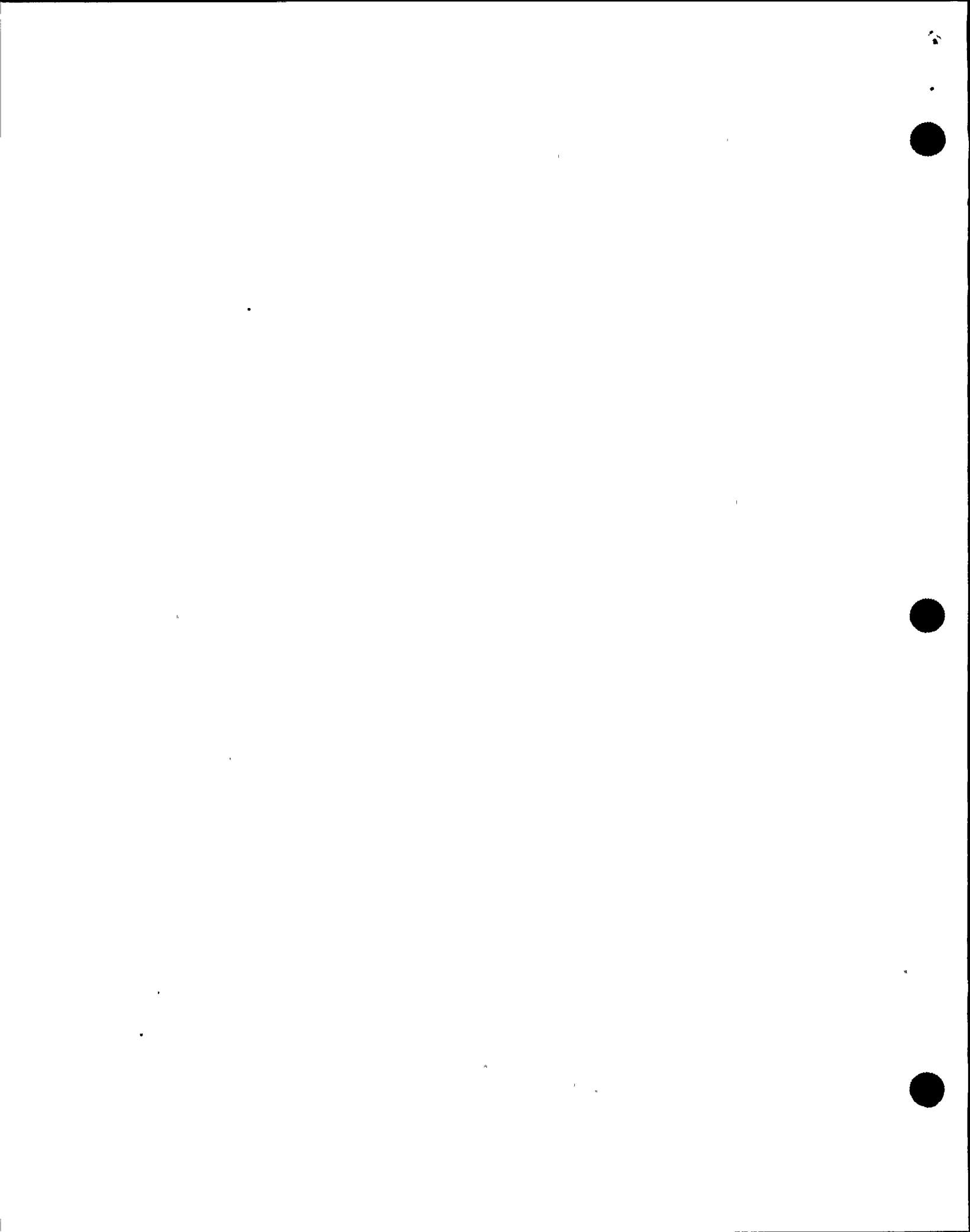
Upon satisfactory completion of this lesson, the trainee will demonstrate the knowledge to:

A. Terminal Objectives:

- TO-1.0 Obtain data from the process computer for plant operation. (2830010101)
- TO-2.0 Print out the plant log (2830020101)
- TO-3.0 Initialize the Process Computer (2839010101)
- TO-4.0 Use the plant computer (SRO only) (2839020103)
- TO-5.0 Direct performance of surveillances when plant computers are out of service. (3450550103)  
(SRO Only)
- TO-6.0 Use the plant computer to monitor thermal limits/PCIOMR. (SRO Only) (3452010103)

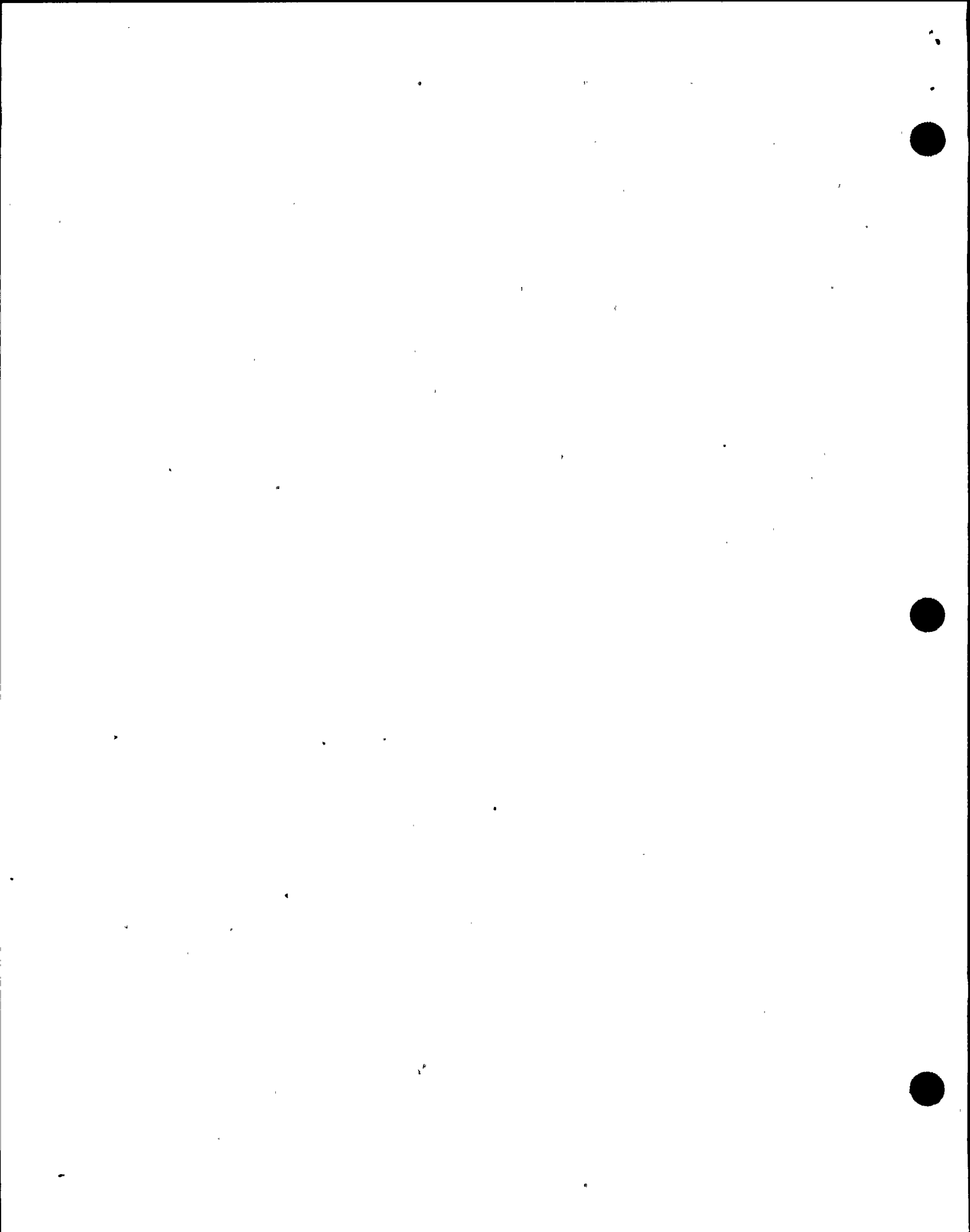
B. Enabling Objectives:

- EO-1.0 Explain the purpose and function of the Process Computer System (PCS).
- EO-2.0 Describe the purpose and function of each of the following major components of the Process Computer System.
  - Process Computer
  - 3D Monicore
  - Keyboards
  - CRT's
  - 5 digit displays
  - Typers
- EO-3.0 State the purpose of the Case ID Report
- EO-4.0 State the objectives of the Operator Demandable (OD) programs in general and OD-3 specifically.
- EO-5.0 State any interlocks associated with the Process Computer System.
- EO-6.0 For the precautions and limitations listed in N2-OP-91A, explain the basis for each precaution and limitation.





- EO-7.0 Regarding the Process Computer System, determine and use the correct procedure to identify actions and/or locate information related to:
- Startup
  - Normal operations
  - Shutdown
  - Off-normal operation
  - Annunciator responses
- EO-8.0 State the function of each alarm and video display color.
- EO-9.0 Describe how the Process Computer System is utilized during the performance of EOP's.
- EO-10.0 Describe the interrelationship of the following list of systems with the Process Computer System.
- Rod Worth Minimizer
  - Reactor Manual Rod Control
  - LPRM
  - Plant Electrical Distribution
- EO-11.0 Given NMP2 Technical Specifications and a set of plant conditions, determine the bases, limiting conditions for operation, limiting safety system setting, and/or action statement as applicable.



I. INTRODUCTION

- Self
- Fill out TR
- Inform trainees of method of evaluation
- Brief trainees on use of trainee evaluation forms
- Review Learning Objectives

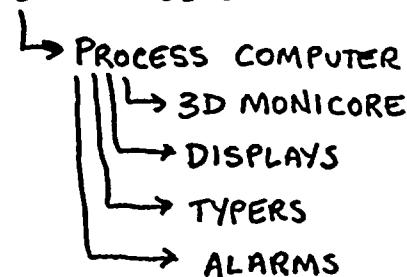
A. System Purpose

1. Provides monitoring of various inputs called plant process variables and issues appropriate alarms and messages if limits are exceeded or trip signals are received.
2. Performs calculations using selected inputs to provide the operator with essential plant performance information through a variety of logs, trends, summaries, and data displays.

