MANUAL CHAPTER 1247 APPENDIX C5

FUEL FACILITY MATERIAL CONTROL & ACCOUNTING INSPECTOR TECHNICAL PROFICIENCY TRAINING AND QUALIFICATION JOURNAL

TABLE OF CONTENTS

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 prerequisite.

The courses assigned in this qualification journal are all provided by organizations outside of the NRC, and as such the schedules and offerings are outside of direct NRC control. If the course offerings are not available in time to complete the qualification, coordinate with your supervisor to determine alternative ways to satisfy these requirements.

REQUIRED MATERIAL CONTROL & ACCOUNTING INSPECTOR TRAINING COURSES

Please note: The four required introductory MC&A training courses in IMC 1247 Appendix A must be completed before beginning these courses in Appendix C5.

The following courses are offered through the DOE National Training Center (NTC) in Albuquerque, NM (see www.ntc.doe.gov for information), Los Alamos National Laboratory (LANL), or NMMSS (see https://www.energy.gov/nnsa/nuclear-materials-management-and-safeguards-system-nmmss):

- MCA-130 Statistical Concepts in Nuclear Material Control and Accountability (or equivalent if no offerings) at NTC
- MCA-260 Physical Inventories for MC&A (or equivalent if no offerings) at NTC
- Fundamentals of NDA (LANL)
- NMMSS Training for NRC (NMMSS)

The following course is offered through Los Alamos National Laboratory and should be taken after the MCA-130 course above:

- Statistical Concepts in Nuclear Safeguards (LANL)

REQUIRED POST-QUALIFICATION TRAINING COURSES:

(To be completed within three years of initial qualification)

- F-204S, Uranium Enrichment Processes

- S-118S Introduction to Physical Security Systems Self-Study

REQUIRED REFRESHER TRAINING:

(To be completed every three years)

- (16 Hours) Refresher Technical Training Seminar as approved by supervisor
- OSHA HAZWOPR (24-hour course) or TMS Health and Safety Training Suite as identified in Memorandum dated May 7, 2010, from Catherine Haney to NMSS Branch Chiefs (See ADAMS Accession No. ML100200563 for details of equivalent iLearn training modules).

CONTINUING TRAINING

These classes are suggested for continuing training for inspectors, following completion of qualification and post-qualification training courses. You may also propose alternate courses in additional topic areas to your supervisor.

- S-301 Security Fundamentals Course
- General Fuel Cycle Self-Study Trainings (as assigned by supervisor post -MC&A and security training)

MATERIAL CONTROL & ACCOUNTING INSPECTOR INDIVIDUAL STUDY GUIDES

Material Control & Accounting Inspector Individual Study Guide (SG)

(SG-MCA-1) Code of Federal Regulations

PURPOSE:

The Code of Federal Regulations (CFR) provides that licensees comply with those Parts of the CFR that pertain to the possession, use, storage, disposal, and transportation of radioactive materials. Fuel cycle facilities are required to develop, document, and implement a material control and accounting program commensurate with the scope and extent of licensed activities within the plants. For this reason, it is mandatory that all material control and accounting (MC&A) inspectors gain a general and comprehensive knowledge of the contents of relevant MC&A 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 MC&A regulation requirements.

COMPETENCY AREA: REGULATORY FRAMEWORK

LEVEL OF EFFORT: 30 hours

REFERENCES:

1. 10 CFR Part 2.390 Public inspections, exemptions, requests for withholding
2. 10 CFR Part 70 Domestic Licensing of Special Nuclear Material
3. 10 CFR Part 74 Material Control and Accounting of Special Nuclear Material
4. 10 CFR Part 75 Safeguards on Nuclear Material – Implementation of US/IAEA Agreement

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Identify, recognize, and locate specific MC&A topics presented in the CFR.
2. Discuss and interpret the content of MC&A requirements identified in the CFR.
3. Discuss and interpret the definitions of MC&A terms identified in the CFR.
4. Compare and contrast MC&A requirements for the different facility types/safeguards categories.

TASKS:

1. Review Part 74 Subpart A including definitions.

2. Review Part 74 Subpart B on reporting requirements. Identify the three primary reports licensees must submit and discuss the purpose of each.

3. Review Part 74 Subpart C on the performance objectives and system capabilities for Category III facilities. Identify the differences in the requirements for Category III fuel fabrication facilities and enrichment facilities.

4. Review Part 74 Subpart D on the performance objectives and system capabilities for Category II facilities. Identify the differences in the requirements for Category II facilities and Category III facilities.

5. Review Part 74 Subpart E on the performance objectives and system capabilities for Category I facilities. Identify the differences in the requirements for Category I, Category II, and Category III facilities.

