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**RENEWAL APPLICATION
APPENDIX H2**

TRAINING COURSE AND QUALIFICATION CARD OUTLINES

**RENEWAL APPLICATION
APPENDIX H2**

TRAINING COURSE AND QUALIFICATION CARD OUTLINES

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Course Outlines

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- 1 **COURSE:** GET-19X/GET-20X - General Employee Training
2
3 **DURATION:** =16 Hours
4
5 **PREREQUISITES:** None
6
7 **SCOPE:**
8
9 **TYPE:** Classroom
10
11 **OBJECTIVES:** Upon completion of this course, the student will be able to perform their
12 job in a safe manner and will have an overview of the site organization
13 and description.
14
15 Mastery of the terminal objectives will be demonstrated by scoring 80
16 percent or higher on the course examination.
17
18 **REFRESHER:** GET-19XA/GET-20XA annually
19
20 **COURSE DESCRIPTION** (by module)
21
22 1. Site Overview & WIPP Description a. Mission of DOE and CBFO
23 =1 hour b. Relationship of WIPP organizations
24 c. Surface structures
25 d. WIPP shafts
26 e. Underground area
27
28 2. Emergency Preparedness a. Definition of occurrence
29 (Includes Occurrence Reporting) b. DOE Order 5000.3B
30 =1 hour c. WP 12-ES3918
31 d. Occurrence reporting process
32 e. Employee involvement with
33 Emergency Preparedness
34 f. Types of emergencies
35 g. Emergency response by WIPP
36 groups
37 h. Off-site response groups
38 i. WIPP emergency procedures
39 j. Emergency equipment
40 k. Employee actions during
41 emergencies
42
43 3. General Safety a. Personal Protective Equipment
44 =1 hour (PPE)
45 b. Requirements for PPE

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8 4. Computer Security
9 =1 hour
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15 5. Fire Protection
16 =1 hour
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23
24 6. RCRA & Storm Water Management
25 =2 hours
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38
39 8. Work Policies and Procedures
40 =1 hour
41
42
43
44
- c. Warning Tags
 - d. WIPP safety hazards
 - e. Medical assistance
 - f. Actions to take for injuries
 - g. Reporting injuries/accidents
 - h. Employee concerns
- a. Department to contact
 - b. WIPP policies and procedures for:
 - 1. Personally owned software
 - 2. Computer games
 - 3. Passwords/password protection
 - c. Computer virus prevention
- a. WIPP Fire Protection Program
 - b. Fire sources at WIPP
 - c. Fire Tetrahedron
 - d. Classes of fires
 - e. Fire extinguisher
 - f. Office Warden Program
 - g. Employee responsibilities during a fire
- a. RCRA history
 - b. RCRA goals
 - c. WIPP goals and relation to RCRA
 - d. Definition of RCRA wastes
 - e. Site generated waste program
 - f. Training requirements for treatment storage and disposal facilities
 - g. Contingency Plan
 - h. Waste Minimization Program
 - i. RCRA regulatory agencies
 - j. RCRA enforcement options
 - k. Application of Storm Water Management policy in relation to the general employee
- a. DOE Orders and MOC Procedures
 - b. Teamwork
 - c. Conduct of Operations Policy
 - 1. Elements of Conduct of Ops
 - d. Quality Assurance Program

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- 11 9. Electrical Safety
12 =1 hour
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- 28 10. Hazard Communications
29 =1 hour
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- 42 11. ~~Personal Protective Equipment~~ PPE
43 =1 hour
44
45
- e. Responsibility for following procedures
f. Resuming work after stoppage
g. Stopping work for unsafe acts
h. Purpose and uses of "Hold Tag"
i. Quality records and requirements
j. Correcting errors on QA Records
k. Configuration Management and affected departments
- a. Variables of electrical circuits
b. Severity of electrical shock
c. Areas where electrical accidents occur
d. WIPP policy on using damaged electrical equipment
e. WIPP policy for modifying electrical protective devices
f. Requirements for use of Ground Fault Interrupters.
g. Purpose of GFI's
h. WIPP policy for resetting breakers
i. WIPP policy for using extension cords, plug-in devices, and other equipment exposed to energized electrical circuits
- a. Description of Haz Comm Std.
b. Health and Safety hazards
c. Protection from workplace hazards
1. PPE
2. Preparedness/Prevention
3. Employee responsibilities
d. Emergency procedures
e. WIPP Hazard Communication Prog.
1. Training
2. Container labels
3. Chemical transfers
4. Material Safety Data Sheets
f. Other information sources
- a. Requirements for head protection
b. Requirements for hearing conservation
c. Requirements for face/eye protection

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3 12. Bloodborne Pathogens
4 =1 hour
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12 13. Ergonomics
13 =2 hours
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18 14. Security
19 =1 hour
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33 15. General Employee Radiological Training (**GERT**)
34 =1 hour
35
36 This program will be implemented prior to declaration of site readiness for all site
37 employees. The standardized core materials for GERT include the following topics:
38
39 Sources of Radiation
40 Non-ionizing and Ionizing Radiation
41 Risk in Perspective
42 ALARA Concept
43 Radiological Controls
44 Monitoring/Dosimetry
45 Emergency Procedures
- d. Requirements for foot protection
 - a. Def. of Bloodborne Pathogens
 - b. Def. of Hepatitis B and Human Immunodeficiency Virus
 - c. Bloodborne Pathogen transmission
 - d. Prevention of bloodborne pathogen infection
 - e. WIPP Exposure Control Plan
 - a. Cumulative Trauma Disorder **(CTD)**
 - b. Risk factors for CTD
 - c. Prevention of CTD
 - d. Recognition of CTD
 - e. Steps to take when CTD develops
 - a. Security Mission
 - b. Def. of Security Officer
 - c. Security Officer Tasks
 - d. Access and Property Control at WIPP
 - e. Badge accountability
 - f. Property Pass system
 - g. Physical security
 - h. Telephone threat list
 - i. Employee responsibilities during demonstration
 - j. Fitness for duty
 - k. Computer security
 - l. Parking requirements

1 Employee Responsibilities

2

3 All times are approximate and do not reflect time spent on additional topics that arise from class
4 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
5 Measures)

1 **COURSE:** GET-19XA/GET-20XA - General Employee Training Refresher
2
3 **DURATION:** Self-paced Course
4
5 **PREREQUISITES:** None
6
7 **SCOPE:**
8
9 **TYPE:** Self-paced Module
10
11 **OBJECTIVES:** Objectives are stated at the beginning of each module, including security,
12 radiological basics, general safety, hazard communications, bloodborne
13 pathogens, hearing protection, and Occupational Safety and Health
14 Administration/Resource Conservation and Recovery Act
15 (OSHA/RCRA).
16
17 Mastery of the terminal objective will be demonstrated by scoring
18 80 percent or higher on the module examination.
19

20 **REFRESHER:** Annually
21

22 **COURSE DESCRIPTION (by module)**
23

- 24 1. Introduction
- 25 a. Self Paced Course
 - 26 b. Information about WIPP organizations
 - 27 c. Appendix Information
 - 28 1. Storm Water Management
 - 29 2. WIPP Land Withdrawal Act
 - 30 3. DOE Mission
 - 31 d. Exam Guidelines
- 32
- 33 2. General Security
- 34 a. Prohibited Articles
 - 35 b. Primary responding agencies
 - 36 c. Wearing your badge
 - 37 d. Escort Responsibility
 - 38 e. Number of visitors an employee may escort
 - 39 f. When to turn off your computer
 - 40 g. Personal Property Passes
- 41
- 42 3. Computer Security
- 43 a. Point of contact
 - 44 b. WIPP policies and procedures for:
 - 45 1. Personally owned software
 - 2. Computer games

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 - 4 4. Fitness for Duty
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 - 8 5. RCRA
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 - 11 6. Storm Water Management
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 - 15 7. Bloodborne Pathogens
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 - 21 8. Hazard Communications
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 - 32 9. Ergonomics
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 - 36 10. ~~Personal Protective Equipment~~ **PPE**
 - 37
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 - 41
 - 42 11. General Safety
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3. Passwords/password protection
 - c. Computer virus prevention
 - a. Reasons for the Fitness for Duty Program
 - b. General Employee Responsibilities
 - a. Types of waste disposed
 - b. Waste Identification
 - a. Application of Storm Water Management policy in relation to the general employee
 - a. Transmission Identification of Bloodborne Pathogens
 - b. Prevention of Hepatitis B and Human Immunodeficiency Virus
 - c. Actions to take if exposed
 - a. Purpose of **Material Safety Data Sheet (MSDS)**
 - b. Responsibilities when transferring hazardous materials
 - c. WIPP Hazard Communication ~~Prog-~~**Program**
 1. Training
 2. Container labels
 3. Chemical transfers
 4. Material Safety Data Sheets
 - a. Identification of CTD
 - b. Ways to prevent CTD
 - c. Required actions
 - a. Requirements for head protection
 - b. Requirements for hearing conservation
 - c. Requirements for face/eye protection
 - d. Requirements for foot protection
 - a. Requirements for obeying signs and tags
 - b. Requirements for reporting an occurrence

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 - 9 12. Conduct of Operations
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- c. Actions for emergency situations
 - d. Resolving employee concerns
 - e. Proper uses of extension cords
 - f. WIPP Circuit Breaker Policy
 - g. Steps to take when responding to fire
 - h. Responsibilities when fighting a fire
 - i. When to use the sign-out board
- a. Goals of In-House Management Program
 - b. Required actions before posting information
 - c. Correcting a written record
 - d. Point of Contact for Records Management

1 **COURSE:** HWW-101 - Hazardous Waste Worker

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3 **DURATION:** =24 hours

4

5 **PREREQUISITES:** None

6

7 **SCOPE:**

8

9 **REFRESHER:** HWW-102 Annually

10

11 **COURSE DESCRIPTION** (by module)

12

13 1. Course and Regulatory Overview

14 =1 hour

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25 2. Hazard Communications

26 =1 hour

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3. Principles of Toxicology

a. OSHA regulations and their applicability to RCRA facilities and operations

b. RCRA standards for generators facilities and for Treatment, Storage, and Disposal Facilities (TSDFs)

c. Department of Transportation/Environmental Protection Agency (DOT/EPA) regulations and applicability to hazardous waste transportation

a. Purpose of the Hazard Communication standard (29 CFR 1910.1200)

b. Locations of Material Safety Data Sheets (MSDSs)

c. Labeling of containers

d. Other resources for information on hazardous materials/waste including National Fire Protection Association (NFPA) 704 hazard warning symbol, DOT United Nations (UN) Identification System, DOT Emergency Response Guidebook, National Institute of Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards. Student exercises are included in this section on the use of these references.

a. Dose-response relationship

- 1 =3 hours
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21 4. Hazards
22 =3 hours
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40
41
42 5. ~~Personal Protective Equipment~~ PPE
43 =3 hours
44
45
- with regard to exposures to hazardous materials
- b. Immediate and delayed effects (acute and chronic effects)
 - c. Different ways substances enter the human body
 - d. Effects of substances on the human body including target organ effects, systemic effects, carcinogens, and genetic effects
 - e. Exposure limits including Threshold Limit Value (TLV), Permissible Exposure Limit (PEL), Lethal Dose 50% (LD₅₀), Lethal Concentration 50% (LC₅₀)
 - f. Effects of temperature extremes on the human body including signs and symptom heat stress and cold stress
 - g. Effects of ionizing radiation
- a. Safety and health hazards when conducting hazardous waste operations including fire, explosion, oxygen deficiency, ionizing radiation, biological, electrical, heat and cold stress
 - b. Hazard classification including chemical, physical, mechanical, biological, and radiological
 - c. Airborne hazards including gases, vapors, and particulates
 - d. Properties of materials including corrosivity, pH, flammability, explosivity, (upper and lower explosive limits), specific gravity, vapor density, boiling point, solubility, and reactivity
 - e. Protection from hazards
 - f. Confined space hazards
 - g. Causes and prevention of accidents
- a. Description and examples of ~~Personal Protective Equipment~~ (PPE)
 - b. Factors in the selection of PPE

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6. Satellite Accumulation Areas
=2 hours

- c. Non-radiological and radiological hazards
 - d. Selection process for PPE
 - e. Ways substances enter PPE including permeation, degradation, penetration
 - f. Equipment included in each of the four levels of PPE adopted by the EPA (Levels A, B, C, and D), capabilities and limitations of each level
 - g. PPE inspection
 - h. Job scope planning
 - i. Human factors that limit the use of PPE
 - j. Demonstration on donning and removal of Level D PPE. Students perform a Level D dress out sequence and are evaluated by a Job Performance Measure.
-
- a. Purpose of hazardous waste satellite accumulation areas (proper accumulation of hazardous waste to protect human health and the environment)
 - b. Key elements of satellite accumulation areas including maintenance of containers, labeling, maximum quantities allowed, and transfers to storage area
 - c. Inspection criteria including aisle space, stacking of containers, closing of containers, labeling requirements, containment structures, housekeeping, warning signs, alarms, fire extinguisher, spill control materials, and ignition sources

- 1 7. Decontamination
- 2 =2 hours
- 3
- 4
- 5
- 6 a. Purpose of decontamination
- 7 (prevent the spreading of
- 8 contamination, prevention of
- 9 exposure to workers, protection of
- 10 the environment)
- 11 b. Causes and prevention of worker
- 12 contamination
- 13 c. Decontamination planning including
- 14 methods for decontaminating
- 15 d. Layout of decontamination stations
- 16 e. Emergency decontamination
- procedures
- All times are approximate and do not reflect time spent on additional topics that arise due to
- class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
- Measures)

- 1 **COURSE:** HWW-102 - Hazardous Waste Worker Refresher
2
3 **DURATION:** 8 hours
4
5 **PREREQUISITES:** HWW-101
6
7 **SCOPE:** This course reviews precautions for safe handling and use of a hazardous
8 material and the management of any hazardous waste generated during the
9 these activities. This is accomplished by reviewing the concepts presented
10 in HWW-101 and the application to a particular hazardous material by the
11 use of a ~~Material Safety Data Sheet (MSDS)~~. Also included in this course
12 is an overview of mixed waste.
13
14 **TYPE:** Classroom and Practical
15
16 **COURSE DESCRIPTION (by lesson)**
17
18 1. Material or Waste Information a. Definition of TRU mixed waste
19 =2 hours b. Emergency actions in the event of a
20 spill or leaking or punctured
21 container of TRU mixed waste
22 c. This module describes the
23 information found in the supplier
24 information section of a ~~Material~~
25 ~~Safety Data Sheet (MSDS)~~
26 d. This information is used in the event
27 the user of the material needs more
28 information than what is included in
29 the particular MSDS
30 e. Information
31 1. This module describes the
32 product's individual
33 ingredients, relative
34 concentration, and the
35 exposure limit for each
36 ingredient
37 f. Physical/Chemical Data
38 1. This module describes the
39 chemical and physical
40 properties of the material
41 including; boiling point,
42 specific gravity, melting point,
43 vapor pressure, vapor density,
44 evaporation rate, solubility,
45 pH, and volatility

- 1 2. Hazard Data
2 =2 hours
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32 3. Safety
33 =2 hours
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- a. This module describes the fire and explosion hazards of the particular material including; flash point, lower explosive limit, upper explosive limit, auto-ignition temperature, NFPA 704M Hazard Classification Rating, fire extinguishing media, special fire fighting procedures, unusual fire and explosion hazards, toxic gases produced, and explosion data
 - b. Reactive Data Module
 - 1. This module describes the material's reactivity characteristics including stability, incompatibility, decomposition, and polymerization
 - c. Health Hazards Data Module
 - 1. This module describes the different ways the user may be exposed to the material and the adverse effects the material may have on the body including; lethal dose 50% (LD₅₀), lethal concentration 50 % (LC₅₀), target organ effects, carcinogenicity, acute and chronic effects, and emergency first aid procedures
 - a. This module describes the precautions for the safe handling of the material including steps to take in the event the material is spilled, waste disposal method (EPA hazardous waste numbers), regulatory requirements (Superfund Amendments and Reauthorization Act (SARA) Title III hazard categories/lists and Comprehensive Environmental Response and Clean up Liability Act (CERCLA) Hazardous Substance classification), labeling of containers, protective

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equipment, and site specific requirements

- b. Control Measures Module
 - 1. This module describes safety control measures to take when using the material including respiratory protection, ventilation requirements, work/hygiene practices and site specific requirements
- c. ~~Personal Protective Equipment~~ **PPE** Module
 - 1. This module describes the purpose of ~~personal protective equipment (PPE)~~, the categories of protection, EPA Levels of Protection (A,B,C,D), PPE material and chemical resistance. In this module the donning and doffing of Level D PPE is demonstrated. The students are given an opportunity to practice and then are evaluated by completion of a Job Performance Measure.
- a. The effects the hazardous material has on various types of PPE material (degradation, permeation, and penetration effects), other common materials and neutralization effects are demonstrated

4. Demonstration
=1 hour

All times are approximate and do not reflect additional time spent on topics that arise due to class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

- 1 **COURSE:** HWR-101 - Hazardous Waste Responder
2
3 **DURATION:** 20 hours
4
5 **PREREQUISITES:** GET-19X/GET-20X
6 Medical Physical
7 SAF 630/631- Respiratory Protection
8 HWW 101 - Hazardous Waste Worker
9
10 **SCOPE:** The instructor will present updated information needed for personnel who
11 respond to hazardous material and/or hazardous waste emergencies at the
12 WIPP site.
13
14 **TYPE:** Classroom and Field Exam
15
16 **OBJECTIVE:** Upon completion of this course, the student will be able to respond to
17 hazardous materials emergencies at the WIPP site
18
19 Mastery of the terminal objective will be demonstrated by scoring 80
20 percent or higher on the post course examination, satisfactory performance
21 on the job performance measure for donning and doffing ~~Personal~~
22 ~~Protective Equipment~~ **PPE**, and participate as a team in the final practical.
23
24 **REFRESHER:** HWR-101A Annually
25

26 **COURSE DESCRIPTION**

- 27
28 1. Regulatory Requirements a. 29 CFR 1910.120
29 =1 hour
30
31 2. Evaluation of Incident a. Physical data
32 =3 hours 1. color
33 A. (Types of Information) 2. odor
34 3. sound
35 b. Cognitive
36 c. Technical
37
38 B. Dispatch and Initial Response Phase a. Primary focus information
39 b. Central Monitoring Room (CMR)
40 information
41 c. During a response
42
43 C. Product Information a. Product identification
44 b. Primary and secondary hazards
45

- 1 D. Incident Elements a. Spill
2 b. Leak
3 c. Fire
4
- 5 E. Incident Priorities
6
- 7 3. Response Operations
8 =1 hour
- 9 A. Size-up, Strategy, and Tactics a. Size-up
10 1. Monitoring atmospheric
11 conditions near the release
12 a. Weather conditions
13 b. Organic vapors, gases,
14 particulates
15 c. Oxygen deficiency
16 d. Specific materials
17 e. Combustible gases
18 f. Inorganic vapors, gases,
19 particulates
20 g. Radiation
21 2. Visual observations
22 3. Unusual odors
23 4. Off-site samples
24 5. Entry team procedures
25 a. Monitoring on-site
26 ambient air
27 b. Types of containers and
28 impoundments
29 c. Physical condition of
30 material
31 d. Leaks or discharges
32 e. Labels and markings
33 6. Additional considerations
34 a. Type, condition, and
35 behavior of container
36 b. Resources and control
37 measures
38 7. Summary of size-up

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B. Incident Command System and
Mitigation Plan at the WIPP
=1 hour

4. Safety
=5 hours

A. Responder Protection

- b. Strategy and tactics
 - 1. Definitions
 - 2. Strategy
 - 3. Tactics
 - 4. Rescue
 - 5. Prevent container failure
 - 6. Containment
 - 7. Confinement
 - 8. Remove ignition sources
 - 9. Extinguish fires
 - 10. Tactical withdrawal

- a. Key elements required
- b. Key personnel and functions
 - 1. Incident commander
 - 2. Science officer
 - 3. Safety officer
 - 4. Records keeper
 - 5. Medical officer
 - 6. Resource officer
 - 7. Operations officer
- c. Implementing response operations
 - 1. Organize
 - 2. Evaluate the situation
 - 3. Develop a plan of action

- a. Pre-entry evaluation
- b. Deny entry
- c. Hydration
- d. Pre-entry briefing
- e. Post-exit evaluation
- f. Support location
- g. Environmental temperature monitoring

1 **COURSE:** HWR-101A - Hazardous Waste Responder, Refresher

2

3 **DURATION:** =8 hours

4

5 **PREREQUISITES:** HWR-101

6

7 **OBJECTIVES:** Upon Completion of this course, the student will be able to respond to
8 hazardous materials emergencies at the WIPP site.