B. General Description

1. The PCS is a digital computer system that:
  - a. Receives process inputs from the plant.
  - b. Converts the inputs to meaningful form for display on video monitors and typers.
  - c. Performs calculations on these inputs.
  - d. Provides information that is necessary for the effective operation of the plant.

PLANT PROCESS VARIABLES



EO-1.0



2. The PCS interfaces with various plant instrumentation and performs the following functions:
  - a. Scans process variables
  - b. Commits data to memory
  - c. Transfers data
  - d. Generates information displays
  - e. Initiates self-monitoring

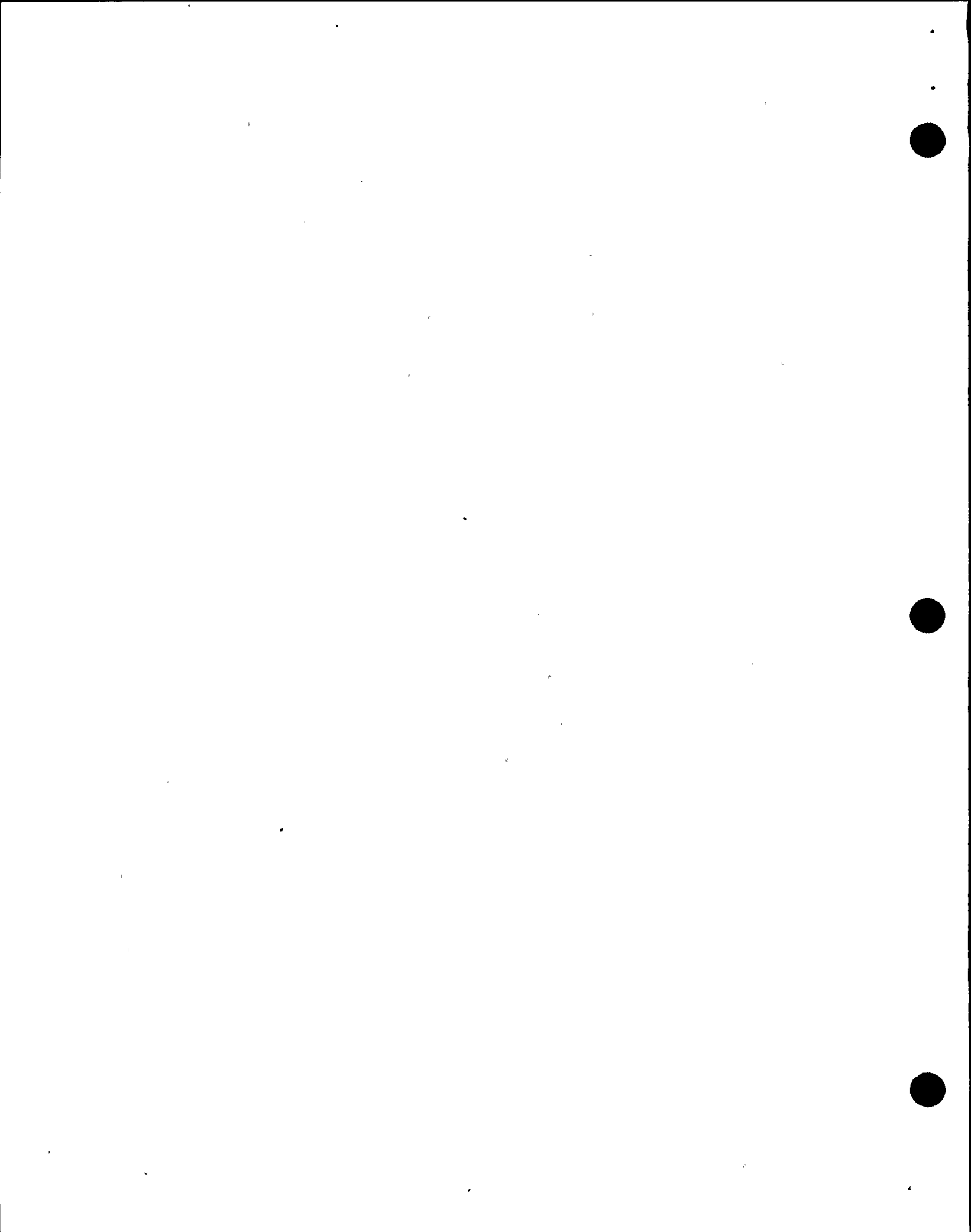
## II. DETAILED DESCRIPTION

### A. Process Computer System

1. PCS consists of the following components which are used to provide information to Control Room operators:
  - a. Process Computer (Honeywell Mod 4500)
  - b. 3D Monicore System (GE 3D Monicore software installed in a Digital Equipment Corporation Microvax 3800 Computer).
  - c. Two keyboards
  - d. Four CRT's
  - e. Three types (utility, log, and alarm)
  - f. Four 5 digit displays
  - g. 2 Vax 3100 work stations with printers (for use with 3D Monicore software).

Show slides of Computer Room if available  
(contact NLO instructors for slides)

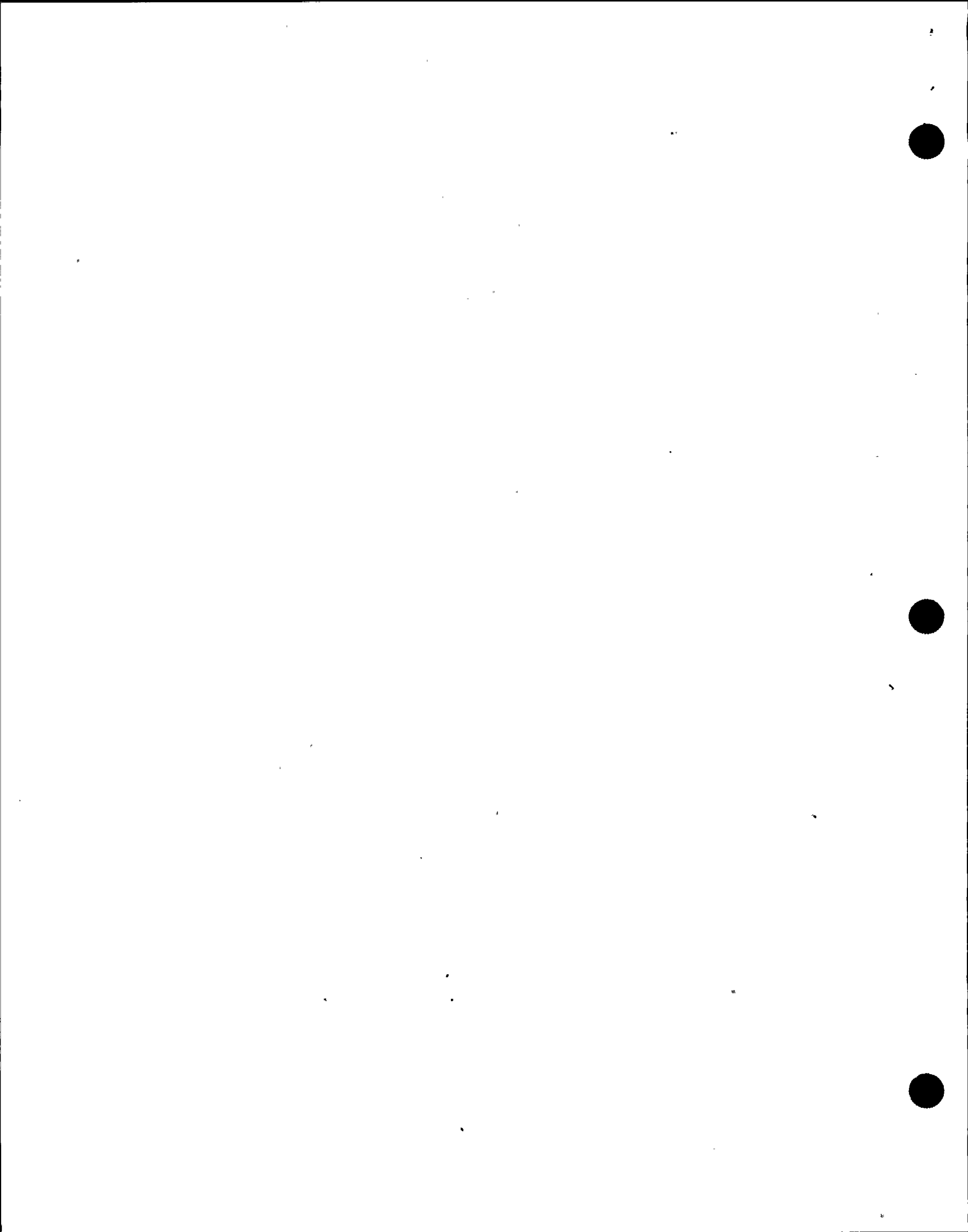
EO-2.0



2. PCS has the ability to provide the operator with a multitude of information including:
  - a. Specific parameter display
  - b. Trend recordings
  - c. Logs
  - d. Alarm listings
  - e. Summaries
3. The 3D Monicore is a system of programs designed to monitor the plant's fuel performance and provide information to evaluate past, current, and future fuel performance.
  - a. Benefits of the 3D Monicore include:
    - Elimination of Lower Power TIP sets during reactor startups.
    - Asymmetric core operation which would allow continued operation with an inoperable control rod that is inserted for maintenance without derate of the unit.
    - Predictive capabilities for planned reactivity changes which reduces the uncertainty and conservation of rod movements, which allows increased generation.

Utilize transparencies and handouts of 3D Monicore displays to show trainees available data.

EO-2.0





- b. NSSS calculations have been removed from the PMS computer and put on the 3D Monicore computer.
- c. The 3D Monicore System uses a Microvax 3800 computer and utilizes plant data from:
  - 1) PMS Computer (Honeywell 4500)
  - 2) NUMAC Rod Worth Minimizer Computer (for rod position data)
- d. Control rod position data from the RWM is transmitted from the RWM to 3D Monicore Computer every 2 seconds.
- e. Rod position changes, selected rod changes, and drive initiation/termination is input to the Monicore computer within 4 seconds.
- f. If the Microvax 3800 Computer is lost, the Vax 3100 work station in the computer room will be used for core monitoring calculations. Additional memory has been added to this system to enable it to act as the back-up.
- g. Connection of the Vax to the PMS will not adversely affect the PMS.

