Appendix C2

Fuel Facility Health Physics Inspector

Technical Proficiency

Training and Qualification Journal

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Introduction

Consult with your supervisor prior to beginning the activities or completing the courses in this qualification journal. In most cases, you will need to complete the Basic Inspector Certification Journal prior to beginning the activities in this Appendix. You may complete the General Proficiency requirements contained in Appendix B together with the Technical Proficiency requirements outlined in this journal.

Several of the topics have both an individual study guide and on-the-job training. You must complete the individual study guide before beginning the corresponding on-the-job training.

Before signing up for any course, be sure that you have checked and have met any prerequisites.

Required Fuel Facility Health Physics Inspector Training Courses:
(These courses have the completion of Appendix A as a prerequisite)

(H-201)	Health Physics Technology
(H-308)	Transportation of Radioactive Materials
(F-206S)	Fire Protection for Fuel Cycle Facilities Self-Study
(24 Hours)	Chemical Safety for Fuel Cycle Facilities Course
(24 hours)	OSHA HAZWOPR Course

Required Refresher Training:
(To be completed every three years)

(F-401)	Fundamentals of Inspection Refresher for Fuel Facilities Inspectors
(G-102)	Fundamentals of Inspection Refresher (alternate if F-401 is not available)
(16 Hours)	Refresher Technical Training Seminar as approved by supervisor
(8 hours)	OSHA HAZWOPR Refresher Course

Post-Qualification Training Courses:
(To be completed within three years of initial qualification)

(H-111)	Environmental Monitoring for Radioactive Materials
(H-119)	Air Sampling for Radioactive Materials
(H-121)	Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Course
(H-311)	Respiratory Protection
(H-312)	Internal Dosimetry and Whole Body Counting
(F-210)	Overview of MOX Production and Operational Safety for Reviewers

Fuel Facility Health Physics Inspector

Study Guides

Fuel Facility Health Physics Inspector Study Guide

TOPIC: (SG-HP-1) Code of Federal Regulations (CFRs)

PURPOSE: The Code of Federal Regulations (CFR) provides that licensees and certificatees (Note - the term licensee will be used throughout this document to represent both licensees and certificatees) comply with those Parts of the CFR that pertain to the possession, use, storage, disposal and transportation of radioactive materials. Fuel facilities are required to develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities within the plants. The CFRs also require that integrated safety analyses (ISAs) be completed that include identification of radiological hazards, potential accident sequences and their likelihood, and engineering controls and management measures to limit the risk from such events. For this reason, it is mandatory that all radiation protection inspectors gain a general and comprehensive knowledge of the contents of relevant radiation protection requirements in the CFR. This activity will provide the inspector with detailed knowledge of the contents of the requirements and how to apply the appropriate radiation protection regulation requirements.

COMPETENCY AREA: REGULATORY FRAMEWORK

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. **40 CFR Part 190**, “Environmental Radiation Protection for Nuclear Power Operations” (Note - applicable to fuel cycle facilities providing fuel to commercial nuclear power plants)
2. **29 CFR Part 1910**, “Occupational Safety & Health Standards”
3. **49 CFR Parts 100**-**189** Transportation
4. **10 CFR Part 190**, “Notices, Instructions, and Reports to Workers: Inspection and Investigation”
5. **10 CFR Part 20**, “Standards for Protection against Radiation”
6. 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions”
7. **10 CFR Part 61**, “Licensing Requirements for Land Disposal of Radioactive Waste”
8. **10 CFR Part 70**, “Domestic Licensing of Special Nuclear

Material"

9. **10 CFR Part 71**, "Packaging and Transportation of Radioactive Material"

10. **10 CFR Part 73**, "Physical Protection of Plants and Materials"

11. 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material"

12. NUREG-1600, "General Statement of Policy and Procedure for NRC Enforcement Actions" (ML003715971)

Note: Bolded CFRs are most important

EVALUATION CRITERIA:

Upon completion of this activity, the inspector should be able to:

1. Identify, recognize and locate specific radiation protection topics presented in the CFRs.

2. Discuss and interpret the content of radiation protection requirements identified in the CFRs.

3. Discuss and interpret the definitions of radiation protection terms identified in the CFRs.

4. Recognize and discuss the regulatory bases for the ISA and management measures as found in 10 CFR Part 70. Relate radiation protection requirements to the content of license applications.

5. Relate the requirements of the CFRs related to health physics to the fuel facility inspection programs. Discuss how the enforcement process as described in the CFRs is reflected in the implementation of the health physics aspects of the Enforcement Policy and Manual. (NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions", on NRC Office of Enforcement Web site)

6. Relate the content of the CFRs to the inspection objectives of the radiation safety inspection procedures (IP) (IP 83822, IP 84850, IP 86740, IP 88035, and IP 88045).

TASKS:

1. Locate and review general and specific radiation protection activities described in the CFRs.

2. Compare and contrast the requirement contained in the health

physics IP to the requirements of the CFRs.

3. Review the CFR to identify the regulatory bases for the radiation protection programs at fuel facilities.

4. Review how the Enforcement Policy Supplements IV, V, and VI are related to the CFRs.

5. Meet with your supervisor, the person designated as a resource, or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of these activities. Discuss the answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Proficiency Level Qualification Signature Card, Item SG-HP-1

Fuel Facility Health Physics Inspector Study Guide

TOPIC: (SG-HP-2) Licensee Documents for Health Physics Inspectors

PURPOSE: The NRC requires that licensees develop an ISA and provide to the NRC an ISA Summary and develop an Environmental Report. For this reason, it is vital that health physics inspectors gain a detailed knowledge of certain aspects of the ISA Summaries and the ISAs where there are any key radiological protection issues, and of the Environmental Report. Additionally, the NRC requires that licensees operate their facilities in compliance with the license or certificate, Technical Safety Requirements (TSRs) (for enrichment plants), and the license application. It is vital that all health physics inspectors gain a detailed knowledge of these documents as they relate to radiation protection. This guide will provide health physics inspectors with the detailed knowledge of the contents of the ISA Summary, license, Environmental Report, TSRs, and license application, the location of the applicable information and requirements for specific topics, and how to apply the requirements.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
REGULATORY FRAMEWORK

LEVEL OF EFFORT: 40 hours

REFERENCES: ISA Summary, ISA, license, license application, Environmental Report, TSRs if applicable, for a facility designated by your supervisor

EVALUATION CRITERIA: Upon completion of this guide, you should be able to:

1. Identify the applicable sections of the designated facility's ISA Summary and demonstration section of the license application (meteorology, engineered safety features ventilation/filtered systems, radiation monitoring instrumentation, radiation protection, radioactive waste management, technical specifications, and quality assurance) and discuss the content.

2. Identify the applicable sections of the designated facility's TSRs, license conditions, condition section of the license application (definitions, radiation monitoring instrumentation, engineered safety features, ventilation, radioactive effluents, solid radioactive waste, radiological environmental monitoring, administrative controls, surveillance requirements, etc.), and discuss the content and basis for the requirements.

3. Discuss the content and basis for the requirements of the designated facility's offsite dose calculation process such as COMPLY.

4. Discuss definitions and terms found in the designated facility's license and license application.

5. Discuss the legal basis, purpose, license conditions, and how these documents (ISAs, ISA summaries, TSRs, license applications) can be changed.