6. Review Part 74 Subpart F on Enforcement.

7. Review 10 CFR 2.390(d) for the requirement on disclosure of MC&A related information.

8. Review Part 70 on domestic licensing of special nuclear material. Identify the sections specific to MC&A.

9. Review Part 75 on implementation of the US/IAEA agreements for the application of safeguards in the United States.

10. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-1

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-2) Fundamental Nuclear Material Control Plans

PURPOSE:

The NRC requires that licensees subject to Subparts C, D, or E of 10 CFR Part 74 develop a Fundamental Nuclear Material Control (FNMC) Plan describing how the performance objectives and system features and capabilities delineated in 10 CFR Part 74 will be met. For this reason, it is vital that MC&A inspectors gain a detailed knowledge of the contents of a licensee's FNMC Plan. This guide will provide MC&A inspectors with the detailed knowledge of the contents of an FNMC Plan, the location of the applicable information and requirements for specific topics, and how to apply the requirements.

COMPETENCY AREAS**:** TECHNICAL AREA EXPERTISE REGULATORY FRAMEWORK

LEVEL OF EFFORT**:** 40 hours

REFERENCES:

1. 10 CFR Part 74 Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. FNMC Plan for a facility or facilities designated by your supervisor or qualified MC&A inspector

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Identify the applicable sections of Part 74 for a facility designated by your supervisor or the person designated as a resource and discuss the required system capabilities for that facility.

2. Identify and discuss the applicable NUREG describing the acceptable FNMC Plan format for the facility designated by your supervisor or qualified MC&A inspector.

3. Discuss the designated facility's MC&A program as described in the FNMC Plan.

4. Discuss how the facility's MC&A program, as specified in the FNMC Plan, meets the requirements specified in the CFR.

5. Draw process/material flow diagrams for the selected facility.

TASKS:

1. For a facility designated by your supervisor or qualified MC&A inspector, identify and review the applicable MC&A regulations in 10 CFR Part 74.

2. Identify and review the appropriate NUREG specifying acceptable FNMC Plan format for the facility designated by your supervisor or qualified MC&A inspector.

3. Review the FNMC Plan for the facility and compare the information in the Plan to the guidance in the applicable NUREG. Identify areas where the Plan deviates from the guidance and discuss with a knowledgeable MC&A staff member. Verify that the selected FNMC Plan is the currently applicable version by comparison to the currently applicable License Amendment. Also review the site-specific MC&A license conditions in the currently applicable License Amendment.

4. Identify each material process conducted at the selected facility including chemical/physical form of SNM input to process, chemical/physical changes to SNM during processing, and chemical/physical form of output from the process. Also identify sources of input materials (receipts) and destination of process outputs (shipments).

5. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-2

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-3) Management Structure

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for a facility MC&A management structure, which includes organization, procedures, and training and qualification. An adequate management structure permits effective functioning of the MC&A system. Documentation, review and approval of procedures eliminate ambiguities about what is to be done and by whom. A training and qualification program can help ensure individuals are adequately prepared to perform their functions correctly with a minimum of errors.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 20 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to MC&A management structure applicable to each of the facility types.

2. Discuss the elements of an effective MC&A organizational structure.

3. Discuss the elements of a procedures system that provides for the adequate review, approval, and use of MC&A procedures.

4. Discuss the elements of an effective MC&A training and qualification program.

5. Discuss any differences in management structure requirements and/or guidance for the different facility types/safeguards categories.

TASKS:

1. Review the requirements for management structure, including organizational structure, procedures, and training and qualification, as specified in 10 CFR Part 74. Identify the differences in management structure requirements for the different facility types/safeguards categories.

2. Review the guidance for implementing an adequate management structure for a Category I facility contained in sections 4.1 and 4.2 of NUREG-1280.

3. Review the guidance for implementing an adequate management structure for a Category III facility contained in chapter 1 of NUREG-1065 and for a Category II facility contained in chapter 3 of NUREG-2159. Compare and contrast the management structure guidance for Category I, II, and III facilities.

4. Review the guidance for implementing an adequate management structure for a Category III enrichment facility contained in chapter 1 of NUREG/CR-5734. Compare and contrast the Category III enrichment facility guidance with the guidance for other Category III facilities.

5. Review, for a particular site, the FNMC Plan section on management structure.

6. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-3

Other Important References Related to this Topic:

- ANSI N15.28, Guide for Qualification and Certification of Safeguards and Security Personnel

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-4) Measurement Systems and Measurement Control

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for a licensee's measurement and measurement control programs. Licensees must maintain a system of measurements to ensure that all quantities of SNM in the accounting records are based on reliable measurements and must control the quality of measurements to satisfy the capabilities required for loss detection, response, and accounting.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 30 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. NUREG/CR-4604, Statistical Methods for Nuclear Material Management
7. TID-26298, Statistical Methods in Nuclear Material Control
8. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to measurement systems and measurement control.

2. Identify the major categories of MC&A measurements. Discuss the specific measurement systems used for each of the measurement categories identified.

