PREPARATION FOR TASK QUALIFICATION

Revised
11/28/2011

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COURSE NUMBER: RPT 212

MEETING TIMES: 0800-1600
CLASSROOM: ROOM E-47B EAST BUILDING
CENTRAL CAMPUS
INSTRUCTOR: CHRISTOPHER STOUT (980-522-3552)
OFFICE: E-40

PREREQUISITE(S): RPT 210 with a minimum grade of "B"

CO-REQUISITE(S): None

COURSE DESCRIPTION: This course covers nuclear industry process requirements for conducting on-the-job training (OJT) and task performance evaluations (TPE); it also orients the student to computer applications and knowledge elements for performing basic radiation protection tasks. These tasks include Taking, Counting, and Recording Surveys, Use of Alpha & Beta Gamma Smear Counters, Posting and Construction of Radiation Control Zones, Control and Storage of Radioactive Materials, and Monitor and Coach Workers Entering/Exiting Radiation Control Areas (RCAs)/Radiation Control Zones (RCZs), Alpha Program, Operation of Neutron Survey Instruments, and Operation of the iSolo Smear Counter.

COURSE OUTCOMES: Students should be able to demonstrate:

1. Rationality, logic and coherence through critical thinking;
2. Their ability to express themselves effectively in quantitative and qualitative terms;
3. The scientific method of inquiry;
4. Their ability to access, retrieve, synthesize and evaluate information.

TEXTBOOK(S): Duke Energy Handouts

REFERENCE(S): Duke Energy Employee Training & Qualification Standard 5502, *Classroom Testing, Evaluation and Bypass*

OTHER REQUIRED MATERIALS, TOOLS, AND EQUIPMENT: Duke Energy Shared Procedures related to the 8 common tasks associated with OJT/TPE. Shared procedures are generic directives that govern work across the Duke Nuclear Fleet.

METHOD OF INSTRUCTION: This lesson will be taught by lecture and class participation in question and answer sessions.

GRADING SYSTEM:

90	-	100	=	A
80	-	89	=	B
Below	-	79	=	F or Fail

GRADE CALCULATION METHOD:

1 Examination	=	100%

Failure of any individual test requires remediation and retesting. If the student passes the retest, a score of 80 will be recorded for that test and averaged with the other grades in that module. If the student fails the second test, he/she will have to repeat the course before they can proceed to the next RPT course in the series. Students who must repeat any RPT course will not be able to continue as part of the current Duke Energy cohort.
A numerical grade will be provided to Duke Energy hiring managers for measuring academic achievement.
This course does include a single comprehensive final examination.

ATTENDANCE POLICY: The student is responsible for punctual and regular attendance in all classes, laboratories, clinical, practical internships, field trips, and other class activities. The College does not grant excused absences; therefore, students are urged to reserve their absences for emergencies. **When illness or other emergencies occur, the student is responsible for notifying instructors and completing work missed.**

During the first 75% of the course a student may initiate withdrawal and receive a grade of a W. A student cannot initiate a withdrawal during the last 25% of the course.

The student is tardy if not in class at the time the class is scheduled to begin and is admitted to class at the discretion of the instructor. If late, please enter the class discreetly. ***No student will be admitted following distribution of exam materials.***

Instructors maintain attendance records. However, *it is the student's responsibility to withdraw from a course*. *A student enrolling in and attending at least one course session remains enrolled until the student initiates a withdrawal.*

Absences for Religious Holidays: Students who are absent from class in order to observe religious holidays are responsible for the content of any activities missed and for the completion of assignments occurring during the period of absence. Students who anticipate their observance of religious holidays will cause them to be absent from class and do not wish such absences to penalize their status in class should adhere to the following guidelines:

1. Observance of religious holidays resulting in three or fewer consecutive absences: Discuss the situation with the instructor and provide written notice at least one week prior to the absence(s). Develop (in writing) an instructor-approved plan which outlines the make up of activities and assignments.
2. Observances of religious holidays resulting in four or more consecutive absences: Discuss the situation with the instructor and provide the instructor with written notice within the first 10 days of the academic term. Develop an instructor-approved plan which outlines the make up of activities and assignments.