Show TP of Relay Room floor plan. Point out locations of Vax workstation.

The Vax computer uses the utility typer for messages.



**B. Video Demand Services****1. Periodic and On-Demand Programs**

- a. These programs calculate and edit the periodic, daily, and monthly core performance logs.
- b. They also provide a variety of operator-demandable data arrays related to nuclear boiler performance.
- c. Three periodic and 6 on-demand (OD-1,2,3,7,8,14)

**2. NSS MENU - is used to:**

- a. Initiate NSS functions
- b. Review NSS function program status
- c. Review NSS function button status
- d. Review the NSS function ID (identification) summary.

-NSS: Nuclear Steam Supply

**3. 3D Monicore Report Menu**

- a. The following data is available from the main menu:

- 1) Periodic logs
- 2) Core power and flow logs
- 3) Bundle data
- 4) Control Rod Data
- 5) PCIOMR Reports
- 6) LPRM Reports
- 7) Power/Exposure Distributions
- 8) TIP Data

Show TP of Monicore Main Menu

Control Room options are:

1. Case ID
2. Reports current
3. Run official 3D
4. Run fast
5. Acknowledge PCIOMR Alarms
6. Auto monitor status
7. Log messages

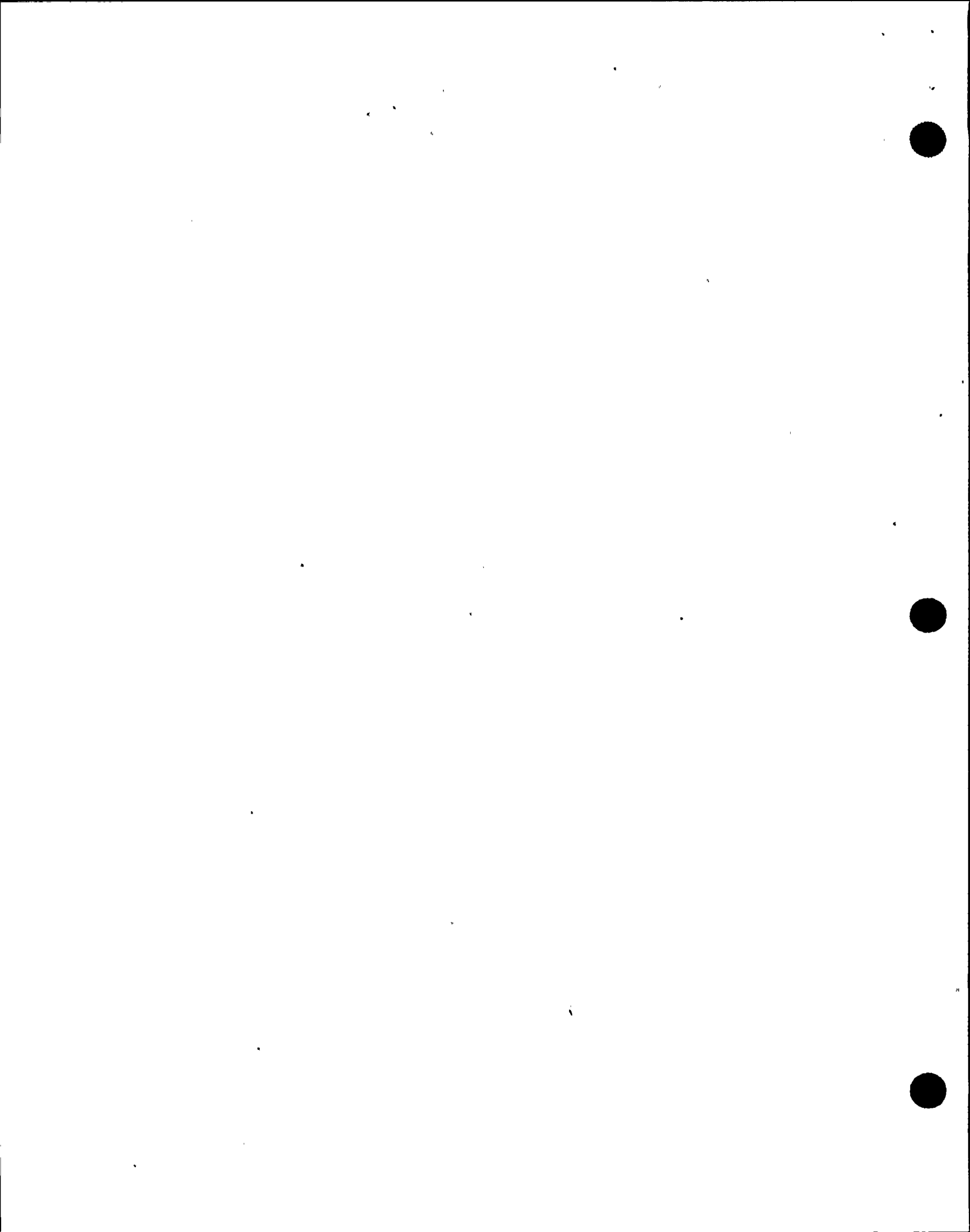


- 9) Isotopic Composition
  - 10) 2D3D Log
  - 11) Control Blade Life
  - 12) Performance Log
  - 13) Fuel Tracking
- b. Case ID Report (Periodic Log)
- 1) Runs automatically at two (2) hour intervals
  - 2) Can be demanded from the Vax work station operator's console.
  - 3) Objective: calculate core power distribution, thermal limits, and other data needed for the periodic core performance log and for the operation of other programs..
- c. Daily Core Performance Summary (Periodic Log)
- 1) Provides a summary of the operating conditions at the time of each Official Monitor Case for the day specified.
- d. Monthly Core Performance Summary (Periodic Log)
- 1) Provides a summary of the daily logs for the month specified.

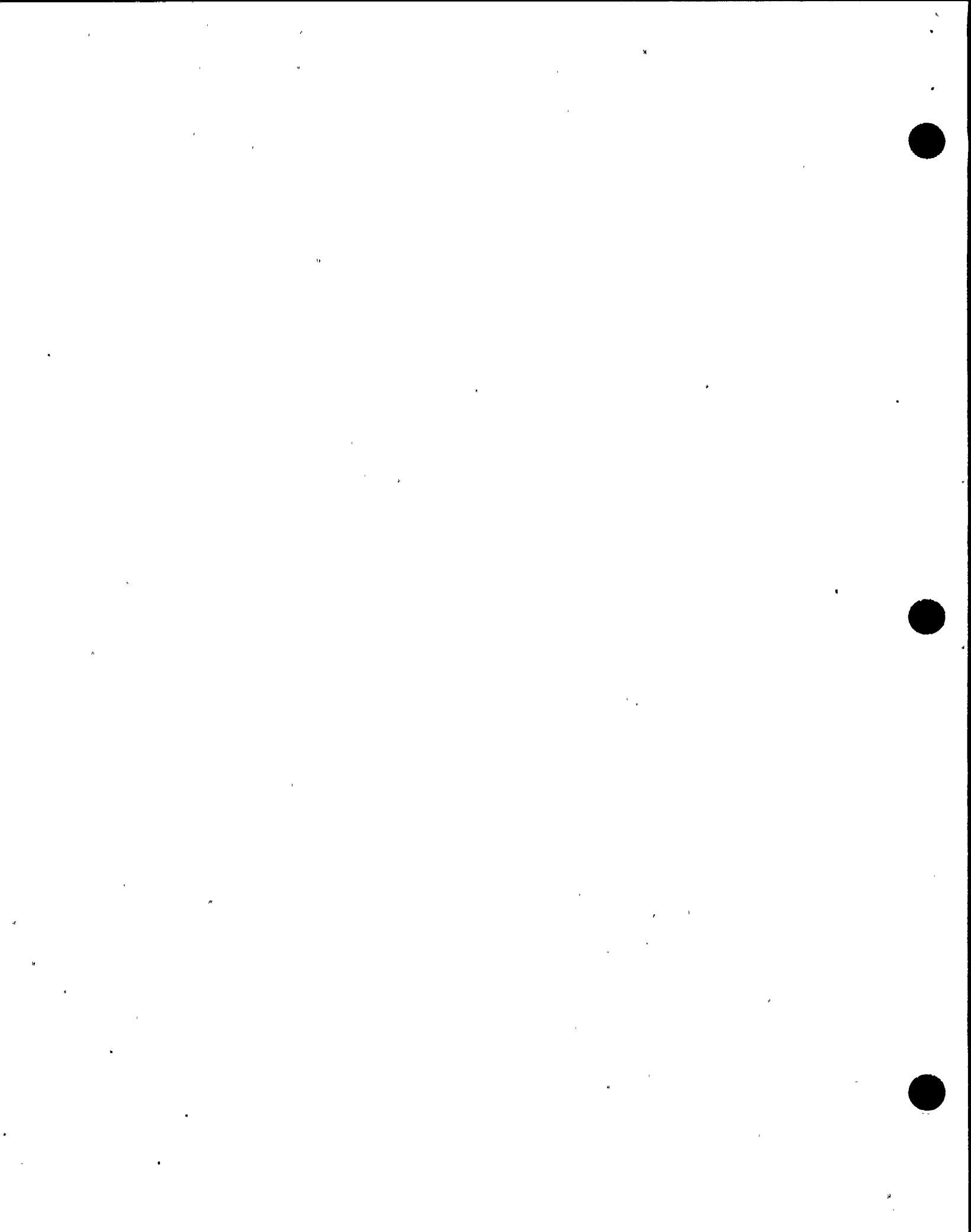
NOTE: When this program was part of PCS, it was the P1 edit. P1 through P4 have been removed from the PCS and replaced by the Case ID Report, Daily, and Monthly summary logs on the 3D Monicore.

EO-3.0

- Distribute handouts of the Case ID Report and point out data available.
- Ask trainees to read values for FPAPDR, MAPRAT, MFLCPR, etc.
- Show TP of Daily Core Performance Summary and point out data available.
- Show TP of Monthly Core Performance Summary and point out data available.