3. Discuss the elements of an effective measurement control program.

4. Discuss any differences in measurement systems/measurement control requirements and/or guidance for the different facility types/safeguards categories.

TASKS:

1. Review the requirements for measurement systems and measurement control as specified in 10 CFR Part 74. Identify the differences in requirements for the different facility types/safeguards categories.

2. Read appendix 13B, Measurement Systems, of NUREG/CR-4604. Be prepared to discuss the major categories of MC&A measurements and the specific measurement systems used for each of the measurement categories identified.

   (a) Review the acceptable elements of a measurements program for the following:
   (b) Category I facility, as described in section 4.3 of NUREG 1280.
   (c) Category II facility, as described in chapter 4 of NUREG-2159.
   (d) Category III facility, as described in chapter 2 of NUREG-1065.
   (e) Category III enrichment facility, as described in chapter 2 of NUREG/CR-5734.

3. Review section 15.2.1, Monitoring Measurement Processes Against Standards, of NUREG/CR-4604. Be prepared to discuss the different elements of a measurement control program, including the use of standards, bias estimation, and statistical control charts.

4. Review the acceptable elements of a measurement control program for the following:

   (a) Category I facility, as described in section 4.4 of NUREG-1280.
   (b) Category II facility, as described in chapter 5 of NUREG-2159.
   (c) Category III facility, as described in chapter 3 of NUREG-1065.
   (d) Category III enrichment facility, as described in chapter 3 of NUREG/CR-5734.

5. Review chapter 3, Sources of Uncertainty in Nuclear Materials Control, of TID-26298. Be prepared to discuss random and systematic error estimates.

6. Review, for a particular site, the FNMC Plan section on the measurements and measurement control program.

7. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-4

Other Important References Related to this Topic:

- NUREG/CR-2078, Handbook of Nuclear Safeguards Measurement Methods
- Regulatory Guide 5.4, Standard Analytical Methods for the Measurement of Uranium Tetrafluoride (UF_4) and Uranium Hexafluoride (UF_6)
- Regulatory Guide 5.5, Standard Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets
- Regulatory Guide 5.9, Guidelines for Germanium Spectroscopy Systems for Measurement of Special Nuclear Material
- Regulatory Guide 5.11, Nondestructive Assay of Special Nuclear Material Contained in Scrap and Waste
- Regulatory Guide 5.21, Nondestructive Uranium-235 Enrichment Assay by Gamma Ray Spectrometry
- Regulatory Guide 5.39, General Methods for the Analysis of Uranyl Nitrate Solutions for Assay, Isotopic Distribution, and Impurity Determinations
- Regulatory Guide 5.58, Considerations for Establishing Traceability of Special Nuclear Material Accounting Measurements

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-5) Item Control/Item Monitoring

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for a licensee's item monitoring/item control program. For Category I facilities, the licensee must ensure timely plant-wide detection of the loss of items that total five formula kilograms or more. For all facilities, the licensee must implement item control procedures that protect against unauthorized and unrecorded removal of items, or of material from items, and that enable timely location of items.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 30 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to item monitoring and item control.
2. Discuss the elements of an effective item monitoring program.
3. Discuss the elements of an effective item control program.
4. Discuss any differences in item monitoring/item control requirements and/or guidance for the different facility types/safeguards categories.

TASKS:

1. Review the item monitoring requirements for a Category I facility as specified in 10 CFR 74.55.
2. Review the acceptable elements of an item monitoring program as described in chapter 2 of NUREG-1280.
3. Review, for a particular Category I facility, the FNMC Plan section on the item monitoring program.
4. Review the item control requirements for a Category III facility as specified in 10 CFR 74.31 and 10 CFR 74.33.
5. Review the acceptable elements of an item control program for the following:

   (a) Category III facility, as described in chapter 6 of NUREG-1065.
   (b) Category III enrichment facility, as described in chapter 6 of NUREG/CR-5734.
6. Review, for a particular Category III facility, the FNMC Plan section on the item control program.
7. Review the item control requirements for a Category II facility as specified in 10 CFR 74.43.
8. Review the acceptable elements of an item control program for a Category II facility as described in chapter 8 of NUREG-2159.
9. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-5

Other Important References Related to this Topic:

- Regulatory Guide 5.80, Pressure-Sensitive and Tamper-Indicating Device Seals for Material Control and Accounting of Special Nuclear Material

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-6) Physical Inventory

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for conducting a physical inventory. Periodic physical inventories enable a licensee to adjust accounts to accurately reflect the status of the inventory. For Category I facilities, comparisons of the book inventory to the physical inventory serve as a quality control check on the performance of the material control tests employed for prompt loss detection. For Category II and Category III facilities, annual physical inventories are performed to confirm that a loss or diversion of a significant quantity of SNM has not occurred.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. TID-26298, Statistical Methods in Nuclear Material Control
7. NUREG/BR-0096, Instructions and Guidance for Completing Physical Inventory Summary Reports
8. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to conducting physical inventories.
2. Discuss the measures taken to prepare a facility for a physical inventory.
3. Discuss the steps taken to conduct a physical inventory.
4. Discuss the process of reconciling the book inventory to the physical inventory.
5. Discuss any differences in physical inventory requirements and/or guidance for the different facility types/safeguards categories.