9

10 Mastery of the terminal objective will be demonstrated by satisfactory
11 performance on the job performance measure for donning and doffing
12 ~~Personal Protective Equipment (PPE)~~, and successfully participate as a
13 team in the final practical

14

15 **REFRESHER:** Annually

16

17 **COURSE DESCRIPTION**

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19

20 1. Review of HWR-101

21 =2 hours

22

23 2. Changes in Regulations, procedures, and polices

24 =2 hours

25

26 3. Lessons Learned

27 =2 hours

28

29 4. Conclusion and Exam

30 =2 hours

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33 All times are approximate and do not reflect additional time spent on topics that arise from class
34 participation, student breaks, class size and/or practical exercises (i.e., Job Performance
35 Measures)

36

- 1 **COURSE:** HWS-101 - Hazardous Waste Worker Supervisor
2
3 **DURATION:** =8 hours
4
5 **SCOPE:** This course will provide the students with the knowledge necessary to identify
6 factors affecting individual and corporate liability under applicable hazardous
7 waste laws and regulations. Students will be able to state the stages of criminal
8 and civil litigation, identify the types of behavior that leads to criminal
9 prosecution, and identify appropriate actions to ensure compliance with
10 applicable hazardous waste operations.
11
12 **TYPE:** Classroom
13
14 **OBJECTIVES:** Upon completion of this course, the student shall be able to perform
15 supervisory functions in compliance with policies, procedures, and regulations,
16 with regard to hazardous waste management.
17
18 Mastery of the terminal objective will be demonstrated by scoring 80 percent
19 or higher on the course examination.
20

21 **REFRESHER:** HWS 101A annually
22

23 **COURSE DESCRIPTION** (by lesson)
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- 25 1. Liability and Responsibility
26 =3 hours
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- a. General requirements
 - b. Definitions and key liability concepts
 - c. Mental element in criminal litigation
 - d. Typical litigation chronology
 - e. Civil and criminal penalties under OSHA
 - f. Criminal penalties under environmental laws
 - g. Federal sentencing guidelines
 - h. Mitigation credit under Federal Sentencing Guidelines
 - i. Who will be defendants
 - 1. Direct involvement
 - 2. Direct supervisory involvement
 - 3. Indirect involvement and Responsible Corporate Officer doctrine
 - j. Representation
 - k. Indemnification
 - l. Scope of employment

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2. Health and Safety Program
=3 hours

A. Industrial Hygiene

B. Spill Containment
(Emergency Response)

C. Site Control

D. Decontamination

E. Reporting Requirements

3. Conclusion =1 hour

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises (i.e. Job Performance Measures)

- m. Types of criminal cases being pursued
- n. Recommended actions
- o. Illustrative cases
 - 1. Knowledge
 - 2. Sovereignty
 - 3. Multiple prosecutions
 - 4. Pervasiveness of liability
 - 5. Potential for catastrophic corporate consequences
- p. Conclusions
 - a. Purpose
 - b. Authority
 - c. Supervisor responsibilities
 - 1. Hazard control
 - 2. Hazardous waste management
 - 3. Hazardous materials management
 - a. Training
 - b. Storage and handling
 - c. Labeling containers
 - d. General precautions and practices
 - d. ~~Personal protective equipment~~ PPE
- a. Exposure limits
- b. Conversion and comparison of parts per million PPM
- a. Spill response plan
- a. Zoning

1 **COURSE:** HWS-101A - Hazardous Waste Worker Supervisor-Refresher

2

3 **DURATION:** =8 Hours

4

5 **PREREQUISITES:** HWS-101

6

7 **TYPE:** Classroom

8

9 **OBJECTIVES:** Upon completion of this course, the student will be able to perform
10 supervisory functions in compliance with policies, procedures, and
11 regulations with regard to hazardous waste management

12

13 Mastery of the terminal objective will be demonstrated by scoring 80% or
14 higher on the course examination.

15

16 **REFRESHER:** Annually

17

18 **COURSE DESCRIPTION** (by lesson)

19

20 1. Review of HWS-101 a. Liability and Responsibility
21 =2 hours b. Health and Safety Program

22

23 2. Changes in regulations, procedures, policies
24 =2 hours

25

26 3. Lessons Learned
27 =2 hours

28

29 4. Conclusion and Exam
30 =1 hour

31

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33 All times are approximate and do not reflect additional time spent on topics that arise from class
34 participation, student breaks, class size, and/or practical exercises (i.e. Job Performance
35 Measures)

- 1 **COURSE:** SAF-630/631 - Respiratory Protection
2
3 **DURATION:** =8 hours
4
5 **PREREQUISITES:** Medical physical
6
7 **TYPE:** Classroom and Practical
8
9 **SCOPE:** This program contains the requirements of respiratory protection as
10 outlined in 29 CFR 1910.134, 10 CFR 20, ANSI, Z88.2-1980 and
11 applicable WIPP procedures.
12
13 **OBJECTIVE:** Upon completion of this course the trainee will demonstrate a knowledge
14 of the WIPP respiratory protection program; respiratory health hazards;
15 and types of respiratory protection devices, their proper use and
16 limitations.
17
18 Mastery of the terminal objective will be demonstrated by scoring 80% or
19 higher on a closed book lesson examination.
20

21 **COURSE DESCRIPTION** (by lesson)
22

- 23 1. Introduction
24 =2 hours
25 A. Basic Requirements
26 a. Regulations
27 b. DOE Orders
28 c. Industry Standards
29 d. WIPP Procedures
30 1. Physical exam
31 2. Pulmonary test
32 3. Training
33 4. Fit Testing
34 5. Identification of potential
35 respirator activities
36 6. Selection of Respirators
37 7. Respirator usage, storage and
38 sanitation

- 1 B. Nature, Extent, and Effects of
2 Respiratory Hazards and the
3 Need for Protection
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13 C. Engineering and Administrative
14 Controls
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19 2. Use of Respirators at WIPP
20 =2 hours
21 A. Selection of Respirators
22
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31 B. Air Purifying Respirators
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37 C. Atmosphere Supplying Respirators
38
39
40 D. Respirator Cleaning/Storage
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- a. Human Respiratory System
 - b. Respiratory Hazards
 - c. Contaminants (Identification)
 - 1. Physical Properties
 - 2. Chemical Properties
 - 3. Concentration
 - 4. Warning Properties
 - 5. MSDS
 - 6. Toxicology
 - a. Gases/Vapors
 - b. Particulates
- a. Hazard Control
 - 1. Engineering Controls
 - 2. Administrative Controls
 - b. As low as reasonably achievable (ALARA)
- a. Medical Verification
 - 1. Physical Exam
 - 2. Spirometer Testing
 - b. Training
 - c. Qualitative/Quantitative Fit Testing
 - d. Selection Factors
 - 1. User Acceptance
 - 2. Psychological/Physiological Complications
- a. Operation
 - b. Limitations/Capabilities
 - 1. Particulate Air Filters
 - 2. Chemical Cartridge Respirators
- a. Operation
 - b. Limitations/Capabilities
- a. Cleaning Frequency
 - b. Maintenance
 - c. Storage

- 1 E. Respiratory Emergencies
 - 2
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 - 9 3. Practical Session
 - 10 =2 hours
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- a. Actions for Air Purifying Respirators
 - b. Self Contained Breathing Apparatus (SCBA) Emergency Actions
 - 1. Buddy System
 - 2. Regulator Failure
 - 3. Insufficient Air Flow
 - 4. Hyperventilation
 - a. Half-Facepiece, Air Purifying Regulators
 - 1. Types
 - 2. Mode of Operation
 - 3. Protection Factors
 - 4. Inspection
 - 5. Donning
 - 6. Qualitative Test
 - 7. Cartridge Type
 - 8. Removal
 - b. Full Facepiece, Air Purifying Regulator
 - 1. Types
 - 2. Mode of Operation
 - 3. Protection Factor
 - 4. Inspection
 - 5. Donning
 - 6. Qualitative Test
 - 7. Removal
 - c. Full Facepiece, SCBA
 - 1. Types
 - 2. Mode of Operation
 - 3. Protection Factor
 - 4. Inspection
 - 5. Donning
 - 6. Qualitative Test
 - 7. Removal

All time are approximate and do not reflect time spent on additional topics that arise due to class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

1 **COURSE:** SAF-515 - Confined Space
2
3 **DURATION:** =12 hours
4
5 **PREREQUISITES:** GET-19X/GET-20X initial training
6 Medical physical
7 SAF-630/631 Respiratory Protection
8 Current OPS-08 Qual Card
9
10 **SCOPE:** The instructor will present hazards, ~~personal protective equipment~~ **PPE**
11 requirements, emergency action, and compliance with regulatory and
12 WIPP procedures involving confined space. Students will learn
13 emergency retrieval techniques for removal of personnel from confined
14 spaces.
15
16 Students will enter a simulated confined space using ~~Personal Protective~~
17 ~~Equipment (PPE)~~
18
19 **TYPE:** Classroom and practical
20
21 **OBJECTIVES:** Upon completion of this course, the student will be able to state the
22 requirements for entry into confined spaces, identify hazards which may
23 exist, provide proper monitoring of the environmental conditions of
24 spaces, and provide proper emergency response actions involving
25 employees in distress.
26
27 Mastery of the terminal objective will be demonstrated by scoring 80
28 percent or higher on the course examination.
29
30 **REFRESHER:** SAF-515A Annually
31
32

- 1 **COURSE:** SAF-515A - Confined Space
2
3 **DURATION:** 4 Hours
4
5 **PREREQUISITES:** SAF-515 - Confined Space Initial Training
6 SAF-630/631 - Respiratory Protection
7 Current OPS-08 Qual Card
8
9 **SCOPE:** The instructor will present hazards, ~~personal protective equipment~~ **PPE**
10 requirements, emergency action, and compliance with regulatory and
11 WIPP procedures involving confined space. The course will also review
12 several confined space fatalities lessons learned.
13
14 **TYPE:** Classroom
15
16 **OBJECTIVES:** Upon completion of this course, the student will be able to describe the
17 WIPP's Confined Space Program
18
19 Mastery of the terminal objective will be demonstrated by scoring 80
20 percent or higher on the course examination
21
22 **REFRESHER:** Annually

- 1 **COURSE:** RAD-101 - Radiological Worker I
2
3 **DURATION:** =16 hours
4
5 **PREREQUISITES:** Radiation Manager Approval
6
7 **SCOPE:** The instructor will present radiological theory and practical information
8 necessary to allow unescorted entry into a controlled area, radioactive
9 materials area, radiological buffer area, and radiation area as required by
10 the WIPP Radiation Safety Manual.
11
12 **TYPE:** Classroom **A**nd Practical
13
14 **OBJECTIVES:** Upon completion of this course, the student will have the knowledge to
15 work safely in areas controlled for radiological purposes.
16
17 Mastery of the terminal objective will be demonstrated by scoring 80
18 percent or higher on the course examination and satisfactory performance
19 on the practical examination.
20
21 Completion of the course meets the training requirements necessary for
22 Radiological Worker -I (RWT-I).
23
24 **REFRESHER:** Retraining every two years with an alternate year refresher.
25

26 **COURSE DESCRIPTION** (by lesson)
27

- 28 1. Radiological Fundamentals a. Introduction
29 =2 hours 1. DOE Safety Policy
30 2. Course Overview
31 3. Radiological Worker (core
32 academics)
33 a. Radiological Worker II
34 (RW II) training
35 b. Course outline
36 c. Successful completion
37 b. Atomic Structure
38 1. Basic Units of Matter
39 a. Protons
40 b. Neutrons
41 c. Electrons
42 2. Stable and Unstable atoms
43 3. Charge of the atom
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- c. Definitions
 - 1. Ionization
 - 2. Ionizing radiation
 - 3. Non-ionizing radiation
 - 4. Radioactivity
 - 5. Radioactive material
 - 6. Radioactive Contamination
 - 7. Radioactive decay
 - 8. Radioactive half-life
- d. Four Basic Types of Ionizing Radiation
 - 1. Alpha particles
 - a. Physical characteristics
 - b. Range
 - c. Shielding
 - d. Biological hazard
 - e. Sources
 - 2. Beta particles
 - a. Physical characteristics
 - b. Range
 - c. Shielding
 - d. Biological hazard
 - e. Sources
 - 3. Gamma rays/x rays
 - a. Physical characteristics
 - b. Range
 - c. Shielding
 - d. Biological hazard
 - e. Sources
 - 4. Neutron particles
 - a. Physical characteristics
 - b. Range
 - c. Shielding
 - d. Biological hazard
 - e. Sources

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2. Biological Effects
=1 hour

- e. Units of Measure
 - 1. Radiation
 - a. Roentgen
 - b. RAD (Radiation Absorbed Dose)
 - c. Rem (Roentgen Equivalent Man)
 - d. Radiation dose and dose rate
 - 2. Contamination/Radioactivity
- f. 10 CFR Part 835, "Occupational Radiation Protection"
 - a. Introduction
 - b. Sources of Radiation
 - 1. Natural sources
 - a. Cosmic radiation
 - b. Sources in earth's crust (terrestrial)
 - c. Internal
 - d. Radon
 - 2. Man-made sources
 - a. Medical radiation sources
 - 1. X-rays
 - 2. Diagnosis and therapy
 - b. Atmospheric testing of nuclear weapons
 - c. consumer products
 - d. Industrial uses
 - c. Effects of Radiation on Cells
 - 1. Biological effects
 - 2. Cell sensitivity
 - 3. Possible effects of radiation on cells
 - a. No damage
 - b. Cells repair damage and operate normally
 - c. Cells are damaged and operate abnormally
 - d. Cells die as a result of damage

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3. Radiation Limits
=1 hour

- d. Acute and Chronic Radiation Dose
 - 1. Acute radiation doses
 - 2. Chronic radiation doses
 - 3. Genetic effects
 - 4. Factors affecting biological damage due to exposure to radiation
 - a. Total dose
 - b. Dose rate
 - c. Types of radiation
 - d. Area of the body which receives a dose
 - e. Cell sensitivity
 - f. Individual sensitivity
- e. Prenatal Radiation Exposure
 - 1. Sensitivity to the unborn
 - 2. Potential effects associated with prenatal exposures
- f. Risks in Perspective
 - 1. Risk from exposures to ionizing radiation
 - 2. Comparison of risks
- g. Summary
 - a. Basis and Purposes for Radiation Dose Limits and Administrative Control levels for radiological workers
 - 1. Bases for DOE dose limits
 - 2. WIPP administrative control levels
 - b. Dose Limits and Administrative Control Levels
 - 1. Whole body Control Levels
 - a. Definition
 - b. Limit and control levels
 - 2. Extremities
 - a. Definition
 - b. Limit and control levels
 - 3. Skin and other organs
 - a. Definition
 - b. Limit and control levels
 - 4. Lens of the eye
 - a. Definition
 - b. Limit and control levels

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4. ALARA Program
=1 hour

- 5. Declared pregnant worker:
Embryo/fetus
 - a. DOE policy
 - b. DOE limit
 - c. Site policy
 - d. WIPP administrative control level
- 6. Visitors and public
- c. Worker Responsibilities Regarding Dose Limits
- d. Summary
 - a. ALARA Program
 - 1. ALARA Concept
 - 2. DOE Management Policy for the ALARA program
 - 3. Site policy
 - b. Responsibilities for the ALARA
 - 1. Management Program
 - 2. Radiological control organization
 - 3. Radiological workers
 - c. External and internal radiation
 - 1. Basic protective measures used to Dose Reduction reduce external doses
 - a. Time
 - b. Distance
 - c. Shielding
 - 2. Additional methods to reduce dose
 - 3. Lessons learned
 - d. Internal Radiation Dose Reduction
 - 1. Pathways
 - a. Inhalation
 - b. Ingestion
 - c. Absorption through the skin
 - d. Absorption through wounds
 - 2. Methods to reduce internal radiation dose

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- 5. Personnel Monitoring Programs
=1 hour
 - e. Radioactive Waste Minimization
 - 1. Methods to minimize radioactive waste
 - 2. Separate radioactive waste from nonradioactive waste
 - 3. Separate compactable material from noncompactable material
 - 4. Minimize the amount of waste generated
 - 5. Use good housekeeping techniques
 - f. Summary
 - a. External Dosimetry
 - 1. Thermoluminescent dosimeters
(TLD)
 - 2. Direct reading dosimeters
 - 3. Alarming dosimeters
 - 4. Worker responsibility for external dosimetry
 - b. External Monitoring
 - c. Worker Dose Records
 - d. Summary
- 6. Radiological Postings and Controls
=2 hours
 - a. Radiological Work Permits
 - 1. Use
 - 2. Types
 - a. General radiological work permit
 - b. Job specific radiological work permit
 - 3. Information to be included on the permit
 - 4. Worker responsibilities

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- b. Radiological postings
 - 1. Uses
 - 2. Requirements
 - 3. Responsibilities of the worker associated with postings, signs, and labels
 - 4. Consequences of disregarding radiological postings, signs, and labels
 - 5. Requirements for entry, exit, and area working in radiologically posted areas
- c. Radiological areas
 - 1. Radiological buffer areas
 - (RBAs)**
 - a. Posting requirements
 - b. Minimum requirements for unescorted entry
 - c. Requirements for working in RBA's
 - d. Requirements for exit
 - 2. Radiation areas
 - a. Posting requirements
 - b. Minimum requirements for unescorted entry
 - c. Requirements for working in area
 - d. Requirements for exit
 - 3. Contamination areas
 - a. Posting requirements
 - b. Require special training
 - 4. High contamination areas
 - a. Posting requirements
 - b. Require special training
 - 5. Airborne radioactivity areas
 - a. Posting requirements
 - b. Require special training
 - 6. Radioactive materials areas
 - a. Posting requirements
 - b. Minimum requirements for unescorted entry
 - c. Requirements for working in area
 - d. Requirements for exit

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6. Radiological Emergencies
=1 hour

- 7. Fixed contamination area
 - a. Posting requirements
 - b. Contact radiological control for entry requirements
- 8. Soil contamination area
 - a. Posting requirements
 - b. contact radiological control for entry requirements
- 9. Underground radioactive materials area
 - a. Posting requirements
 - b. General requirements
- 10. Hot spots
 - a. Posting requirements
- d. Summary
 - a. Emergency alarms and responses
 - 1. Area radiation monitors (ARMs)
 - 2. Continuous Airborne Monitors (CAMs)
 - b. Disregard for radiological alarms
 - c. Radiological emergency situations
 - d. Considerations in Rescue and Recovery Operations
 - e. Summary

- 1 7. High/very High Radiation Area Training
2 =1 hour
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22 8. Written Examination and Review
23 =1 hour
24
25 9. Job Performance Measures (JPM) Review and JPM Evaluations
26 =4 hours
27
28
- a. Definitions
 - 1. High radiation area
 - 2. Very high radiation area
 - b. Signs and postings
 - c. General entry, work, exit
 - 1. Entry requirements
 - 2. Working requirements
 - 3. Exit requirements
 - d. Access controls
 - 1. Administrative controls
 - 2. Physical controls
 - 3. Consequences for violating radiological signs or postings or bypassing physical access controls
 - e. Response to area radiation alarms and unusual conditions
 - f. Considerations in Rescue and Recovery Operations
 - g. Summary

29 All times are approximate and do not reflect time spent on additional topics that arise from class
30 participation, student breaks, class size and/or practical exercises. (i.e. Job Performance
31 Measures)
32

- 1 **COURSE:** RAD-201 - Radiological Worker II
2
3 **DURATION:** =8 hours
4
5 **PREREQUISITES:** Radiation Manager Approval
6
7 **SCOPE:** The instructor will present an intensive course intended for the
8 radiological workers whose job assignments involve unescorted entry to
9 high and very high radiation areas, contamination areas, high
10 contamination areas, and airborne activity areas.
11
12 **TYPE:** Classroom ~~And~~ and Practical
13
14 **OBJECTIVES:** Demonstrate the ability to work safely in radiologically controlled areas,
15 use ALARA techniques in accordance with WIPP radiation protection
16 procedures
17
18 Mastery of the terminal objective will be demonstrated by scoring 80
19 percent or higher on the course examination and satisfactory performance
20 on the practical examination
21
22 **REFRESHER:** Retraining every two years with an alternate year refresher
23

24 **COURSE DESCRIPTION** (by lesson)
25

- 26 1. Radioactive Contamination a. Plutonium
27 =3 hours b. Comparison of ionizing radiation
28 1. Ionizing radiation and
29 radioactive contamination
30 2. Radioactive contamination
31 3. Radiation is energy,
32 contamination is material
33 c. Types of contamination
34 d. Sources of radioactive contamination
35 1. Sources
36 2. Indicators of possible area
37 contamination
38 3. Employee response to a spill
39 e. Contamination control methods
40 1. Preventable methods
41 2. Engineering control methods
42 3. Personal protective measures
43 a. Protective clothing
44 f. Contamination monitoring
45 equipment

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- 1. Purpose
 - 2. Types and uses
 - 3. Frisking
 - g. Decontamination
 - 1. Personnel decontamination
 - 2. Material decontamination
 - a. General considerations
 - b. Methods available
 - c. Techniques
 - h. Contamination control requirements
 - 1. Posting requirements
 - 2. Requirements for entering
 - 3. Donning double protective clothing PC's
 - 4. Exit requirements
 - 5. Method for removing items from contamination areas
 - i. Unusual events involving radioactive materials
 - 1. Unusual events
 - 2. Use of the incident command system
 - 3. Actions of emergency responders
 - 4. Response techniques
 - j. Identification of radiation hazards
 - 1. Placards
 - 2. Labels
 - 3. Shipping papers
 - k. Field operation protocol for radiation accidents

2. Practical Examination and review
=1 hour
3. JPM Review and JPM Evaluations
=4 hours

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

- 1 **COURSE:** TRG-293/298 - Subject Matter Expert and On-the-Job Training
2
3 **DURATION:** =4 hours
4
5 **PREREQUISITES:** Manager Approval
6
7 **TYPE:** Classroom
8
9 **SCOPE:** The instructor will provide the training skills and knowledge necessary
10 to perform the role of subject matter expert (**SME**)/on-the-job trainer
11 (**OJT**).
12
13 **OBJECTIVE:** Upon completion of this course the student will be able to perform the
14 instructional duties of a Level I Instructor (SME/OJT trainer) In
15 compliance with WIPP training policies.
16
17 Mastery of the terminal objective will be demonstrated by scoring 80
18 percent or higher on the course examination.
19
20 **REFRESHER:** Every Two Years

21
22 **COURSE DESCRIPTION** (by lesson)
23

- 24 1. Requirements for Qualification
25 =.5 hour
26
27 a. Qualification card
28 b. Designation letter to training
29 c. Training course
30 d. SME Qualification Board
31 e. Arranging the SME Board
32 f. Conduct of the Board
33 g. Maintaining qualification
34 h. Lapses in qualification
35
36 2. Role of the Level I Instructor
37 =1 hour
38
a. Conduct formal OJT
b. Develop/revise qualification cards
c. Maintaining files related to area of
expertise
d. Limitations of Level I Instructors

- 1 3. On-The-Job (OJT) Training
 - 2 =1 hour
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 - 15 4. Qualification Cards
 - 16 =1 hour
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 - 22 5. Qualification Guide
 - 23 =.5
 - 24
 - 25
- a. Definition
 - b. Formal training vs. informal training
 - c. Process for OJT
 - 1. Introduction phase
 - 2. Explanation phase
 - 3. Knowledge evaluation phase
 - 4. Demonstration phase
 - 5. Practice phase
 - 6. Practical evaluation phase
 - 7. Rules
 - d. Trainee failures or slow learners
 - e. Good OJT practices
 - f. Common OJT instructor errors
- a. Purpose
 - b. Elements
 - c. Writing competency statements
 - d. Selecting competency statements for requalification
 - e. Reviewing qualification cards

26 All times are approximate and do not reflect additional time spent on topics that arise from class
27 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
28 Measures)
29

1 **COURSE:** TRG-300 - Classroom Instructor - Level II

2

3 **DURATION:** =40 hours

4

5 **PREREQUISITES:** Manager's approval

6

7 **SCOPE:** The Instructor will present the student with the information and skills
8 necessary to develop and preform classroom instruction based on DOE
9 guideline "Good Practice For Training And Qualification of Instructors"
10 DOE-HDBK-1001-96.