- e. Core Power and Flow Log
  - 1) Displays thermal hydraulic heat balance data. •Show TP-18 (NSSS Heat Balance) and point out data available.
- f. Bundle Data
  - 1) Displays thermal limits of an individual bundle or bundle type
  - 2) A third option displays limiting exposure margins for a specified bundle type.
- g. Control Rod Data
  - 1) Displays current control rod positions found in the live data file.
- h. PCIOMR
  - 1) PCIOMR monitoring program calculates, edits, and displays data pertinent for monitoring and applying the PCIOMR procedure. •Preconditioning Interim Operating Management Recommendation  
•Review Pellet Cladding Interaction with trainees. Discuss the need for preconditioning with non-barrier fuel.
- i. LPRM Reports Menu has the following data available:
  - 1) LPRM failure status: log case/live
  - 2) LPRM deviations log
  - 3) LPRM exposure log and exposure correction log correction factors





- 4) LPRM remaining life
  - 5) LPRM gain adjustment factors
  - 6) LPRM calibration currents
  - 7) Instrument readings status
- j. Power/Exposure Distribution
- 1) Core divided into R-Z geometry
  - 2) Radially (R) core is divided into eight (8) concentric rings.
    - Ring one in center to eight at the core edge
    - Each slice represents one node.
  - 3) Axially (Z) the core is divided into 25 slices.
  - 4) Power Distribution: relates the target power distribution to actual and is expressed as a deviation percentage.
    - Show TP-19 (Core Axial and Radial Distribution) and point out data available.
  - 5) Exposure Distribution: relates the target exposure distribution to actual and is expressed as a deviation percentage.
- k. TIP Data/Comparison Report
- 1) Provides: current information, past TIP data.
  - 2) Allows comparison of two (2) cases using calculated TIP shapes.



- l. Isotopic Composition
  - 1) Provides weight in grams of:
    - U-235, 236, 238
    - Np-237
    - Pu-238 through 242
- m. 2D3D Log Reports
  - 1) Prints out two (2) or three (3) dimensional arrays of most calculated parameters.
- n. Control Blade Life Report Menu
  - 1) Used to estimate remaining control blade lifetime from any full core case.
- o. Performance Logs
  - 1) Used to compare key items between two (2) cases.
- p. Fuel Tracking
  - 1) Used to trend historical data for up to ten (10) bundles.
4. Operator Demandable Programs (OD)
  - a. Whole-Core LPRM Calibration and Base Distributions (OD-1).

EO-4.0

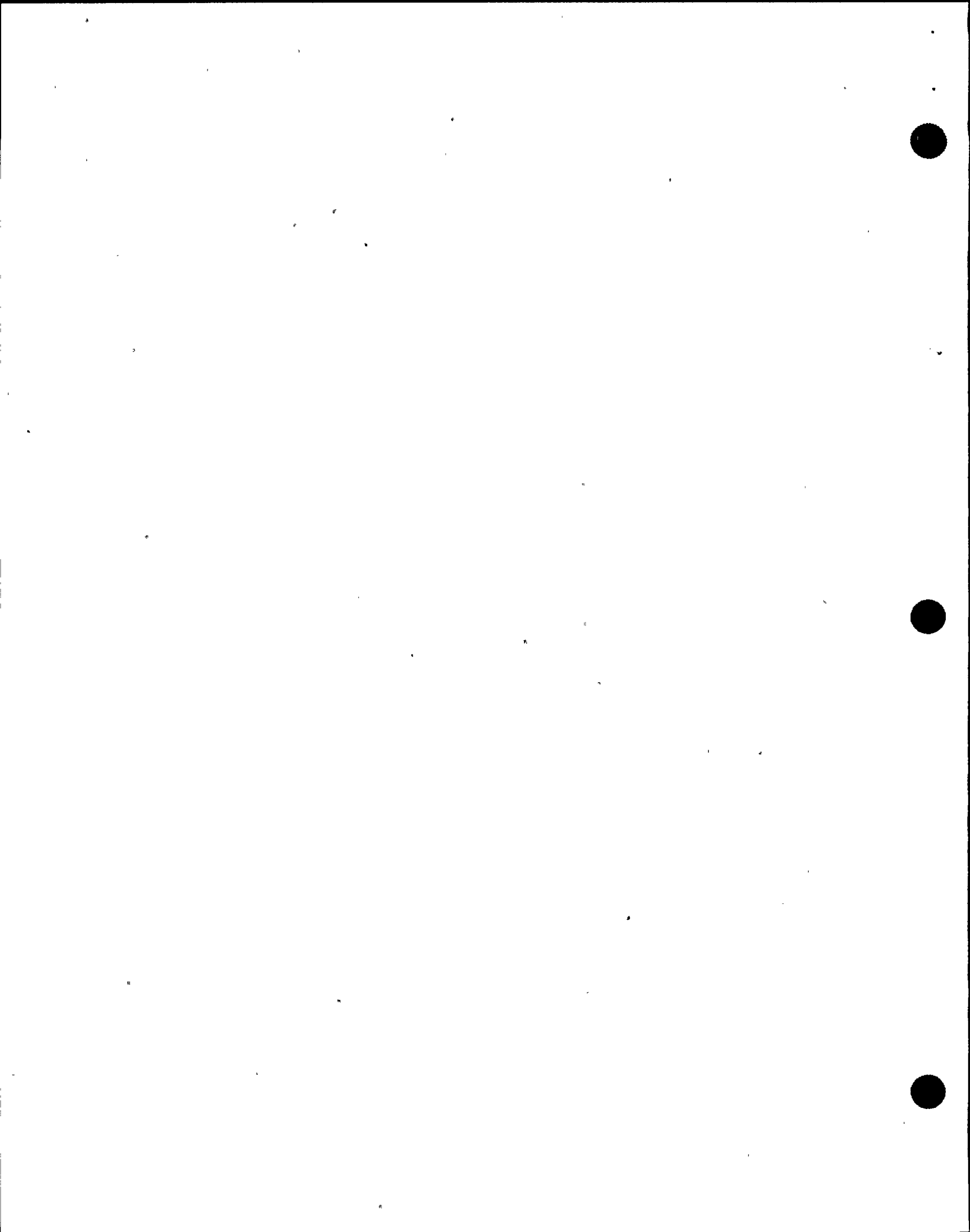


- 1) OD-1 determines LPRM calibration constants which, when multiplied by the actual LPRM readings, produce calibrated LPRM readings that are proportional to radially cross-calibrated TIP signals read at the LPRM locations.
  - 2) OD-1 monitors the TIP, LPRM, and all other accumulated data required to perform the calibration calculations and to edit the results of these calculations.
- b. Specified LPRM Substitute Value and Base Distribution (OD-2).
- 1) OD-2 uses the TIP system to:
    - a) Determine the accurate substitute LPRM readings (calibrated and full power adjusted) for any failed LPRM sensor, and/or
- Show TP of OD-1 print out. Point out data available
- Distribute handout of OD-1.
- Show TP of OD-2. Point out available information

EO-4.0



- b) Determine an updated BASE distribution (an axial distribution calibrated, full power adjusted TIP readings) in any in-core ion chamber string for which the axial difference distribution used in PI has become excessively large.
- c. Core Thermal Power and APRM Calibration (OD-3). -OD-3 can be run by depressing the NSS-1 Key.
- 1) OD-3 calculates the core thermal power by solving an energy balance on the Rx vessel. EO-4.0
- 2) OD-3 also determines the core flow rate.
- 3) It also calculates the updated APRM calibration constants, gain adjustment factors (AGAF), and trip levels all based upon present APRM readings and the newly calculated core thermal power. -Distribute handout of OD-3. -Show TP of OD-3 and point out data available. -Utilize Appendix A of NEDE-24810 Volume II (Glossary of Computer Abbreviations) as necessary.





- 4) AGAF's are required to compensate for loss of LPRM detector sensitivity with exposure, or for APRM amplifier output changes which may occur after substantial shifts in the core power distribution.
- g. Present Control Rod Positions (OD-7)
- 1) OD-7 Objectives:
- a) Option 1 displays the most recent values in the rod position array (core-map presentation) which is continuously updated only during movement of a selected rod. The array is stored in the computer core.
- b) Option 2 forces the updating of the array by calling for a new scan of all rods, and displays the resulting array.

Briefly review operation of LPRM's with trainees. (if necessary)