TASKS:

1. Review the physical inventory requirements for a Category I facility as specified in 10 CFR 74.59.
2. Review the acceptable elements for conducting a physical inventory for a Category I facility as described in chapter 4 of NUREG-1280:

   (a) Section 4.5.1, Facility Preparation.
   (b) Section 4.5.2, Inventory Performance.
   (c) Section 4.5.3, Inventory Reconciliation.
   (d) Section 4.4.4, Standard Error of the Inventory Difference Estimator.

3. Review, for a particular Category I facility, the FNMC Plan section on physical inventory.
4. Review the physical inventory requirements for a Category III facility as specified in 10 CFR 74.31, for a Category III enrichment facility as specified in section 74.33, and for a Category II facility as specified in 10 CFR 74.43. What are the differences? What are the similarities?
5. Review the acceptable elements for conducting a physical inventory for a Category III facility as described in NUREG-1065:

   (a) Chapter 5, Physical Inventories.
   (b) Section 4.2, Determination of SEID.
   (c) Section 4.3, Bias Corrections.

6. Review the acceptable elements for conducting a physical inventory for a Category III enrichment facility as described in NUREG/CR-5734:

   (a) Chapter 5, Physical Inventories.
   (b) Section 4.2, Determination of SEID.

7. Review, for a particular Category III facility, the FNMC Plan section on physical inventory.

8. Review the physical inventory requirements for a Category II facility as specified in section 74.43 of the CFR.

9. Review the acceptable elements for a physical inventory program for a Category II facility as described in chapter 7 of NUREG-2159.

10. Review chapters 4, 5, and 6 in TID-26298 for a general discussion of limits of error and calculating the variance of the inventory difference.

11. Review NUREG/BR-0096 for instructions and guidance for completing NRC Form 327. Be prepared to discuss the various items that are reported on the form.

12. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION**:** Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-6

Other Important References Related to this Topic:

- Regulatory Guide 5.88, Physical Inventories and Material Balances at Fuel Cycle Facilities

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-7) Process Monitoring

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for a licensee's process monitoring program. For Category I facilities, licensees must have a quality control program that will provide early indications or diversion or theft and a prompt detection system for significant abrupt diversions of five formula kilograms or more.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 20 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to process monitoring.
2. Discuss the elements of an effective process monitoring program.

TASKS:

1. Review the process monitoring requirements for a Category I facility as specified in 10 CFR 74.53.
2. Review the acceptable elements of a process monitoring program as described in chapter 1 of NUREG-1280:

   (a) Section 1.1.1, Process Subdivision and Measurement Points.
   (b) Section 1.1.2, Material Control Tests.
   (c) Section 1.1.3 and 1.1.4, Location Categorization and Material Substitution.

(d) Section 1.1.5, Exemptions.
(e) Section 1.1.6, Trend Analysis.

3. Review, for a particular Category I facility, the FNMC Plan section on the process monitoring program.

4. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION**:** Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-7

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-8) Detection Program for Enrichment Facilities

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for an enrichment facility's program to protect against and detect unauthorized production of enriched uranium.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 20 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
3. FNMC Plan for an enrichment facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to precluding and detecting unauthorized production of enriched uranium.
2. Discuss the elements of an effective detection program.

TASKS:

1. Review the detection program requirements for an enrichment facility as specified in 10 CFR 74.33.
2. Review the guidance for an acceptable detection program as described in chapter 9 of NUREG/CR-5734:

   (a) Section 9.1, Organization.

(b) Section 9.2, General Description of Program.
(c) Section 9.3, Data, Information, and Activities to be Monitored.
(d) Section 9.4, Reporting and Documentation Requirements.

3. Review, for a particular enrichment facility, the FNMC Plan section on the detection program.

4. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-8

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-9) Resolution Program

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for resolving an indicator of potential loss of nuclear material. For Category I facilities, the resolution program must be able to respond promptly to process and item monitoring alarms and determine whether the alarm was caused by an actual loss or by a system error. For all facilities, the licensee must investigate and resolve indicators of potential loss including significant shipper-receiver differences (SRDs), excessive inventory differences (IDs), and item control discrepancies. For enrichment facilities, indicators of unauthorized production must also be investigated and resolved.

COMPETENCY AREA**:** TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 30 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. NUREG/CR-4108, Development of MC&A Alarm Resolution Procedures
7. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to resolution of process monitoring and item monitoring alarms for Category I facilities.