11

12 **TYPE:** Classroom and Practical

13

14 **OBJECTIVES:** Upon completion of this course the student will be able to develop,
15 conduct, and document formal classroom training in compliance with
16 current WIPP training policies.

17

18 Mastery of the terminal objective will be demonstrated by satisfactory
19 performance on all practical sessions and maintaining 80 percent or higher
20 for an overall course Average. No score less than 70 percent may be
21 scored on any daily examination.

22

23 **REFRESHER:** TRG-292 Every six months

24

25 **COURSE DESCRIPTION** (by lesson)

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27 1. Introduction
28 =1 hour

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- a. Course title
- b. Course terminal objective
 - 1. Part I
 - 2. Part II
- c. Course topics
 - 1. Qualities of a competent instructor
 - 2. Adult learning principles
 - 3. Performance Based Training (PBT)
 - 4. Training settings
 - 5. Learning objectives
 - 6. Test development
 - 7. Development of lesson plans
 - 8. Use of instructional aids
 - 9. Presentation and facilitation skills
 - 10. Effective questioning techniques

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 - 14 2. Competencies of a Competent Instructor
 - 15 =1 hour
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 - 30 3. Adult Learning Principles
 - 31 =2 hours
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11. Behavioral problems
 12. Demonstration method
 13. Evaluations
 14. Administration
 15. Final practical examination
 - a. Subject choices
 - b. Time limit
 - c. Requirements in the lecture
 - d. Evaluation method
 - e. Video taped
 - d. Summary
 - a. Motivator
 - b. Role of the Instructor
 - c. Role of the Level II Instructor
 1. Develop instructional materials
 2. Conduct formal classroom instruction in their technical area
 3. Administer examinations
 4. Document formal training
 - d. Reasons for Qualified Instructors
 - e. Categories of Instructor Qualities
 - f. Qualities of competent instructor
 - g. Common pitfalls to an instructor's success
 - h. Summary
 - a. Motivator
 - b. Learning defined
 1. Learning based on experience
 2. Learning as an experience retained by the learner and produces a measurable change in behavior
 3. How change can occur
 4. Categories of learning
 - c. Learning style
 - d. Instructor learning principles
 1. Learning principles and information processing
 2. Learning principle equals motivation

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4. Overview of PBT/Training Accreditation Program (TAP)
=1 hour

3. Learning principle equals digestible chunks
4. Learning principle equals experience
5. Learning principle equals attention
6. Learning principle equals reinforcement
7. Learning principle equals retention
8. Learning principle equals retrieval
9. Learning principle equals transfer
10. Summarize concepts
- e. Adults as Learners
 1. Four adult learning principles
 2. Concept of the learner
 3. Role of experience
 4. Readiness to learn
 5. Orientation to learning
 6. Internal summary
- f. Barriers to learning in adults
 1. Physical barriers
 2. Emotional barriers
 3. Intellectual barriers
 4. Learning style barriers
- g. Summary
 - a. Motivator
 - b. Performance Based Training
 1. Definition
 - c. Five Phases of PBT System
 1. Analysis
 2. Design
 3. Development
 4. Implementation
 5. Evaluation
 - d. Reasons for using the PBT process
 - e. Definitions of five phases
 1. Analysis
 - a. Purpose
 - b. Process/products
 1. Job analysis
 2. Task analysis

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| 17 | 5. | Methods of Instruction | 2. Design |
| 18 | | =1 hour | a. Purpose |
| 19 | | | b. Process/products |
| 20 | | | 3. Development |
| 21 | | | a. Purpose |
| 22 | | | b. Process/products |
| 23 | | | 4. Implementation |
| 24 | | | a. Purpose |
| 25 | | | b. Process/products |
| 26 | | | 5. Evaluation |
| 27 | | | a. Purpose |
| 28 | | | b. Process/products |
| 29 | | | f. DOE Order |
| 30 | | | 1. DOE Order 5480.18 |
| 31 | | | h. Summary |
| 32 | | | a. Motivator |
| 33 | | | b. Training sessions |
| 34 | | | 1. Definition |
| 35 | | | 2. Training sessions common to DOE |
| 36 | | | 3. Classroom setting |
| 37 | | | 4. On-the-Job |
| 38 | | | 5. Laboratory setting |
| 39 | 6. | Development of Learning Objectives | 6. Self-paced instruction setting |
| 40 | | =1 hour | 7. Simulator setting |
| 41 | | | c. Setting selection criteria |
| 42 | | | 1. Setting criteria |
| 43 | | | d. Training methods |
| | | | 1. Lecture |
| | | | 2. Discussion |
| | | | 3. Role-play |
| | | | 4. Self-study |
| | | | 5. Walk-through |
| | | | 6. Case study |
| | | | e. Summary |
| | | | a. Motivator |
| | | | b. Definition of learning objective |
| | | | 1. Definition |
| | | | 2. Why write objectives |
| | | | 3. When to write objectives |
| | | | 4. Basic assumptions |

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7. Methods of Testing
=2 hours

- c. Component parts of learning objectives
 - 1. Action statement
 - 2. Conditions
 - 3. Standard
 - 4. Implied conditions and standards
- d. Definition of Terminal Objective
 - 1. Definition
 - 2. First sentence
 - 3. Second sentence
- e. Source of Information for Terminal Objectives
- f. Definition of Enabling Objective
 - 1. Definition
- g. Information source for enabling objectives
- h. Exercise
 - 1. Terminal objective
 - 2. Enabling objective
- i. Summary
 - a. Motivator
 - b. Purpose of testing
 - 1. Purpose of testing
 - 2. Selection and placement
 - 3. Feedback to trainers and trainees
 - 4. Motivation
 - 5. Improvement to training programs
 - c. When are tests developed?
 - 1. Analysis phase
 - 2. Design phase
 - a. Training settings
 - b. Learning objectives
 - c. Entry-level skills
 - d. Design
 - e. Written tests
 - f. Oral tests
 - 3. Development phase
 - 4. Implementation phase
 - 5. Evaluation phase

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8. Developing Lesson Plans
=2 hours

- d. Guidelines for question development
 - 1. Approved test question formats at the WIPP
 - a. True/false
 - b. Multiple choice
 - c. Matching
 - d. Completion/short answer
 - e. Draw/label
 - 2. General guidelines
 - 3. True/false format
 - 4. Multiple choice
 - 5. Matching
 - 6. Completion/short answer
 - 7. Draw/label
- e. Approved examination format
 - 1. Two items per objective
 - 2. Meet the intent of the objective
 - 3. Use acceptable format
- f. Examination format
 - 1. Version vs. multiple exam
 - 2. Required formats
 - 3. Approval
- g. Control of examinations
 - 1. Examination preparation
 - 2. Administering the examination
 - 3. Grading examination
- h. Examination failure
- i. Summary
 - a. Motivator
 - b. Function of a Lesson Plan
 - 1. Defined as TAP
 - 2. Accomplish objective
 - 3. Promote consistency
 - 4. Serve as guide
 - c. Elements of Lesson Plan format
 - 1. Cover page
 - 2. Instructor pages
 - d. Definition of "Introduction"
 - 1. Goal of introduction
 - 2. Preliminaries
 - a. Instructor name and background
 - b. Lesson title
 - c. Trainee comfort

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 - 12 9. Development of Instructional Aids
 - 13 =2 hours
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- d. Solicit participation for questions and comments
 - 3. Learning objectives
 - 4. Overview
 - e. Development of the Body
 - 1. Outline content
 - 2. Topics sequence
 - 3. Detail of content
 - f. Definition of Summary
 - g. Summary
 - a. Motivator
 - b. Definition of instructional aid
 - c. Purpose of instructional aids
 - d. General guidelines for instructional aids
 - 1. Design and development guidelines
 - 2. Utilization guidelines
 - e. Guidelines for the use of visual aids
 - f. Writing boards (white and chalk)
 - 1. Introduction
 - 2. Development tips
 - 3. Utilization tips
 - g. Flip charts
 - 1. Introduction
 - 2. Development tips
 - 3. Utilization tips
 - h. Overhead transparencies
 - 1. Introduction
 - 2. Development tips
 - 3. Utilization tips
 - i. Handout materials and study guides/workbooks
 - 1. Introduction
 - 2. Purpose
 - 3. Development tips
 - 4. Utilization tips
 - j. Videos/films
 - 1. Introduction
 - 2. Development tips
 - 3. Introduce video
 - 4. Utilization tips
 - k. Training aids
 - 1. Transition

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7 10. Use of Presentation and Facilitation Skills
8 =2 hours
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23 11. Effective Questioning Techniques
24 =2 hours
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- 2. Types of training aids
 - 3. Purpose
 - l. Consideration for selecting training aids
 - m. Summary
 - a. Motivator
 - b. Understanding speaking fears
 - c. Presentation skills
 - 1. Personal space
 - 2. Body movements/ gestures/eye contact/voice
 - 3. Exercise
 - d. Communications model
 - e. Facilitation skills
 - 1. Transition
 - 2. Attending skills
 - 3. Observing skills
 - a. Exercise
 - 4. Listening skills
 - f. Summary
 - a. Motivator
 - 1. Why trainers do not ask questions
 - a. Control
 - b. Time
 - c. Discomfort for self and trainees
 - d. Other
 - b. Advantages of questioning
 - c. Characteristics of effective questions
 - d. Difference between comprehension and interaction questions
 - e. Types of questions
 - 1. Overhead question
 - 2. Rhetorical question
 - 3. Direct question
 - 4. Relay questions
 - 5. Reverse question
 - 6. Pointed question
 - 7. Offensive question
 - f. Asking questions
 - g. Responding to answers
 - h. Summary

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2 12. Handling Behavioral Problems
3 =1 hour
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43 13. Use of Demonstration Methods
44 =1 hour
- a. Motivator
 - b. Characteristics of behavioral problems
 - 1. Argumentative
 - 2. Belligerent
 - 3. Bored
 - 4. Chronic questioner
 - 5. Clown
 - 6. Late to class
 - 7. Monopolizer
 - 8. Preoccupied
 - 9. Shy
 - 10. Slow learner
 - 11. Superior learner
 - 12. Exercise
 - c. Guidelines for determining
 - 1. Determining need a personal conference
 - d. Guidelines for personal conference
 - 1. Planning the conference
 - a. State the problem
 - b. Describe your reaction to the problem
 - c. Ask for the trainee view of the situation
 - d. Ask the trainee for recommendations
 - e. Present your alternatives
 - f. Select the best solution from alternatives and develop an action plan
 - g. Set specific follow up review dates
 - 2. Physical arrangement for the conference
 - 3. Conducting the conference
 - 4. Strategies for active listening
 - e. Methods for correcting behavioral problems
 - f. Summary
- a. Motivator
 - b. Purpose of the demonstration method

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14. Purpose of Evaluations
=1 hour

- c. Effective areas of demonstration method
 - 1. Concepts
 - 2. Manipulative skills
 - 3. Attitudes
 - 4. Practice
- d. Training aids
- e. Advantages and disadvantages
 - 1. Advantages
 - 2. Disadvantages
- f. Preparing for the lesson
- g. Steps in the demonstration method
 - 1. Introduction
 - 2. Presentation
 - 3. Practice
 - 4. Summary
- h. Actual presentation
- i. Exercise
- j. Summary
 - a. Motivator
 - b. Definition of evaluation
 - c. Purposes of evaluation
 - d. Sections of evaluation process
 - e. Evaluations performed
 - 1. Trainee questionnaire
 - 2. Post training survey (trainee)
 - 3. Post training survey (supervisor)
 - 4. Annual instructor observation form
 - f. Results of the evaluation
 - g. Summary

- 1 15. Training Administration
 - 2 =1 hour
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 - 23 16. Final Practical
 - 24 =6 hours
 - 25
 - 26 17. Examinations
 - 27 =2 hours
 - 28
 - 29 18. Work Time
 - 30 =8 hours
 - 31
 - 32
- a. Motivator
 - b. Course package
 - 1. Lesson plan
 - 2. Exam, quizzes, and JPMs
 - 3. Trainee handouts
 - 4. Overheads
 - 5. Approval
 - a. Training records
 - b. Cognizant manager
 - c. Training manager
 - d. Material given back to instructor
 - c. Course preparation
 - 1. Lesson plan
 - 2. Exams and quizzes
 - 3. Trainee handouts
 - 4. Overheads
 - 5. Paperwork
 - d. Training attendance sheet
 - e. Post class activities
 - f. Summary

33 All times are approximate and do not reflect additional time spent on topics that arise from class
34 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
35 Measures)
36

- 1 **COURSE:** MED-101 - First Aid and CPR
2
3 **DURATION:** 12 hours
4
5 **PREREQUISITES:** None
6
7 **SCOPE:** The instructor will provide Cardio Pulmonary Resuscitation (CPR)
8 training including one-rescuer CPR, the Heimlich maneuver, and first aid
9 techniques.
10
11 **TYPE:** Classroom and CPR Practical
12
13 **OBJECTIVES:** Upon completion of this course, the student will be able to administer
14 basic first aid and one-rescuer CPR in accordance with the national safety
15 council. Identify heart disease factors, signs, and symptoms of a heart
16 attack and perform one-rescuer CPR and the Heimlich maneuver.
17
18 Mastery of the terminal objective will be demonstrated by scoring 80
19 percent or higher on the course examination and satisfactory performance
20 on the practical examination.
21
22 **REFRESHER:** MED 101A Annually
23
24

25 **COURSE DESCRIPTION** (by lesson)
26

- 27 1. Definitions and Legal Aspects a. Duty to act
28 =1 hour b. Consent for treatment
29 c. Abandonment
30 d. Good Samaritan law
31 e. Confidentiality
32
33 2. Assessment a. Purpose
34 =1 hour b. Systematic approach considerations
35 c. Parts
36 d. Scene assessment
37 e. Primary survey
38 f. Secondary survey
39

- 1 3. ~~Cardiopulmonary Resuscitation (CPR)~~
2 =1 hour
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11 Treatment of Various Conditions
12 =4 hours
13
14 4. Shock
15
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18 5. Bleeding
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25 6. Head Injury
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31 7. Burns
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35 9. Heat Related Injuries/Illnesses
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45 10. Bone and Joint Injuries
- a. Anatomy of cardiovascular system
b. Physiology of the heart
c. Anatomy of the respiratory system
1. Upper airway
2. Lower airway
3. Alveoli
4. Pulmonary arteries, veins,
capillaries
d. Physiology of the respiratory system
e. Heart disease
- a. Hypovolemic shock
b. Fainting
c. Anaphylactic shock
- a. Types
b. Control
c. Treatment
d. Acquired Immunodeficiency Syndrome AIDS and Human Immunodeficiency Virus HBV
- a. General information
b. Scalp lacerations
c. Skull fractures
d. Spinal injuries
1. Treatment
- a. Classifications
b. Causes
c. Treatment
- a. Types
1. Heat cramps
a. Treatment
2. Heat exhaustion
a. Signs and symptoms
b. Treatment
3. Heat stroke
a. Signs and symptoms
b. Treatment
- a. General information

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 - 3 11. Summary
 - 4
 - 5 12. Written examination
 - 6
 - 7 13. Practical
 - 8 =3 hours
 - 9
- b. Signs and symptoms
 - c. Treatment

10 All times are approximate and do not reflect additional time spent on topics that arise from class
11 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
12 Measures)
13

1 **COURSE:** MED-101A - First Aid and CPR Refresher
2
3 **DURATION:** =8 Hours
4
5 **PREREQUISITES:** MED-101
6
7 **SCOPE:** The instructor will provide refresher training Basic CPR (one-rescuer) and
8 basic first aid techniques
9
10 **TYPE:** Classroom and practical
11
12 **OBJECTIVES:** Upon completion of this course, the student will able to administer basic
13 first aid and one-rescuer CPR
14
15 Mastery of the terminal objective will be demonstrated by scoring 80
16 percent or higher on the course examination and satisfactory performance
17 on the practical examination
18
19 **REFRESHER:** Annually

- 1 **COURSE:** HMT-102 - Hazardous Materials and Waste Transportation
2
- 3 **DURATION:** =16 Hours
4
- 5 **PREREQUISITES:** Manager approval and/or assignment to transportation duties in
6 accordance with 49 CFR
7
- 8 **SCOPE:** Instruction meeting 49 CFR 172 Subpart H provided in a modular format.
9 This course covers: awareness, the hazards material table, packaging,
10 marking, labeling, placarding, material separation and segregation, special
11 or unique transportation moves, safety, and site specific transportation
12 issues.
13
- 14 **TYPE:** Classroom lecture including exercises to enhance trainee learning and
15 retention
16
- 17 **OBJECTIVES:** Upon completion of the course, the trainee will be able to define, locate,
18 apply and maintain compliance with the DOT regulations involving the
19 transportation and/or offering for transportation of a hazardous material or
20 waste.
21
- 22 Mastery of this objective will be demonstrated by scoring a minimum of
23 80 percent on the course examinations using "approved course" reference
24 material.
25
- 26 **REFRESHER:** Biennially
27
- 28 **COURSE DESCRIPTION** (by lesson)
29
- 30 1. Awareness/familiarization a. Introduction
31 =1 hour 1. Instructor
32 2. Lesson
33 3. Course content
34 4. Lesson objectives
35 b. Lesson materials
36 1. ~~Department of Transportation~~
37 (DOT) Regulations
38 a. Brief history
39 b. Purpose
40 c. Scope
41 d. Terminology
42 e. Application of
43 regulations

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 - 34
 - 35 2. The Hazardous Materials Table
 - 36 =3 hours
 - 37
 - 38
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2. Training programs
 - a. Module assignments
 1. Basic modules
 2. Additional modules
 - c. Training program objectives
 - d. Training requirements
 - e. General transportation responsibility
 - f. General transportation liability
 - g. Potential exposures
 1. Number of shipments
 2. Events leading to exposures
 3. Causes for events
 - h. Compliance mandate
 1. Regulator responsibility
 2. Penalties
 3. Trends
 - i. DOE guidance
 1. DOE Orders
 2. Interaction of DOE Orders and Federal Regulations
 - j. Enforcement
 - k. Application of DOT Regulations at DOE facility
 - l. Introduction to Title 49 CFR
 1. Overview transportation regulations
 2. Navigating within the code book
 - m. Shippers acronym
 - n. Standardized DOT communications
 - o. Summary
 - p. Review
 - q. Questions and answer
 - a. Introduction
 - b. Lesson body
 1. Lesson objectives
 - c. Shipper's Star
 - d. Definition
 1. Hazardous material
 2. Hazardous waste
 3. Hazardous substance

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3. Packaging
=1.5 hours

4. Marking
=1.5 hours

- e. Hazard classes
 - 1. Nine 9 classes
 - 2. Special cases
 - 3. Class system
 - 4. Identification
 - 5. Shipper's responsibility
 - 6. Material identification
 - f. The Hazardous Materials Table
 - 1. 10 columns
 - 2. Navigating the hazardous materials table
 - g. Summary
 - h. Review
 - i. Questions and answers
- a. Introduction
 - 1. Lesson
 - b. Lesson body
 - 1. Lesson objectives
 - c. Terminology
 - 1. Packaging vs. package
 - a. Packaging
 - b. Package
 - d. Identifying packaging by code
 - 1. Recognition types
 - 2. Code interpretation for UN packaging
 - a. Packaging type
 - b. Packaging group
 - e. Limited quantity packing exemptions
 - 1. Describe "Limited Quantity"
 - 2. General criteria
 - f. Package Acceptance Criteria
 - 1. Acceptable packaging
 - 2. Unacceptable packaging
 - g. Summary
 - h. Review
 - i. Questions and answers
- a. Introduction
 - b. Lesson body
 - 1. Lesson objectives
 - 2. Purpose

