

NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

LESSON PLAN

07-187-91

INSTRUMENTATION AND CONTROL

CONTROL SYSTEMS

02-LOT-002-309-2-04

Prepared By: Unit #2 Training Department

DATE AND INITIALS

APPROVALS

SIGNATURES

REVISION 0

Training Supervisor
Unit #2
G. L. Weimer

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5/11/88

Assistant Superintendent
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CONTROLLED DOCUMENT
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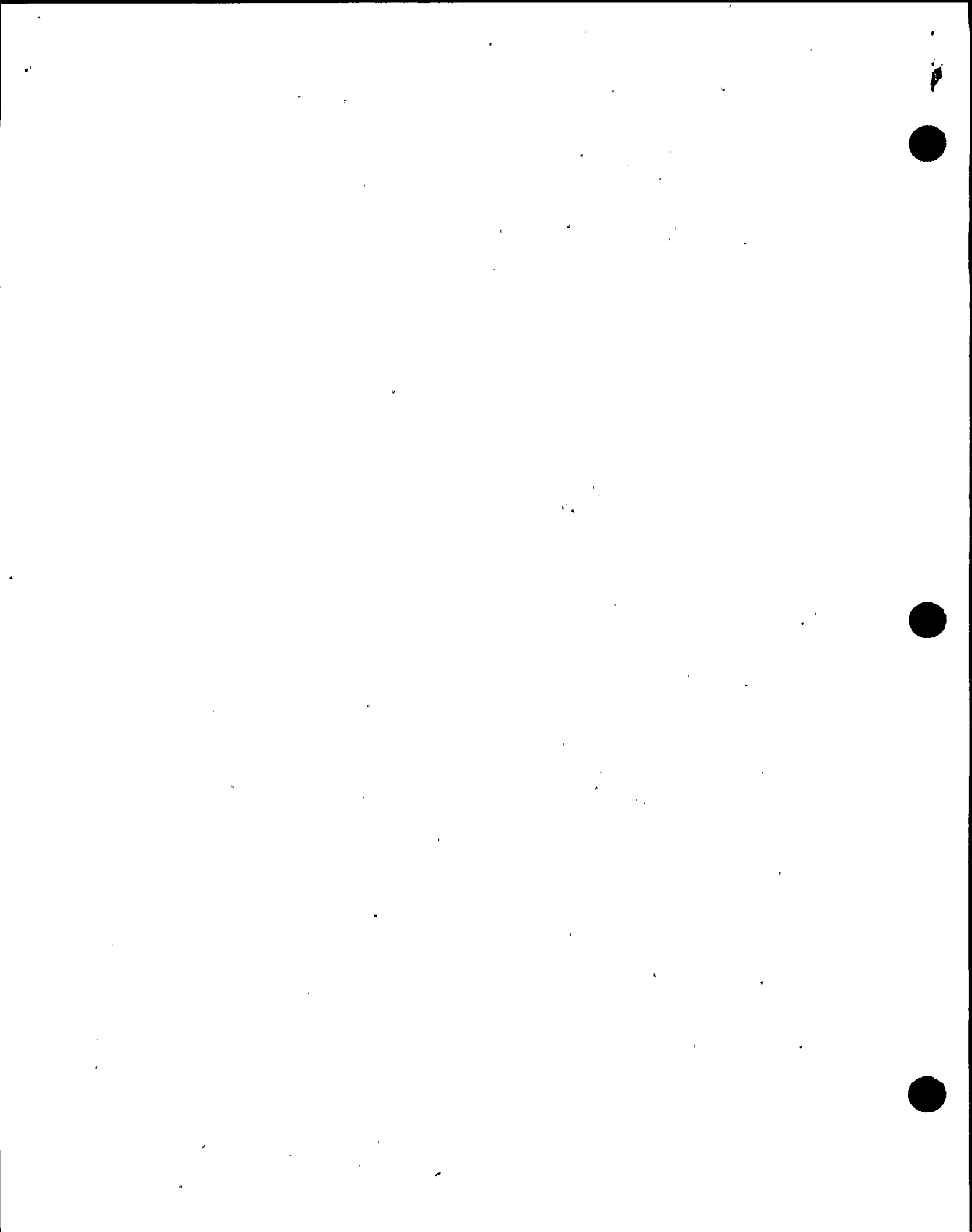


I. TRAINING DESCRIPTION

- A. Title: Instrumentation and Control, Control Systems
- B. Purpose:
In a lecture presentation, the instructor shall present information for the student to meet each Student Learning Objective. Additionally, he shall provide sufficient explanation to facilitate the student's understanding of the information presented.
- C. Estimated Duration: Approximately 1 hour
- D. Training Methods:
- Classroom Lecture
 - Assign the Student Learning Objectives as review problems with the student's obtaining answers from the text, writing them down and handing them in for grading.
- E. References:
1. GE BWR Academic Series, Instrumentation and Control Rev. 1, Chapter Four.

II. REQUIREMENTS AND PREREQUISITES

- A. Requirements for Class:
1. AP-9, Rev. 2, Administration of Training
 2. NTP-10, Rev. 3, Training of Licensed Operator Candidates
- B. Prerequisites:
1. Instructor
 - a. Demonstrated knowledge and skills in the subject, at or above the level to be achieved by the trainees, as evidenced by previous training or education, or
 - b. SRO license for Nine Mile Point Unit Two or a similar plant, or successful completion of SRO training including simulator certification at the SRO level for Nine Mile Point Unit Two.
 - c. Qualified in instructional skills as certified by the Training Analyst Supervisor.



2. Students
 - a. Meet eligibility requirements per 10CFR55, or
 - b. Be recommended for this training by Operations Superintendent or his designee or the Training Superintendent.

III. TRAINING MATERIALS

A. Teaching Materials

1. Transparency Package
2. Overhead Projector
3. Whiteboard and felt tip markers
4. GE BWR Academic Series, Instrumentation and Control, Instructor Guide, Chapter Four
5. OLP-ICD

B. Student Materials

1. GE BWR Academic Series, Instrumentation and Control, Text

IV. EXAMINATIONS, QUIZZES AND ANSWER KEYS

Exams will be generated and administered as necessary. They will be on permanent file in the Records Room.



V. OBJECTIVES

Upon completion of this chapter, mastery of required topical knowledge will be demonstrated by performing Enabling Objectives listed beneath each topic title.

1. Principles of Automatic Control Systems
 5. List the basis functions necessary for an automatic control system.
 6. List the elements that make up a basic automatic control system.
 7. Explain the process by which the elements of an automatic control system perform the functions of that system.

2. Control Loop Diagrams
 2. Identify components of an automatic control system as represented by a block diagram.

3. Process Time Lags
 3. Explain effects of process time lags on an automatic control system.

4. Modes of Automatic Control
 2. Explain how the controller of an automatic control system responds to the controlled variable for each of the four modes of control.
 3. Define gain, proportional band, offset, reset rate, rate time.

5. Stability of Automatic Control Systems
 3. Describe how the mode of control affect stability.



6. Controller and Actuators

2. Describe the function of controls and indications of Manual-Auto control stations.
3. Identify the components of the following types of control valve actuators:
 1. pneumatic
 2. hydraulic
 3. solenoid
 4. motor
4. Explain the operation of each type of control valve actuator.



VI. LESSON CONTENT

- A. GE BWR Academic Series, Instrumentation and Control, Instructor Guide, Chapter Four.