6. Discuss the delineated programs, processes, equipment, and limits, and the reasons they are required.

7. Discuss the requirements for surveillances, action statements, and reporting.

8. Discuss the license conditions section of the license application and the types of information located in this section. Focus on engineered and administrative controls for airborne radioactive material in controlled areas and internal dose monitoring and radioactive materials effluent section.

TASKS:

1. Review a copy of the ISA Summary and license application for the facility designated by your supervisor, with particular attention to the sections as listed in the Evaluation Criteria above.

2. Locate a copy of the license and/or TSRs for the facility designated by your supervisor and review the various sections as listed in the Evaluation Criteria above.

3. Review and familiarize yourself with the other documents listed in the reference list. Specifically, identify the purpose of each document and what guidance the document provides.

4. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of this guide. Discuss the answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item SG-HP-2

TOPIC: (SG-HP-3) Worker Radiation Protection

PURPOSE: The purpose of this guide is to familiarize you with the regulatory basis and historical agency positions related to occupational radiation protection. The information is addressed in generic correspondence, Regulatory Guides (RG) and regulations that pertain to access controls to radiation protection. The related IP is IP 83822, "Radiation Protection."

The IP has three main objectives:

1. Evaluation of the effectiveness of a licensee's program for internal dose control to assure that doses to workers are below NRC limits
2. Evaluation of the effectiveness of a licensee's program for external dose control to assure that doses to workers are below NRC limits
3. Evaluation of the effectiveness of a licensee's program to assure that worker doses are as low as is reasonably achievable (ALARA).

The inspection will determine whether the licensee has an adequate program, including administrative, operational, and engineering controls, to maintain occupational exposure ALARA.

ALARA is the central concept of occupational radiation protection. In the United States the linear non-threshold dose response model was selected for its ease of application in a regulatory environment. This model assumes that any exposure to ionizing radiation constitutes a risk and that risk increases proportionally with exposure. An outgrowth of this is the concept of maintaining collective dose ALARA, thereby minimizing the total risk associated with the use of radioactive materials. In order to minimize individual risk, individual exposures are also maintained ALARA with the collective exposure taking precedence.

National Committee for Radiation Protection (NCRP) Publication 116 ALARA guidance can be summarized as follows:

Justification - The need to justify radiation dose on the basis of benefit.
Optimization - The need to ensure the benefits are maximized.
Limitation - The need to apply dose limits.

COMPETENCY AREA: REGULATORY FRAMEWORK
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 80 hours

REFERENCES:

1. 10 CFR Parts 19 and 20

2. NUREG-1736, Consolidated Guidance: 10 CFR Part 20-Standards for Protection Against Radiation read the sections that address the following:
   - 10 CFR Part 20.1003
   - 10 CFR Part 20.1101
   - 10 CFR Part 20.1202 through 1204
   - 10 CFR Part 20.1406 through 1502
   - 10 CFR Part 20.1601 through 1602
   - 10 CFR Part 20.1701 through 1906

3. RG 8.9, “Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program” (Rev 1, ML003739554)

4. RG 8.10, “Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable” (Rev. 1-R) (ML003739563)

5. RG 8.11, “Applications of Bioassay for Uranium” (ML003739450)

6. RG 8.13, “Instructions Concerning Prenatal Radiation Exposure” (Rev. 3, ML003739505)

7. RG 8.24, “Health Physics Surveys During Enriched Uranium-235 Processing and Fuel Fabrication” (Rev. 1, ML003739609)

8. RG 8.25, “Air Sampling in the Workplace” (ML003739616)

9. RG 8.29, “Instruction Concerning Risks from Occupational Radiation Exposure” (Rev. 1, ML003739401)

10. RG 8.36, “Radiation Dose to the Embryo/Fetus” (ML003739548)

11. General Health Physics Practices for Fuel Cycle Facilities Course Trainee Guide

12. ANSI N13.1, “Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities”

13. ANSI N42.17B, “Performance Specifications for Health Physics Instrumentation - Occupational Airborne Radioactivity Monitoring Instrumentation”

14. ANSI Z88.2, “Respiratory Protection”

15. ANSI N13.6, “Performance Criteria for Instrumentation Used for In-Plant Plutonium Monitoring”

16. NUREG/CR-0041, “Manual of Respiratory Protection Against Airborne Radioactive Materials” (Rev. 1, ML062350101)

17. Health Physics Positions (HPPOS)-018, 020, 021, 022, and 217 (These papers are found on the NRC’s Public Website: About NRC > How NRC Protects You > Health Physics Positions Based on 10 CFR Part 20)

18. NUREG/CR- 5569, Rev 1.

19. NUREG/CR-5631, “Contribution of Maternal Radionuclide Burdens to Prenatal Radiation Doses” (Rev 2, ML061870465)

20. NCRP 128, “Radionuclide Exposure of Embryo/Fetus”

21. HPPOS-088, “Corrections for Sample Conditions for Air and Gas Monitoring”

22. HPPOS-279, “Technical Assistance Request Regarding Electronic Calibration of Survey Instruments”

23. Information Notice 85-87, “Hazards of Inerting Atmospheres”

24. Information Notice 98-20, “Problems with Emergency Preparedness Respiratory Protection Programs”

25. HPPOS-147, “Respirator User’s Notice -Use of Unapproved Subassemblies” (NIOSH warns against the use of unapproved subassemblies (parts and components) and unauthorized modifications for/of approved respirators)

26. Federal Register Notice 64, Page 54543, Part 20, Subpart H revision in 1999, Final Rule Summary, “Respiratory Protection and Controls to Restrict Internal Exposure.”

NOTE: This SG should be done in the office prior to performing the corresponding OJT at a licensee site.

EVALUATION CRITERIA: Upon completion of this independent study guide you should be able to:

1. Discuss the regulatory requirements associated with airborne radioactivity areas, radiation areas and high radiation areas.

2. Discuss the regulatory requirements associated with surveys and be able to describe what may constitute a survey other than documented direct meter measurements.

3. Describe the essential elements of an internal dose control and monitoring system

4. Describe the essential elements of an air sampling and evaluation program to monitor intakes of airborne uranium, plutonium, and technetium-99.

5. Describe the responsibility of a licensee for limiting, monitoring and tracking the exposure of a declared pregnant worker.
   a. Discuss the timing of licensee actions.
   b. Discuss the embryo/fetus exposure limits
   c. Discuss the inspection considerations detailed in IP 83822.

6. Describe the elements of an internal dosimetry program (in-vivo counting, urinalysis, and fecal analysis) for uranium and plutonium.

7. Describe the limitations of an air sampling program for monitoring internal dose (lapel and area air samplers).

8. Explain air sampler calibration techniques.

9. Describe appropriate calibration techniques for radiation survey meters.

10. Explain the complexities of neutron dose monitoring (for plutonium processing).

11. Describe the essential elements of a basic respiratory protection program that would be acceptable to the NRC based on 10 Part 20.

12. Explain the potential consequences of not using a Self Contained Breathing Apparatus (SCBA) in immediately dangerous to life or health (IDLH) environments (such as uranium hexafluoride (UF_6) clouds or inert atmospheres).

13. Describe deficiencies that are commonly found in respiratory protection programs.

14. Explain ALARA using a working definition that would be

understandable to someone not affiliated with nuclear power or its regulation.

15. Name the activities which account for the greatest percentage of the collective dose received in a fuel facility.

16. Explain the NRC philosophy with regard to assigning a set dollar value for ALARA planning purposes.

17. State the regulatory basis of ALARA and identify what condition(s) must exist in order to cite a violation on basis of ALARA.