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5. Labeling
=1.5 hours

3. Material identification
 - a. The proper shipping name **PSN**
 - b. UN/Uniform Act **UA** number
 - c. Shipments containing multiple materials
4. Physical markings
 - a. Location
 - b. Marking format
 - c. Poison Inhalation Hazard **PIH**
 - d. Arrows
 - e. Reportable quantities
 - f. Consignor/consignee information
5. Exemptions
 - c. Summary
 - d. Review
 - e. Questions and answers
- a. Introduction
- b. Lesson body
 1. Lesson objective
 2. Purpose
 3. Label selection
 - a. Hazardous Materials Table (HMT) table
 4. General placement of labeling
 5. Primary vs. secondary labeling
 - a. Primary label
 - b. Secondary
 6. Specific labeling requirements
 - a. Gas cylinders
 - b. Alternative labeling
 7. Mixed shipment in one package
 - a. Special requirements
 8. Combination package in one
 - a. Special requirements of outer package
- c. Summary
- d. Review
- e. Questions and answers

- 1 6. Shipping Papers
2 =1.5 hours
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28 7. Placarding
29 =1.5 hours
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- a. Introduction
 - 1. Lesson
 - b. Lesson body
 - 1. Lesson objectives
 - c. Types of shipping documents
 - 1. Standard bill of lading
 - 2. Waste manifest
 - d. Basic components of a proper shipping paper
 - e. Specific shipping paper
 - 1. Shipper information
 - 2. Quantity of packages
 - 3. Hazardous materials
 - 4. Quantity of material
 - 5. Emergency response information
 - 6. Certification statement signature
 - f. Shipping paper format
 - g. Additional information
 - 1. Hazardous and non-hazardous shipping paper
 - h. Emergency information
 - i. Summary
 - j. Review
 - k. Questions and answers
- a. Introduction
 - b. Lesson material
 - c. Lesson objectives
 - d. Purpose
 - 1. Hazardous material identification
 - 2. Materials with certain exemptions
 - e. Application
 - 1. Placards should not be used
 - 2. Selection criteria
 - a. Table application
 - b. Aggregate gross weight
 - 3. Authorized placards
 - a. Displaying requirements
 - b. Placard identification
 - f. Shipper's requirements

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| 18 | 8. | Other placards |
| 19 | | 1. Explosives |
| 20 | | 2. Residue |
| 21 | | 3. Spontaneously combustible |
| 22 | | 4. Organic peroxide |
| 23 | | 5. Harmful |
| 24 | | 6. Class 9 |
| 25 | | h. Displaying of subsidiary placards |
| 26 | | 1. Criteria |
| 27 | | j. Displaying placards |
| | | 1. Single trailer or bobtail type truck |
| | | 2. Multiple trailers |
| | | k. Summary |
| | | l. Review |
| | | m. Questions and answers |
| | a. | Introduction |
| | b. | Lesson material |
| | | 1. Lesson objectives |
| | | 2. Purpose |
| | c. | The table |
| | | 1. Layout |
| | | 2. Symbols |
| | d. | Summary |
| | e. | Review |
| | f. | Questions and answers |

- 1 9. Special and Unique Moves
2 =1 hour
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22 10. Safety
23 =1 hour
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- a. Introduction
 - b. Lesson material
 - 1. Lesson objectives
 - 2. Terminology
 - a. Empty
 - b. Residue
 - c. Treatment of “empty” shipments
 - d. Overpack and salvage drums
 - 1. Overpack drums
 - a. Intended use
 - b. Use requirements
 - 2. Salvage drums
 - a. Intended use
 - b. Package requirements
 - e. Shipment of samples
 - 1. Material identification
 - 2. Unknown material
 - f. Summary
 - g. Review
 - h. Questions and answers
- a. Introduction
 - b. Lesson material
 - 1. Lesson objectives
 - 2. Emergency response information
 - a. Transportation
 - b. Resources
 - c. Emergency Response Guide
 - 1. Purpose
 - 2. Emergency Response Guidebook layout and overview
 - d. Using the emergency
 - 1. Locate chemical identity in Response Guidebook
 - 2. Review concerns and response recommendations
 - e. Potential risk and actions
 - 1. Risk
 - 2. Actions
 - f. Response principles
 - 1. “Never”
 - 2. Consider

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 - 8 11. Site Specific Transportation
 - 9 =1 hour
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- g. Documentation
 - 1. DOT Form F5800.1
 - 2. When to document
 - h. Summary
 - i. Review
 - j. Questions and answers
 - a. Introduction
 - b. Lesson material
 - 1. Lesson objectives
 - 2. Department/sect/individual
 - a. Employee involvement for shipment from the WIPP
 - b. Material control
 - c. Procurement
 - d. Health physics
 - e. Hazardous waste operations (**HWO**)
 - c. The shipping process
 - d. Additional information requirements by HWO
 - e. Hazardous waste shipments
 - f. Summary
 - g. Review
 - h. Questions and answers

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

- 1 **COURSE:** HMT-104 - DOT Emergency Response Information
2
- 3 **DURATION:** =3 hours
4
- 5 **PREREQUISITES:** None
6
- 7 **SCOPE:** This course is designed to instruct the trainee in the basic concepts of
8 applying DOT ~~Transportation~~ regulations involving shipments from the
9 WIPP site. This course will inform the trainee of information that may be
10 required when responding to an emergency involving transportation of
11 hazardous materials and hazardous waste from the WIPP site.
12
- 13 **TYPE:** Classroom
14
- 15 **OBJECTIVES:** Upon completion of this lesson, the trainee will be able to respond to
16 phone request from emergency personnel when hazardous materials or
17 hazardous waste are in transit from the WIPP site that may have been
18 involved in a transportation accident.
19
- 20 Mastery of the terminal objective will be demonstrated by scoring a
21 minimum of 80 percent on the course examination.
22
- 23 **REFRESHER:** None
24
- 25 **COURSE DESCRIPTION** (by lesson)
26
- 27 1. Regulations a. Emergency response information
28 =.5 hour b. Applicability
29 c. Availability
30
- 31 2. Logistics of an Emergency Response a. Central Monitoring Room Operator
32 =2.5 hours response to a request for emergency
33 1. Request received at CMR
34 2. Requestor need further
35 information

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- b. ~~Organization~~ of Emergency Response Guidebook organization
 - 1. By placard
 - 2. By shipping papers
 - 3. By package hazardous waste label
 - 4. Highlighted entries
 - 5. No available reference Information
- c. Log entries
- d. Summary

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

- 1 **COURSE:** SAF-501 - Inexperienced Miner Training
2
- 3 **DURATION:** 40 Hours
4
- 5 **PREREQUISITES:** None (Steel-toe shoes/boots required for underground tour)
6
- 7 **SCOPE:** The instructor will present the required information to allow unescorted
8 underground access
9
- 10 **OBJECTIVES:** Fulfill all requirements of 30 CFR part 48 for underground access.
11
12 Mastery of the terminal objective will be demonstrated by satisfactory
13 performance on all practical sessions and by scoring 80 percent or higher
14 on the daily exams with no score less than 70 percent with post course
15 examination.
16
- 17 **REFRESHER:** SAF-502 Annually
18
- 19 **COURSE DESCRIPTION** (by lesson)
20
- 21 1. Introduction a. Paperwork
22 =.5 hour b. Course attendance
23 1. Required attendance
24 2. Special instructions
25 c. Overview of the WIPP Underground
26 Operations
27 1. Similarity to other mining
28 operations
29 a. Potash mining
30 2. Differences to other mining
31 operations
32 a. Potash mining
33 b. Coal mining
34 d. Summary
35
- 36 2. Act of 1977 a. Creation of the Federal Mine
37 =1 hour b. Safety and Health Act of 1977
38 1. Congressional Act
39 b. Purpose

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14 3. Miner's Representative
15 =1 hour
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24 4. Reporting of Hazards/Lines of Authority
25 =1 hour
26
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39 5. Self-Rescuer/Respiratory Devices
40 =1.5 hour
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- c. Coverage under the Act of 1977
 - 1. Mandatory safety and health standards
 - 2. Inspection rights
 - 3. Accident investigations
 - 4. Record keeping
 - 5. Guidelines for correcting dangerous conditions
 - 6. Mandatory posing of violations and warnings
 - 7. Required training
 - d. Summary
 - a. Definition
 - b. The miner's representative under the Act of 1977
 - c. The miner's representative system at WIPP
 - d. Protection of the employee
 - e. Need for employee participation in the inspection of the site
 - f. Summary
 - a. Hazards
 - b. Reporting of hazards
 - 1. Responsibilities
 - a. Miner operator
 - b. Supervisor
 - c. Employee
 - c. Method of reporting
 - 1. Potential minor hazard
 - 2. Hazards involving possible imminent dangers
 - d. Disciplinary actions and the employee
 - e. Need for employee involvement
 - f. Summary
- a. Purpose
 - b. Service life
 - c. Inspection/Color code
 - d. Mine operator quarterly inspection
 - e. The self-rescuer
 - 1. Features
 - 2. The assembly

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 - 9 6. Entering and Leaving the Mine
 - 10 =1 hour
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 - 18 7. Transportation
 - 19 =1 hour
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 - 36 8. Communications
 - 37 =1.5 hours
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- f. Operation
 - g. Demonstration
 - h. Practical application
 - i. Respiratory protection
 - 1. The WIPP program
 - 2. Requirements
 - j. Summary
 - a. Access requirements
 - 1. Miner training
 - b. Qualification period
 - c. Lamp room location
 - 1. Proper safety equipment
 - 2. Sign-in procedure
 - 3. Brass tag
 - d. Summary
 - a. General
 - 1. Surface
 - 2. Underground
 - b. Hazards
 - c. Hazard preventive equipment
 - 1. Lighting
 - 2. Alarms
 - d. Personnel warning systems
 - e. Interaction with pedestrians
 - 1. Normal travel patterns
 - 2. Variations
 - f. Samples of hazards
 - 1. Conveyance
 - 2. Electric carts
 - 3. Haulage trucks
 - 4. Fork lift trucks
 - g. Summary
 - a. WIPP communications systems overview
 - 1. Personnel
 - 2. Artificial
 - b. System breakdown
 - 1. Personnel communication
 - a. Lamp signals
 - b. Hand signals
 - c. Appropriate uses
 - 2. Artificial communications

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|----|-----------------|----|-----------------------------|
| 1 | | a. | Commercial telephone |
| 2 | | b. | Mine phone |
| 3 | | c. | Gia-tronics |
| 4 | | d. | Alarms systems |
| 5 | | e. | Alarm warning lights |
| 6 | | c. | Summary |
| 7 | 9. Mine Map | a. | Definitions |
| 8 | =1 hour | b. | Map legends |
| 9 | | c. | Directions and locations |
| 10 | | 1. | Underground reference point |
| 11 | | 2. | Boundary limits |
| 12 | | d. | Primary drifts |
| 13 | | 1. | North/South |
| 14 | | 2. | East/West |
| 15 | | e. | Drifts by area name |
| 16 | | 1. | North |
| 17 | | a. | East/West |
| 18 | | b. | North/South |
| 19 | | 2. | Other North area drifts |
| 20 | | 3. | South construction area |
| 21 | | 4. | South disposal area |
| 22 | | f. | Assembly areas |
| 23 | | g. | Summary |
| 24 | | | |
| 25 | 10. Ventilation | a. | Ventilation |
| 26 | =1.5 hours | 1. | General requirements |
| 27 | | b. | Intake volume |
| 28 | | c. | Intake points |
| 29 | | 1. | Air Intake Shaft |
| 30 | | 2. | Salt Handling Shaft |
| 31 | | 3. | Waste Shaft |
| 32 | | d. | Exhaust volume |
| 33 | | e. | Primary air-flow routes |
| 34 | | 1. | North mine area air flow |
| 35 | | | (intake) |
| 36 | | 2. | North mine area air flow |
| 37 | | | (exhaust) |
| 38 | | 3. | South mine area air flow |
| 39 | | | (intake) |
| 40 | | 4. | South mine area air flow |
| 41 | | | (exhaust) |
| 42 | | f. | Air quality |
| 43 | | g. | Air flow balancing |
| 44 | | 1. | The plan |
| 45 | | 2. | Adjustments |

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5 11. Evacuation and Escape Routes
6 =2 hours
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27 12. Ground Control
28 =2.5 hours
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- 3. Unapproved adjustments
 - h. Escapeways
 - i. Summary
 - a. WIPP underground evacuation procedures
 - 1. Authorization for evacuation
 - 2. Notifications
 - 3. Initial actions
 - b. Escapes
 - 1. Purpose
 - 2. Primary
 - 3. Secondary
 - c. Non-routine egress
 - 1. Combination usage
 - 2. Blocked access
 - d. Define a barricade
 - e. Function of barricades
 - f. Permanent barricades
 - g. Temporary barricades
 - h. Methods of erecting a temporary barricade
 - i. Barricades in relationship with WIPP design
 - j. Summary
 - a. Evaluation of ground control
 - b. Federal regulations
 - c. State mining regulations
 - d. WIPP procedures
 - e. Introduction to ground control and ventilation
 - f. Introduction to barring down and scaling
 - g. Demonstration of bar down and scaling techniques
 - h. Geological formation at WIPP
 - i. Review of class room instruction
 - j. Field activities
 - 1. Identification of bad back or rib
 - 2. Bar down operations
 - 3. Scaling down operations
 - 4. Safety issues
 - k. Summary/exam

- 1
2 13. Hazard Recognition
3 =6 hour
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30 14. Health
31 =1 hour
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- a. General hazard recognition
 - 1. Mining as a whole
 - 2. Comparing WIPP with general mining industry
 - b. Mobile equipment
 - 1. Size
 - 2. Construction
 - 3. Other hazards
 - c. Ground control
 - 1. Over confidence in work place
 - 2. Barriers
 - 3. Improper installation of control devices
 - d. Electrical hazards
 - 1. Cables
 - 2. Substations and switch racks
 - 3. Unauthorized personal equipment
 - e. Loss of ventilation
 - 1. Air quality
 - 2. Radiation
 - f. Housekeeping
 - 1. General
 - 2. Risk to personnel
 - g. Laser operations
 - h. Seismic activity
 - i. Summary
- a. Air quality
 - 1. Dust
 - 2. Other vapors
 - 3. ~~Personal protective equipment~~ **PPE**
 - b. Noise
 - 1. Acceptable working levels
 - a. 8 hour shift
 - b. Short term
 - 2. Protection against damage
 - a. In-ear protection
 - b. Over-the-ear protection
 - c. Chemicals
 - 1. Use
 - 2. ~~Personal protective equipment~~ **PPE**
 - 3. Training
 - 4. Health effects

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- 5. Pre-event planning
- d. Potable water
- e. Toilet facilities
 - 1. Chemical toilets
- f. Waste receptacles
 - 1. General
- g. Food consumption
 - 1. Restriction
- h. Radiation exposure
 - 1. ALARA
 - 2. External
 - 3. Internal
 - 4. Through wounds
- i. Summary

All times are approximate and do not reflect additional time spent on topics that arise from class participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance Measures)

- 1 **COURSE:** SAF-502 - Mine Safety-Experienced Miner Refresher
2
3 **DURATION:** =8 Hours
4
5 **PREREQUISITES:** SAF-501
6
7 **SCOPE:** The instructor will update personnel of any change or modification in the
8 underground
9
10 **TYPE:** Classroom
11
12 **OBJECTIVES:** Fulfill requirements of 30 CFR part 48, for annual experienced miner
13 refresher training
14
15 Mastery of the terminal objective will be demonstrated by scoring 80
16 percent or higher on the course examination
17
18 **REFRESHER:** Annually
19

20 **COURSE DESCRIPTION** (by lesson)
21

- 22 1. Introduction a. Hand out 5000-23 MSHA Forms
23 =.5 hour b. Workplace overview
24 1. Ground control
25 2. Electrical
26 3. Air quality
27 4. Equipment
28 a. Accidents
29 b. Fires
30 c. Noise
31 c. Summary
32
33 2. Authority and Responsibility of Supervisors, a. Miner's representative
34 Miner's Representatives b. Miner's rights and responsibilities
35 =.5 hour c. Normal reporting of safety issues
36 d. Safety issues with eminent danger
37 1. Verbal notification
38 2. Protection from reporting
39 safety issues
40 3. Work refusal
41 e. Summary
42

- 1 3. Ventilation
2 =1 hour
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28 4. Ground Control
29 =1 hour
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35 5. Entering and Leaving the Mine
36 Transportation and Controls
37 =.5 hour
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- a. Intake volume
 - b. Intake points
 - 1. Air Intake Shaft
 - 2. Salt Handling Shaft
 - 3. Waste Shaft
 - c. Exhaust volume
 - 1. Exhaust Shaft
 - 2. EFB capabilities
 - d. Primary air-flow routes
 - 1. North mine area air flow (intake)
 - 2. North mine area air flow (exhaust)
 - 3. South construction air flow (intake)
 - 4. South construction air flow (exhaust)
 - 5. South disposal area air flow (intake)
 - 6. Waste Shaft station area
 - e. Air quality
 - 1. Required testing
 - 2. Ventilation failure
 - 3. Adjustments
 - 4. Unapproved adjustments
 - f. Summary
- a. Ground control
 - 1. General employee responsibility
 - 2. Typical ground failures
 - 3. Ground control practices
 - b. Summary
- a. Underground access procedure
 - 1. General employee responsibility
 - 2. Violation of restricted areas
 - b. ~~Personal protective equipment~~ **PPE**
 - c. Transportation
 - 1. The conveyance
 - 2. Mobile equipment
 - 3. Airlocks and doors
 - d. Summary

- 1 6. Communication, Warning Alarms and
2 signals
3 =.5 hour
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17 7. Mine Map, Escapeway, Emergency
18 Evacuation and Barricades
19 =1 hour
20
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26 8. Accident Prevention
27 =.5 hour
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29
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31
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33 9. Self-Rescuer
34 =.5 hour
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- a. Communication systems
 - 1. ~~GTE~~ Telephone
 - 2. Mine telephone
 - 3. Public address system
 - b. Alarm systems
 - 1. Fire
 - c. Emergency staging areas
 - 1. Assembly areas
 - 2. Station areas
 - d. Alarm notification actions
 - 1. Escapeways
 - 2. Retreat to station for evacuation
 - 3. Retreat to assembly areas
 - e. Summary
- a. Escapeways
 - b. Assembly areas
 - 1. Purpose
 - 2. Locations
 - 3. Personnel duties during emergencies
 - c. Barricade equipment
 - d. Summary
- a. Event happenings
 - b. Changing events
 - c. Pre-event recognition
 - d. Lessons learned
 - e. Summary
- a. Definition
 - b. Purpose
 - c. Inspections
 - d. Methods of conversion - catalytic conversion
 - e. Protection from deadly gas
 - f. Conversion to what compound?
 - g. Effect time limit
 - h. Compounds and operation
 - i. Practical applications
 - j. Summary

1 10. First Aid
2 =1 hour
3

a. Basic principles

4 All times are approximate and do not reflect additional time spent on topics that arise from class
5 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
6 Measures)

- 1 **COURSE:** RIG-001 - Incidental Rigger
2
3 **DURATION:** =16 Hours
4
5 **PREREQUISITES:** None
6
7 **SCOPE:** The instructor will present types of rigging, how to size up the load to be
8 lifted, and the mechanical lifting devices.
9
10 **TYPE:** Classroom
11
12 **OBJECTIVES:** Upon completion of this course, the student will be able to perform
13 incidental rigger duties in compliance with the DOE Standard Hoisting
14 and Rigging Manual DOE-STD-1090-96.
15
16 Mastery of the terminal objective will be demonstrated by scoring 80
17 percent or higher on the course examination.
18
19 **REFRESHER:** None
20

21 **COURSE DESCRIPTION** (by lesson)
22

- 23 1. Identifying Rigging Components a. Qualifications
24 =4 hours b. Definitions
25 c. Wire rope components
26 1. Core
27 2. Strand
28 3. Wire
29 d. Core
30 1. Strand
31 2. Wire
32 3. Lay of the rope
33 4. Length of the rope lay
34 5. Inspection
35 e. Web slings
36 f. Polyester slings
37 g. Wire rope slings
38 1. Inspection
39 2. Hooks
40 3. Spreader beam
41 4. Eyebolts
42 5. Shackles - anchor and chain
43 6. Wire rope clips - U bolt and
44 twin base
45 7. Turnbuckles

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2 2. Inspection and Storage - Weight Calculation a. Rigging inspection
3 =4 hours 1. Improper sling use
4 2. Inspection techniques
5 3. Rigging storage
6 4. Load weight determination
7 5. Calculations
8 6. Center of gravity
9 7. Slings and hitches
10 8. Load angle
11 9. Choker hitch rated capacity
12 adjustment
13 10. Load cell
14
15 3. Identify Lifts/Long Term Check-Out a. Load indicating devices
16 Hand Signals 1. Ordinary lift
17 =4 hours b. Critical lifts
18 1. Determination
19 2. Requirements
20 c. Pre-engineered production lift
21 d. Rigging check-out
22 e. Long-term checkout
23 f. Standard signals and signaler
24 identification
25
26 4. Identify rigging Attachments, Accessories a. Beam Clamps
27 and Uses 1. Types
28 =4 hours 2. Inspection
29 3. Hand operated hoists
30 a. Chain hoist
31 b. Lever operated hoist
32 1. Link chain
33 2. Roller chain
34 3. Wire rope
35 b. Jacks
36 c. Using jacks
37 d. Cribbing
38 e. Cribbing assembly
39

40 All times are approximate and do not reflect additional time spent on topics that arise from class
41 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
42 Measures)

- 1 **COURSE:** OPS-115 - Conduct of Shift Operations
2
3 **DURATION:** =8 hours
4
5 **PREREQUISITES:** None
6
7 **SCOPE:** The instructor will describe how shift operation will be conducted at the
8 site.
9
10 **OBJECTIVES:** Upon completion of this course, the student will be able to perform their
11 job in accordance with Operations Department "Conduct of Operations"
12 WP 04-CO.
13
14 Mastery of the terminal objective will be demonstrated by scoring 80
15 percent or higher on the course examination.
16
17 **REFRESHER:** NONE