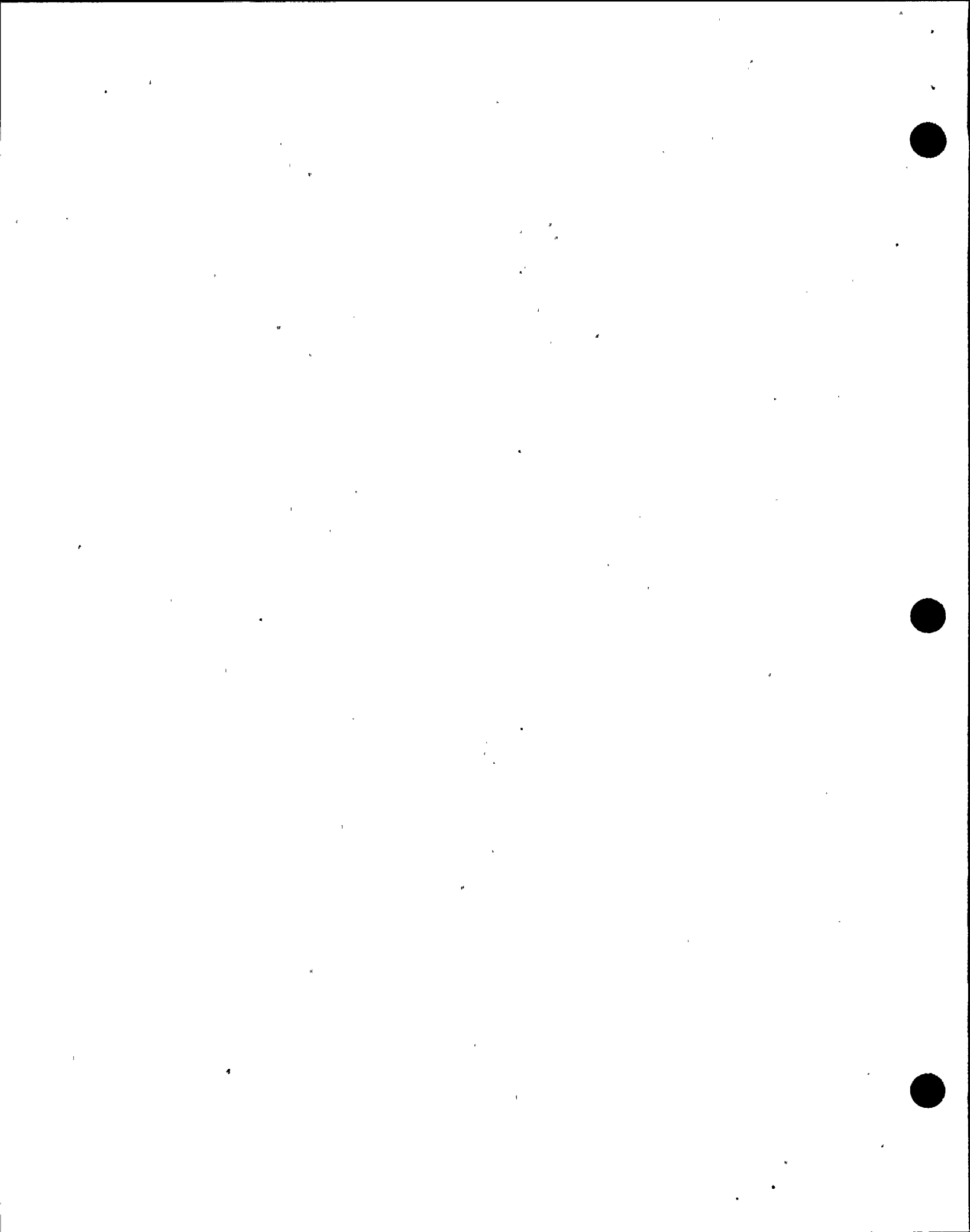
-Show TP of OD-7. Point out data available.

-Computer limits the Control Room to Option 2.

Q: When is an OD-7 requested as part of the EOP's?

A: In attachment 14, Alternate Control Rod Insertion.

EO-4.0



- 2) Option 2 should be used when the operator believes that any previously failed rod position equipment has been repaired and is now operative. Additionally the Operator may employ Option 2 when any doubt exists with regard to the stored rod position array.  
(eg: half scram testing, scrambled rod)
- h. Present LPRM Readings (OD-8)
- 1) OD-8 Objective: to calculate and edit the present LPRM readings.
  - 2) When OD-8 is initiated:
    - a) A rapid (6 seconds) scan of all LPRM's is run.
    - b) Calibration constants are applied to the readings.
    - c) Tests are made to show whether the LPRM readings are within "reasonable" high and low limits.  
If they are not, the last good value is stored instead of the "failed" reading.

-Show TP of OD-8. Point out available information.

EO-4.0



n. Substitute and Unknown Control Rod Positions (OD-14).

1) OD-14 Objectives:

- a) To update and/or edit the stored list of substitute notch positions for rods whose position monitoring equipment has failed, or
- b) To edit the coordinates of rods whose positions are not known.

- Total of 11 separate options.
- Options 1 through 4 provide for updating/editing the list of substitute positions of control rods which have failed automatic monitoring equipment.
- Options 5 thru 11 set or reset various program flags affecting the operation of periodic programs.

EO-4.0

C. Miscellaneous Services.

- 1. Several other services are available from the PCS, but are accessed only from the Computer Room.



- a. Most concern testing and maintenance of the computer, programs, and various peripherals.

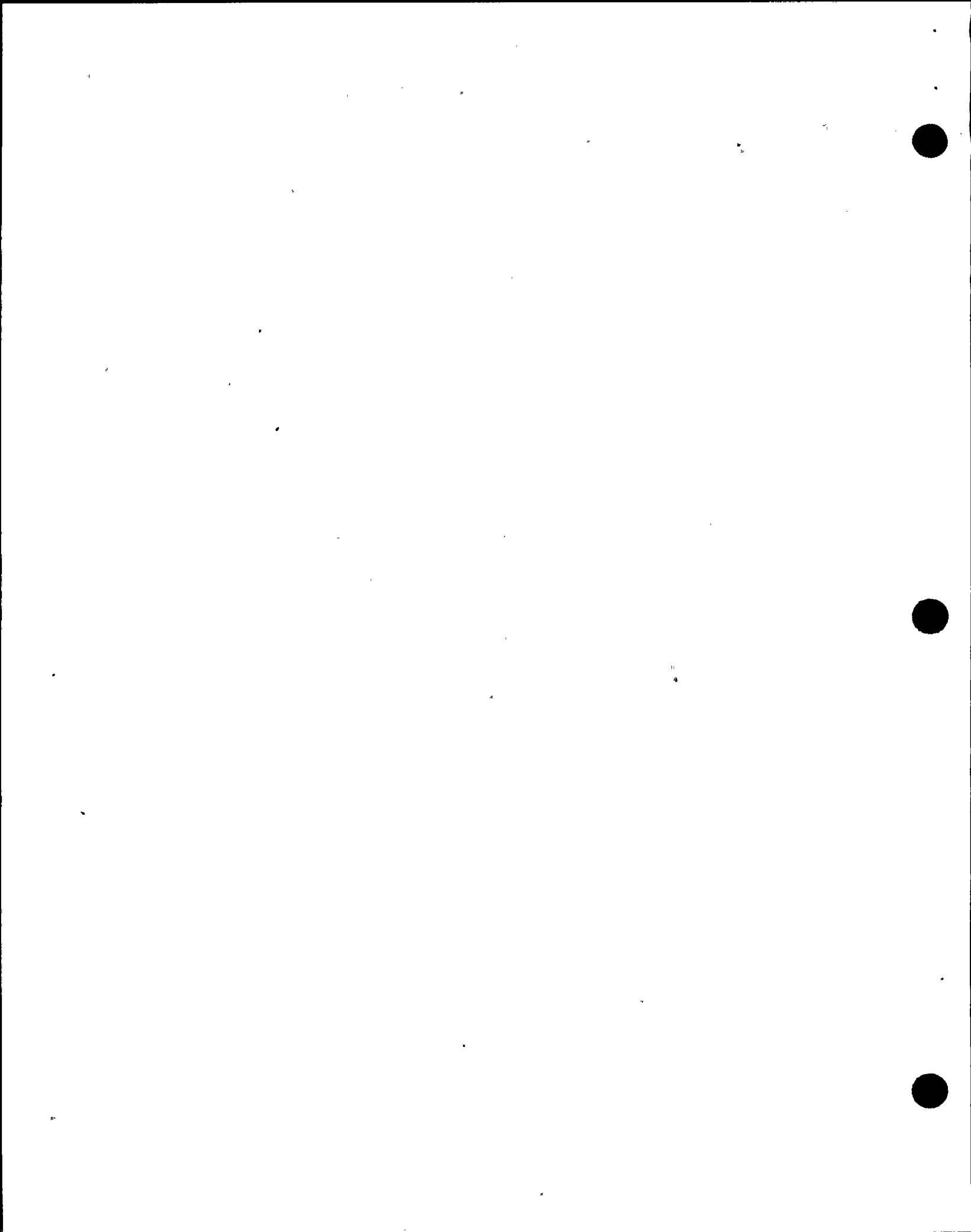
D. RWM

1. The Rod Worth Minimizer assures the maintenance of low control rod worths, thereby minimizing the consequences of a control rod drop accident and optimizing the utilization of fuel.
2. The RWM employs the discrete and periodic monitoring of the positions of all control rods, and compares these positions to a predefined control rod sequence stored in the computer's memory.
3. The RWM gives alarms and rod blocks to ensure adherence to the stored sequence when operating below the LPSP of 20% Rx power.  
NOTE: See the Reactor Manual Control System chapter for details of RWM operation.

- Show TP of NUMAC RWM while briefly discussing its operation.

E. Control Rod Interface Programs

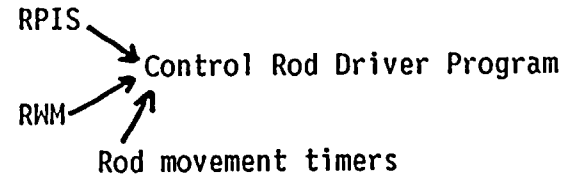
1. Control rod interface programs perform the scanning, alarming, and data updating necessary for monitoring control rod movements.





- a. The Control Rod Driver program monitors the Rod Position Information System (RPIS), the RWM and Rod Movement SYSCNT timer for any change in control rod status.

Draw on board:

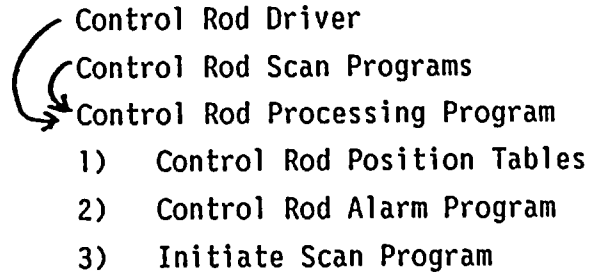


- 1) If any of these services indicates rod movement or a control rod scan, the Control Rod Driver turns on the Control Rod Processing Program.

- b. The Control Rod Processing Program maintains and updates internal control rod position tables.

Draw on board:

- 1) This data is used to:
- Initiate the Control Rod Scan Program.
  - Set up alarm messages for printout by the Control Rod Alarm program.



- c. The Control Rod Alarm program types out control rod alarm messages as required by the Control Rod Processing Program (discussed further in Abnormal Operations).



## III. INSTRUMENTATION, CONTROLS AND INTERLOCKS

## A. Keyboard Functions

1. All functions are available from the Operator's CRT keyboard (C91-K600), Utility CRT keyboard (C91-K601), or the Vax Workstations.

Show TP of keyboard. Point out function keys.

## B. Trend Pens

1. Three trend recorders can be used to record trends of selected ID values.
  - a. Vertical section of panel 603
  - b. Vertical section of panel 601 left side.
  - c. Vertical section of panel 851 right side.

Show TP's of P601, P603, P851 and point out recorders.