2. Discuss the requirements for resolving potential indicators of missing material including: significant SRDs, excessive IDs, item control discrepancies, and evidence of unauthorized production.

3. Discuss the guidance for resolving process monitoring and item monitoring alarms for Category I facilities.

4. Discuss the guidance for resolving potential indicators of missing material including: significant SRDs, excessive IDs, item control discrepancies, and evidence of unauthorized production.

5. Discuss any differences in resolution program requirements and/or guidance for the different facility types/safeguards categories.

TASKS:

1. Review the alarm resolution requirements for a Category I facility as specified in 10 CFR 74.57.

2. Review the requirements for resolution of excessive IDs and significant SRDs for Category I facilities as specified in 10 CFR 74.59(f) and (h).

3. Review the guidance for development of MC&A alarm resolution procedures in NUREG/CR-4108.

4. Review the acceptable elements for resolving alarm indicators for a Category I facility as described in chapter 3 of NUREG-1280.

5. Review the acceptable elements for resolving excessive IDs and significant SRDs for a Category I facility as described in chapter 4 of NUREG-1280:

   (a) Section 4.5.3, Inventory Reconciliation.
   (b) Section 4.7.2, Shipper-Receiver Differences.

6. Review, for a particular Category I facility, the FNMC Plan sections on alarm resolution, resolving excessive IDs and resolving significant SRDs.

7. Review the requirements for resolving excessive IDs and significant SRDs for a Category III facility as specified in 10 CFR 74.31.

8. Review the guidance for resolving excessive IDs, significant SRDs, and item control discrepancies for a Category III facility as described in NUREG-1065:

   (a) Section 5.6, Inventory Difference Limits and Response Actions.
   (b) Chapter 7, Shipper-Receiver Comparisons.
   (c) Section 6.6, Investigation and Resolution of Item Discrepancies.
   (d) Chapter 9, Resolving Indications of Missing Uranium.

9. Review, for a particular Category III facility, the FNMC Plan sections on resolving excessive IDs, significant SRDs, and item control discrepancies.

10. Review the requirements for resolving excessive IDs and significant SRDs for a Category II facility as specified in 10 CFR 74.43.

11. Review the guidance for resolving excessive IDs, significant SRDs, and item control discrepancies for a Category II facility as described in NUREG-2159:

    (a) Section 7.6, Inventory Reconciliation, Inventory Difference Limits and Response Actions.
    (b) Chapter 9, Shipper-Receiver Comparisons.
    (c) Section 8.6, Investigation and Resolution of Item Discrepancies.
    (d) Chapter 12, Resolving Indications of Loss, Theft, Diversion, or Misuse of Special Nuclear Material.

12. Review, for a particular Category II facility, the FNMC Plan sections on resolving excessive IDs, significant SRDs, and item control discrepancies.

13. Review the requirements for resolving excessive IDs, significant SRDs, and indications of unauthorized production for a Category III enrichment facility as specified in 10 CFR 74.33.

14. Review the guidance for resolving excessive IDs, significant SRDs, item control discrepancies, and indicators of unauthorized production for a Category III enrichment facility as described in NUREG/CR-5734:

    (a) Section 5.6, Inventory Difference Limits and Response Actions.
    (b) Chapter 7, Shipper-Receiver Comparisons.
    (c) Section 6.7, Investigation and Resolution of Item Discrepancies.
    (d) Chapter 10, Resolving Indications of Missing Uranium and of Unauthorized Production of Enriched Uranium.

15. Review, for a particular Category III enrichment facility, the FNMC Plan sections on resolving excessive IDs, significant SRDs, item control discrepancies, and indicators of unauthorized production.

16. Compare the resolution program requirements for the different facility types/safeguards categories.

17. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-9

Other Important References Related to this Topic:

- Regulatory Guide 5.41, Shipping, Receiving, and Internal Transfer of Special Nuclear Material at Fuel Cycle Facilities

Material Control & Accounting Inspector Individual Study Guide

(SG-MCA-10) Recordkeeping and Independent Assessments

PURPOSE:

The purpose of this guide is to familiarize you with the requirements and guidance for a facility's recordkeeping system and for performance of independent assessments of the MC&A program. The licensee must have an auditable records system that contains sufficient information to facilitate further review, audits, and inspections to demonstrate that all FNMC Plan commitments have been met. An independent assessment of the MC&A program enables the licensee to evaluate the overall effectiveness of the MC&A program relative to the performance objectives and system capabilities specified in the regulations.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 20 hours

REFERENCES:

1. 10 CFR Part 74, Material Control and Accounting of Special Nuclear Material
2. NUREG-1280, Rev. 1, Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment
3. NUREG-2159, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance
4. NUREG-1065, Rev. 2, Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required For Low-Enriched Uranium Facilities
5. NUREG/CR-5734, Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities
6. NUREG/BR-0006, Instructions for Completing Nuclear Material Transaction Reports
7. NUREG/BR-0007, Instructions for the Preparation and Distribution of Material Status Reports
8. FNMC Plan for a facility designated by your supervisor or a qualified MC&A inspector

Note: This SG must be completed prior to performing the corresponding On-the-Job Training at a licensee site.