18
19 **COURSE DESCRIPTION** (by lesson)
20

- 21 1. DOE Guidance for Conduct of Operations and Basic Requirements
22 =1 hour
23
24 a. DOE Policy
25 b. DOE Orders
26 c. Conduct of operations sections
27 1. Operations organization and administration
28 2. Shift routines and operating practices
29 3. Control area activities for the WIPP
30 4. Communications
31 5. Control of on-shift training
32 6. Investigation of abnormal events
33 7. Notifications
34 8. Control of equipment and system status
35 9. Tagouts and lockouts
36 10. Independent verification
37 11. Log keeping
38 12. Operations turnover
39 13. Operations aspects of facility unique processes
40 14. Required reading
41 15. Timely orders to operators
42 16. Operations procedures
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15 2. Sections of Conduct of Operations
16 =5 hours
17 A. Communications
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25 B. Control Area Activities
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31 C. Control of Equipment and System
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- 17. Operator aid posting
 - 18. Equipment and piping labeling
 - d. Operations organization and administration
 - 1. Operations Policies
 - 2. Resources
 - 3. Monitoring of operating performance
 - 4. Accountability
 - 5. Planning for safety
 - e. Procedures
 - 1. Use of procedures
 - 2. Working copies
 - a. Emergency communications
 - b. Public address system usage
 - c. Contacting operators
 - d. Radios
 - e. Abbreviations and acronyms
 - f. Oral instructions and informational communications
 - a. Control area access
 - b. Professional behavior
 - c. Monitoring the main control panels
 - d. Control operator ancillary duties
 - e. Operation of control area equipment
 - a. Status change authorization and reporting
 - b. Equipment and systems alignment
 - c. Equipment locking and tagging
 - d. Equipment deficiency identification and documentation
 - e. Work authorization and documentation
 - f. Equipment post-maintenance testing and return to service
 - g. Alarm status
 - h. Temporary modification control
 - i. Distribution and control of equipment and system documents

- 1 D. Independent Verification
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- a. Components requiring independent verification
- b. Occasions requiring independent verification
- c. Verification techniques
- E. Operator Aid Postings
- F. Equipment and Piping Labeling
 - a. Requirements
 - b. Identifying labeling deficiencies
- G. Shift Requirements
 - a. Routines and operating practices
 - 1. Status practices
 - 2. Safety practices
 - 3. Operator inspection tours
 - 4. Round/tour inspection sheets
 - 5. Personnel protection
 - 6. Response to indications
 - 7. Resetting protective devices
 - 8. Load changes
 - 9. Authority to operate equipment
 - 10. Shift operating bases
- H. Control of On-Shift Training
 - a. Adherence to training programs
 - b. On-shift instructor qualification
 - c. Supervision and control of trainees
 - d. Operator qualification program approval
 - e. Training documentation
 - f. Suspension of training
 - g. Maximum number of trainees
- I. Logkeeping
 - a. Establishment of operating logs
 - b. Timeliness of recordings
 - c. Information to be recorded
 - d. Legibility
 - e. Corrections
 - f. Log review
 - g. Care and keeping of logbooks

- 1 J. Operations Turnover
 - 2 a. Turnover checklists
 - 3 b. Document review
 - 4 c. Control panel walk-down
 - 5 d. Discussion and exchange of
 - 6 responsibility
 - 7 e. Shift crew briefing
 - 8 f. Reliefs occurring during the shift
- 9 K. Operations Aspects of Facility
- 10 Unique Processes
 - 11 a. Operator responsibilities
 - 12 b. Operator knowledge
 - 13 c. Operator response to process
 - 14 problems
 - 15 d. Communications between operations
 - 16 and process personnel
- 17 L. Required Reading
 - 18 a. File Index
 - 19 b. Reading assignments
 - 20 c. Required dates for completion of
 - 21 reading
 - 22 d. Documentation
 - 23 e. Review
- 24 M. Timely Orders to Operators
 - 25 a. Content and format
 - 26 b. Issuing, segregating, and reviewing
 - 27 orders
 - 28 c. Removal of orders

29 3. Summary

30 All times are approximate and do not reflect additional time spent on topics that arise from class
31 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
Measures)

- 1 **COURSE:** TRG-296 - Root Cause Analysis
2
- 3 **DURATION:** =8 hours
4
- 5 **PREREQUISITES:** None
6
- 7 **SCOPE:** The instructor will provide personnel with the knowledge and skills
8 necessary to identify the root cause of unplanned plant events, in
9 accordance with DOE standards. Students will analyze incidents to
10 identify corrective action necessary to prevent the incidents from
11 recurring. This training is recommended for all operators, technicians,
12 supervisors, and managers.
13
- 14 **TYPE:** Classroom And Practical
15
- 16 **OBJECTIVES:** Upon completion of this course, the student will be able to perform root
17 cause analysis in accordance with DOE Order 232.1.
18
- 19 Mastery of the terminal objective will be demonstrated by scoring 80
20 percent or higher on the course examination and satisfactory performance
21 on the practical examination.
22
- 23 **REFRESHER:** None
24
- 25 **COURSE DESCRIPTION** (by lesson)
26
- 27 1. Introduction to Root Cause Analysis a. Case study
28 =2 hours b. Root cause
29 c. Other causes
30 d. Event
31 e. Event/cause relationship
32 f. Root cause analysis
33 g. Reason for root cause analysis
34 1. Overview
35 2. Specifics
36 3. Concern - employees
37 4. Concern - facility
38 5. Concern - company permanent
39 image
40 6. Concern - public and
41 environment
42 7. Concern - economic
43 8. Concern - legal
44

- 1 2. Root Cause Analysis Process
2 =4 hours
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26 3. Root Cause Analysis at the WIPP
27 =1 hour
28
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33
34 4. Summary
35 =1 hour
36
37 5. Homework
38
- a. Phases and sub-phases
 - 1. Collect data
 - 2. Correct
 - 3. Inform
 - 4. Follow-up
 - b. Phase one - collect data
 - 1. What to collect
 - 2. How to collect
 - 3. Data review
 - c. Phase two - assess
 - 1. Purpose
 - 2. Methods
 - 3. Use, advantages, and disadvantages
 - 4. Event and casual factor charting
 - 5. Consists of two phases
 - 6. Cause and effect
 - 7. Cause and effect charting
 - d. Phase three - correct
 - e. Phase four - communications
 - 1. Internal
 - 2. External
 - f. Phase five - follow-up
- a. Investigations
 - b. Reportable and non-reportable events
 - c. Root cause analysis team report
 - d. Reportable events
 - e. Non-reportable events
 - f. Follow-up

39 All times are approximate and do not reflect additional time spent on topics that arise from class
40 participation, student breaks, class size, and/or practical exercises. (i.e. Job Performance
41 Measures)

- 1 **COURSE:** SAF-645 - RCRA Emergency Coordinator (WIPP Contingency Plan
2 Procedure)
3
- 4 **DURATION:** N/A
5
- 6 **PREREQUISITES:** None
7
- 8 **SCOPE:** This self-paced lesson describes the responsibilities and actions to be
9 taken by the RCRA Emergency coordinator and other emergency response
10 personnel whenever the WIPP Contingency Plan, Renewal Application
11 Chapter F, is implemented.
12
- 13 **TYPE:** Self-paced
14
- 15 **OBJECTIVES:** Upon completion of this course, the student will be able to perform the
16 duties of RCRA Emergency Coordinator in accordance with established
17 requirements.
18
- 19 Mastery of the terminal objective will be demonstrated by scoring 80
20 percent or higher on the course examination.
21
- 22 **REFRESHER:** None
23
- 24 1. State the purpose of the RCRA Contingency Plan, Renewal
25 Application Chapter F.
26
- 27 2. Describe the general responsibilities of the RCRA Emergency
28 Coordinator.
29
- 30 3. Identify the emergency response groups and their responsibilities.
31
- 32 4. State when the Contingency Plan, Renewal Application Chapter F,
33 is to be implemented.
34
- 35 5. Describe the criteria for Incident Levels I, II, and III.
36
- 37 6. Describe the types of events that do not implement the
38 Contingency Plan, Renewal Application Chapter F.
39
- 40 7. Describe the activities regarding initial response and notification of
41 emergency response personnel.
42
- 43 8. Describe the actions to be taken when a surface evacuation is
44 declared.
45

- 1 9. Describe the action to be taken when an underground evacuation is
2 declared.
- 3
- 4 10. State the information that is included in notifications to public
5 safety and regulatory safety agencies.
- 6
- 7 11. Describe the various means of identifying hazardous materials.
- 8
- 9 12. Describe the information that is initially provided to the
10 Emergency Coordinator by the Emergency Services Technician
11 (EST).
- 12
- 13 13. Describe the additional information that is collected to conduct a
14 more thorough assessment.
- 15
- 16 14. Define the 4 criteria that are evacuated in the assessment stage of
17 an incident.
- 18
- 19 15. State when the RCRA Emergency Coordinator would request
20 assistance from off-site agencies.
- 21
- 22 16. Describe the actions involved in the control, containment, and
23 correction of an incident.
- 24
- 25 17. Describe physical and chemical methods of mitigation.
- 26
- 27 18. Describe the actions that are implemented in the event of a fire.
- 28
- 29 19. Describe the actions to be taken in the event of an explosion.
- 30
- 31 20. Describe the actions to be taken in the event of a spill.
- 32
- 33 21. Describe the actions to be taken in the event of container spills or
34 leakage.
- 35
- 36 22. State who is responsible for the radiological decontamination of
37 personnel.
- 38
- 39 23. Describe the response actions to spills, or leaking, or punctured CH
40 and RH TRU mixed waste containers.
- 41
- 42 24. Describe the actions to be taken in the event of a natural
43 emergency (earthquake, lightning strike, etc.) involving hazardous
44 waste or materials.
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25. Describe the response efforts in the event of spalling of ground in the underground.
 26. Describe the response efforts in the event of a roof fall in the underground.
 27. Describe the events to be completed during the emergency termination phase.
 28. Describe the reporting requirements in the event the Contingency Plan, Renewal Application Chapter F, is implemented.

- 1 **COURSE:** SAF-632 - Office Warden
2
3 **DURATION:** = 2 Hours
4
5 **PREREQUISITES:** None
6
7 **SCOPE:**
8
9 **TYPE:** Classroom
10
11 **OBJECTIVES:** Upon completion of this course, the student will be able to state the
12 responsibilities and duties of the Office Warden, in accordance with
13 established guidelines, policies, and regulations.
14
15 **REFRESHER:** SAF-632 annually
16
17 1. Objectives a. Define role of Office Warden
18 = 10 minutes b. List responsibilities
19 c. Describe emergency notification
20 system
21 d. Describe purpose of
22 assembly/staging areas
23
24 2. Presentation a. Role of Office Warden
25 = 90 minutes b. Office Warden responsibilities
26 1. Day-to-day
27 2. Emergency situations
28 3. Bomb threats
29 4. Inclement weather
30 5. Personnel accountability
31 w/no assembly
32 c. Emergency Notification System
33 1. Different evacuation
34 notifications
35 2. Reporting emergencies
36 d. Assembly/staging areas
37 1. Purpose
38 2. Locations
39
40 3. Review and Exam
41 = 20 minutes
42
43 All times are approximate and do not reflect additional time spent on topics that arise from class
44 participation, student breaks, class size, and/or practical exercises (i.e. Job Performance
45 Measures)

1 **COURSE:** SAF-621 - Firefighter I

2

3 **DURATION:** =40 hours

4

5 **PREREQUISITES:** None

6

7 **SCOPE:** This class prepares the student to respond to fires. This class is taught by
8 the New Mexico Fire Academy

9

10 **OBJECTIVES:**

11

12 **REFRESHER:** Training is conducted 8 hours quarterly

13

14 **COURSE DESCRIPTION** (by lesson)

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16 1. Inspection

17 =.5 hour classroom

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23 2. Sprinklers

24 =.5 hour classroom

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a. Common causes of fires and their prevention

b. Fire protection procedures

c. Define importance of public relations

d. Define dwelling inspection procedures

a. Identify a fire department sprinkler connection and water motor alarm

b. Connect hose lines to a fire department connection of a sprinkler or standpipe system

c. Define how automatic sprinkler heads open and release water

d. Temporarily stop flow of water from a sprinkler head

- 1 3. Overhaul
2 =2 hours classroom
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15 4. Salvage
16 =1.5 hours classroom
17 =.5 hours practical
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24 5. Fire Streams
25 =1.5 hours classroom
26 =2.5 hours practical
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32 6. Fire Hoses, Nozzles, and Appliances
33 =2.5 hours classroom
34 =3.5 hours practical
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- a. Demonstrate searching for hidden fires
 - b. Demonstrate exposure of hidden fires by opening ceilings, walls, floors, and pulling apart burned material
 - c. Demonstrate how to separate and remove charred materials from unburned material
 - d. Define duties of fire fighters left at the scene for fire and security surveillance
 - e. Identify the purpose of overhaul
- a. Identify the purpose of salvage and its value
 - b. Demonstrate folds and rolls of salvage covers
 - c. Demonstrate salvage cover throws
 - d. Demonstrate the techniques of inspection, cleaning, and maintaining salvage equipment
- a. Define a fire stream
 - b. Manipulate a nozzle so as to attack Class A and Class B fires
 - c. Define water hammer and at least one method for its prevention
 - d. Demonstrate how to open and close a nozzle
- a. Identify the sizes, types, amounts, and uses of hose carried on a pumper
 - b. Demonstrate the use of nozzles, hose adapters, and hose appliances carried on a pumper
 - c. Advance dry hose lines of two different sizes from a pumper:
 - 1. Into a structure
 - 2. Up a ladder into an upper floor window
 - 3. Up an inside stairway to an upper floor

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4. Up an outside stairway to an upper floor
5. Down an inside stairway to a lower floor
6. Down an outside stairway to a lower floor
7. To an upper floor by hoisting
- d. Advance charged hose lines of two different sizes from a pumper
 1. Into a structure
 2. Up a ladder into an upper floor window
 3. Up an inside stairway to an upper floor
 4. Up an outside stairway to an upper floor
 5. Down an inside stairway to a lower floor
 6. Down an outside stairway to a lower floor
 7. To an upper floor by hoisting
- e. Demonstrate the techniques for cleaning fire hose, couplings, and nozzles and inspecting for damage
- f. Connect a fire hose to a hydrant and fully open and close the hydrant
- g. Demonstrate the loading of fire hose on a fire apparatus and identify the purpose of at least three types of hose loads and finishes
- h. Demonstrate three types of hose rolls
- i. Demonstrate two types of hose carries
- j. Demonstrate coupling and uncoupling of the fire hose
- k. Work from a ladder with a charged attack line which shall be 1.5" or larger
- l. Demonstrate carrying hose into a building to be connected to a standpipe
- m. Demonstrate the methods for extending a hose line
- n. Demonstrate replacing a burst section of hose line

- 1 7. Forcible Entry
2 =3 hours classroom
3 =1 hour practical
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- 9 8. Ladders
10 =1.5 hours classroom
11 =2.5 hours practical
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- 35 9. Rescue
36 =5 hour classroom
37 =1.25 hours practical
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- a. Identify and demonstrate each type of manual forcible entry tool
- b. Identify the method and procedure of properly cleaning, maintaining, and inspecting each type of forcible entry tool and equipment
- a. Identify each type of ladder and its intended use
- b. Demonstrate the following ladder carries:
1. One person carry
 2. Two person carry
 3. Three person carry
 4. Four person carry
 5. Five person carry
 6. Six person carry
- c. Raise each type and size of ground ladder
- d. Climb the full length of every type
- e. Climb the full length of each type of ground and aerial ladder carrying fire fighting tools or equipment while ascending and descending
- f. Climb down the full length of a ground and aerial ladder carrying an injured person
- g. Demonstrate the techniques of working from ground and aerial ladders with tools and appliances
- h. Demonstrate the techniques of cleaning ladders
- a. Demonstrate the removal of injured persons from immediate hazards practical by use of carries, drags, and stretchers
- b. Demonstrate searching for victims in burning, smokefilled buildings, or other hostile environments
- c. Define the use of a life belt
- d. Define safety procedures as they apply to rescue

- 1 10. Self-Contained Breathing Apparatus
2 =2 hours classroom
3 =2 hours practical
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22 11. Ropes
23 =2 hours class room and practical
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- a. Identify at least four hazardous respiratory environments encountered in fire fighting
 - b. Demonstrate the use of all types of self-contained breathing apparatus in a dense smoke environment
 - c. Identify the physical requirements of the wearer, the limitations of the self-contained breathing apparatus, and the safety features of all types of self-contained breathing apparatus
 - d. Demonstrate donning self-contained breathing apparatus while wearing protective clothing
 - e. Demonstrate that the self-contained breathing apparatus is in a safe condition for safe use
 - f. Identify the procedure for cleaning and sanitizing the self-contained breathing apparatus for future use
- a. Identify and describe the purpose for specific knots
 - b. Identify the construction characteristics and appropriate uses of natural and synthetic fiber rope
 - c. Demonstrate tying a bowline knot, a clove hitch, rescue knot, figure of eight knot, a becket or sheep bend, and an overhand safety knot
 - d. Demonstrate the bight, loop, round turn, and half hitch as used in tying knots and hitches
 - e. Using an overhand knot, hoist any selected forcible entry tool, ground ladder, or appliance to a height of 20 feet
 - f. Demonstrate the techniques of inspecting, cleaning, maintaining, and storing rope

- 1 12. Ventilation
2 =5 hours classroom
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17 13. Safety
18 =1 hour classroom
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- a. Define the principals of ventilation, and identify the advantages and effects of ventilation
 - b. Identify the dangers present and precautions to be taken when performing ventilation
 - c. Demonstrate opening various types of windows from inside and outside, with and without tools
 - d. Demonstrate breaking window and door glass and its removal
 - e. Using an ax, demonstrate the ventilation of a room and a floor
 - f. Define the theory of a back draft explosion
- a. Identify dangerous building conditions created by fire
 - b. Demonstrate techniques for action when trapped or disoriented in a fire situation
 - c. Define procedures to be used in electrical emergencies
 - d. Define fire service lighting equipment
 - e. Identify safety procedures when using fire services lighting equipment
 - f. Demonstrate the use of portable power plants, lights, cords, and connectors
 - g. Define safety procedures as they apply to emergency operations, specifically:
 - 1. Protective equipment
 - 2. Team concept
 - 3. Portable tools and equipment
 - 4. Riding and apparatus
 - 5. Hazardous materials incidents

- 1 14. Fire Behavior
2 =3 hours
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29 All times are approximate and do not reflect additional time spent on topics that arise from class
30 participation, student breaks, class size, and/or practical exercises (i.e., Job Performance
31 Measures)
- a. Define fire
 - b. Define the fire triangle and fire tetrahedron
 - c. Identify two chemical, mechanical, and electrical energy sources
 - d. Define the following stages of fire:
 - 1. Incipient
 - 2. Flame spread
 - 3. Hot smoldering
 - 4. Flash over
 - 5. Steady state
 - 6. Clear burning
 - e. Define the three methods of heat transfer
 - f. Define the three physical stages of matter in which fuels are commonly found
 - g. Define the hazard of finely divided fuels as they relate to the combustion process
 - h. Define flash point, fire point, and ignition temperature
 - i. Define concentrations in air as it affects combustion
 - j. Identify three products of combustion found in structural fires which create a life hazard

- 1 **COURSE:** EOC-101 - Initial Mine Rescue
2
3 **DURATION:** 20 Hours
4
5 **PREREQUISITES:** Physical, underground experience
6
7 **SCOPE:**
8
9 **TYPE:** Classroom, field, hands-on
10
11 **OBJECTIVES:** Upon completion of this training, the student will be able to wear and
12 maintain a Drager self-contained breathing apparatus, and perform all the
13 functions required as a member of a mine rescue team.
14
15 **REFRESHER:** 48 hours of refresher training is required annually
16

17 **COURSE DESCRIPTION** (by lesson)
18

- 19 1. MSHA 2004 (Drager BG 174-A) a. Description
20 =8 hours b. Major parts
21 c. Wearing and testing
22 d. Limitations
23 e. Maintenance
24
25 2. MSHA 2202 (Mine Gases) a. Meaning of terms
26 =2 hours 1. Specific gravity
27 2. Explosive range
28 3. Toxicity
29 4. Asphyxiate
30 5. Solubility
31 b. Physical properties and
32 characteristics
33 1. Normal air
34 2. Oxygen
35 3. Nitrogen
36 4. Carbon dioxide
37 5. Carbon monoxide
38 6. Oxides of nitrogen
39 7. Hydrogen
40 8. Hydrogen sulfide
41 9. Sulfur dioxide
42 10. Methane

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 - 7 3. MSHA 2203 (Mine Ventilation)
 - 8 =2 hours
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 - 14 4. MSHA 2204 (Mine Exploration)
 - 15 =2 hours
 - 16
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 - 26 5. MSHA 2205 (Firefighting)
 - 27 =2 hours
 - 28
 - 29
 - 30
 - 31
 - 32
 - 33 6. MSHA 2206 (Rescue of Survivors)
 - 34 =2 hours
 - 35
 - 36
 - 37
 - 38 7. MSHA 2207 (Mine Recovery)
 - 39 =2 hours
 - 40
 - 41
 - 42
- c. Composition, physical properties, and characteristics
 - 1. Smoke
 - 2. Rock strata gases
 - 3. Damps
 - a. Purpose and methods
 - b. Ventilation controls
 - c. Proper chain-of-command when altering ventilation
 - d. Air measurement devices
 - e. Construction of ventilation controls
 - a. Examination of mine openings
 - b. Barefaced exploration
 - c. The fresh air base
 - d. Apparatus teams
 - e. Briefing
 - f. Going underground
 - g. Exploration procedures
 - h. Traveling procedures
 - i. Ground testing
 - j. Debriefing
 - a. Classification of fires
 - b. Firefighting equipment
 - c. Firefighting techniques
 - 1. Indirect
 - 2. Direct
 - d. Explosions
 - a. Rescuing survivors
 - 1. Rescue techniques
 - 2. First aid
 - b. Recovery of bodies
 - a. Assessing conditions
 - b. Re-establishing ventilation
 - c. Clearing and rehabilitating

43 All times are approximate and do not reflect additional time spent on topics that arise from class
44 participation, student breaks, class size and/or practical exercises (i.e., Job Performance
45 Measures)

1 **COURSE:** Radiological Control Technician Fundamental Academic Lessons

2

3 **DURATION:** ~ 52 hours

4 Students may elect to test out of these courses with Radiological Control
5 Manager approval

6

7 **PREREQUISITES:** Lesson specific

8

9 **SCOPE:** Lesson specific

10

11 **REFRESHER:** Requalification every two years

12

13 **COURSE DESCRIPTION** (by module)

14

15 **1.** Basic Mathematics and Algebra (CL1.01) = 4 hours

16

17 a. Prerequisites - None

18 b. Scope - This lesson is a review of arithmetic and algebraic methods used to
19 perform various radiological control calculations required by the **Radiological**
20 **Control Technician (RCT)** to perform his/her daily duties. These calculations
21 include scientific notation, unit analysis and conversion, radioactive decay
22 calculations, dose rate/distance calculations, shielding calculations, and stay-
23 time calculations.