## C. Digital Displays

1. There are four digital displays associated with the BOP digital cabinet.
  - a. Located in the P603 vertical section
  - b. On the left-side are:
    - 1) A digital clock (HH:MM)
    - 2) A 4-digit selectable display

Point out locations on TP of P603.



- c. On the right-side are two 5-digit selectable displays.

D. Interlocks

When one program is being run, another program may be rejected depending on priority.

EO-5.0

IV. SYSTEM OPERATION

A. Precautions & Limitations

Review precautions and limitations of OP-91A with trainees.

EO-6.0

B. Startup

Review startup procedure of OP-91A with trainees

System startup will be done by Computer

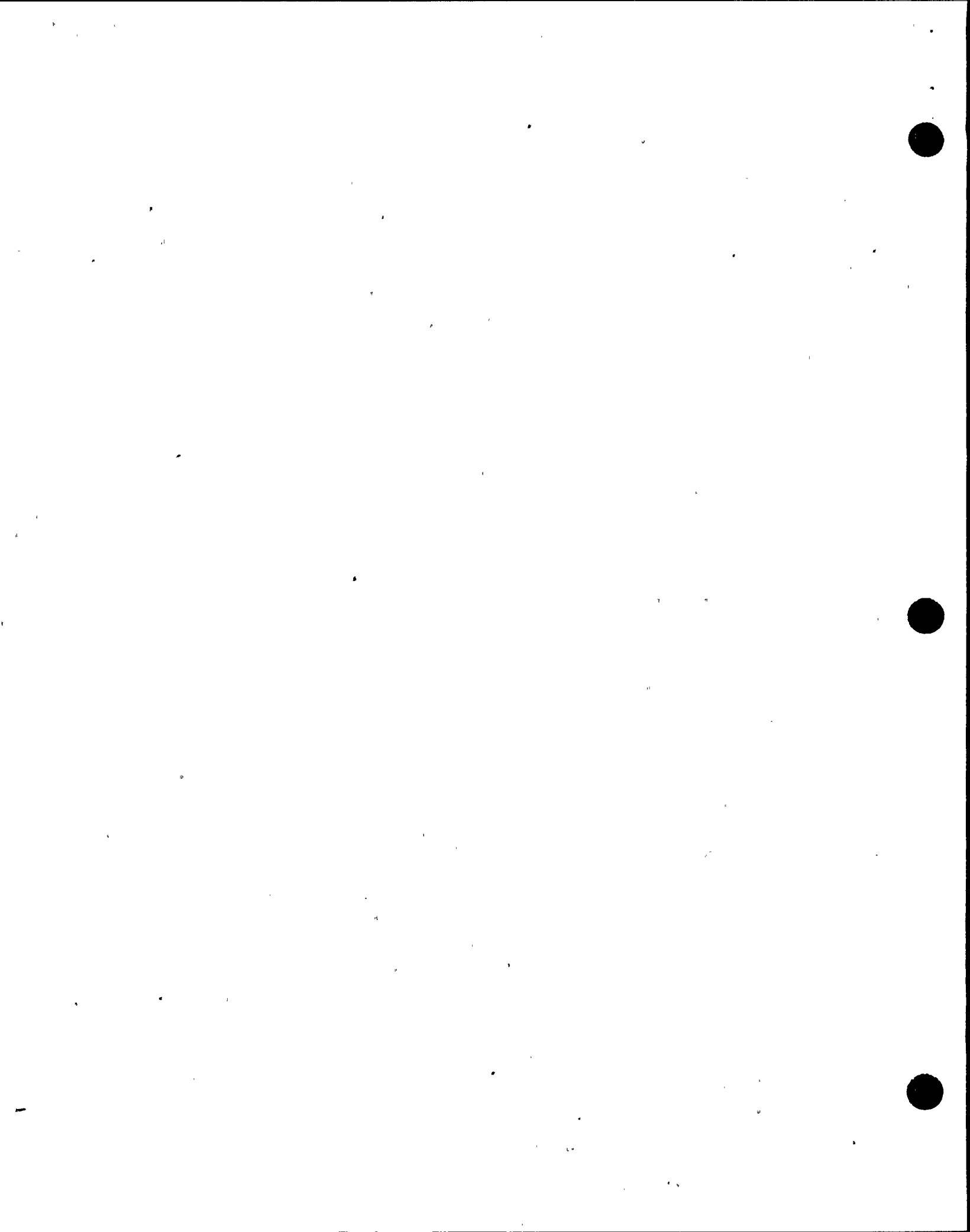
EO-7.0

C. Normal Operation

Department personnel

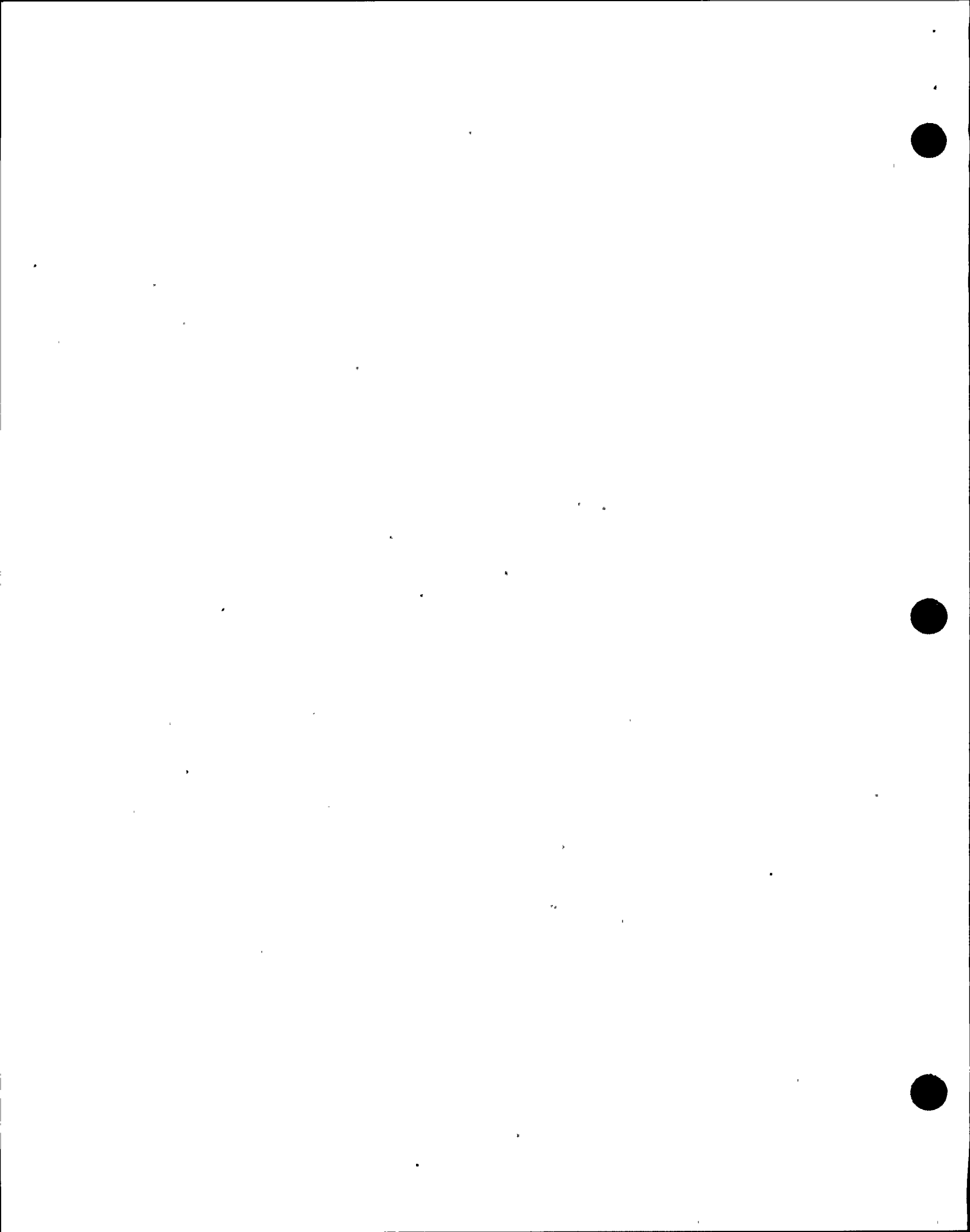
1.

- a. PCS is normally in operation, continuously scanning the various inputs.
  - 1) All readouts are in the applicable engineering units.
  - 2) All information is stored in the main memory, and is periodically recorded on magnetic tape ("dumped") for safekeeping.
- b. 3D Monicore system is normally in operation and available for providing fuel performance related information to the operator from either of the Vax Workstations.



2. Operator request for console operation:
  - a. Results in a brief interaction with the computer software: concise instructions are displayed which detail the information required and the operator's choices.
3. A desired function is initiated by:
  - a. Depressing
    - 1) A dedicated function button (e.g., POINT DATA), or
    - 2) A menu selection function button (i.e., INIT or NSS MENU),
  - b. Entering the corresponding function number and
  - c. Depressing the EXEC action key (and ENABLE).
4. After a function has been selected, a display or response message is displayed on the CRT in use.
  - a. This documents the initiation of the selected function and/or provides for the entry of additional data required to operate the function.

Show TP's of CRT displays and point out information available on each.





## D. Shutdown

The system will not be shutdown except for maintenance, and this will be done by Computer Department personnel.

EO-7.0

## E. Infrequent Operation

Review each of these briefly with trainees.

## 1. Static or Dynamic Program Inhibition

- a. If a request to initiate a program is not honored due to static or dynamic priority considerations, an appropriate error message will be written to inform the operator of such.
  - 1) If the request came from the operator's console:
    - Further attempts to initiate the desired program would have to be operator initiated.
  - 2) If PCS demanded the program, the computer will keep trying until it is successful.