EVALUATION CRITERIA:

At the completion of this guide, you should be able to:

1. Discuss the requirements pertaining to recordkeeping and performance of independent assessments.

2. Discuss the requirements for preparing and distributing Nuclear Material Transaction Reports and Material Status Reports.

3. Discuss the elements of an effective MC&A recordkeeping system.

4. Discuss the elements of an effective independent assessment of a licensee's MC&A program.

TASKS:

1. Review the recordkeeping requirements for the different facility types/safeguards categories as specified in 10 CFR Part 74. Identify any differences in recordkeeping requirements for the different facility types/safeguards categories.

2. Review the guidance for implementing an adequate recordkeeping system for the following:

   (a) Category I facility, contained in section 4.6 of NUREG-1280.
   (b) Category II facility, contained in chapter 14 of NUREG-2159.
   (c) Category III facility, contained in chapter 11 of NUREG-1065.
   (d) Category III enrichment facility, contained in chapter 12 of NUREG/CR-5734.

3. Review the requirements for conducting an independent assessment of the MC&A program for the different facility types/safeguards categories as specified in 10 CFR Part 74. Identify any differences in the requirements for conducting the assessment for the different facility types/safeguards categories.

4. Review the guidance for conducting an independent assessment of the MC&A program for the following:

   (a) Category I facility, contained in section 4.10 of NUREG-1280.
   (b) Category II facility, contained in chapter 10 of NUREG-2159.
   (c) Category III facility, contained in chapter 8 of NUREG-1065.
   (d) Category III enrichment facility, contained in chapter 8 of NUREG/CR-5734.

5. Review the requirements for preparing and distributing Material Status Reports and Nuclear Material Transaction Reports as specified in 10 CFR 74.13 and 74.15.

6. Review the guidance for preparing and distributing Material Status Reports and Nuclear Material Transaction Reports.

7. Meet with your supervisor or the person designated as a resource to discuss any questions you may have as a result of this activity and to discuss the items listed in the Evaluation Criteria section.

DOCUMENTATION**:** Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item SG-MCA-10

Other Important References Related to this Topic:

- Regulatory Guide 5.51, Management Review of Nuclear Material Control and Accounting Systems

MATERIAL CONTROL & ACCOUNTING INSPECTOR ON-THE-JOB TRAINING ACTIVITIES

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-1) Management Structure

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the area of management structure.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 16 hours

Note: Successful completion of SG-MCA-3 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-3 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. Inspection Procedure (IP) 85303, MC&A Management Structure and Personnel Training and Qualification (Cat I)
2. IP 85203, Management Structure and Control (Cat II)
3. IP 85401, Management Structure (Cat III)
4. Licensee organizational charts, training modules, and MC&A procedures
5. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. Discuss the licensee's management structure and how it ensures effective functioning of the MC&A system.
2. Discuss the licensee's MC&A training and qualification program for general employees, personnel performing MC&A activities in the field, and personnel within the MC&A organization.
3. Describe the process for developing and reviewing critical MC&A procedures.
4. Describe the process for ensuring the licensee's procedures and FNMC Plan are consistent.

TASKS:

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 qualified inspector.

1. Prior to the site visit, review the applicable inspection procedure, specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. Review the licensee's organizational charts and compare them to the description in the FNMC plan. Discuss with the licensee the site's management structure and how it ensures effective functioning of the MC&A system through:

   (a) Clear overall responsibility for MC&A functions.
   (b) MC&A management independent of production.
   (c) Separation of key MC&A responsibilities.

3. Review, and discuss with the licensee, MC&A training and qualification for the following groups:

   (a) General employees.
   (b) MC&A custodians.
   (c) Personnel performing MC&A measurements and other activities.
   (d) Staff in the MC&A organization.

4. Review training modules/course materials for a sample of the MC&A training activities conducted at the site.

5. Review documentation of training/qualification for a sample of employees who perform MC&A activities.

6. Discuss with the licensee the process for developing and reviewing MC&A procedures.

7. Select two licensee MC&A procedures and compare the procedural requirements with the requirements in the FNMC Plan.

8. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-1

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-2) Measurement Systems and Measurement Control

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the area of measurement systems and measurement control.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 24 hours

Note: Successful completion of SG-MCA-4 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-4 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85309, Measurement Systems and Control (Cat I)
2. IP 85207, Measurement Systems (Cat II)
3. IP 85209, Measurement Control and Statistics (Cat II)
4. IP 85402, Measurement Program (Cat III)
5. IP 85403, Measurement Control Program (Cat III)
6. Licensee measurement control procedures
7. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. Identify the licensee's key SNM measurement points and measurement systems.
2. Discuss the licensee's MC&A measurement control program.
3. Discuss the use of control standards.
4. Discuss the calibration of measurement systems.