TASKS:

1. Review and familiarize yourself with the documents listed in the reference list. Specifically, identify the purpose of each document and what guidance the document provides.

2. Read the Radiation Protection sections of an assigned license application.

3. Read HPPOS-088 which pertains to calibration of air sampling equipment. (The following equation is provided to help with understanding the issue related to Gas Law Correction.)

$$V_s = V_c\left(\frac{P_c}{P_s}\right)\left(\frac{T_s}{T_c}\right)$$ (See NUREG 1400 for further details)

Where:
Vs= volume under field conditions (appropriate volume unit)
Vc= volume under calibration conditions (appropriate volume unit)
Ps= absolute pressure during sampling (mm Hg)
Pc= absolute pressure during calibration (mm Hg)
Ts= absolute temperature during sampling (Kelvin)
Tc= absolute temperature during calibration (Kelvin)

4. Read RG 8.10 and be prepared to discuss the following:
   a. The definition of ALARA.
   b. The factors that must be taken into account when making
   ALARA recommendations.
   c. The types of activities typically accounting for the majority of the exposures.
   d. The key elements of a radiation control program
   e. The NRC-defined dollar-per-rem amount to be used in these analyses for occupational exposure (if any).
   f. If an ALARA cost benefit analysis indicates that for a given action there is a net benefit, does that mean that a particular

action must be performed?

g. If ALARA applies equally to internal and external exposures.

h. The roles of the Radiation Protection Manager:
- Where does (s)he normally fit in the reporting chain?
- Why does (s)he normally fit there?
- What are his/her specific responsibilities with regard to the ALARA program?
- What is his/her responsibility with respect to the sites radiation protection training program?

5. Review the regulatory basis, including the statements of consideration, for the application of the ALARA regulations.

6. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of this training activity. Discuss the answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item SG-HP-3.

Other Important References Related to this Topic:

ANSI N42.17A-1989, Performance Specifications for Health Physics Instrumentation - Portable Instrumentation for Use in Normal Environmental Conditions

ANSI N42.17C-1989, Performance Specifications for Health Physics Instrumentation - Portable Instrumentation for Use in Extreme Environmental Conditions

ANSI N323A-1997, Radiation Protection Instrumentation and Calibration, Portable Survey Instruments

Office of Inspection and Enforcement (IE) Information Notice 83-68, “Respirator User Warning: Defective Self Contained Breathing Apparatus Air Cylinders”

IE Information Notice 85-48, “Respirator User Warning: Defective Self Contained Breathing Apparatus Air Cylinders”

IE Information Notice 86-103, “Respirator Coupling Nut Assembly Failures”

IE Information Notice 89-47, “Potential Problems with Worn or Distorted Hose Clamps on Self Contained Breathing Apparatus”

IE Information Notice 94-35, “National Institute for Occupational Safety and Health

NIOSH Respirator User Notices, Inadvertent Separation of the Mask Mounted Regulator (MMR) from the Facepiece of the Mine Safety Appliances (MSA) Company Self Contained Breathing Apparatus (SCBA) and Status Update"

IE Information Notice 95-01, DOT Safety Advisory: High Pressure Aluminum Seamless and Aluminum Composite Hoop Wrapped Cylinders

Questions & Answers (Q&A) 91, Clarifies the need to comply with programmatic requirements when using respirators (These Q&As are found on the NRC's Public website: About NRC > How NRC Protects You > Health Physics Positions Based on 10 CFR Part 20 > FAQ)

Q&A 124, Notes that this section's requirements apply to respirators used during emergencies

Q&A 418, Explains that licensee's need a formal program whenever a respirator is used to limit intake

HPPOS 103, Guidance for Medical Evaluations for Respiratory Users

TOPIC: (SG-HP-4) Radioactive Material Transportation

PURPOSE: The purpose of this SG is to familiarize you with the regulatory bases and historical agency positions in the area of radioactive material transportation. Specifically, the information provides you the necessary technical knowledge to conduct inspections using IP 86740, Inspection of Transportation Activities. The NRC requires that licensees ensure adequate protection of public health and safety from exposure to radioactive material during shipment. Licensees must comply with the requirements of 10 CFR Part 20 and 10 CFR Part 71 and DOT regulations contained in 49 CFR Parts 100-189. This guide will provide you with detailed knowledge of the requirements contained in regulations and position documents.

COMPETENCY AREA: REGULATORY FRAMEWORK
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. 10 CFR Part 20 and 10 CFR Part 71
2. 49 CFR Parts 100-189
3. NUREG-1608, “Categorizing and Transporting Low Specific Activity Materials and Surface Contaminated Objects”
4. NUREG-1660, “U.S. - Specific Schedules of Requirements for Transport of Specified Types of Radioactive Material Consignments”
5 DOT Emergency Response Guidebook

NOTE: This SG must be completed in the office before beginning the related OJT Training at a licensee site.

EVALUATION CRITERIA: Upon completion of this guide, you should be able to:

1. Discuss the packaging, labeling and marking requirements for various types of radioactive materials packages expected to be shipped from a facility, as presented in NUREG-1660 and 49 CFR parts 100-189.

2. Discuss the manifesting, labeling, and placarding requirements for non-exempt types of radioactive materials packages relative to NUREG 1660.

3. Discuss the allowable radiation dose rate and contamination limits for shipment of packages of radioactive material specified in regulatory documents 49 CFR parts 100-189 and 10 CFR Part 71.4. The limits include transport vehicle dose limits, cab limits, and package limits, as appropriate.

4. Discuss HAZMAT training and emergency response program requirements relative to guidance in Information Notices 92-62, 92-72, 95-09, and 49 CFR Parts 100-189.

5. Discuss Quality Assurance Requirement for a radioactive materials shipping program, as described in 10 CFR Part 71.

TASKS:

1. Review and familiarize yourself with the documents listed in the reference list and in the list of other important references. Specifically, identify the purpose of each document and what guidance the document provides.

2. Review the requirements for the transfer and receipt of radioactive material as specified in 10 CFR Part 20 and 10 CFR Part 71, including reporting requirements for problems identified.

3. Review the requirements in the area of training and emergency response as specified in 49 CFR parts 100-189. Identify minimum training requirements and minimum emergency response requirements.

4. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of these activities. Discuss answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item SG-HP-4

Other Important References Related to this Topic:

IE Information Notice 90-50, “Minimization of Methane Gas in Plant Systems and Radwaste Shipping Containers”

IE Information Notice 92-62, “Emergency Response Information Requirements for IE Radioactive Material Shipments”

IE Information Notice 92-72, “Employee Training and Shipper Registration Requirements for Transporting Radioactive Materials”

IE Information Notice 95-09, “Monitoring and Training of Shippers and carriers of Radioactive Materials”

NUREG/CR-5569, Rev. 1, “Health Physics Positions Data Base”

NUREG/CR-6204, “Questions and Answers Based on Revised 10 CFR 20”

Fuel Facility Health Physics Inspector Study Guide

TOPIC: (SG-HP-5) Solid Radwaste Management and Processing

PURPOSE: The purpose of this SG is to familiarize you with the regulatory bases and historical agency positions in the area of solid radioactive waste control and processing (including control of contaminated items). Specifically, the information provides you the necessary technical knowledge to conduct inspections using the solid radioactive waste portions of IP 88035, "Radioactive Waste Management", and IP 84850, "Radioactive Waste Management - Inspection of Waste Generator Requirements of 10 CFR Part 20 and 10 CFR Part 61." This guide will provide you with detailed knowledge of the requirements contained in regulations and position documents.