24 c. Outline - Introduction

25 - Basic math operations with fractions

26 - Basic math operations with decimals

27 - Convert fractions to decimals and vice-versa

28 - Convert percent to decimal and vice-versa

29 - Basic math operations with signed numbers

30 - Basic math operations with exponents

31 - Find rational square roots

32 - Convert scientific notation to standard form and vice-versa

33 - Basic math with scientific notation

34 - Solving equations using the "Order of Mathematical Operations"

35 - Performing algebraic functions

36 - Solving equations with common and natural logarithms

37 - Exam

38

- 1 **2.** Unit Analysis and Conversion (CL1.02) = 4 hours
2
3 a. Prerequisites - None
4 b. Scope - This lesson is a review of the unit analysis and conversion process
5 necessary for the RCT to perform air and water sample activity calculations,
6 contamination calculations, and many other applications.
7 c. Outline - Introduction
8 - Unit systems of measurement and base units for mass, length and time
9 - SI prefix values and abbreviations
10 - Using conversion factors/tables
11 - Using formulas
12 - Exam
13
14 **3.** Physical Sciences (CL1.03) = 4 hours
15
16 a. Prerequisites - None
17 b. Scope - This lesson is a review of basic physics since the RCT may work in
18 environments where materials can undergo changes in state, resulting in
19 changes in the radiological work environment.
20 c. Outline - Introduction -
21 - Work/force/energy in relation to physics
22 - Identify and describe four forms of energy
23 - State the Law of Conservation of Energy
24 - Solid/liquid/gas in regards to shape and volume
25 - Basic atom structure
26 - Defining physical science terms
27 - Identifying symbols
28 - Periodic Table element arrangement
29 - Identifying Periodic Table layout
30 - Defining terms relative to atomic structure
31 - Exam
32
33 **4.** Nuclear Physics (CL1.04) = 4 hours
34
35 a. Prerequisites - None
36 b. Scope - This lesson is designed to provide an understanding of the forces
37 present within an atom.
38 c. Outline - Introduction
39 - Definitions: Nucleon, Nuclide, Isotope
40 - Mass-Energy Equivalence Concept
41 - Definitions: Mass Defect, Binding Energy
42 - Definitions: Fission, Criticality, Fusion
43 - Exam
44

- 1 **5.** Sources of Radiation (CL1.05) = 4 hours
2
3 a. Prerequisites - None
4 b. Scope - This lesson provides an understanding that radiation sources are not
5 limited to nuclear facilities. The study of radiation sources provides data for:
6 - The basis for occupational exposure
7 - Showing the effects from high source exposures
8 - Assessing the impact on radiation background from nuclear facilities
9 - Determining the use of building materials
10 c. Outline - Introduction
11 - Identifying natural background radiation sources
12 - Identifying artificially produced radiation sources and dose magnitudes
13 from each source
14 - Exam
15
16 **6.** Radioactivity and Radioactive Decay (CL1.06) = 4 hours
17
18 a. Prerequisites - None
19 b. Scope - This lesson provides an understanding of the radioactive decay
20 processes from different types of radionuclides.
21 c. Outline - Introduction
22 - Neutron to proton ratio
23 - Definitions: radioactivity, radioactive decay
24 - Characteristics of alpha, beta, and gamma
25 - Identifying radioactive decay modes
26 - Decay of radioactive nuclides
27 - Differences: natural and artificial radioactivity
28 - Unstable fission products
29 - Three naturally-occurring radioactive families and their end products
30 - Identify nuclide attributes with Nuclide Chart
31 - Tracing nuclide decay and stable end-product
32 - Definitions: curie, Becquerel
33 - Definitions: specific activity, half-life
34 - Calculate activity using the decay formula
35 - Defining exposure, absorbed dose, dose equivalent, and quality factor
36 - Defining roentgen, rad/gray, and rem/sievert
37 - Exam
38
39 **7.** Interaction of Radiation with Matter (CL1.07) = 4 hours
40
41 a. Prerequisites - None
42 b. Scope - This lesson provides an understanding of how different types of
43 radiation interacts with different types of matter.
44 c. Outline - Introduction
45 - Define ionization, excitation, bremsstrahlung

- 1 - Defining specific ionization, linear energy transfer (**LET**), stopping
- 2 power, range, and W-value
- 3 - Alpha particle energy transfer
- 4 - Energy transfer for beta particulate radiation
- 5 - Gamma photon interaction with matter
- 6 - Kinetic energies of various types of neutrons
- 7 - Slow neutron capture
- 8 - Scattering interactions for fast neutrons
- 9 - Characteristics of materials shielding alpha, beta, gamma and neutron
- 10 radiations
- 11 - Exam

12
13 **8. Biological Effects of Radiation (CL-1.08) = 4 hours**

- 14
- 15 a. Prerequisites - None
- 16 b. Scope -This lesson provides a basic understanding of the methods in which
- 17 radiation may cause biological damage so that the RCT may protect
- 18 themselves and the workers from unnecessary exposure to ionizing radiation.
- 19 c. Outline - Introduction
- 20 - Function of various cell structures
- 21 - Effects of radiation on cell structures
- 22 - Law of Bergonie and Tribondeau
- 23 - Factors affecting radiosensitivity of cells
- 24 - Most and least radiosensitive cells
- 25 - Reactions on cells from ionizing radiation
- 26 - Definitions: stochastic, non-stochastic effect
- 27 - LD 50/30 value for humans
- 28 - Somatic effects of chronic radiation exposure
- 29 - Three types of acute radiation syndromes and associated exposure levels
- 30 and symptoms
- 31 - Radiation exposure risks to embryo and fetus
- 32 - Somatic and heritable effects
- 33 - Exam

34
35 **9. Radiological Protection Standards (CL1.09) = 4 hours**

- 36
- 37 a. Prerequisites - None
- 38 b. Scope -This lesson provides an understanding of the history of the
- 39 development of the limits to show why the current limits of exposure are
- 40 imposed. This lesson also provides an awareness of the current CFRs and
- 41 DOE Orders that may affect the RCTs at the work place.
- 42 c. Outline - Introduction
- 43 - Role of advisory agencies in developing radcon recommendations
- 44 - Role of regulatory agencies in developing standards and regulations
- 45 - DOE Radiological Control Manual (RCM) purpose and scope

- 1 - DOE RCM use of “shall” and “should”
2 - Exam
3
4 **10. ALARA (CL1.10) = 4 hours**
5
6 a. Prerequisites - None
7 b. Scope - This lesson provides an understanding of the ALARA philosophy and
8 shows the methods for the RCT to establish and maintain the commitment to
9 ALARA that all personnel at the facility must have for a safe radiological work
10 place.
11 c. Outline - Introduction
12 - Base assumptions for ALARA philosophy
13 - Collective personnel and individual exposure
14 - Effective radiological ALARA program
15 - Purposes of pre- and post-job reviews
16 - RCT responsibilities for implementation
17 - Exam
18
19 **11. External Exposure Control (CL1.11) = 4 hours**
20
21 a. Prerequisites - None
22 b. Scope - This lesson provides an understanding of external exposure reduction
23 and control measures available to the RCT to provide the best coverage and
24 support at the radiological work site.
25 c. Outline - Introduction
26 - Four basic methods for minimization
27 - Calculating gamma exposure rates
28 - Source reduction techniques
29 - Time-saving techniques
30 - Calculating remaining allowable dose equivalent or stay time
31 - “Distance to radiation sources” techniques
32 - Calculating exposure rate or distance for a point source of radiation
33 - Calculating exposure rate or distance for a line source of radiation
34 - Effects of distance on exposure rates from a plane source
35 - Mass and linear attenuation coefficients
36 - Defining “density thickness”
37 - Density-thickness values for skin, lens of the eye, and the whole body
38 - Using equations to calculate shielding thickness and exposure rates for
39 gamma/x-ray radiation
40 - Exam
41
42 **12. Internal Exposure Control (CL1.12) = 4 hours**
43
44 a. Prerequisites - None

- 1 b. Scope - This lesson is designed to familiarize the technician with those actions
2 necessary as a result of the entry of radioactive materials into the body and the
3 basis for those actions.
4 c. Outline - Introduction
5 - Four ways radioactive material enters the body
6 - Methods to prevent/minimize entry of radioactive material
7 - Defining and distinguishing Annual Limit on Intake (ALI) and Derived
8 Air Concentration (DAC)
9 - Determining basis for ALI
10 - Defining “reference man”
11 - Using DACs to minimize internal exposure
12 - Behavior of radioactive materials in the body
13 - Natural reductions of radionuclides in body
14 - Relationship between physical, biological and effective half lives
15 - Calculating effective half life
16 - Medical elimination methods
17 - Exam

18
19 **13. Radiation Detector Theory (CL1.13) = 4 hours**

- 20
21 a. Prerequisites - None
22 b. Scope - This lesson provides a good theoretical understanding of radiological
23 instrumentation to help RCTs understand the data obtained by that
24 instrumentation.
25 c. Outline - Introduction
26 - Fundamental laws of electrical charges
27 - Defining current, voltage, resistance, and their respective units
28 - Functions of detector and readout circuitry components in radiation
29 measurement system
30 - Parameters affecting ion pair numbers in a gas-filled detector
31 - Regions of gas amplification curves
32 - Characteristics of a detector used in gas amplification curve regions
33 - Defining resolving time, dead time, and recovery time
34 - Discriminating between various types of radiation and various radiation
35 energies
36 - Operation of scintillation detector and associated components
37 - Operation of neutron detector
38 - Principles of GeLi and HPGe detectors
39 - Exam
40

1 **COURSE:** Radiological Control Technician Site-Specific Academic Lessons

2
3 **DURATION:** =88 hours

4
5 **PREREQUISITES:** Lesson specific

6
7 **SCOPE:** Lesson specific

8
9 **1.** Counting Errors and Statistics (CL2.03) = 4 hours

- 10
11 a. Prerequisites - CL1.01 through CL1.13
- 12 b. Scope - This lesson provides a basic knowledge of the random process of
13 detecting and measuring radioactivity and the associated counting errors
14 involved with that process. The RCTs will use this knowledge when obtaining
15 the radioactivity measurements to make decisions that may affect the health
16 and safety of workers at the facility and its surrounding environments
- 17 c. Outline - Introduction
- 18 - Analyzing errors and their effect on sample measurements
 - 19 - Sample analysis statistics applications
 - 20 - Defining mean, median, and mode
 - 21 - Determining mean, median, and mode
 - 22 - Defining variance and standard deviation
 - 23 - Calculating the standard deviation
 - 24 - Purpose of Chi-squared test
 - 25 - Criteria for acceptable Chi-squared values at the WIPP
 - 26 - Purpose of creating quality control charts
 - 27 - WIPP **Quality Control** QC chart maintenance and review requirements
 - 28 - Purpose of warning and control limits
 - 29 - Purpose of efficiencies and correction factors
 - 30 - Calculating efficiencies and correction factors
 - 31 - Meaning of counting data reported as “x±y”
 - 32 - Reporting results to desired confidence level
 - 33 - Purpose of determining background
 - 34 - WIPP methods and requirements for determining background
 - 35 - Purpose of performing sample planchet maintenance
 - 36 - WIPP method and requirements of performing planchet maintenance for
37 counting systems
 - 38 - Methods to improve statistical validity of sample measurements
 - 39 - Defining and explaining “detection limits”
 - 40 - Calculate detection limit values at WIPP
 - 41 - Purpose, method, and criteria for acceptable values of determining
42 crosstalk at the WIPP
 - 43 - Purpose and method of performing voltage plateau
 - 44 - Exam
- 45

- 1 **2.** Dosimetry (CL2.04) = 4 hours
2
3 a. Prerequisites - None
4 b. Scope - This lesson introduces the types of dosimeters used to measure
5 external radiation to people at the facility. The material presented in this
6 lesson is valuable to RCTs since dosimeters are the only direct method to
7 measure and document personnel radiation exposure and ensure regulatory
8 compliance with applicable limits.
9 c. Outline - Introduction
10 - DOE occupational worker external exposure limits
11 - DOE established limits for embryo/fetus
12 - WIPP administrative exposure control guidelines for radiation/non-
13 radiation workers, incidents and emergencies, and unborn children
14 - Requirements for pregnant worker
15 - Theory of operation of a TLD
16 - Theory of operation of a TLD reader
17 - Advantages and disadvantages of a TLD
18 - WIPP beta-gamma TLDs
19 - WIPP neutron TLDs
20 - WIPP TLD use requirements
21 - WIPP personnel neutron dosimeter types and principle of operation
22 - WIPP self-reading dosimetry (**SRD**) principle of operation
23 - WIPP alarming dosimeter use guidelines and principle of operation
24 - WIPP bioassay monitoring methods
25 - Exam
26
27 **3.** Contamination Control (CL2.05) = 4 hours
28
29 a. Prerequisites - None
30 b. Scope - This lesson shows that contamination control is probably one of the
31 most difficult and challenging tasks the RCTs will encounter. This lesson
32 covers the methods to prevent personnel contaminations and releases of a
33 radioactive material into the environment which is the ultimate purpose of a
34 radiological control organization.
35 c. Outline - Introduction
36 - Removable and fixed surface contamination
37 - Components of the radiation monitoring program
38 - Basic goal of the program
39 - Basic principles
40 - Possible engineering control methods
41 - Use of protective clothing
42 - Basic factors which determine protective clothing requirements
43 - Exam
44
45 **4.** Airborne Sampling Program/Methods (CL2.06)= 4 hours

- 1
2
3 a. Prerequisites - None
4 b. Scope - This lesson provides an overview of the air sampling program and the
5 methods for obtaining airborne radioactivity concentration in an area to ensure
6 that the control measures assigned are effective and continue to be effective.
7 c. Outline - Introduction
8 - Primary objectives of air monitoring program
9 - Three physical states of radiation contaminants
10 - Ensuring a representative air sample
11 - Defining “isokinetic sampling”
12 - Six methods for obtaining samples and their principle of operation
13 - Selection of air monitoring methods
14 - Purpose of five types of samplers/monitors
15 - Factors affecting accuracy of measurements
16 - WIPP air monitoring program
17 - Exam
- 18 5. Airborne Sampling Laboratory (CL2.06A) = 4 hours
19
20 a. Prerequisites - None
21 b. Scope - This training laboratory provides the initial on-the-job training for the
22 ~~job performance measures (JPMs)~~ pertaining to the Airborne Sampling
23 Program/Methods.
24 c. Outline - Introduction
25 - Collecting **Fixed Air Sampler (FAS)** filters
26 - Analyzing air sample for radioactivity
27 - Changing ‘Station A’ FAS filters
28 - Determining appropriate respiratory equipment based on air activity
29
- 30 6. Radiological Source Control (CL2.08) = 4 hours
31
32 a. Prerequisites - None
33 b. Scope - This lesson provides an understanding of the purposes, uses, methods
34 to control radioactive sources that are necessary at a nuclear facility.
35 c. Outline - Introduction
36 - N41.1 requirements for radioactive sources
37 - WIPP sources that must be controlled
38 - Packaging, marking and labeling requests
39 - Storage area approval and posting requests
40 - WIPP procedures for storage and accountability of radioactive sources
41 - Exam
42
- 43 7. Access Control and Work Area Setup (CL2.10) = 4 hours
44
45 a. Prerequisites - None

- 1 b. Scope - This lesson presents instruction in Radiological Work Permits, various
2 types of postings used in radiological areas, setting up radiological areas,
3 access controls, and releasing of material from radiological areas.
4 c. Outline - Introduction
5 - Purpose and information on Radiological Work Permit (**RWP**) including
6 WIPP classifications
7 - Responsibilities in using or initiating RWP
8 - WIPP document that governs our ALARA program
9 - WIPP establishment of exposure/performance goals
10 - WIPP conditions requiring a pre-job ALARA review
11 - WIPP conditions requiring a post-job ALARA review
12 - Purpose of postings, signs, labels and barricades; and RCTs
13 responsibilities for them
14 - WIPP postings, requirements for postings/barriers, and entry requests for
15 various radiological areas
16 - Setting up radiological areas
17 - Containment device discrepancies
18 - Setting up portable ventilation systems and count rate meters
19 - Requirements while working in RBAs
20 - Requirements for removing or releasing materials from any radiological
21 area
22 - Exam
23
24 **8. Radiological Work Coverage (CL2.11) = 4 hours**
25
26 a. Prerequisites - None
27 b. Scope - This lesson covers the methods of job coverage by RCTs to assist
28 radiological workers in keeping their radiation exposures ALARA.
29 c. Outline - Introduction
30 - Three purposes of job coverage
31 - Continuous and intermittent job coverage
32 - Conditions that require job coverage
33 - Planning job coverage
34 - Pre-job briefing discussions
35 - Worker and technician exposure control techniques
36 - WIPP in-progress radiological surveys
37 - WIPP documentation of in-progress surveys
38 - Actions taken for unexpected survey results
39 - Contamination control techniques
40 - Preventative job coverage techniques
41 - Overall job control techniques
42 - WP 12-5 reasons to stop radiological work activities
43 - Exam
44
45 **9. Shipment/Receipt of Radioactive Material (CL2.12) = 4 hours**

- 1
2 a. Prerequisites - None
3 b. Scope -
4 c. Outline - Introduction
5 - Regulatory agencies for radioactive material transport
6 - Defining the DOT terms: Low-Specific Activity (LSA), Limited Quantity,
7 Transport Index, Exclusive Use, and Closed Transport Vehicle
8 - Determining radionuclide contents of a package
9 - Radiation and contamination surveys and applicable limits performed on
10 packages
11 - Radiation and contamination surveys and applicable limits performed on
12 exclusive use vehicles
13 - Placement of placards on transport vehicles
14 - WIPP shipment release inspection criteria
15 - WIPP procedures for receipt and shipment
16 - WIPP procedures for shipments exceeding limits
17 - WIPP procedures for opening packages
18 - Exam

19
20 **10. Radiological Incidents and Emergencies (CL2.13) = 4 hours**

- 21
22 a. Prerequisites - None
23 b. Scope - This lesson covers the necessary immediate and supplementary actions
24 for responding to radiological emergencies and abnormal events. This lesson
25 also reveals that, although most people do not take incident response planning
26 seriously because they do not expect the unexpected, incidents do occur, and
27 experience has shown that best response comes from workers who have
28 prepared themselves with a plan for dealing with incidents.
29 c. Outline - Introduction
30 - RCT general response and responsibilities
31 - Emergency equipment and facilities, including location and contents of
32 emergency equipment kits
33 - RCT response to CAM alarm
34 - RCT response to personnel contamination monitor alarm
35 - RCT response to off scale or lost dosimetry
36 - RCT response to radiation levels or area alarm
37 - RCT response to dry or liquid spill
38 - RCT response to fire in a radiological area or involving radioactive
39 materials
40 - RCT response to other incidents
41 - Emergency response levels
42 - Incident documentation procedures
43 - Emergency response team structure
44 - Offsite incident support groups
45 - Plant incidents, including cause, prevention, and response

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14. Contamination Monitoring Instrumentation (CL2.17) = 4 hours

- a. Prerequisites - None
- b. Scope - This lesson provides an understanding of contamination monitoring (count rate) instruments to provide the basis for assignment of practical contamination and internal exposure controls, to establish the proper controls, and to identify personnel contamination prior to exiting radiological areas at the facility.
- c. Outline - Introduction
 - Portable contamination monitoring equipment selection
 - WIPP beta/gamma and/or alpha survey count rate meter probe features and specifications
 - WIPP count rate instrument features and specifications
 - WIPP personnel contamination monitor features and specifications
 - WIPP contamination monitor (tool, bag, laundry monitors) features and specifications
 - Exam

15. Air Sampling Equipment (CL2.18) = 4 hours

- a. Prerequisites - None
- b. Scope
- c. Outline - Introduction
 - WIPP portable air sampler (**PAS**) selection
 - Physical and operating characteristics and limitation(s) of WIPP portable air samplers
 - Physical and operating characteristics and limitation(s) of WIPP motor air pumps
 - Pre-operational checkout of WIPP PASs
 - Physical and operating characteristics and limitation(s) of WIPP beta-gamma CAMs
 - Physical and operating characteristics and limitation(s) of WIPP alpha CAMs
 - Exam

- 1 **16. Counting Room Equipment (CL2.19) = 4 hours**
2
3 a. Prerequisites - None
4 b. Scope - This lesson covers counting room equipment in relation to types used,
5 purpose for, radiation monitored, operational requirements, and specific
6 limitations and characteristics. The RCT uses information from these counting
7 instruments to identify and assess the hazards presented by contamination and
8 airborne radioactivity and establish protective requirements for work
9 performed in radiological areas.
10 c. Outline - Introduction
11 - WIPP Scintillation Alpha and Beta laboratory counter/scalers' features
12 and specifications
13 - WIPP low background auto alpha/beta proportional counting system
14 features and specifications
15 - Exam

1 **COURSE:** Confirmation Radiography Operator (Level 1)

2
3 **TYPE:** Classroom/OJT

4
5 **OBJECTIVES:** Upon completion of this course and obtaining a grade of at least 80% on a
6 comprehensive examination, the student will be able to review
7 radiography records performed by another radiographer. Level 1
8 radiographers will perform a practical capability demonstration in the
9 presence of an experienced, qualified radiography operator or trainer.