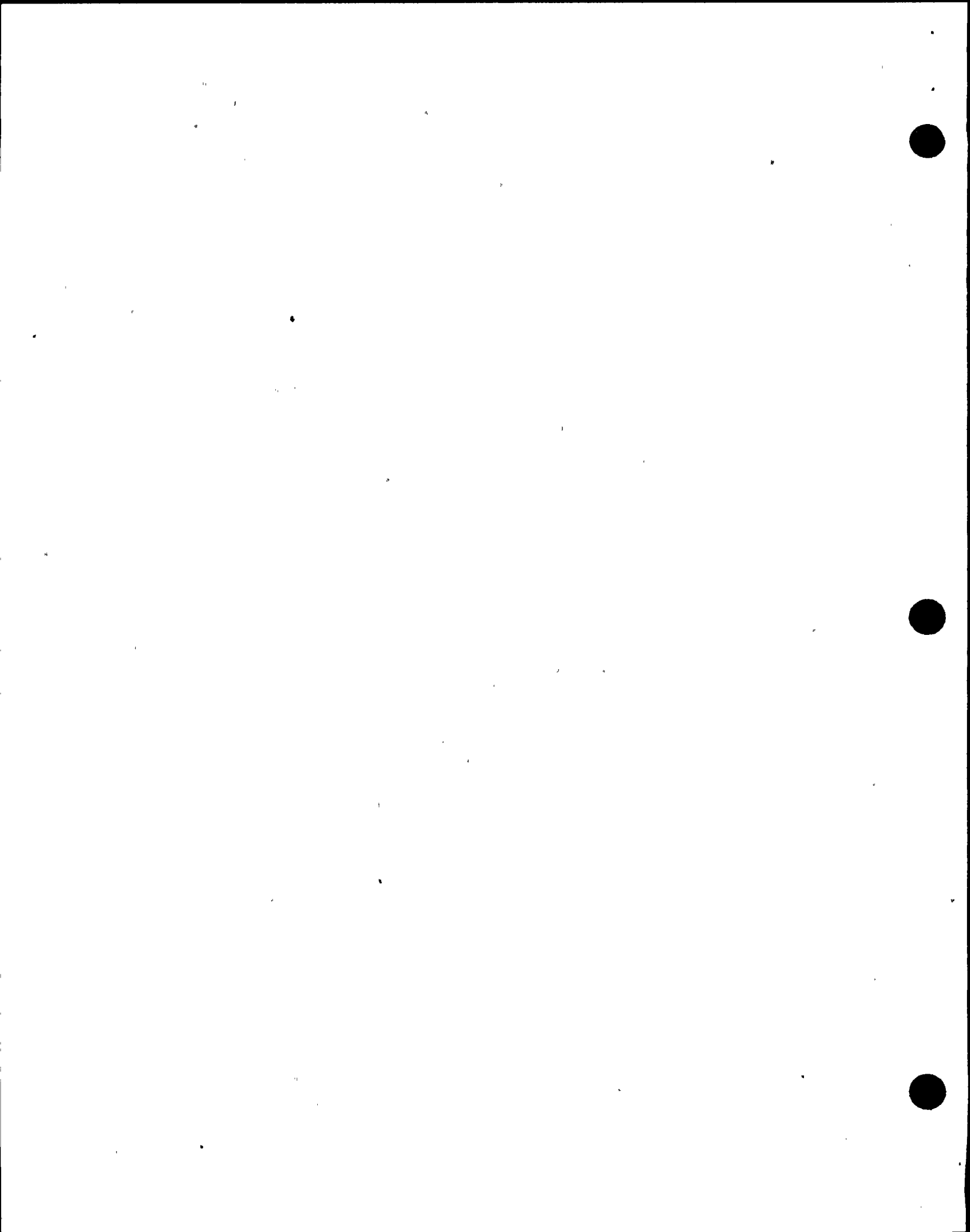
## 2. TIP Scan

- a. PCS has three programs to provide the TIP, LPRM, and APRM readings required for the operation of NSS programs OD-1 and OD-2.
  - 1) Data is collected during TIP traverses (See TIP chapter for details).

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- 2) From the point where the TIP probe starts downward through the core from the top of the active fuel, the TIP Scan program will scan:
  - a) The TIP probe readings as it traverses the core, and
  - b) The APRM and LPRM readings at various points in the traverse.
- b. The TIP alarm program will monitor the traverse, and alarm TIP system errors such as:
  - 1) Improper speed during traverse
  - 2) TIP not running in the proper channel
- c. The Control Rod Processing program will initiate a warning message if a rod movement request is detected, stating that rod movement during a TIP traverse will degrade the accuracy of the core calculations.



## F. Off-Normal Operation

Review off-normal section of OP-91A with trainees.

Off-normal conditions of this system require assistance from computer specialists.

EO-7.0

## G. Annunciator Response

EO-7.0

## 1. Alarms

a. Are initiated automatically in response to a variable which has reached a specified condition.

Review loss of all annunciators section of OP. Stress increased manning requirements.

b. A summary of all variables currently in alarm can be demanded by the Control Room Operator.

c. Provided for information and historical perspective.

## 2. When a variable is in alarm state so that its value is not usable:

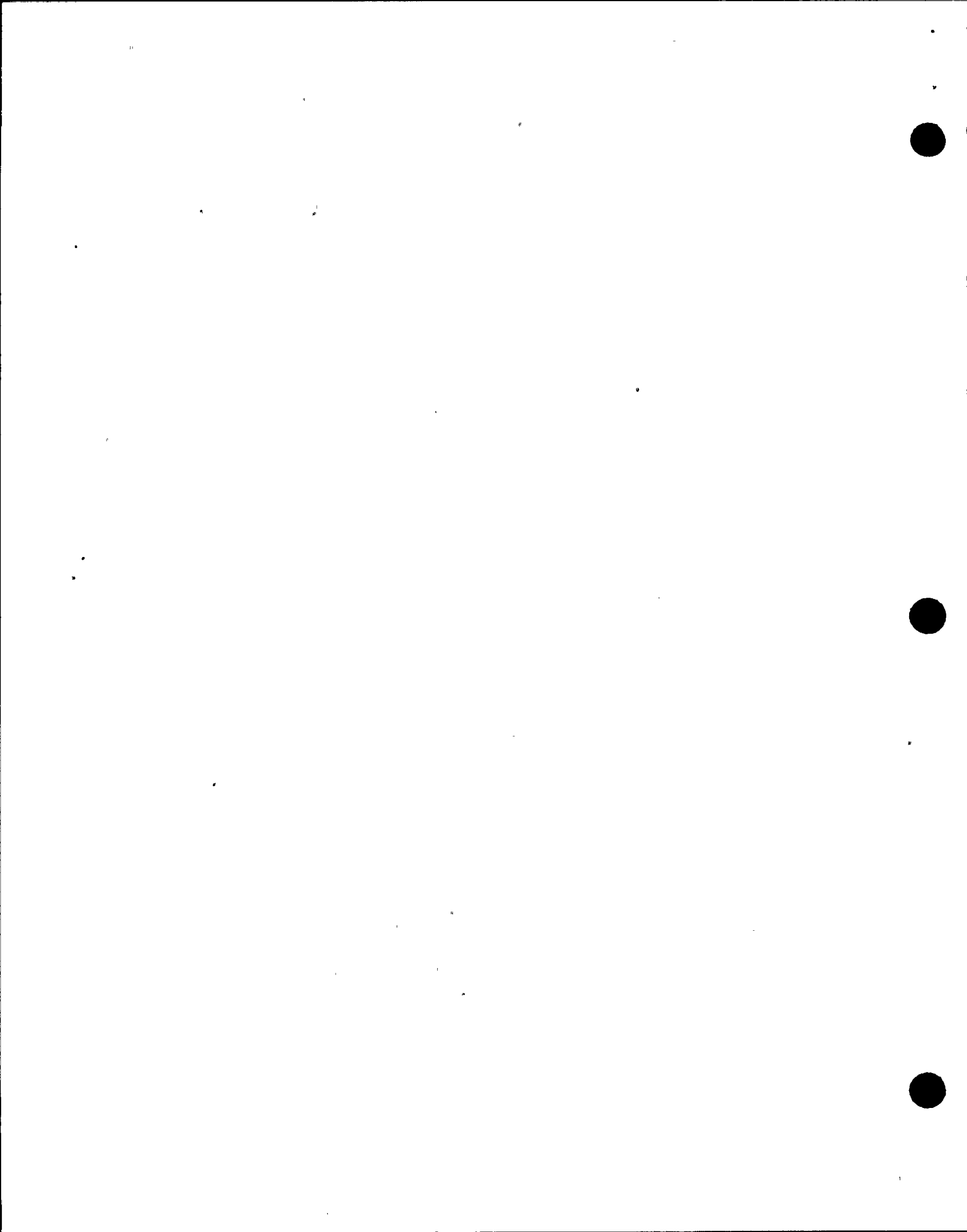
- Last good value is used
- A code (red asterisk or data in white) accompanies substituted value indicating variable is temporarily deleted from processing.
- Updated normally after it returns to a usable condition.

## 3. Alarm Categories

EO-8.0

- a. Cat 1: Red -- Equipment trip alarm
- b. Cat 2: Yellow -- Pre-trip alarm
- c. Cat 3: Cyan (Light Blue) -- Trouble and local alarm

Show trainees these indications in the simulator if possible.



4. Selected NSS signals are scanned once each second to monitor process variable alarms. If they have changed state from previous condition then:
  - a. Alarm the condition/return to normal
  - b. Single stroke bell
  - c. Print description message
5. Control Rod Alarm Program
  - a. Types out the following alarms associated with rod movement:
    - 1) Rod Drift Alarm
    - 2) RPIS Timing Error
    - 3) RPIS Malfunction
    - 4) Rod XX-YY. From OO to NN.
    - 5) OD-1/2 Control Rod motion will degrade calibration accuracy
6. Post Trip Log
  - a. A printout on the Utility typer.
  - b. Provides an operations log of data history prior to and following a plant trip.
  - c. The NSS Post Trip log will aid the operator in establishing the cause of a Rx scram.

Bring a portion of the post trip log to the classroom and show trainees format in which data is recorded.





- d. The log is initiated:
  - 1) Automatically on receipt of a scram, or
  - 2) Is demandable through LOG SVCE on the operator's console.

7. Sequence of "Events" Log

- a. Provides a chronological log on the alarm typer of rapidly occurring plant instrumentation alarm status changes.
- b. Aids the operator in establishing the cause of a Rx scram and identifying events which may or may not allow the Rx to return to normal operations.
- c. Also aids in the verification of the proper operations and assessment of ECCS operation.