COMPETENCY AREA:
REGULATORY FRAMEWORK
FUNDAMENTAL FACILITY DESIGN & OPERATION
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste."
2. Radwaste system and facility description from the licensed facility designated by your supervisor.
3. 10 CFR Part 20, "Standards for Protection against Radiation."
   a. Subpart F, "Surveys and Monitoring"; 20.1501(a) and 20.1501(b)
   b. Subpart K, "Waste Disposal."
4. NRC Branch Technical Position, Waste Form Technical Position
5. NRC Branch Technical Position on Concentration Averaging and Encapsulation
6. NUREG/BR-0204, Instructions for Completing NRC's Uniform Low-level Radioactive Waste Manifest
7. IE Circular 81-07, Control of Radioactively Contaminated Material
8. IE Information Notice 85-92, "Surveys of Wastes Before Disposal From Nuclear Reactor Facilities"

9. NUREG/CR-5569, Rev. 1, “Health Physics Positions Data Base”

10. NUREG/CR-6204, “Questions and Answers Based on Revised 1 CFR Part 20”

11. NUREG 1736, “Consolidated Guidance: 10 CFR Part 20 Standards for Protection Against Radiation” (ML01330179)

12. IE Information Notice 83-05, “Obtaining Approval for Disposing of Very-Low-Level Radioactive Waste - 10 CFR Section 20.302” (current 10 CFR Part 20.2002).

NOTE: This SG should be completed in the office before beginning the related OJT at a licensee site.

EVALUATION CRITERIA: Upon completion of this guide, you should be able to:

1. Discuss and highlight the key aspects of the plant’s solid radioactive waste processing systems, and their operation, as described in the license application.

2. Discuss the purpose and principal requirements of 10 CFR Part 61 and NRC waste classification and characterization guidance.

3. Discuss NRC guidance in the area of collection of representative samples of waste for the 10 CFR Part 61 program and how changes in waste streams should be identified for purposes of waste characterization and classification.

4. Discuss the principal aspects of classification of low-level radwaste as outlined in 10 CFR Part 61.

5. Discuss and identify free release criteria for contaminated materials from Radiation Control Area (RCA) to the public domain.

6. Explain the “no detectable” licensed radioactive material release policy for surface contamination, volumetric contamination, and difficult to detect radionuclides.

7. Discuss the calibration technique for contamination monitors used to free release material (e.g., small article monitor (SAM), bag monitor, frisker) in order to conform to guidance in NRC Circular 81-07 and IE Information Notice 85-92.

8. Describe the difference between a release limit and the “no

detectable" criteria.

9. Describe the minimum detection sensitivity criteria that licensees must use for radiation surveys of potentially contaminated material.

TASKS:

1. Review and familiarize yourself with the documents listed in the reference list and in the list of other important references. Specifically, identify the purpose of each document and what guidance the document provides.

2. Locate a copy of the solid radwaste section from the license application of your designated facility. Review the design and operation of the radwaste systems. Identify the various sources of solid radioactive waste.

3. Review and highlight the key aspects and requirements for low-level radioactive waste disposal as outlined in 10 CFR Part 61 and the burial site license.

4. Review free release criteria of contaminated materials from RCA to the public domain.

5. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of this activity. Discuss answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item SG-HP-5

Other Important References Related to this Topic:

Information Notice 86-20, "Low-Level Radioactive Waste Scaling Factors – 10 CFR Part 61"

NRC Bulletin 80-10, "Contamination of Non-Radioactive System and Resulting Potential for Unmonitored, Uncontrolled Release to Environment"

Fuel Facility Health Physics Inspector Study Guide

TOPIC: (SG-HP-6) Radiological Environmental Monitoring Program (REMP)

PURPOSE: The purpose of this SG is to familiarize you with the regulatory bases and historical agency positions in the area of radiological environmental monitoring. Specifically, the information provides you the necessary technical knowledge to conduct inspections using IP 88045, "Effluent Control and Environmental Protection." The NRC requires that licensees ensure adequate protection of public health and safety from exposure to radioactive material released to the public domain as a result of routine operations. The REMP is required by the license. The REMP supplements the effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation in the environment are in agreement with the values predicted by the radioactive effluent monitoring program.

This guide will provide you with detailed knowledge of the requirements contained in regulations and position documents in the area of radiological environmental monitoring.

COMPETENCY AREA: REGULATORY FRAMEWORK
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. 10 CFR Part 20
2. IP 88045, "Effluent Control and Environmental Protection."
3. Plant license application
4. RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) – Effluent Streams and the Environment" (Rev. 2, ML071790506)
5. NUREG/CR-5569, Rev. 1, "Health Physics Positions Data Base"
6. NUREG/CR-6204, "Questions and Answers Based on Revised 10 CFR Part 20"
7. NUREG 1736, "Consolidated Guidance: 10 CFR Part 20-Standards for Protection Against Radiation" (ML01330179)

EVALUATION CRITERIA: Upon completion of this guide, you should be able to:

1. Discuss the specific regulatory requirements that require a licensee to have a REMP.

2. Discuss the specific environmental sampling techniques (water, air particulate, vegetation, fish, and soil/sediment) required to be used in accordance with the REMP.

3. Discuss the different measuring techniques (proportional counter, gamma spectroscopy, liquid scintillation counter, and thermoluminescent dosimeter (TLD)) that may be used by the licensee and the capabilities and limitations of each.

4. Discuss and show how to calculate standard data reduction techniques, including minimum detectable activity (MDA) and lower limit of detection (LLD) highlighted in NRC and industry publications.

5. Discuss the NRC expectations for a licensee's QA program for REMP including the use and bases for inter-laboratory and intra-laboratory comparisons.

6. Discuss the NRC requirements for a Meteorological Monitoring Program, including calibration methodology for wind direction, wind speed, and delta temperature.

7. Be able to utilize χ/Q and D/Q, and annual average data in order to determine exposure rates associated with atmospheric dispersion.

8. Discuss the annual report of effluents and resulting offsite doses.

9. Describe the man-made and natural radiation exposure pathways (plant effluents and the source of the natural background radiation) that are present at your assigned facility.

10. Identify the specific environmental sample requirements for your assigned facility as described in the license application.

11. Discuss any environmental contamination from licensed activities, including ponds, burial sites, and groundwater issues.

TASKS:

1. Review and familiarize yourself with the documents listed in the reference list and in the list of other important references. Specifically, identify the purpose of each document and what

guidance the document provides.

2. Locate and review the REMP requirements in the license application for your assigned facility.

3. Review the Environmental Report and any special environmental studies for your assigned facility.

4. Review counting statistics and data reduction, including MDA and LLDs.

5. Review radiological analytical methodology for likely releases from your facility such as isotopic uranium or plutonium, total uranium, technetium-99, thorium, gross alpha, and gross beta.

6. Review meteorological monitoring and calibration requirements for your facility.

7. Review the sequential relationship between Radiological Effluent Controls and the REMP for your facility.

8. Review man-made and natural radiation exposure pathways (plant effluents and the source of the natural background radiation) that are present at your assigned facility.

