



NORM Worker Course Outline



Prerequisites: This course shall have no formal pre-requisite.

Course Length: 4 hours – Course length shall vary depending on the number of delegates.
Total course time includes breaks.

Class Size: The maximum number of delegates that may be trained and tested per instructor shall be thirty-five (35) in the classroom session

Course Objective

- Provide delegates assigned to work with or around NORM the necessary skills to safely perform their jobs.
- Provide delegates with recommended practices and guidelines to perform safely while working with NORM.
- Delegates should be able to demonstrate knowledge during a written examination.

Course Design

- Power Point© / Lecture / Audio Video / Visual Aids

Successful Course Completion

- Requires a minimum score of 75% or better.
- Grades shall be calculated by dividing the number of questions answered correctly by the total number of exam questions.
- Delegates will have no more than thirty (30) minutes to complete the exam.

Course Content Summary

- Classroom

Breaks: 10 minutes (approximately every hour)

Lunch: 1 Hour

Course Outline

About NORM

- What is NORM?
- Review Regulations

About Radioactivity

- Natural Sources of NORM
- Understanding Radioactivity
- Understanding Atoms

Radiation

- What is radiation?
- Types of Ionizing Radiation
 - Alpha Particles
 - Beta Particles
 - Gamma Radiation
- Penetrating Power of Different Ionizing Radiation
- Periodic Table Groups
 - Review Periodic Table of Elements
 - Ionizing of Matter
- Sources of Radiation
 - Natural
 - Discuss examples
 - Artificial
 - Discuss examples

NORM in the Workplace

- Oil & Gas Industry
- NORM within Oil & Gas Production Facilities
 - How Radium Flows
- The Accumulation of Radioactive Materials
- Radon Gas
 - How Radon Gas Flows
- Technologically Enhanced NORM (TENORM)

Radiation & Contamination

- Modifying Units of Measure
 - Milli
 - Micro
 - Nano
 - Pico
- Measurement Terms for NORM Detection
 - Roentgen
 - Roentgen Equivalent Man (REM)
 - Roentgen Absorbed Dose (RAD)
 - Curie
 - Micro-Roentgen Per Hour
 - Counts Per Minute (CPM)
- Radioactive Contamination
 - Loose Contamination

- Fixed Contamination

Hazards of Contamination

- Large Dose of Radiation (Acute)
 - General Effects of Body
 - Legal Limits
 - General Radiation Exposure Effects
 - 0-50 REM
 - 80-120 REM
 - 130-170 REM
 - 180-122 REM
 - 270-330 REM
 - 5,000 REM
- Contamination Theories
 - Linear Dose Effect Theory
 - Threshold Dose Effect Theory
- Health Effects of NORM Exposure
- Internal Contamination Effects
- Common Methods of Exposure
- Other Radiation Risks

Worker Protection

- Review Safe Work Practices

Signs & Labels

- Postings in NORM Areas
 - Restricted Areas
 - Radiation Areas
 - Stored Material Areas
 - Airborne Radiation Areas
 - High Radiation Areas
- NORM Container Markings
- “Notice to Employees” Document

NORM Detection

- Reliable Detection & Measurement of NORM
 - NORM Meters
 - Probe Attachment
 - Pancake Attachment
 - Optically Stimulated Luminescence Dosimeters
- Establishing Safe Work Boundaries



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- NORM Radiation Surveys
- Record Keeping
- Recommended NORM Site Documents

Personal Protective Equipment

- Discuss Common PPE
 - Gloves
 - Respirators
 - Safety Glasses/Face Shields
 - Coveralls/Disposable Clothing
 - Rubber Boots
 - Hard Hats
- Discuss Techniques:
 - Proper Fit
 - Condition
 - Nature of Work
 - Donning PPE
 - Removing PPE (Potentially Contaminated)

Decontamination

- Decontamination Procedures
- Decontamination Concepts

Emergency Response Procedures

- NORM Spill Emergency
- Injured Worker
- Fires & Explosions

Practical Session

- None

Training Center Provided Material

- Course Materials
- NORM Meter

Delegate Requirements

- None

Reference Material / Documents

Department of Transportation (DOT)



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- 49 CFR 173 – General Shipping Requirements
Department of Environmental Quality (DEQ)
Implementation Manual for Management of NORM in Louisiana
Radiation Protection Division