ACADEMIC CONDUCT: **ACADEMIC DISHONESTY**: Students are expected to uphold the integrity of the College's standard of conduct, specifically in regards to academic honesty. All forms of academic dishonesty including, but not limited to, cheating on assignments/tests, plagiarism, collusion, and falsification of information will call for disciplinary action. Disciplinary action imposed

may include one or more of the following: written reprimand, loss of credit for assignment/test, termination from course, and probation, suspension, or expulsion from the College. For further explanation of this and other conduct codes, please refer to the Student Handbook. All students are required to read and sign a Duke Energy Test Integrity Form/Cover Sheet when taking Duke Energy examinations.

CELLULAR PHONES AND PAGERS/BEEPERS: Cellular phones, pagers and beepers are not permitted to be turned on or used within the classroom. Use of these devices during classroom time will be considered a violation of the student code as it relates to "disruptive behavior."

CLASS/LAB PROCEDURES:

Duke Energy instructors review objectives at the beginning of each classroom presentation. All Test items will be based on those objectives. Students need to learn the material related to those objectives in preparation for examinations.

ACCOMMODATIONS:

Students who need special accommodations in this class because of a documented disability should notify Student Disability Services by calling (864) 592-4818, toll-free 1-800-922-3679; via email through the SCC web site at www.sccsc.edu/resources/disabilities; or by visiting the office located in the East Building Room 30-B on the SCC Central campus. Contacting Student Disability Services early in the semester gives the College an opportunity to provide necessary support services and appropriate accommodations.

COURSE COMPETENCIES & OBJECTIVES:

Upon satisfactory completion of this course, the student will be able to:

I Provide and document On-The-Job Training (OJT) and Task Performance Evaluation (TPE) per Duke Energy Employee Training and Qualification (ETQS) Standards.

1. State the purpose of the OJT Training and TPE Evaluation process.
2. Identify the responsibilities of the following:
   - Trainee
   - OJT Trainer
   - TPE Evaluator
   - Management observer
3. Explain the purpose of each section of the Training and Qualification (T&Q) Guide.
4. Describe the OJT/TPE process.
5. Describe the documentation required for OJT/TPE.

II Describe the requirements for taking, counting and recording surveys.

1. Explain the operation and detection capabilities of the following portable survey instruments.
   - Ion Chamber - RO20, RO-7
   - GM - MGPI Telepole, MGPI AMP 100/200, Ludlum Model 3 (mr/hr)
   - Count Rate Meters - RM-14, Electra 1B / Delta, Ludlum Model 3 (cpm)

- Ludlum Model 19
- AMS-4

2. Explain what the yellow and white lines on the probe housing of the MGPI Telepole indicate.
3. Describe the significance of not properly orienting the source to the MGPI Telepole detector probe.
4. Describe the pre-operational checks of portable survey instruments.
5. Describe what determines short term and long term issue of RP equipment.
6. State how portable survey instruments are checked and returned if the electronic log is unavailable.
7. State the definition of contact and general area dose rates.
8. State the circumstances that require a survey for beta radiation.
9. Describe the methods for performing beta and beta-gamma surveys.
10. Explain the basic method for performing an item survey using instrumentation identified in this task (element 1).
11. Explain the basic method for performing an item survey for alpha.
12. State the requirements for performing a loose surface contamination smear survey.
13. State the limits associated with wet or oily smears.
14. Describe the requirements for counting smears using an RM-14 and Ion Chamber.
15. Describe how to convert dpm from cpm when using a count rate meter to count smears.
16. Explain the basic method for performing and counting treated cloth (large area) contamination surveys.
17. Identify the circumstances that require an air sample for particulates, iodines, noble gases, and tritium.
18. Describe the basic method for obtaining a representative air sample.
19. Describe the sampling medium used for the collection of particulates, radioiodines, noble gases, and tritium from the air.
20. Describe the set-up and precautions associated with air sampling.
21. Describe the conditions when CP-100 (or equivalent) cartridges can be excluded from air sampling.
22. Explain the process for purging CP-100 (or equivalent) cartridges including how a purge is performed and when a purge is required.
23. Describe the hazards of air sampling in high hydrogen concentration in the atmosphere.
24. State the reason and criteria for screening air samples.
25. Describe how to screen air samples.
26. Describe the general requirements for submitting an air sample for counting.
27. Describe the requirements for returning portable survey instruments.
28. Describe how surveys should be documented.
29. Identify the requirements to produce a new or update the existing Radiological Plan Views.