9. Review the process for any laboratory inter-comparison program at your assigned facility.

10. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of these activities. Discuss answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item SG-HP-6

Other Important References Related to this topic:

Environmental Measurement Laboratory, “HASL-300 Procedures Manual,” U.S. Department of Energy, New York, NY

NCRP Report No. 45, “Natural Background Radiation in the US”

NCRP Report No. 47, “Tritium measurement Techniques”

NCRP Report No. 50, “Environmental Radiation Measurements”

ANSI N545-1975, “Performance, Testing, and Procedural Specification for TLD, Environmental Application”

ANSI N13.1-1969, “Guide to Sampling Airborne Radioactive materials in Nuclear Facilities”

TOPIC: (SG-HP-7) Radioactive Airborne and Liquid Effluent Treatment and Monitoring Systems

PURPOSE: The purpose of this SG is to familiarize you with the regulatory bases and historical agency positions in the area of radioactive airborne and liquid effluent treatment and monitoring systems. The NRC requires that licensees ensure adequate protection of public health and safety and the environment from exposure to radioactive materials released to the public domain. Radiation exposure to the public is to be below the 10 CFR Part 20 limits and, for those facilities manufacturing uranium for the commercial fuel cycle, within 40 CFR Part 190 limits. This guide will provide you with detailed knowledge of the requirements contained in these regulations.

COMPETENCY AREA: REGULATORY FRAMEWORK
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 45 hours

REFERENCES:

1. 10 CFR Part 20, 10 CFR Part 70, and 10 CFR Part 76
2. 40 CFR Part 190
3. Plant license application
4. IP 88035, "Radioactive Waste Management" (for liquid and airborne radioactive waste)
5. NUREG/CR-5569, Rev. 1, "Health Physics Positions Data Base"
6. NUREG/CR-6204, "Questions and Answers Based on Revised 10 CFR Part 20"
7. NUREG 1736, "Consolidated Guidance: 10 CFR Part 20-Standards for Protection Against Radiation" (ML01330179)

EVALUATION CRITERIA: Upon completion of this guide, you should be able to:

1. Discuss and identify effluent sampling techniques that may be used by the licensee for sampling effluents such as radioactive waste water, storm water runoff, and air particulate and non-particulate (such as soluble uranium).

2. Discuss different measuring techniques, such as proportional counting, gamma spectroscopy, and liquid scintillation counting that a licensee may use to analyze its samples. Compare and contrast the techniques.

3. Discuss calibration techniques for a laboratory's gamma spectroscopy, proportional counter, and liquid scintillation counter. Identify the types of sources to be used and expected MDA or LLDs.

4. Discuss laboratory analytical techniques for radionuclides such as isotopic uranium or plutonium, gross alpha/beta, total uranium, and technetium-99. Identify best methods.

5. Discuss laboratory quality assurance and quality control (QA/QC) Policy and its implementation, including inter-laboratory and intra-laboratory comparisons. Discuss NRC expectations in this area.

6. Discuss and calculate MDA and LLDs for hypothetical samples.

7. Discuss the principles of air cleaning systems, such as in-place filter testing. Discuss applicable guidance documents and acceptable results

8. Review the air cleaning system and liquid effluent processing sections from your assigned facility's license application. Discuss the principal components and their use.

9. Identify the various sources of liquid and gaseous radwaste at your assigned facility by reviewing the license application and environmental report. Discuss the described waste streams, and technologies associated with liquid and airborne radwaste processing for the facility.

TASK:

1. Review and familiarize yourself with the documents listed in the reference list and in the list of other important references. Specifically, identify the purpose of each document and what guidance the document provides.

2. Review and evaluate effluent sampling techniques, such as radioactive waste water, soluble airborne, and air particulate.

3. Review and evaluate the different measuring techniques, such as proportional counter, gamma spectroscopy, and liquid scintillation counter.

4. Review and evaluate the calibration techniques and results for

the measurement laboratory's gamma spectroscopy, proportional counter, and liquid scintillation counter.

5. Review and evaluate the characteristics of radiation monitoring systems (RMS), such as gamma-scintillation detector, beta-scintillation detector, Geiger-Müeller (GM), and ion chamber. Identify capabilities and limitations.

6. Review and evaluate principle air cleaning system tests, such as air in-place filter testing. Compare with applicable regulatory requirements for your facility.

7. Identify the various sources of liquid and airborne radwaste at assigned facility.

8. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of these activities. Discuss answers to the questions listed under the Evaluation Criteria section of this study guide with your supervisor or the person designated as a resource.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item SG-HP-7

Other important references related to this topic:

Environmental Measurement Laboratory, "HASL-300 Procedures Manual," U.S. Department of Energy, New York, NY

NCRP Report No. 58, "A Handbook of Radioactivity Measurements Procedures"

RG 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup System in Light-Water-Cooled Nuclear Power Plants" (ML011710176 - Endorsed ANSI N509-1976 and N510-1975)

RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) - Effluent Streams and the Environment" (ML071790506)

ANSI N13.1-1982, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities"

ANSI/ASME N510-1980, "Testing of Nuclear Air-Cleaning Systems"

IE Bulletin No. 80-10, "Contamination of Nonradioactive Systems and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to the Environment,"

May 6, 1980

IE Information Notice No. 82-49, “Correction for Sample Conditions for Air and Gas Monitoring,” December 16, 1982

Fuel Facility Health Physics Inspector

On-The-Job Training Activities

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-1) Internal and External Dose Controls

PURPOSE: The purpose of this activity is to familiarize you with inspection activities in IP 83822, "Radiation Protection."

COMPETENCY AREA:
TECHNICAL AREA EXPERTISE
ASSESSMENT AND ENFORCEMENT
COMMUNICATION
INSPECTION

LEVEL OF EFFORT: 32 hours

NOTE: Successful completion of SG-HP-3 is a prerequisite to this activity

REFERENCES: All the references used in SG-HP-3 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and related regulatory documents. Any references other than licensee procedures will be used to determine the regulatory stance that has been historically applied by the NRC for a given situation. References selected should support the actual inspection effort.

1. Licensee Radiological Access Control, Radiological Postings, Radiation Work Permit, and Declared Pregnant Worker procedures

2. Licensee dose printout of individual doses for a work group identified by qualified inspector

EVALUATION CRITERIA: Upon completion of the tasks in this OJT, you should be able to:

1. Describe areas that are considered radiologically risk significant and what kind of work would increase the risk significance.

2. Describe licensee controls for airborne radioactive materials, radiation areas, and high radiation areas.

3. Describe the licensee's mechanism for making timely changes to controls and postings for airborne radioactivity and radiation areas, as a result of changing plant operations.

4. Describe the results of the survey you performed and the survey performed by the licensee and explain what could cause the

results to be different.

5. Describe the information communicated to the worker by the Radiation Work Permit (RWP), and the responsibilities of the radiation workers and health physics staff.

6. Explain licensee policy on the use of lapel and stationary air sampling, and how each is used to determine derived air concentration (DAC) hours and internal dose.

7. Explain the actions expected from workers in response to a high airborne radioactivity alarm, criticality alarm, and a frisker alarm and malfunction.

8. Describe methods that could be employed to reduce or prevent the uptake of radioactive materials.

9. Describe expected licensee response to suspected or actual uptake of airborne radioactive material.

10. Explain why there are still some variations in the amount of dose received for plant workers.

11. Describe licensee source term trending techniques.

12. Describe considerations in determining whether temporary containment and ventilation are provided at RPs request.

13. Describe how the licensee ALARA program incorporates lessons learned, industry experience, historical data, and employee feedback/recommendations.