10
11 **REFRESHER:** Biennially

12
13 **COURSE DESCRIPTION**

14
15 ~~Level 1 radiography operators shall be instructed in the specific waste generating practices and~~
16 ~~typical packaging configurations expected to be found in each Waste Matrix Code at each site~~
17 ~~shipping waste to WIPP.~~ The OJT and apprenticeship shall be conducted by an experienced,
18 qualified radiography operator or trainer prior to qualification of the training candidate.

19
20 The Permittees' Level 1 confirmation radiography training program includes:

21
22 Formal Training

- 23
24 · Project Requirements
25 · State and Federal Regulations
26 · Basic Principles of Radiography
27 · Radiography of Waste Forms (including the ability to identify liquids and compressed
28 gases which will be verified by a radiography subject matter expert)
29 · Waste Stream-Specific Instruction (~~e.g., specific waste generating processes, typical~~
30 ~~packaging configurations, waste material parameters~~)

31
32 On-the-Job Training

- 33
34 · System Operation (equipment and procedures used by Level 1 radiographers)
35 ~~–Identification of Packaging Configurations~~
36 ~~–Identification of Waste Material Parameters/Waste Matrix Codes~~
37 · Identification of excess residual liquids as defined in the Renewal Application Chapter B,
38 Section B-1c TSDF WAC, and compressed gases
39 ~~–Verification of waste stream description~~
40 · Review of the Waste Stream Profile Form to verify that the waste contains no ignitable,
41 corrosive, or reactive waste and that assigned Environmental Protection Agency
42 hazardous waste numbers are allowed for storage and disposal by the WIPP Hazardous
43 Waste Facility Permit.
44

- 1 **COURSE:** Confirmation Radiography (Level 2)
2
3 **TYPE:** Classroom/OJT
4
5 **OBJECTIVES:** Upon completion of this course, the student will be able to perform
6 radiography in a safe manner and will be able to confirm whether waste
7 contains ignitable, corrosive, or reactive waste.
8
9 Successfully pass a comprehensive exam based upon training enabling
10 objectives. The comprehensive exam will address the radiography
11 operation, documentation, and procedural elements stipulated in Renewal
12 Application Chapter B ~~this WAP.~~
13
14 Perform practical capability demonstration in the presence of appointed
15 site Permittee radiography subject matter expert.
16
17 **REFRESHER:** Biennially
18

19 **COURSE DESCRIPTION**

20
21 ~~Level 2 radiography operators shall be instructed in the specific waste generating practices and~~
22 ~~typical packaging configurations expected to be found in each Waste Matrix Code at each site~~
23 ~~shipping waste to WIPP. The OJT and apprenticeship shall be conducted by an experienced,~~
24 ~~qualified radiography operator prior to qualification of the training candidate.~~
25

26 The Permittees' Level 2 confirmation radiography training program includes:
27

28 Formal Training

- 29
30 · Project Requirements
31 · State and Federal Regulations
32 · Basic Principles of Radiography
33 · Radiographic Image Quality
34 · Radiographic Scanning Techniques
35 · Application Techniques
36 · Radiography of Waste Forms
37 · Standards, Codes, and Procedures for Radiography
38 · Waste Stream-Specific Instruction
39

40 On-the-Job Training

- 41
42 · System Operation
43 ~~· Identification of Packaging Configurations~~
44 ~~· Identification of Waste Material Parameters/Waste Matrix Codes~~

1 · Identification of excess residual liquids as defined in the Renewal Application Chapter B,
2 Section B-1c, TSD-F-WAC and compressed gases

3 ~~Verification of waste stream description~~

4 · Review of the Waste Stream Profile Form to verify that the waste contains no ignitable,
5 corrosive, or reactive waste and that assigned Environmental Protection Agency
6 hazardous waste numbers are allowed for storage and disposal by the WIPP Hazardous
7 Waste Facility Permit.

8
9 A radiography training drum shall include items common to the waste streams to be confirmed
10 by the Permittees. The training drums shall be divided into layers with varying packing densities
11 or different drums may be used to represent different situations that may occur during
12 radiography examination by the Permittees. The following elements will be in a radiography
13 training drum(s):

- 14
15 · Aerosol can with puncture
16 · Horsetail bag
17 · Pair of coveralls
18 · Empty bottle
19 · Irregular shaped pieces of wood
20 · Empty one gallon paint can
21 · Full container
22 · Aerosol can with fluid
23 · One gallon bottle with three tablespoons of fluid
24 · One gallon bottle with one cup of fluid (upside down)
25 · Leaded glove or leaded apron
26 · Wrench

27
28 These items shall be successfully identified by the operator as part of the qualification process.

29
30 Requalification of operators shall be based upon evidence of continued satisfactory performance
31 (primarily video/audio reviews) and shall be done at least every two years. Unsatisfactory
32 performance will result in disqualification. Unsatisfactory performance is defined as the
33 misidentification of excess residual liquids (as defined in the Renewal Application Chapter B,
34 Section B-1c TSD-F-WAC) or compressed gases in a training drum or a score of less than eighty
35 percent (80%) on the comprehensive exam. Retraining and demonstration of satisfactory
36 performance are required before a disqualified operator is again allowed to operate the
37 radiography system for the Permittees.

1 **COURSE:** Confirmation Visual Examination (Level 1)

2
3 **TYPE:** Classroom/OJT

4
5 **OBJECTIVES:** Upon completion of this course and obtaining a grade of at least 80% on a
6 comprehensive examination, the student will be able to perform a review
7 of visual examination records and will be able to confirm ~~the Summary~~
8 ~~Category Group, Waste Matrix Code~~ and whether waste contains
9 ignitable, corrosive, or reactive waste. Level 1 visual examination
10 personnel will perform a practical capability demonstration in the presence
11 of an experienced, qualified visual examination expert or trainer.

12
13 **REFRESHER:** Biennially

14 15 **COURSE DESCRIPTION**

16
17 ~~Level 1 visual examination personnel shall be instructed in the specific waste generating~~
18 ~~processes, typical packaging configurations, and waste material parameters expected to be found~~
19 ~~in each Waste Matrix Code in the waste stream being confirmed using visual examination.~~

20
21 The OJT and apprenticeship shall be conducted by an operator experienced and qualified in
22 visual examination or a qualified trainer prior to qualification of the candidate. The training shall
23 be site waste stream specific to include the various waste configurations being confirmed. For
24 example, the particular physical forms and packaging configurations at each site will vary and
25 operators shall be trained on types of waste that are generated, stored, and/or characterized at that
26 particular site.

27
28 Visual examination personnel shall be requalified once every two years.

29
30 The Level 1 visual examination training program includes:

31 32 Formal Training

- 33
34 · Project Requirements
35 · State and Federal Regulations
36 · Batch Data Report Forms
37 · Waste Stream-Specific Instruction (e.g., ~~waste generating processes, typical packaging~~
38 ~~configurations, waste material parameters~~)

39 40 On-the-Job Training

- 41
42 · System Operation (equipment and procedures used by Level 1 visual examination
43 personnel)
44 ~~–Identification of Packaging Configurations~~
45 ~~–Identification of Waste Material Parameters/Waste Matrix Codes~~

- 1 · Identification of excess residual liquids as defined in the Renewal Application Chapter B,
2 Section B-1c, TSDF-WAC and compressed gases
- 3 ~~· Verification of waste stream description~~
- 4 · Review of the Waste Stream Profile Form to verify that the waste contains no ignitable,
5 corrosive, or reactive waste and that assigned Environmental Protection Agency
6 hazardous waste numbers are allowed for storage and disposal by the WIPP Hazardous
7 Waste Facility Permit.
- 8

- 1 **COURSE:** Confirmation Visual Examination (Level 2)
2
3 **TYPE:** Classroom/OJT
4
5 **OBJECTIVES:** Upon completion of this course, the student will be able to perform
6 confirmation visual examination or a review of visual examination records
7 in a safe manner and will be able to confirm whether waste contains
8 ignitable, corrosive, or reactive waste.
9
10 Successfully pass a comprehensive exam based upon training enabling
11 objectives. The comprehensive exam will address the visual examination
12 operation, documentation, and procedural elements stipulated in Renewal
13 Application Chapter B ~~this WAP.~~
14
15 Perform practical capability demonstration in the presence of appointed
16 site Permittee visual examination subject matter expert.
17
18 **REFRESHER:** Biennially
19

20 COURSE DESCRIPTION

21
22 ~~Level 2 visual examination operators shall be instructed in the specific waste generating~~
23 ~~processes, typical packaging configurations, and waste material parameters expected to be found~~
24 ~~in each Waste Matrix Code in the waste stream being confirmed using visual examination.~~
25

26 The OJT and apprenticeship shall be conducted by an operator experienced and qualified in
27 visual examination prior to qualification of the candidate. The training shall be site waste stream
28 specific to include the various waste s configurations being confirmed. ~~For example, the~~
29 ~~particular physical forms and packaging configurations at each site will vary so operators shall~~
30 ~~be trained on types of waste that are generated, stored, and/or characterized at that particular site.~~
31

32 Visual examination personnel shall be requalified once every two years.

33
34 The Level 2 confirmation visual examination training program includes:
35

36 Formal Training

- 37
38 · Project Requirements
39 · State and Federal Regulations
40 · Batch Data Report Forms
41 · Application Techniques
42 · Waste Stream-Specific Instruction ~~(e.g., specific waste generating processes, typical~~
43 ~~packaging configurations, waste material parameters)~~
44

1 On-the-Job Training

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- ~~–Identification of Packaging Configurations~~
- ~~–Identification of Waste Material Parameters/Waste Matrix Code~~
- Identification of Prohibited Items liquids as defined in the Renewal Application Chapter B, Section B-1c, TSDF-WAC and compressed gases
- ~~–Verification of waste stream description~~
- Review of the Waste Stream Profile Form to verify that the waste contains no ignitable, corrosive, or reactive waste and that assigned Environmental Protection Agency hazardous waste numbers are allowed for storage and disposal by the WIPP Hazardous Waste Facility Permit.

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1

Qualification Cards

1 **QUALIFICATION CARD:** CH Waste Handling Technician (WH-01A, WH-01B)
2 CH Waste Handling Engineer (WH-02)
3

4 **DURATION:** Nine to twelve months
5

6 **CLASSROOM TRAINING:** Various classroom courses are utilized to provide operators the
7 requisite training as part of the qualification process. The
8 candidate must satisfactorily complete the classroom training
9 courses prior to completion of the qualification card.
10

11 **SCOPE:** The CH Waste Handling Technician Qualification Card (WH-01A
12 Backfill Technician, and Emplacement Technician, and WH-01B
13 Waste Handling Technician) and CH Waste Handling Engineer
14 Qualification Card (WH-02 Waste Handling Operations
15 Qualification Card Guide Book [WH-GUIDE-1]).
16

17 **REFERENCES:** CH Waste Handling Technician Qualification Card (WH-01)
18 CH Waste Handling Engineer Qualification Card (WH-02)
19 Waste Handling Operations Qualification Card Guide Book (WH-
20 GUIDE-1)
21

22 **QUALIFICATION CARD DESCRIPTION (by category)**
23

24 **1. Equipment Knowledge Requirements**
25

26 Demonstrate knowledge of the following for the various pieces of CH waste handling
27 equipment and systems:
28

- 29 ● General principle of equipment operation
- 30 ● Understanding of alarms, indications, and readings
- 31 ● Proper response to abnormal equipment conditions
- 32 ● Precautions, administrative requirements, and technical specification requirements
- 33 ● Basic safety requirements for equipment operation
34

35 **2. Equipment Operation Practical Requirements**
36

37 Demonstrate competency in conducting CH waste handling equipment and system
38 functional and operational inspections.
39

40 Demonstrate competency in standard operation of CH waste handling equipment and
41 systems.
42

1 **3. Integrated Process Knowledge Requirements**
2

3 Demonstrate knowledge of the following for the various integrated support functions.
4

- 5 ● Administrative activities for equipment/system isolation, modification and control
- 6 ● Management of site derived waste
- 7 ● Proper response to abnormal facility conditions
- 8 ● Container storage area inspections
- 9 ● Facility support systems

10
11 **4. Integrated Process Practical Requirements**
12

13 Demonstrate competency in performing administrative duties for equipment/system
14 isolation and control.

15
16 Demonstrate competency in management of site derived waste.

17
18 Demonstrate competency in performing container storage area inspections.

19
20 Walkdown the various facility support systems that affect waste handling.

1 **QUALIFICATION CARD:** RH Waste Handling Technician (RH-01A, RH-01B, RH-01C)
2 RH Waste Handling Engineer (RH-02)
3

4 **DURATION:** Nine to twelve months
5

6 **CLASSROOM TRAINING:** Various classroom courses are utilized to provide operators the
7 requisite training as part of the qualification process. The
8 candidate must satisfactorily complete the classroom training
9 courses prior to completion of the qualification card.
10

11 **SCOPE:** The RH Waste Handling Technician Qualification Card (RH-01A,
12 RH-01B, RH-01C) and RH Waste Handling Engineer
13 Qualification Card (RH-02).
14

15 **REFERENCES:** RH Waste Handling Technician Qualification Card
16 RH Waste Handling Engineer Qualification Card
17 Waste Handling Operations Qualification Card Guide Book
18

19 **QUALIFICATION CARD DESCRIPTION** (by category)
20

21 **1.** Equipment Knowledge Requirements

22 Demonstrate knowledge of the following for the various pieces of RH waste handling
23 equipment and systems:
24

- 25 ● General principle of equipment operation
- 26 ● Understanding of alarms, indications, and readings
- 27 ● Proper response to abnormal equipment conditions
- 28 ● Precautions, administrative requirements, and technical specification requirements
- 29 ● Basic safety requirements for equipment operation
30

31 **2.** Equipment Operation Practical Requirements
32

33 Demonstrate competency in conducting RH waste handling equipment and system
34 functional and operational inspections.
35

36 Demonstrate competency in standard operation of RH waste handling equipment and
37 systems.
38

1 **3. Integrated Process Knowledge Requirements**
2

3 Demonstrate knowledge of the following for the various integrated support functions.
4

- 5 ● Administrative activities for equipment/system isolation, modification and control
- 6 ● Management of site derived waste
- 7 ● Proper response to abnormal facility conditions
- 8 ● Container storage area inspections
- 9 ● Facility support systems

10
11 **4. Integrated Process Practical Requirements**
12

13 Demonstrate competency in performing administrative duties for equipment/system
14 isolation and control.

15
16 Demonstrate competency in management of site derived waste.

17
18 Demonstrate competency in performing container storage area inspections.

19
20 Walkdown the various facility support systems that affect waste handling.

1 **QUALIFICATION CARD:** Radiological Control Technician (~~RCT~~)

2
3 **DURATION:** =9 working months

4
5 **CLASSROOM TRAINING:** Various classroom courses are utilized to reinforce the training
6 received as part of the qualification card. The candidate is required
7 to complete

8
9 **SCOPE:**

10
11 **REFERENCES:** WP 12-5, WIPP Radiological Control Manual
12 WP 12-HP, WIPP OHP Procedures Manual
13 WP 12-RE, Rad Engineering Procedures Manual

14
15 **QUALIFICATION CARD DESCRIPTION** (by category)

16
17 **1. Academics Training**

18
19 There are 13 lessons associated with the core academics program and 15 lessons
20 associated with the site academics program.

21
22 **2. Practical Training**

23
24 There are 33 job performance measures associated with the practical training element of the RCT
25 qualification program covering the following areas:

26
27 Demonstrate generation of a Radiological Work Permit.

28
29 Demonstrate how a radiological area should be posted.

30
31 Demonstrate applicable emergency response to various events.

32
33 Demonstrate competency in operating various types of monitoring equipment.

34
35 **3. Written Examination**

36
37 This exam is administered after successful completion of academic lessons and practical
38 lessons. Successful completion of the comprehensive written exam is necessary prior to
39 participation in the oral examinations.

40
41 **4. Oral Examination Board**

42
43 The oral board consists of members of Radiation Safety, Operational Health Physics,
44 Facility Operations, and Technical Training. This board will assess the candidate's

1 response to normal and emergency situations encountered by a Radiation Control
2 Technician.

1 **QUALIFICATION CARD:** EST-01 Emergency Services Technician

2
3 **DURATION:** 2 Years

4
5 **PREREQUISITES:** The candidate must be current in CPR and possess an EMT-I
6 License.

7
8 **CLASSROOM TRAINING:** Additional classroom training courses are required prior to
9 completion of this qualification card.

10
11 **SCOPE:** This qualification card must be completed by all candidates prior
12 to standing a watch unsupervised. Qualification is a six month
13 process. The individual may perform duties without direct
14 supervision only for those evolutions and/or operations for which
15 training has been completed.

16
17 All signatures must be made by an approved Subject Matter
18 Expert. The signatures indicate that the trainee has demonstrated
19 satisfactory knowledge and performance of the task(s) indicated.

20
21 **REFERENCES:** Emergency Services Technician Qualification Card Guide Book
22 (EST-01G)
23 WIPP Emergency Management Program (WP 12-9)
24 Emergency Fire Pump (WP 04-FP2202)
25 Inspection and Testing of Sprinkler Systems
26 1. Wet Pipe Fire Sprinkler System Testing (PM000025)
27 2. NFPA 13, Installation of Sprinkler Systems
28

29 **QUALIFICATION CARD DESCRIPTION** (by category)

30
31 **1. Knowledge Requirements**

32
33 Demonstrate basic knowledge of emergency management procedures and protocols such
34 as:

- 35
36
- 37 ● The purpose and types of dry chemicals utilized in large and portable dry chemical systems.
 - 38 ● Inspection and testing principles of sprinkler systems, buildings, pull boxes, and fire
39 detection systems.
 - 40 ● The general operation and hazards of fixed halon systems.
 - 41 ● Principles and procedures for operation of various fire and rescue apparatus.
 - 42 ● Selection and use of ~~personal protective equipment~~ **PPE**.

- 1 ● Selection and use of hazardous material equipment and supplies for control and
2 mitigation.
- 3
- 4 **2.** Practical Requirements
- 5
- 6 Demonstrate competency in the following areas:
- 7
- 8 ● Use of fire suppression apparatus and equipment.
- 9 ● Use of rescue apparatus and equipment.
- 10 ● Inspection and testing techniques and completion of corresponding forms.
- 11 ● Operation of ambulance and operation and application of all ambulance equipment
12 and supplies.
- 13 ● Application of all hazardous materials equipment and supplies for control and
14 mitigation.

- 1 **QUALIFICATION CARD:** FPT-01 Fire Protection Technician
- 2
- 3 **DURATION:** 2 Years
- 4
- 5 **PREREQUISITES:** The candidate must be currently certified in CPR and possess an
- 6 EMT-B License.
- 7
- 8 **CLASSROOM TRAINING:** Additional classroom training courses are required prior to
- 9 completion of this qualification card.
- 10
- 11 **SCOPE:** This qualification card must be completed by all candidates prior
- 12 to standing a watch unsupervised. Qualification is a six month
- 13 process. The individual may perform duties without direct
- 14 supervision only for those evolutions and/or operations for which
- 15 training has been completed.
- 16
- 17 All signatures must be made by an approved Subject Matter
- 18 Expert. The signatures indicate that the trainee has demonstrated
- 19 satisfactory knowledge and performance of the task(s) indicated.
- 20
- 21 **REFERENCES:** Emergency Services Technician Qualification Card Guide Book
- 22 (EST-01G)
- 23 WIPP Emergency Management Program (WP 12-9)
- 24
- 25 **QUALIFICATION CARD DESCRIPTION** (by category)
- 26

1 **1. Knowledge Requirements**

2

3 Demonstrate basic knowledge of emergency management procedures and protocols such
4 as:

5

6 ● The purpose and types of dry chemicals utilized in large and portable dry chemical
7 systems.

8 ● Inspection and testing principles of sprinkler systems, buildings, pull boxes, and fire
9 detection systems.

10 ● The general operation and hazards of fixed halon systems.

11 ● Principles and procedures for operation of various fire and rescue apparatus.

12 ● Selection and use of ~~personal protective equipment~~ **PPE**.

13 ● Selection and use of hazardous material equipment and supplies for control and
14 mitigation.

15

16 **2. Practical Requirements**

17

18 Demonstrate competency in the following areas:

19

20 ● Use of fire suppression apparatus and equipment.

21 ● Use of rescue apparatus and equipment.

22 ● Inspection and testing techniques and completion of corresponding forms.

23 ● Operation of ambulance and operation and application of all ambulance equipment
24 and supplies.

