

# PALO VERDE NUCLEAR GENERATING STATION

**Instructor Training**

**Classroom Lesson**



<b>Program: I &amp; C Program</b>	<b>Technical Review:</b>
<b>LP Number: NID32C000102</b>	
<b>Title: Gaseous Radwaste Explosive Gas Monitor</b>	<b>Line Approval:</b>
<b>Duration : 4 Hours</b>	
<b>Date: 4/30/2008</b>	<b>Teaching Approval:</b>
<b>Rev Author: Harry W. Gahagen</b>	

**INITIATING DOCUMENTS:**

Site Maintenance Training Program Description

**REQUIRED TOPICS**

NONE

**CONTENT REFERENCES**

Orbisphere Diagnostic and Service Center Manual

36ST-9GR02 : Gaseous Radwaste Explosive Gas Monitoring System Calibration

74OP-9SS03 : Gaseous Waste System Sampling

VTM-O115-00001 Vendor Tech Manual for Orbisphere Oxygen Analyzer

**Lesson Plan Revision Data**

Apr 13, 2008 Harry Gahagen Record created

**Tasks and Topics Covered**

The following tasks are covered in Gaseous Radwaste Explosive Gas Monitor:

<b>Task or Topic Number*</b>	<b>Task Statement</b>
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Lesson: [Gaseous Radwaste Explosive Gas Monitor](#)

<a href="#">GR03</a>	<a href="#">Troubleshoot GR system</a>
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Total tasks or topics: 1

**TERMINAL OBJECTIVE:**

- 1.1 Given the appropriate references,, DESCRIBE the functions and basic system description of the major components and flow path of the Gaseous Radwaste System
  - 1.1.1 STATE the functions of the Gaseous Radwaste System
  - 1.1.2 DESCRIBE the major components of the gaseous Radwaste System
  - 1.1.3 DESCRIBE the flowpath of the Gaseous Radwaste System

## **Lesson Introduction: Gaseous Radwaste Explosive Gas Monitor**

The following items are things to consider in your Lesson Introduction. They are not mandatory.

You should develop your own introduction and place that material in the Program Hierarchy in the Lesson Introduction Tab or appropriate Training Unit.

### **CLASSROOM GUIDELINES**

- If applicable, remind students of class guidelines as posted in the classroom.
- Pass the attendance sheet around and have it signed in Dark ink.
- Ensure that student materials needed for the class are available for each student.
- Emphasize student participation and remind them of your philosophy on asking and answering questions, if applicable.

### **ATTENTION STEP**

- Give a brief statement or story to get student concentration focused on the lesson subject matter.

### **LESSON INTRODUCTION**

- Give a brief statement that introduces the specific lesson topic. Should be limited to a single statement.

### **MOTIVATION**

- Focus student's attention on the benefits they derive from the training. At Instructor's discretion. The need for motivation in each succeeding lesson must be analyzed by the Instructor and presented as necessary.
- Instructor should include how the STAR process can be used to improve or enhance Operator Performance, if applicable.
- Read and discuss lesson terminal objective and review lesson enabling objectives, if desired.
- If applicable, briefly preview the lesson topic outline and introduce the major points to be covered. The objective review may have been sufficient.
- REINFORCE the following PVNGS management expectations as opportunities become available:

- Nuclear Safety
- Industrial Safety Practices
- STAR and Self-Checking
- Procedure Compliance
- Communication Standards
- ALARA
- Prevent Events

**COURSE TERMINAL OBJECTIVE**

Given the appropriate references, the Instrumentation and Control Technician will be able to DESCRIBE the purpose, operation and maintenance of the Explosive Gas Monitor System. The student must achieve a score of 80% or greater on a written examination at the end of the course.

**NOTE**

Method of instruction will be lecture and discussion of referenced transparencies or slides and handout pages, unless otherwise specified.

**\*\*\*\*\*INTRODUCTION\*\*\*\*\***

- I. Attention Step.
  
- II. Self Introduction
  
  
- III. Classroom Guidelines
  - A. Attendance Sheet
  
  
  - B. Materials

**NOTE**

Before class, ensure your equipment is operable and place the following on the board:

- Instructor's Name
- Instructor's work phone number
- Course name
- Course length

**\*\*\*\*\*INTRODUCTION\*\*\*\*\***

- I. Get the attention of the students on you rather than outside interests. Any appropriate means is acceptable.
  
- II. Introduce yourself and present your background and experience, if applicable. This is the best opportunity to have students introduce themselves, if you use this technique to "open up" the class.
  
- III. Refer to the CLASS GUIDELINES at the front of the handout and in front of this lesson plan. Read them or discuss them as applicable to the particular group in your class.
  - A. Pass the attendance sheet around and have it signed in black ink. If applicable, have students add their mail station numbers to the attendance sheet for use when mailing out course certificates. If needed, now is a good time to fill out a seating chart or individual name cards.
  
  - B. Ensure that student materials needed for the class are available for each student. For materials required, refer to the list of

materials on the cover page. Describe the handout format, if applicable, and stress the importance of taking good notes for future reference, both in the field and for the remainder of the course.

C. Questions and Participation

C. Discuss the importance of participation and your philosophy on asking or answering questions (i.e., do they need to raise their hand, etc.), if applicable.