14. Describe the process used to determine and assign fetal dose. Describe a woman's rights with respect to declaring her pregnancy.

15. Describe the degree of documentation in the corrective action program with regards to threshold, detail, thoroughness, and timeliness and how the program should be assessed for adequacy.

NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you might have should be brought to the attention of the inspector. Any tasks previously completed as part of the course "General Health Physics Practices for Fuel

Cycle Facilities" need not be repeated if done on a separate inspection.

TASKS:

1. Identify exposure significant work areas within the plant.

2. Identify appropriate licensee controls for internal uptakes and external exposure in process areas.

3. Walk down a work area with a contamination survey instrument and determine if licensee surveys are accurate. Prior to performing the survey perform the following steps:
   a. Select an appropriate instrument. (If you are uncertain, contact the qualified inspector.)
   b. Familiarize yourself with the operations of the instrument and any peculiarities/features that it may have.
   c. Turn the instrument on and check its batteries, check high voltage or instrument zero (if applicable), and physical condition, and perform a response test with appropriate source.
   d. Verify that the instrument is within its calibration interval. (If there is any doubt about the operability of the instrument, do not use it.)

4. Review RWPs used to access an area of anticipated high airborne radioactivity and identify what work control instructions are specified.

5. Discuss the engineering controls that would be expected for an area that was expected to exceed 20 DAC airborne being produced by maintenance. (A qualified inspector can identify an example and work through this with you.)

6. Review plant procedures for internal dose assessment. Walk the procedure through for a hypothetical uptake that involves either enriched uranium or plutonium.

7. Select several work stations and observe operators during the inspection. Discuss any observations with a qualified inspector.

8. Review at least two reports to management on plant radiological conditions (normally weekly or monthly). Discuss with the Radiation Protection Manager his/her evaluation of adverse trends in the reports.

9. Compare individual internal doses or lung counts for three

workgroups and identify probable reasons for significant differences.

10. Determine the elements of the licensee's source term control strategies.

11. Review a licensee self assessment or audit. Select three findings from the report and determine if the identified problems are documented in the corrective action program for tracking and resolution.

12. Review Declared Pregnant Worker (or Woman) procedures. Review the exposure results and monitoring controls employed by the licensee with respect to the requirements. (Program should have provisions for determining fetal dose from internal deposition as well as external radiation.)

13. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics Inspector to discuss any questions you may have as a result of these activities and to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-1

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-2) Air Sampling Program

PURPOSE: The purpose of this activity is to familiarize you with air sampling and evaluation programs as they are used to show compliance with internal dose limits.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 36 hours

Note: Successful completion of SG-HP-3 is a prerequisite to this training

REFERENCES: References used in SG-HP-3 related to air sampling are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the license application. References selected should support the actual inspection effort.

1. Licensee procedures for routine and special air sampling, including sampler calibration and results evaluation, including work restrictions.

2. Licensee procedures for analyzing air samples and calculation to DAC-hours, uptakes, and internal dose.

3. Licensee procedures for determining the representativeness of stationary air samplers, including initial location and periodic re-verification.

4. Licensee procedures for air sampler and bioassay or in-vivo counting results.

EVALUATION CRITERIA: Upon Completion of this training you should be able to:

1. Describe a routine air sampling program for Low Enrichment Uranium (LEU), High Enrichment Uranium (HEU), and plutonium, including regulatory limits, DACs, and licensee action points.

2. Discuss typical actions for unexpected events that could cause increased airborne material.

3. Discuss typical actions taken when there are airborne events or unexpectedly high air sample results.

4. Describe the methodology used to calibrate air sampling instruments.

5. Describe the process used to resolve situations where instruments are found to be significantly out of calibration. What is the impact on surveys done with the instrument?

6. Describe the methodology used to determine DACs and uptakes based on air sample results, limitations and areas for potential errors.

7. Discuss licensee documentation that is used to identify, report, and track problems involving personnel unexpected air sample results.

NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you may have should be brought to the attention of the inspector.

TASKS:

1. Observe air samplers in operation and observe routine change-out of samples.

2. Discuss the licensee air sampling program, limitations, and resultant licensee actions with the licensee individual in charge of the air sampling program.

3. Review results of air samples to determine if there were any results above action or restriction points. Determine if actions required by procedures were taken, including determination of internal dose. Determine whether air samples were properly measured utilizing calibrated equipment.

4. Review the equipment used to analyze air samplers. Review the latest calibration for this equipment. Discuss with the technician the process for preparing and analyzing samples.

5. Discuss with the individual in charge of the air sampling program the process for determining that lapel and stationary air samplers are representative.

6. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics inspector to discuss any questions you may have as a result of these activities, and

to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-2.

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-3) Bioassay and In-vivo Counting

PURPOSE: The purpose of this training is to familiarize you with bioassay and in-vivo counting programs.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 36 hours

Note: Successful completion of SG-HP-5 is a prerequisite to this training

REFERENCES: References used in SG-HP-5 related to bioassay and in-vivo counting are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the license application. Any references other than licensee procedures will be used to determine the regulatory stance that has been historically applied by the NRC for a given situation. References selected should support the actual inspection effort.

1. Licensee urine sampling, analysis, and evaluation procedures.
2. Licensee lung counting and internal dose assessment procedures
3. Licensee fecal sampling, analysis, and evaluation procedures.
4. Licensee procedures for actions as a result of internal depositions.

EVALUATION CRITERIA: Upon completion of this training, you should be able to:

1. Discuss bioassay, and in-vivo counting programs, limitations, and resultant licensee actions.
2. Discuss regulatory requirements for bioassay and in-vivo counting programs.
3. Describe the calibration techniques used for in-vivo counters.
4. Describe the methods used for urine and fecal sample preparation, analysis, and evaluation, including typical action points for LEU and HEU.

5. Describe a routine bioassay and in-vivo counting program, including frequency and bases, for-cause sampling or counting, and relationship to the air sampling program.

6. Discuss licensee documentation that is used to identify, report and track problems involving personnel contaminations, unexpected exposures, radiological incidents, and events involving uncontrolled or unmonitored internal or external exposure of workers.

NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you may have should be brought to the attention of the inspector.

TASKS:

1. Review results of urinalyses and in-vivo counts to determine if there were any results above action or restriction points. Determine if actions required by procedures were taken, including determination of internal dose. Determine whether urine samples or personnel were properly measured utilizing calibrated equipment.

2. Review the most recent calibration of the in-vivo counter. Review the counting facility and discuss operating procedures with the counter operator.

3. Review the equipment used to evaluate urine samples. Review the latest calibration for this equipment. Discuss with the technician the process for preparing and analyzing samples.

4. Discuss with the individual in charge of the bioassay program the process for fecal sampling and analysis.

5. Review air sample results, personnel contaminations, and event evaluations to determine if bioassays or lung counts were made per the license. Discuss the relationship of bioassay sampling and in-vivo results to air sampling with the individual in charge of the program.

6. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics inspector to discuss any questions you may have as a result of these activities and to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-3.