25 ● Application of all hazardous materials equipment and supplies for control and
26 mitigation.

1 **QUALIFICATION CARD:** Quality Assurance Inspector

2

3 **DURATION:** Six to nine months

4

5 **CLASSROOM TRAINING:** Various formal classroom courses are utilized to support the
6 training received as part of the qualification card. The candidate is
7 required to complete the classroom training courses, satisfactorily,
8 prior to completion of the qualification card.

9

10 **SCOPE:** The Quality Assurance Qualification card establishes the minimum
11 education, skill, training, knowledge, and experience requirements
12 for Quality Assurance personnel who perform inspection activities.

13

14 **REFERENCES:** WP 13-1, Quality Assurance Program Description
15 QAI PD2-3, Qualification of Inspection Personnel

16

17 **QUALIFICATION CARD DESCRIPTION** (by category)

18

19 **1. General Knowledge**

20

21 Demonstrate knowledge of the minimum site specific procedures:

22

- 23 ● ASME NQA-1
- 24 ● Quality Assurance Program Description
- 25 ● Safety Manual
- 26 ● Hoisting and Rigging Procedures
- 27 ● Work Authorization Procedures
- 28 ● Document Control Procedures

29

30 **2. On-the-Job Training**

31

32 Perform at least 20 hours of the following activities while supervised by a qualified
33 inspector:

34

- 35 ● Receiving inspection
- 36 ● Dimensional inspection
- 37 ● Mechanical inspection
- 38 ● Electrical inspection
- 39 ● Civil inspection

40

- 1 **3.** Qualification Card
2
3 Perform the following tasks:
4
5 • Receipt inspection
6 • Conduct an inspection
7 • Hold/witness point inspection
8 • Issuance of a corrective action request
9 • Hold tag issuance
10 • Verification of corrective action
11 • Conduct a corrective action receipt inspection

1 **QUALIFICATION CARD:** Facility Operations Roving Watch

2

3 **DURATION:** Six to nine months

4

5 **CLASSROOM TRAINING:** Various classroom courses are utilized to reinforce the training
6 received as part of the qualification card. The candidate is required
7 to complete the classroom training courses, satisfactorily, prior to
8 completion of the qualification card.

9

10 **SCOPE:** The Facility Operations Roving Watch **(RW)** qualification is the
11 foundation for all of the Facility Operations qualifications. The
12 qualifications developed utilizing the Facility Operations Roving
13 Watch qualification are the Central Monitoring Room Operator
14 Qualification (FO-CMRO-2) and the Facility Operations Shift
15 Engineer Qualification (FO-FOSE-3) (for FSM). This
16 qualification is used by all Facility Operations personnel
17 qualifying. All of the requirements of the applicable qualifications
18 must be completed by the candidate before operating any
19 equipment or performing any operating evolutions without direct
20 supervision of a qualified operator.

21

22 **REFERENCES:** Facility Operations Roving Watch Qualification Card (FO-RW-1)
23 WIPP Operations Watchstation Qualification Card Guide Book
24 (FO-GUIDE-1)

25

26 **QUALIFICATION CARD DESCRIPTION** (by category)

27

28 **1. System Knowledge**

29

30 Demonstrate knowledge of the critical facility operating systems, such as:

31

- 32 ● Theory of the system and equipment
- 33 ● System design
- 34 ● Differences in the various building systems around the facility
- 35 ● Alarms and sequence of actions that follow alarms

36

37 The systems covered include:

38

- 39 ● Facility electrical and backup electrical systems
- 40 ● Heating, air conditioning, and ventilation systems
- 41 ● Underground ventilation systems
- 42 ● Domestic water and fire protection systems

43

- 1 **2.** System Operation Practical Evaluation
2
3 Demonstrate system startup/shutdown for the various facility systems according to
4 procedures.
5
6 Demonstrate maintenance of applicable records pertaining to the operation of facility
7 systems.
8
9 Demonstrate ability to conduct periodic required testing of facility systems.
10
11 Demonstrate competency to respond to alarms and emergency situations according to
12 procedures.
13
14 **3.** Integrated Plant Knowledge
15
16 Discuss the site policies on equipment lockout/tagout.
17
18 Discuss the process of notifications and authorizations that is involved in making
19 temporary plant modifications.
20
21 Discuss the site process for work authorization.
22
23 Discuss the role and responsibilities of Facility Operations on the site.
24
25 Discuss Conduct of Operations as it applies to Facility Operations.
26
27 **4.** Integrated Plant Practical Evaluation
28
29 Demonstrate the lockout/tagout process.
30
31 Prepare paperwork associated with a temporary plant modification.
32
33 Demonstrate ability to maintain the Facility Operations logs.
34
35 Demonstrate the actions that are taken in various facility emergencies.
36
37 Demonstrate ability to stand watch as RW during various shifts.
38
39 **5.** Oral Qualification Exam
40
41 This final portion of the qualification consists of an oral board exam conducted by board
42 members who are knowledgeable in the qualification program areas.

1 **QUALIFICATION CARD:** Central Monitoring Room Operator

2

3 **DURATION:** Three to five months

4

5 **CLASSROOM TRAINING:** Various classroom courses are utilized to reinforce the training
6 received as part of the qualification card. The candidate is required
7 to complete the classroom training courses, satisfactorily, prior to
8 completion of the qualification card.

9

10 **SCOPE:** The Facility Operations Central Monitoring Room Operator
11 Qualification (FO-CMRO-2) in conjunction with the Roving
12 Watch qualification make up the support for the Facility
13 Operations Shift Engineer Qualification (FO-FOSE-3). This
14 qualification is used by Facility Operations personnel qualifying as
15 CMR operators or Facility Operations Shift Supervisors. All of the
16 requirements of the applicable qualifications must be completed by
17 the candidate prior to operating any equipment or performing any
18 operating evolutions without direct supervision of a qualified
19 operator. Qualification are valid for two years.

20

21 **REFERENCES:** Central Monitoring Room Operator Qualification Card (FO-CMR-2)
22 WIPP Operations Watchstation Qualification Card Guide Book
23 (FO-GUIDE-1)

24

25 **QUALIFICATION CARD DESCRIPTION** (by category)

26

27 **1.** System Knowledge

28

29 Demonstrate knowledge of the following for the various systems in the Central Monitoring
30 Room:

31

- 32 ● Theory of the system and equipment
- 33 ● System design
- 34 ● Alarms and sequence of actions that follow the alarms

35

36 **2.** System Operation Practical Evaluation

37

38 Demonstrate competency in standard operation of the systems in the Central Monitoring
39 Room including obtaining various pieces of information such as:

40

- 41 ● System status
- 42 ● Alarm Status
- 43 ● Meteorological data

44

45 Demonstrate what actions are to take place in the event of an alarm.

- 1
2 Demonstrate storage of information and subsequent retrieval.
3
4 **3. Integrated Plant Knowledge**
5
6 State the actions that must be taken to remove a CMS Central Monitoring System point
7 scan/alarm check.
8
9 Discuss the sequence of events that must occur during a facility emergency.
10
11 **4. Integrated Plant Practical Evaluation**
12
13 Demonstrate how the CMR log is maintained.
14
15 Demonstrate the sequence of events that are involved in CMS Central Monitoring System
16 point scan/alarm check removal.
17
18 Demonstrate ability to stand watch as Central Monitoring Room Operator ~~CMRO~~ during
19 different shifts.
20
21 Demonstrate the sequence of events involved in a facility emergency.
22
23 **5. Oral Qualification Exam**
24
25 This final portion of the qualification consists of an oral board exam conducted by board
26 members who are knowledgeable in the qualification program areas.

1 **QUALIFICATION CARD:** Facility Operations Shift Supervisor

2

3 **DURATION:** Three to five months

4

5 **CLASSROOM TRAINING:** Various classroom courses are utilized to reinforce the training
6 received as part of the qualification card. The candidate is required
7 to complete the classroom training courses, satisfactorily, prior to
8 completion of the qualification card.

9

10 **SCOPE:** The Facility Operations Shift Engineer Qualification (FO-FOSE-3)
11 is the final qualification developed from the Central Monitoring
12 Room Operator Qualification and Roving Watch Qualification.
13 This qualification is used by Facility Operations personnel, Facility
14 Operations Engineer, and Facility Shift Manager. The candidate
15 must be recommended by the Facility Operations Manager to
16 perform this qualification. All of the requirements of the
17 applicable qualifications must be completed by the candidate prior
18 to operating any equipment or performing any operating evolutions
19 without direct supervision of a qualified operator. Qualifications
20 are valid for two years.

21

22 **REFERENCES:** Facility Operations Shift Engineer (FO-FOSE-3)
23 WIPP Operations Watchstation Qualification Card Guide Book
24 (FO-GUIDE-1)

25

26 **QUALIFICATION CARD DESCRIPTION** (by category)

27

28 **1.** System Knowledge

29

30 Completed qualification through Central Monitoring Room Operator Qualification and
31 Roving Watch Qualification

32

33 **2.** System Operation Practical Evaluation

34

35 Completed qualification through Central Monitoring Room Operator Qualification and
36 Roving Watch Qualification

37

1 **3. Integrated Plant Knowledge**

2
3 Discuss the site work authorization process and the role of the Facility Shift Manager
4 (FSM).

5
6 Discuss the use of operator aids.

7
8 Discuss the responsibilities of the FSM.

9
10 Discuss the use of shift instructions.

11
12 Discuss the role of the FSM in facility emergencies and the actions that are to be taken by
13 the FSM.

14
15 Discuss the role of the Quality Assurance and Safety programs on the site.

16
17 Discuss the Contingency Plan, Renewal Application Chapter F, and its implementation.

18
19 Discuss site regulatory compliance as it applies to hazardous waste and hazardous
20 materials.

21
22 **4. Integrated Plant Knowledge Evaluation**

23
24 Complete the required documentation for a lockout/tagout.

25
26 Complete the proper documentation relating to temporary plant modifications.

27
28 Perform various work authorization actions.

29
30 Demonstrate a review of the Facility Operations logs.

31
32 Demonstrate the response required for various facility emergencies.

33
34 Demonstrate ability to stand watch as FSM during different shifts.

35
36 **5. Oral Qualification Exam**

37
38 This final portion of the qualification consists of an oral board exam conducted by board
39 members who are knowledgeable in the qualification program areas.

1 **QUALIFICATION CARD:** WWIS Data Administrator

2
3 **DURATION:** Two years

4
5 **CLASSROOM TRAINING:** Various classroom courses are utilized to provide the WIPP
6 Waste Information System (WWIS) Data Administrator with the
7 knowledge and background on the WIPP waste operations. OJT
8 connected with the everyday operation of the database will be
9 provided by the WWIS SME. The candidate must satisfactorily
10 complete the classroom training courses and the OJT prior to
11 qualification.

12
13 **SCOPE:** The WWIS Qualification Card provides the minimum knowledge
14 and competency requirements for qualification. The requirements
15 of the qualification must be completed to the satisfaction of the
16 current WWIS SME prior to the candidate performing any of the
17 WWIS data functions without direct supervision by a qualified
18 WWIS Data Administrator (DA).

19
20 **REFERENCES:** WWIS Data Administrator Qualification Card

21
22 **QUALIFICATION CARD** (by category)

23
24 **1.** Equipment Knowledge Requirements

25
26 Demonstrate knowledge of the following WWIS hardware and software systems:

- 27
28 ● General computer operation principles and communication terminal techniques
29 ● IBM PC and Internet techniques
30 ● Bar Code Reader System operation

31
32 **2.** Equipment Operation Practical

- 33
34 ● Obtain and maintain local and Internet IDs
35 ● Access WWIS and produce reports
36 ● Demonstrate operation of bar code reader interface to WWIS
37

1 **3. Integrated Process Knowledge Requirements**
2

3 Demonstrate knowledge of the following project document data requirements:
4

- 5 ● WIPP Waste Acceptance Criteria
 - 6 ● WIPP Quality Assurance Program Plan
 - 7 ● Waste Analysis Plan
- 8

9 Demonstrate knowledge of the following WWIS Specific documentation:
10

- 11 ● WWIS Software Requirements Specification
 - 12 ● WWIS Software Configuration Management Plan
 - 13 ● WWIS Software Quality Assurance Plan
 - 14 ● WWIS Software Design Description
- 15

16 **4. Integrated Process Practical Requirements**
17

18 Demonstrate competency in performing the administrative duties of the WWIS DA
19

20 Demonstrate competency in accessing the local area network (LAN) and the Internet.
21

22 Demonstrate the WIPP data interface to the WWIS via a walkdown of the receipt and
23 emplacement operations that provide data to the database.

1 **QUALIFICATION CARD:** Radioactive Transportation (TE-01)
2 Federal Motor Carrier Safety Regulations (TE-02)
3 Hazardous Materials (TE-03)
4 Hazardous Waste Shipments by Public Highway (TE-05)
5

6 **DURATION:** Six to twelve months
7

8 **CLASSROOM TRAINING:** Various classroom courses are utilized to provide candidates the
9 requisite training as part of the qualification process. The
10 candidate must satisfactorily complete the classroom training
11 courses listed on the individual qualification card as a prerequisite
12 to beginning that process.
13

14 **SCOPE:** The Transportation Engineer qualification cards (TE-01 through
15 TE-05) provide the minimum knowledge and competency
16 requirements for qualification. The requirements of the individual
17 qualification cards must be completed by the candidate prior to
18 performing those duties without direct supervision.
19

20 **REFERENCES:** Radioactive Transportation (TE-01)
21 Federal Motor Carrier Safety Regulations (TE-02)
22 Hazardous Materials (TE-03)
23 Hazardous Waste Shipments by Public Highway (TE-05)
24

25 **QUALIFICATION CARD DESCRIPTION** (by category)
26

27 **1. Knowledge Requirements**
28

29 Demonstrate knowledge of the following regulatory arenas:
30

- 31 ● Radioactive Material Transportation
 - 32 ● Federal Motor Carrier Safety Regulations
 - 33 ● Hazardous Materials
 - 34 ● Hazardous Waste Shipments by Public Highway
- 35

36 **2. Practical Requirements**
37

38 Demonstrate competency in performing the following for a given shipment:
39

- 40 ● Determine the proper shipping name
- 41 ● Determine the proper labeling and placement requirements
- 42 ● Determine the proper application and marking requirements
- 43 ● Prepare the proper shipping documents (i.e., Hazardous Waste Manifest, Bill of
44 Lading, LDR notification form, etc.)

1 **QUALIFICATION CARD:** Sampling Team (ST-01)

2
3 **DURATION:** 1 month

4
5 **PREREQUISITES:** HWW-101 - Hazardous Waste Worker/Hazardous Waste
6 Responder

7
8 **SCOPE:** This qualification card must be completed by all candidates prior
9 to performing sampling tasks without the direct supervision of a
10 qualified person. This qualification ensures that the sampler will
11 collect samples in a way that will protect the sampler and the
12 integrity of the sample collected.

13
14 **REFERENCES:** WIPP Sampling Team Qualification Guide ST-01G
15 WP 02-EC.05 Quality Assurance Project Plan for WIPP Site
16 Effluent and Hazardous Materials Sampling
17 WP 02-EC.06 WIPP Site Effluent and Hazardous Materials
18 Sampling Plan

19
20
21 **QUALIFICATION CARD DESCRIPTION** (by category)

22
23 **1. Knowledge Requirements**

24
25 Demonstrate basic knowledge of hazardous waste sampling protocol such as:

- 26
27
 - 28 ● Preventing cross-contamination of samples and equipment
 - 29 ● Importance of the a chain-of-custody
 - 30 ● Purpose of the field logbook and documentation
 - 31 ● Labeling and sealing procedures
 - 32 ● Methods of obtaining various sample types (i.e. Toxicity Characteristic Leaching
33 Procedure (TCLP) organics, volatile organic compounds, TCLP metals)

34 **2. Safety Requirements**

35
36 Demonstrate knowledge of the safety requirements for sampling activities such as:

- 37
38
 - 39 ● Level of ~~personal protective equipment~~ (PPE) needed for various sampling situations
 - 40 ● Actions to take when encountering damaged or bulging containers
 - 41 ● Importance of the “Buddy System”

42 **3. Practical Requirements**

- 43
44
 - 45 ● Correct and safe use of sampling equipment
 - Collection of a given sample preventing cross-contamination

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- 1 ● Labeling and sealing sampling containers
- 2 ● Completion of the Chain-of-Custody form

1 **QUALIFICATION CARD:** Sampling Team Assistant (STA-01)

2
3 **DURATION:** 1 month

4
5 **PREREQUISITES:** HWW-101 - Hazardous Waste Worker/Hazardous Waste
6 Responder

7
8 **SCOPE:** This qualification card must be completed by all candidates prior
9 to performing sampling tasks without the direct supervision of a
10 qualified person. This qualification ensures that the sampler will
11 collect samples in a way that will protect the sampler and the
12 integrity of the sample collected.

13
14 **REFERENCES:** WIPP Sampling Team Qualification Guide ST-01G
15 WP 02-EC.05 Quality Assurance Project Plan for WIPP Site
16 Effluent and Hazardous Materials Sampling
17 WP 02-EC.06 WIPP Site Effluent and Hazardous Materials
18 Sampling Plan

19
20
21 **QUALIFICATION CARD DESCRIPTION** (by category)

22
23 **1. Knowledge Requirements**

24
25 Demonstrate basic knowledge of hazardous waste sampling protocol such as:

- 26
27
 - Preventing cross-contamination of samples and equipment
 - Importance of the chain-of-custody
 - Purpose of the field logbook and documentation
 - Labeling and sealing procedures
 - Methods of obtaining various sample types (i.e., TCLP organics, volatile organic compounds, TCLP metals)

28
29
30
31
32
33
34 **2. Safety Requirements**

35
36 Demonstrate knowledge of the safety requirements for sampling activities such as:

- 37
38
 - Level of ~~personal protective equipment (PPE)~~ needed for various sampling situations
 - Actions to take when encountering damaged or bulging containers
 - Importance of the "Buddy System"

39
40
41
42 **3. Practical Requirements**

- 43
44
 - Correct and safe use of sampling equipment
 - Collection of a given sample preventing cross-contamination

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- 1 ● Labeling and sealing sampling containers
- 2 ● Completion of the Chain-of-Custody form

1 **QUALIFICATION CARD:** Waste Handling Hoist Equipment Operator

2
3 **DURATION:** Approximately 12 to 15 months

4
5 **SCOPE:** The Waste Handling Hoist Equipment Operator Qualification (M-
6 30) prepares the candidate to be a qualified man-hoist operator.
7 All of the requirements for the applicable qualification must be
8 completed prior to operating the Waste Handling Hoist unless
9 under the direct supervision of a qualified operator.

10
11 **REFERENCES:** Waste Handling Hoist Equipment Operator Qualification Card
12 Guide (M-30G)
13 Waste Handling Shaft Operation Procedure
14

15 **QUALIFICATION CARD DESCRIPTION** (by category)

16
17 **1. Equipment Knowledge**

18 Demonstrate knowledge of the following systems associated with the Waste Hoist:

- 19 ● Major components of the Waste Hoist in the headframe and collar areas
- 20 ● Major components of the Waste Hoist electrical systems
- 21 ● Be able to describe the correct operations of all Waste Hoist systems and their
22 interrelationships

23
24
25
26 **2. Equipment Safety**

27 Demonstrate knowledge of all safety systems associated with the Waste Hoist and how
28 their functions affect hoist operation.

29 Describe the correct response of the operator when safety features are actuated.

30
31
32
33 **3. Equipment Practical**

34 Perform normal startup and shutdown of all Waste Hoist systems.

35 Perform normal hoisting operations for material and personnel in all modes of operation.

36
37
38
39 **4. Classroom Training**

40 Receive formal training in electrical safety.

41
42
43 **5. Required Reading**

44 Read the appropriate related procedures for waste hoist operation.
45

1 **QUALIFICATION CARD:** Waste Handling Shaft Tender Operator

2
3 **DURATION:** Approximately 7 months

4
5 **SCOPE:** The Waste Handling Shaft Tender Operator Qualification (M-31)
6 prepares the candidate to operate controls and systems located at
7 both the collar area (surface) and the station area (underground) at
8 the Waste Shaft. All the requirements for this qualification must
9 be completed prior to operation of Waste Shaft systems unless
10 under the direct supervision of a qualified operator.

11
12 **REFERENCES:** Waste Handling Shaft Tender Qualification Guide (M-31G)
13 Waste Handling Shaft Operation Procedure

14
15 **QUALIFICATION CARD DESCRIPTION** (by category)

16
17 **1. Equipment Knowledge**

18
19 Demonstrate knowledge of the following Waste Shaft equipment at the collar and station:

- 20
21 ● Waste Shaft controls
22 ● Communication systems
23 ● Conveyance control panels
24 ● Cage and its capacity

25
26 **2. Equipment Safety**

27
28 Demonstrate knowledge of all safety systems and devices associated with the Waste Hoist.

29
30 Describe the position responsibilities with regard to shaft safety and who to contact during
31 abnormal conditions.

32
33 **3. Personnel Safety**

34
35 Demonstrate knowledge of the requirements for all personnel who wish to enter the
36 underground via the Waste Shaft.

37
38 Demonstrate knowledge of actions required during all work in and around the Waste Shaft
39 or surrounding areas.

40
41 **4. Equipment Maintenance**

42
43 Describe the maintenance and inspection duties of both the collar and station tender.

44
45 **5. Equipment Practical**

- 1
- 2 Perform pre-shift inspections of the collar and station areas.
- 3
- 4 Perform all record keeping duties of the shaft tender.
- 5
- 6 Demonstrate proper operation of the Local Control Stations, Pivot Rail System, and Bell
- 7 Systems.