III Describe the requirements for using an alpha/beta/gamma smear counter.

1. Explain why smears must be screened prior to placing in automatic smear counters.
2. Identify the instrument used to screen smears and the contamination limit for placing smears in the automatic smear counters.
3. Explain the expected response to the following types of smear counter malfunctions
   - Counter Jam
   - Contaminated Planchet
   - High Background
   - Lost Smear
   - Contaminated Detector
   - Loss of Power

IV Describe the requirements for posting and constructing Radiation Control Zones (RCZs).

1. Define the following terms (criteria) and be able to establish RCZs using this criterion.
   - Unrestricted Area – Outside the single site boundary fence
   - Owner Controlled Area – Outside the protected area fence and within the site boundary fence
   - Restricted / Protected Area – Inside protected area fence
   - Radiation Control Area (RCA)
   - Radiation Control Zone (RCZ)
   - Very High Radiation Area (VHRA)
   - Locked High Radiation Area (LHRA)
   - High Radiation Area (HRA)
   - ALARA Controlled Area (ACA)
   - Radiation Area (RA)
   - Airborne Radioactivity Area (ARA)
   - Airborne Radioactivity Area due to Noble Gases
   - Radioactive Material (RAM)
   - Highly Contaminated Area (HCA)
   - Contaminated Area (CA)
   - Elevated Alpha Contaminated Area
   - Inside Taped Boundary
   - RWP Required for Entry
   - Incore Detector Movement in Progress
   - Fuel Movement in Progress
   - Notify RP Prior to Entry
   - See Planview
   - See Sign at Entry Point
   - Data Insert
   - Authorized Entry Only
   - Blank Insert
   - All Entries Require Continuous RP Coverage
   - No Entry at This Point
   - Low Exposure Waiting Area (LEWA)
   - Significant Dose Contributor (SDC)
   - Hot Spot
2. Discuss the conditions which allow exceptions to posting of an

area.
3. Discuss the general posting requirements for an RCZ.
4. Discuss access control requirements for HRAs, ACAs, LHRAs, and VHRAs.
5. Describe the proper methods and operating experience associated with RCZ boundary construction.
6. Discuss the documentation requirements when establishing an RCZ outside the RCA that is expected to last more than 24 hours.

V Describe the requirements for controlling and storing radioactive materials.

1. State the personnel who are qualified to escort radioactive material > 100 mrem/hr at ½".
2. Explain the process when handling:
   - Items being disposed of as Radioactive Trash.
   - Radioactive Material to be stored for future use.
   - Hand carried material being transported from the RCA OR from working RCZs outside the RCA.
   - Radioactive material being moved in or out of Radioactive Material Area outside the RCA.
   - Radioactive material being removed from the RCA OR working RCZ.
   - Items being removed from a Contaminated Area.
   - Radioactive Material being transported under the control of non-RP personnel outside the RCA.
   - Transporting contaminated tools from the Hot Tool Room to Radiologically controlled areas.
   - Transporting radioactive samples to the RCA for analysis.
3. Describe INPO E&A Finding RP 8-1 from McGuire Evaluation No. PE-96-026.
4. State the general criteria for the survey of items that have been in known or potentially contaminated areas.
5. State the limits for unconditional release of an item.
6. Explain the tagging requirements when unconditional release limits are exceeded.
7. List items that may be excluded from Radiation/Radioactive Material (yellow) Tags.
8. State when Radioactive Material Tape may be used instead of Radiation/Radioactive Material Tags.
9. Explain internal versus external when dealing with Radioactive Material that is wrapped, bagged, or containerized.
10. Explain how to complete a Radiation/Radioactive Material (yellow) tag for inside and outside use.
11. Explain the process for items that are being conditionally released.
12. State the criteria for tagging/labeling containers of licensed materials.
13. State the exceptions to tagging/labeling containers of licensed material.
14. State the requirements when previously tagged/labeled containers no longer contain radioactive material.
15. State the requirements associated with tagging material removed