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-4) Radioactive Material Transportation

PURPOSE: The purpose of this OJT training is to provide you tasks and information that will familiarize you with the inspection requirements contained in procedure IP 86740, "Inspection of Transportation Activities", to allow you to independently conduct inspections in this area. The licensee's radioactive material processing and shipping programs are required 10 CFR Part 20 and 10 CFR Part 71, and DOT's regulations contained in 49 CFR Parts 100-189.

COMPETENCY AREA:
INSPECTION
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES: References used in SG-HP-4 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the license application. References selected should support the actual inspection effort.

1. Licensee licensed material shipping and transportation procedures.

2. Licensee procedures for transportation QA.

EVALUATION CRITERIA: Upon completion of the tasks, you should be able to:

1. Discuss the packaging, labeling, and marking requirements for various types of radioactive materials packages which are expected to be shipped from the facility. Identify in NUREG-1660 and 49 CFR the specific labeling and placarding requirements.

2. Discuss the manifesting and placarding requirements for the various types of radioactive materials packages you inspected. Show in NUREG 1660 the specific requirements. Discuss conformance with NUREG/BR-0204.

3. For typical product and radwaste shipments, identify the allowable radiation and contamination dose limits specified in regulatory documents 49 CFR 100-189, and compare and contrast them with the values the licensee identified.

4. Discuss the HAZMAT training and emergency response program

used by the licensee to meet regulatory requirements. Discuss this information relative to guidance in Information Notices 92-62, 92-72, 95-09, and 49 CFR.

5. Locate Certificates of Compliance (COC) and discuss the checks required by the COC before shipment.

6. Discuss the licensee's corrective action program in the area of radioactive material shipping.

NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you may have should be brought to the attention of the inspector.

TASKS:

1. Review and familiarize yourself with the documents listed in the reference list. Specifically, identify the purpose of each document and what guidance the document does provide.

2. Review the licensee's implementation of the regulations in the area of training and emergency response as specified in 49 CFR.

3. Select at least five non-exempt radioactive materials shipments and review for compliance with all appropriate regulatory requirements, including conformance with the container certificate of compliance for the packages used.

4. Observe the packaging, surveying, labeling, marking, vehicle checks, emergency instruction, disposal manifests, shipping papers, and loading of a radioactive waste shipment (preferably a non-exempt shipment). Inter-compare your findings with applicable regulatory requirements.

5. Review records of (and if possible observe), licensee QA checks of a shipment.

6. Review corrective action reports in the area of transportation to identify problems in this area and to understand the licensee's corrective action process.

7. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics inspector to discuss any questions you may have as a result of these activities and to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-4

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-5) Solid Radwaste Management and Processing

PURPOSE: The purpose of this OJT is to provide you tasks and information that will familiarize you with the inspection requirements contained in the solid radwaste sections of IP 88035, "Radioactive Waste Management," and IP 84850, "Radioactive Waste Management - Inspection of Waste Generator Requirements of 10 CFR 20 and 10 CFR 61."

COMPETENCY AREA: INSPECTION
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES: References used in SG-HP-5 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the license application. References selected should support the actual inspection effort.

1. Licensee solid waste processing procedures, including, where applicable, incinerator operation, waste sorting, compaction, and other processing.

2. Licensee procedures for release of materials for unrestricted use.

EVALUATION CRITERIA: Upon completion of the tasks, you should be able to describe the inspection requirements contained in the solid radwaste sections of IP 88035, "Radioactive Waste Management," and IP 84850, "Radioactive Waste Management - Inspection of Waste Generator Requirements of 10 CFR 20 and 10 CFR 61."

> NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you may have should be brought to the attention of the inspector.

TASKS:

1. Review and familiarize yourself with the documents listed in the reference list. Specifically, identify the purpose of each document and what guidance the document does provide.

2. Review the contents of the licensee's program for use of scaling factors for hard to detect nuclides, and the waste form and characteristics requirements for disposal of solid radioactive waste. Identify how the licensee quantifies those radionuclides listed in 10 CFR Part 61 Tables 1 and 2.

3. Review the requirements for the transfer of radioactive material contained in licensee procedures and compare that with requirements contained in 10 CFR Part 20 and license conditions.

4. Review the burial license requirements for a low-level radioactive waste disposal facility used by the licensee and discuss the specific requirements, in the area of waste characteristics, for burial of the waste.

5. Review the requirements for determination of the quantity of material in waste shipment containers (such as drum monitors). Discuss the limitations on such determinations.

6. Review operation of a box or drum compactor.

7. Review operation of an incinerator.

8. Review corrective action reports in the area of radioactive waste processing to identify problems in this area and to understand the licensee's corrective action process.

9. Discuss the calibration technique for radiation instruments used to screen and clear potentially contaminated materials/articles (e.g., a small article monitor (SAM) and a bag monitor) based on IE Circular 81-07 and IE Information Notice 85-92.

10. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics inspector to discuss any questions you may have as a result of these activities and to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-5

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-6) Radiological Environmental Monitoring Program (REMP)

PURPOSE: The purpose of this OJT is to provide you with tasks and information that will familiarize you with the inspection requirements contained in IP 88045, "Effluent Control and Environmental Protection," to allow you to independently conduct inspections in these areas. The NRC requires that licensees ensure adequate protection of public health and safety from exposure to radioactive material released to the public domain as a result of routine operations. The REMP is required by the license and application and supplements the effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation in the environment are in agreement with the values predicted by the radioactive effluent monitoring program and Environmental Report.

COMPETENCY AREA: INSPECTION
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES: References used in SG-HP-6 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the license application. References selected should support the actual inspection effort.

1. Licensee environmental sampling, monitoring, and evaluation program procedures.

2. Licensee procedures for decontamination and decommissioning, if applicable.

EVALUATION CRITERIA: Upon completion of the tasks, you should be able to:

1. Discuss the environmental sampling techniques (water, milk, air iodine, air particulate, vegetation, fish, and soil/sediment) that you inspected.

2. Discuss the radiological environmental conditions in the surroundings of the facility, including any indications of onsite contamination, offsite positive results, and groundwater conditions.

3. Discuss the different measuring techniques (proportional

counter, gamma spectroscopy, liquid scintillation counter, and TLD reader) that you inspected. Compare and contrast the methods.

4. Discuss data reduction techniques used by the licensee, including MDA and LLD.

5. Discuss the Laboratory's QA Policy and QC implementation, including inter-laboratory and intra-laboratory comparisons.

6. Discuss the Meteorological Monitoring Program, including calibration methodology for wind direction, wind speed, and delta temperature.

7. Discuss the licensee's determination of the characteristics of atmospheric dispersion; χ/Q, D/Q, and annual average data.

NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you may have should be brought to the attention of the inspector.

TASKS:

1. Review and become familiar with the documents listed in the reference list.

2. Review the REMP section from the license application.

3. Review the radiological measurement instrument data (proportional counter, gamma spectroscopy, liquid scintillation counter, and TLD reader).

4. Review the counting statistics used by the licensee, including MDA and LLD.

5. Review and evaluate the radiological analytical methodology for isotopic uranium, total uranium, plutonium, technetium-99, ambient radiation (using TLD), and gross alpha and beta. Compare the licensee's techniques to standard analytical techniques.

6. Review and evaluate the meteorological monitoring requirements and evaluate the adequacy of the calibration results for wind direction, wind speed, and delta temperature.

7. Conduct walk downs of selected REMP sampling stations such as the meteorological monitoring tower, air sampling location,

stream sampler location. If possible, accompany a technician during sample acquisition.