IV. Course Introduction

A. Content Overview

1. Gaseous Radwaste System
2. Explosive Gas Monitoring System
3. Sensor Rebuild
4. Diagnostic and Service Center

V. Motivation

A. The EGM System has been modified such that only oxygen is now monitored. The monitoring of hydrogen is no longer done. Any degassing of the primary will be mostly hydrogen, therefore it is necessary to monitor the Gaseous Radwaste System for oxygen only to determine if an explosive atmosphere is present.

V. Focus student attention on the benefits they will derive from the training. Some SFR's, LER's, EER's, etc. are located at the end of the lesson plan, and at the end of this section in the handout. You will have another opportunity to read and discuss them in the lesson summary.

VI. Course Pre-summary

A. Course Terminal Objective Review

Given the appropriate references, the Instrument and Control Technician will be able to DESCRIBE the purpose, operation, and maintenance of the Explosive Gas Monitor System. The student must achieve a score of 80% or greater on a written examination at the end of the course.

A. Read and/or discuss the course terminal objective.

B. Course Outline and Sequence

B. Present a general course schedule or sequence.

C. Assignments and Evaluations

C. Describe the type of exams which will be administered.

1.

VII. Lesson Introduction

A. Topic Introduction

A. Give a brief statement which introduces the specific lesson topic(s).

1. Three functions of the Gaseous Radwaste System.

- 2. Gaseous Radwaste System major components.
- 3. Gaseous Radwaste System flowpath.
- B. Motivation
  - 1. The Gaseous Radwaste System ensures that there will be no unmonitored or uncontrolled releases to the environment.
- C. Lesson Pre-summary
  - 1. Objectives review  

Given the appropriate references, DESCRIBE the functions and basic system description of the major components and flowpath of the Gaseous Radwaste System.
  - 2. Topic summary
- B. Relate the specific lesson topic to the students' future and present needs.
  - 1. Read and discuss the lesson terminal objective.
  - 2. Briefly preview the lesson topic outline and introduce the major points to be covered. The objective review may be sufficient.

<b>T.Obj 1.1</b>	<b>Given the appropriate references,, DESCRIBE the functions and basic system description of the major components and flow path of the Gaseous Radwaste System</b>
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**EO 1.1.1 STATE the functions of the Gaseous Radwaste System**

**1.1.1.1 Main Idea**

I. Gaseous Radwaste System

A. Functions

Using Power Point and the student handout discuss the Functions of the Gaseous Radwaste

1. Collects and stores potentially radioactive gases generated within the plant to allow for radioactive decay prior to release to the environment.
2. Provides a controlled mixing of the stored gases with the Radwaste exhaust when the decay period requirement has been met.
3. Provides an isolation of the Gaseous Radwaste System if preset limits are met or exceeded during a release.

B. Basic System Description

Gaseous Radwaste System drawing

1. Collects radioactive or potentially radioactive waste gas.
2. Primarily hydrogen in an oxygen free atmosphere.
3. Stored approximately 45 days - based on Xe-133 - to allow for decay.
4. After the gas is sampled it is discharged at a controlled rate to the Radwaste Building Exhaust for dilution.
5. Sources of waste gas:
  - a. Reactor Drain Tank
  - b. Containment Refueling Failed Fuel Detector Vent
  - c. Reactor Vessel Vent
  - d. Gas Stripper
  - e. Volume Control Tank
  - f. Volume Control Tank Relief
  - g. Gas Analyzer Return
  - h. Fuel Building Refueling Failed Fuel Detector Vent

Describe the components in the order of the flowpath

<b>EO 1.1.2</b>	<b>DESCRIBE the major components of the gaseous Radwaste System</b>
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<b>EO 1.1.3</b>	<b>DESCRIBE the flowpath of the Gaseous Radwaste System</b>
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**1.1.3.1 Main Idea**

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|--|--|--|
| <p>D. Sample System Flow Loop</p> <p>1. Samples from:</p> <ul style="list-style-type: none"><li>a. Surge tank</li><li>b. Any one of the Decay tanks</li><li>c. Surge tank header</li></ul> <p>2. Sent to:</p> <ul style="list-style-type: none"><li>a. Surge tank</li><li>b. Surge tank header</li><li>c. Both</li></ul> | <p>Using Power Point and the student Handout Show the locations of major components on 140 ft Radwaste Building.</p> <p>Show the Gaseous Radwaste Control Room Control Panel and the major control devices</p> | <p>Using Power Point and the student Handout Show the locations of major components on 140 ft Radwaste Building.</p> <p>Show the Gaseous Radwaste Control Room Control Panel and the major control devices</p> |
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## **SUMMARY OF MAIN PRINCIPLES**

The following items are things to consider in your lesson summary. They are not mandatory. You should develop your own summary.,

### **Objectives Review**

Review the Lesson Objectives

Topic Review

Restate the main principles or ideas covered in the lesson. Relate key points to the objectives. Use a question and answer session with the objectives.

### **Questions and Answers**

Oral questioning

Ask questions that implement the objectives. Discuss students answers as needed to ensure the objectives are being met.

### **Problem Areas**

Review any problem areas discovered during the oral questioning, quiz, or previous tests, if applicable. Use this opportunity to solicit final questions from the students (last chance).

### **Concluding Statement**

If not done in the previous step, review the motivational points that apply this lesson to students needs. If applicable, end with a statement leading to the next lesson.

You may also use this opportunity to address an impending exam or practical exercise.

Should be used as a transitional function to tie the relationship of this lesson to the next lesson. Should provide a note of finality.