from Highly Contaminated Areas.

VI Describe the requirements for monitoring and coaching workers who are entering or exiting the Radiation Control Area and Radiation Control Zones.

1. Describe the requirements for the control of personnel entering the RCA/RCZs.
2. Describe the requirements for verifying RWP compliance.
3. Describe how to control and prevent unnecessary materials from entering the RCA/RCZs.
4. Describe how to control personnel and equipment leaving the RCA/RCZs.
5. Describe the actions associated with personnel contamination.
6. Explain the "Empty Pockets Policy"
7. State the requirements for drinking RP approved liquids at a contaminated RCZ.
8. Describe/demonstrate the desired behaviors of an RP technician assigned to the SPA or alternate RCA exit.

VII Describe the Duke Energy Alpha Program and actions required to implement the program.

1. State why the loss of control of surface and/or airborne alpha contamination may be more significant than beta-gamma contamination.
2. Identify the possible sources of alpha contamination in a nuclear plant.
3. Explain how elapsed time from the origination of alpha contamination can affect the significance of the alpha hazard.
4. Define "Alpha Level" and explain how it is used.
5. Describe how to determine Activity Ratio based on smear data.
6. Define Alpha Level I, II, and III
7. State personnel frisking requirements based on Activity Ratio.
8. Identify where to find the Station Weighted Alpha DAC value and the Station Alpha Level.
9. State requirements for counting smears for alpha.
10. Describe actions that should be taken for Alpha Levels I, II & III based on smear data.
11. State when radiological posting should be considered for the alpha hazard.
12. State when all tools and materials must be controlled for alpha.
13. State when air samples are to be counted for alpha.
14. Identify requirements for counting air samples for alpha.
15. Describe actions that should be taken based on air sample data.
16. Describe appropriate actions when comparing Alpha Level as determined by Activity Ratio and DAC Ratio.
17. Describe how to determine DAC Ratio based on air sample data.
18. Explain the two methods used to ensure that the lower limit of detection (LLD) is met when sampling for alpha airborne activity.
19. Describe how to determine minimum sample volume and minimum sample flow rate required for alpha airborne activity.

VIII Describe the operation of neutron survey instruments.

1. Identify instruments used for neutron monitoring.
2. Describe the instruments used for Neutron Surveillance.
3. Describe how neutron surveys should be documented.

IX Describe the requirements for using an alpha/beta/gamma smear counter.

1. Describe the limits for use and operation of the ISOLO smear counter.
2. Explain the expected response to the following types of smear counter malfunctions
   - Sample slide tray jam
   - Contaminated Planchet
   - High Background
   - Lost Smear
   - Contaminated Detector
   - Loss of Power

X Upon completion of this training, the students will have the knowledge associated with the operation of lapel air samplers common to all Duke Energy Nuclear Sites.

1. State the type of hazard monitored when using lapel air samplers.
2. State the required length of tubing when using lapel air samplers.
3. State the battery restrictions associated with the lapel air samplers.

XI. Upon completion of this training, the students will have the knowledge associated with the operation of the Ludlum 3030P Portable Smear Counter common to all Duke Power Nuclear Sites.

1. State the actions to be taken if both the QC light and the DPM light are illuminated on the Ludlum 3030P.