8. Review the man-made and natural radiation exposure pathways (licensed materials and the source of the natural background radiation). Evaluate how the licensee takes these into consideration when analyzing its samples.

9. Review corrective action reports in the area of radiological environmental monitoring and radioactive material controls to identify problems in this area and understand the licensee's corrective action process.

10. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics inspector to discuss any questions you may have as a result of these activities and to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-6

Fuel Facility Health Physics Inspector On-the-Job Training

TOPIC: (OJT-HP-7) Radioactive Airborne and Liquid Effluent Treatment and Monitoring Systems

PURPOSE: The purpose of this OJT is to provide you tasks and information that will familiarize you with the liquid and airborne effluent inspection requirements contained in IP 88035, "Radioactive Waste Management," to allow you to independently conduct inspections in this area. Inspections are to determine whether radiation dose to the public is to be below the 10 CFR Part 20 and 40 CFR Part 190 limits, where applicable.

COMPETENCY AREA: INSPECTION
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 90 hours

REFERENCES: References used in SG-HP-7 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the license application. References selected should support the actual inspection effort.

1. Licensee liquid and airborne control and processing procedures.

EVALUATION CRITERIA: Upon completion of the tasks, you should be able to:

1. Discuss the conformance of the facility's liquid radioactive and airborne effluent processing systems, and their operation, with that described in the license application.

2. Discuss your review of recent changes to radioactive waste processing systems and if the changes were in accordance with 10 CFR Part 50.59. Discuss the licensee's estimates of doses to members of the public for these changes.

3. Discuss the effluent sampling techniques (water, air iodine, and air particulate) that you inspected. Compare and contrast the capabilities and limitations of each method.

4. Discuss the different measuring techniques (proportional counter, gamma spectroscopy, and liquid scintillation counter) that you inspected and compare and contrast their capabilities and limitations.

5. Discuss data reduction techniques, including MDA and LLD. Verify licensee MDA and LLD calculations for each release pathway.

6. Discuss the radioactive liquid treatment, monitoring, and sampling systems and the effluent release pathways, and compare them to those in the license application.

7. Discuss the radioactive airborne effluent treatment, monitoring, and sampling systems, and compare them to those in the license application. Discuss the air cleaning systems and their functions (e.g., HEPA filters, scrubbers).

NOTE: The following tasks are to be performed concurrent with an inspection at an operational fuel facility under the direction of a qualified inspector. Any unexpected findings or questions that you may have should be brought to the attention of the inspector.

TASKS:

1. Review and become familiar with the documents listed in the reference list.

2. Locate a copy of the air cleaning system section from the license application. Conduct walk downs of as much of the facility as possible. Compare your observations with descriptions in the license application.

3. Identify the various sources of liquid and gaseous radwaste, waste streams, and technologies associated with liquid and gaseous radwaste processing for the facility. Compare your observations with descriptions in the license application.

4. Locate a copy of the liquid radwaste section from the license application. Conduct walkdowns (considering ALARA and safety constraints) of as much of the facility's liquid radwaste processing systems as possible. Assess the licensee's conformance of the facility with the license application.

5. Identify the various sources of liquid radioactive waste, waste streams, and technologies associated with liquid radioactive waste processing for the facility.

6. Review and evaluate the public dose calculation made by the licensee.

7. Review and evaluate the results of a recent in-place HEPA test and observe such a test if possible.

8. Review and understand the radioactive liquid release permits.

9. Review and understand the Annual Radioactive Effluent Release Report.

10. Review corrective action reports in the area of radioactive gaseous and liquid effluent and monitoring systems to identify problems in this area and to understand the licensee's corrective action process.

11. Meet with your supervisor, the person designated as a resource or a qualified Fuel Facility Health Physics inspector to discuss any questions you may have as a result of these activities and to demonstrate that you can meet the evaluation criteria for this OJT.

DOCUMENTATION: Fuel Facility Health Physics Inspector Proficiency Level Qualification Signature Card, Item OJT-HP-7

Fuel Facility Health Physics Inspector Technical Proficiency Level Signature Card and Certification

Inspector Name: _____	*Employee Initials / Date*	*Supervisor's Signature / Date*
A. Training Courses		
Health Physics Technology (H-201)		
Transportation of Radioactive Materials (H-308)		
Fire Protection for Fuel Cycle Facilities Self-Study (F-206S)		
Chemical Safety for Fuel Cycle Facilities Course		
OSHA HAZWOPER Course (24 Hours)		
B. Study Guides (SG)		
(SG-HP-1) Code of Federal Regulations (CFRs)		
(SG-HP-2) Licensee Documents for Health Physics Inspectors		
(SG-HP-3) Worker Radiation Protection		
(SG-HP-4) Radioactive Material Transportation		
(SG-HP-5) Solid Radwaste Management and Processing		
(SG-HP-6) Radiological Environmental Monitoring Program (REMP)		
(SG-HP-7) Radioactive Airborne and Liquid Effluent Treatment and Monitoring Systems		
C. On-the-Job Training (OJT) Activities		
(OJT-HP-1) Internal and External Dose Controls		
(OJT-HP-2) Air Sampling Program		
(OJT-HP-3) Bioassay and In-vivo Counting		
(OJT-HP-4) Radioactive Material Transportation		
(OJT-HP-5) Solid Radwaste Management and Processing		
(OJT-HP-6) Radiological Environmental Monitoring Program (REMP)		
(OJT-HP-7) Radioactive Airborne and Liquid Effluent Treatment and Monitoring Systems		

Supervisor's signature indicates successful completion of all required courses and activities listed in this journal and readiness to appear before the Oral Board.

Supervisor's Signature: _____ Date: _____

This signature card and certification must be accompanied by Form 1, Fuel Facility Health Physics Inspector Technical Proficiency Level Equivalency Justification, if applicable.

Copies: Inspector
HR Office
Supervisor

Form 1: Fuel Facility Health Physics Inspector Technical Level Proficiency Justification	
Inspector Name: _____	*Identify equivalent training and experience for which the inspector is to be given credit.*
A. Training Courses	
Health Physics Technology (H-201)	
Transportation of Radioactive Materials (H-308)	
Fire Protection for Fuel Cycle Facilities Self-Study (F-206S)	
Chemical Safety for Fuel Cycle Facilities Course	
OSHA HAZWOPR Course (24 Hours)	
B. Study Guides (SG)	
(SG-HP-1) Code of Federal Regulations (CFRs)	
(SG-HP-2) Licensee Documents for Health Physics Inspectors	
(SG-HP-3) Worker Radiation Protection	
(SG-HP-4) Radioactive Material Transportation	
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(OJT-HP-4) Radioactive Material Transportation	
(OJT-HP-5) Solid Radwaste Management and Processing	
(OJT-HP-6) Radiological Environmental Monitoring Program (REMP)	
(OJT-HP-7) Radioactive Airborne and Liquid Effluent Treatment and Monitoring Systems	

Supervisor's Recommendation: _____ Date: _____

Division Director's Approval: _____ Date: _____

Copies to: Inspector
HR Office
Supervisor

Attachment 1

Revision History for IMC 1247 Appendix C-2

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	02/18/09 CN 09-006	Researched commitments for 4 years and found none. New inspection manual chapter to specify qualification requirements for NRC fuel facility operations, health physics, emergency preparedness, security, material control and accounting, and construction inspectors.	N/A	N/A	ML090400794