Show trainees a portion of the "sequence of events" log from the simulator.

H. EOP Use

- 1. The Process Computer System is utilized in support of the EOP's through the use of:
  - a. Sequence of Events Log (as described above)
  - b. OD-7 (to determine control rod positions)

EO-9.0



## V. SYSTEM INTERRELATIONS

## A. Rod Worth Minimizer

Designed to constrain control rod positioning according to predefined sequences. These sequences are designed to limit the maximum reactivity worth of individual control rods, thus minimizing the consequences of a control rod drop accident.

## B. Reactor Manual Rod Control and LPRM

RXMC and LPRM send data to the PCS, via the computer interface module.

## C. Plant Electrical Distribution

PCS is powered by 120V, 3 phase, 2VBS-PNLC100 which is supplied by UPS bus 2VBB-UPS1G.

Q: Does the RWM provide information to the 3D Monicore computer, or vice versa?

A: RWM to Monicore

EO-10.0

## UPS1G Power Supplies:

Normal: US3 or US4 via 2VBB-TRS1

Maintenance: USG

Battery: 2BYS-SWG001C

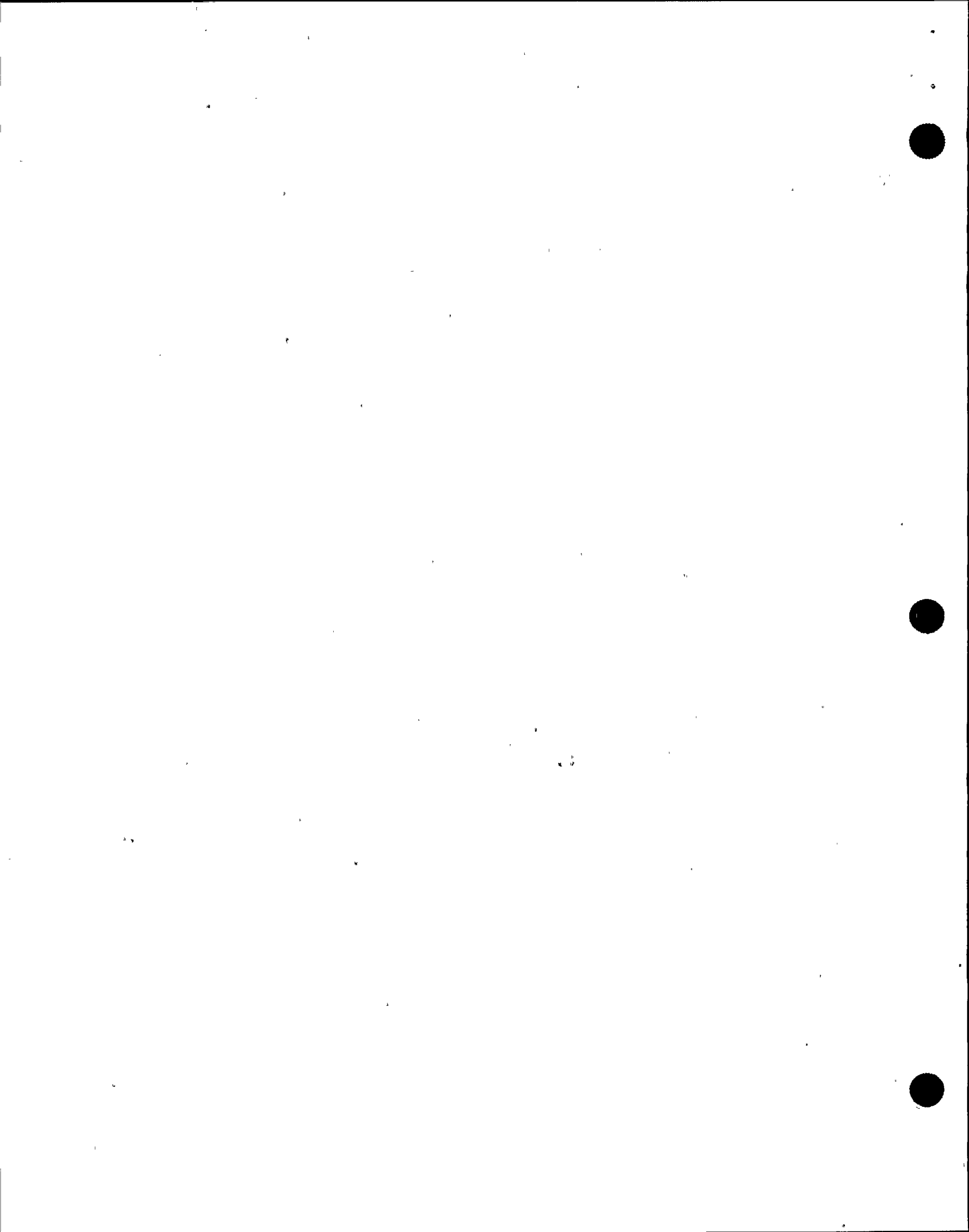
## VI. TECHNICAL SPECIFICATIONS

Review table 6.2.2-1 with trainees.

EO-11.0

## VII. RELATED PLANT EVENTS

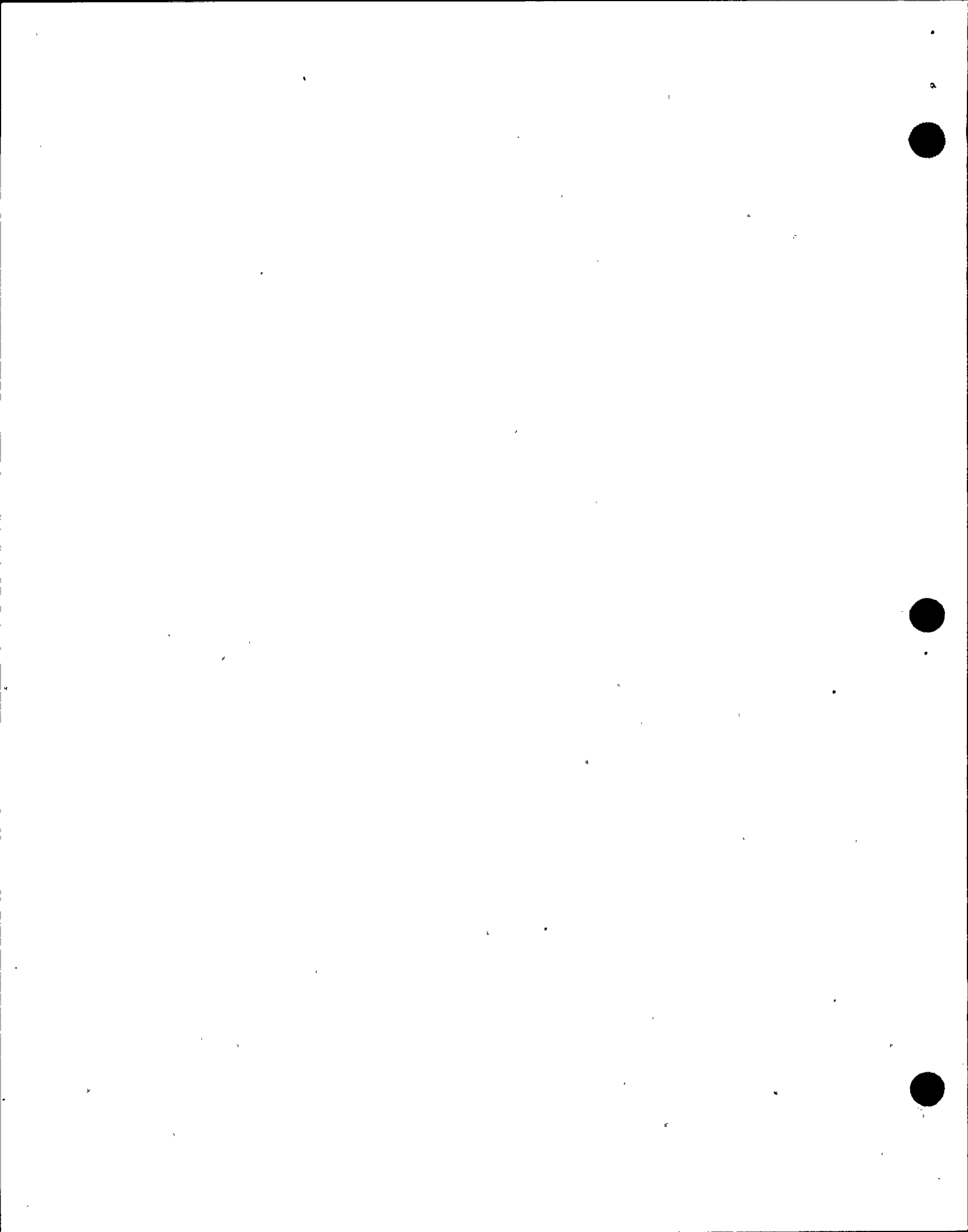
A. Refer to Addendum "A" and review related events with class, (if applicable).



## VIII. SYSTEM HISTORY

## A. Review the following system modifications with trainees:

- PN2Y86MX161 (Installation of jumpers 2CEC-CP19) This concerned wiring with respect to pulsed inputs for TIP System.
- PN2Y87MC035 (Human Factors 1st Refuel Commitments) Outlines corrections for Human Engineering Discrepancies concerning the PCS.
- PN2Y87MX111 (Process Computer Terminate Remote Interface Module) Used for the transfer of core monitoring information (BUCL data) offsite and to allow remote access by GE San Jose to perform problem analysis and diagnosis without sending a person to the site.
- PN2Y87MX148 (GETARS Composite Reactor Scram Channel) Prevents SENTINEL from inadvertently tripping during surveillance testing and other half scrams.
- PN2Y87MX199 (Increase Common Wire Size) Reduces noise levels to the display driver.
- PN2Y88MX117 (Change APRM Filler Constant) Changes APRM filter constant from .4 sec. to 3.0 sec. to reduce noise related problems with OD-1 software.



- PN2Y88MX190 (Addition of GE 3D Monicore Core Monitoring System) Incorporates 3D Monicore into Process Computer System.

## IX. WRAP-UP

- A. Review the Trainee Learning Objectives
- B. Answer any questions