5. Describe how the licensee ensures its measurement systems are in statistical control.

6. Discuss the licensee's methods for estimating random and systematic error variances.

TASKS:

> 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 qualified inspector.

1. Prior to the site visit, review the applicable inspection procedure(s), specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. Review the licensee's material flows and measurement systems for those flows, as described in the FNMC Plan. Discuss the material flows and measurement systems with the licensee. Tour the plant and laboratory areas and observe the MC&A measurement systems. Observe as many systems as possible, given the time available. Include weighing, volume, sampling, analytical, and NDA systems.

3. Review the licensee's measurement control program, as described in the FNMC Plan.

4. Discuss the organization and management of the measurement control program including:

   (a) Position of measurement control coordinator.
   (b) Use of measurement control procedures.
   (c) Training and qualification of measurement personnel.

5. Discuss with the licensee the use of control standards, including certification, traceability, and storage of standards.

6. Discuss the licensee's calibration program for MC&A measurement systems. Select two measurement systems for review of calibration and control standards usage. Verify the systems have been calibrated according to procedure, and that the control standards used in the calibration are traceable to national measurement standards. If possible, observe measurements being conducted on the measurement systems.

7. Review recent control charts (or control data) for two measurement systems. Determine if the measurement systems are in control. Verify that out-of-control measurements were investigated according to the FNMC Plan and the applicable procedure.

8. Review the estimation of random and systematic error variances as described in the licensee's FNMC Plan and procedures. Select two measurement systems for review of the variance estimates. Determine if the variance estimates for the systems

selected have been calculated in accordance with the FNMC Plan and the applicable procedure.

9. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-2

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-3) Item Control/Item Monitoring

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the areas of item monitoring and item control.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 24 hours

Note: Successful completion of SG-MCA-5 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-5 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85305, Item Monitoring (Cat I)
2. IP 85205, Item Control Program (Cat II)
3. IP 85405, Item Control Program (Cat III)
4. Licensee item monitoring or item control procedure(s)
5. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. For Category I facilities, discuss how the licensee ensures timely plant-wide detection of the loss of items that total five formula kilograms or more.
2. For Category I facilities, calculate the sample size needed for an item monitoring test for a population of items with a specified power of detection and goal quantity.
3. For Category II and III facilities, discuss how the licensee's item control program protects against unauthorized and unrecorded removal of items, or removal of material from items, and enables timely location of items.
4. Discuss the elements of an effective tamper-safing program.

TASKS:

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 qualified inspector.

1. Prior to the site visit, review the applicable inspection procedure, specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. For a Category I facility, review the licensee's item monitoring program as described in the FNMC plan and the item monitoring procedure(s).

   (a) Discuss with the licensee how items are categorized (1A or 1B) for proper item monitoring testing and how the item inventory is stratified.
   (b) Review the method used for determining the sample size for item monitoring tests.
   (c) Review a sample of records from the most recent item monitoring tests. Verify the sample size used for at least two of the strata. Determine if the tests had been conducted at the proper frequency and that discrepancies were handled in accordance with the FNMC Plan and item monitoring procedure(s).
   (d) Discuss with the licensee how inventory is maintained within vaults and controlled access areas.
   (e) Observe licensee staff conduct an item monitoring test if one is being conducted during the inspection week.

3. For Category II and III facilities, review the licensee's item control program as described in the FNMC plan and the item control procedure(s).

   (a) Discuss with the licensee how current knowledge of items is maintained.
   (b) Review the method used for determining the sample size for any item monitoring activities that are conducted.
   (c) Review a sample of records from the most recent item monitoring activities. Verify the sample size used for at least two of the strata. Determine if the activities had been conducted at the frequencies specified in the FNMC Plan and that discrepancies were handled in accordance with the Plan and item control procedure(s).
   (d) Observe licensee staff conduct item monitoring activities if any are being conducted during the inspection week.

4. Discuss the licensee's tamper-safing program including:

   (a) Individual(s) responsible for tamper-indicating devices (TIDs).
   (b) Issuance and storage of TIDs.
   (c) Training of personnel who apply TIDs.

5. Select a sample of 30 items from the licensee's inventory and examine the items to confirm that they are in their proper locations and that they are properly identified (including TID number and net weight). While performing the activity, select 10 adjacent items in their storage locations, note the items' identity, TID number (if

applicable), and net weight. Verify the information for the adjacent items in the licensee's database.

6. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-3

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-4) Physical Inventory

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the area of physical inventory.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISEINSPECTION

LEVEL OF EFFORT: 24 hours

Note: Successful completion of SG-MCA-6 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-6 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85311, Physical Inventory (Cat I)
2. IP 85211, Physical Inventory (Cat II)
3. IP 85404, Physical Inventory (Cat III)
4. IP 85501, Inventory Program (Cat III Enrichment)
5. Licensee physical inventory procedures
6. Licensee FNMC Plan and MC&A-related license conditions
7. MC&A Statistical Methods (ML081920190) and associated spreadsheets (ML081920171)

EVALUATION CRITERIA:

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

1. Discuss measures taken by the licensee to prepare for a physical inventory.
2. Discuss how the licensee conducts the physical inventory, and how it ensures that all quantities of nuclear material have been located and identified.
3. Discuss the licensee's inventory reconciliation process.

4. Discuss the calculation of the SEID, bias correction to the ID, and any prior period adjustments.

5. Identify the elements required for completion of NRC Form 327.

TASKS:

> 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 qualified inspector.

1. Prior to the site visit, review the applicable inspection procedure, specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. Review the licensee's physical inventory process, as described in the FNMC Plan and physical inventory procedures.

3. Review the licensee's procedure for inventory preparation. Discuss with the licensee inventory preparation including:

   (a) Cutoff procedures for processing, transfers, etc.
   (b) Training of and instructions for personnel performing the physical inventory.
   (c) Pre-inventories/walk-downs of areas.
   (d) Tamper-safing of containers whose content will be accepted for inventory.

4. Review the licensee's procedure for conducting the physical inventory. Discuss conduct of the physical inventory with the individual who has overall responsibility for the inventory including:

   (a) Methods used to ensure all material is inventoried and none is counted more than once.
   (b) Methods used to ensure all items recorded during inventory have element and isotope quantities based on measurements.
   (c) Verification of tamper-safed items.

5. Review the licensee's procedure for inventory reconciliation. Discuss with the licensee how the licensee ensures that nuclear material has been accounted for and that the facility's records reflect the results of the physical inventory.

6. If a physical inventory is being conducted during the week of the inspection, observe conduct of part of the physical inventory. If the inventory is not being conducted during the inspection, walk-down one area with licensee staff who conducted the most recent inventory in that area.

7. Review the licensee's procedure for calculation of the SEID. Discuss, with the individual responsible, calculation of the SEID for the most recent inventory. Determine the significant contributors to the SEID. Select two of the significant

contributors for a more thorough review of their contribution to the SEID. Verify that the calculations were conducted in accordance with the SEID procedure.

8. Review the licensee's method for applying a bias correction to the ID. Verify that the bias correction was conducted according to procedure for the most recent inventory.

9. Review the licensee's method for calculating prior period adjustments (PPAs). Review the calculation of a PPA from the most recent inventory. Verify that the PPA was calculated in accordance with procedure. Verify that the licensee adjusted all past NRC Form 327s that were affected by the PPA calculated during the current period.

10. Review the most recently completed NRC Form 327. Verify that the items reported on the form were calculated according to the instructions in NUREG/BR-0096 and the licensee's FNMC Plan.

11. Review NRC Form 327s from previous inventory periods and identify any unusual differences in SEID, bias corrections to the ID, and PPAs, as compared with the current inventory period. Discuss these differences with the licensee.

12. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-4

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-5) Process Monitoring

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the area of process monitoring.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 24 hours

Note: Successful completion of SG-MCA-7 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-7 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85307, Process Monitoring
2. Licensee process monitoring procedure(s)
3. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. Discuss how the licensee ensures timely plant-wide detection of the loss of material that totals five formula kilograms or more.
2. Verify alarm threshold and quality control limit calculations for a process monitoring unit.
3. Discuss the elements of an effective process monitoring program.

TASKS:

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 qualified inspector.

1. Prior to the site visit, review IP 85307, specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. Review the licensee's process monitoring program as described in the FNMC plan and process monitoring procedures.

3. Discuss with the licensee how it verifies that all SSNM in the processing areas of the plant has been included in a process monitoring test except for those materials identified in 10 CFR 74.53(a). Review with the licensee the exceptions.

   (a) Discuss how the licensee ensures that items in the processing areas that are excluded from the item monitoring tests, but are subject to 10 CFR 74.55, are in fact monitored.
   (b) Discuss the other exceptions including scrap, low throughput operations, and research and development operations.
   (c) Discuss with the licensee other materials that may be used for substitution in the process areas.

4. Select, with the help of a qualified inspector, two process units for further review. For each unit selected:

   (a) Review the applicable process monitoring procedure.
   (b) Review input/output differences (IODs) experience since the last inspection.
   (c) Review documentation for the two most recent process monitoring tests.
   (d) Verify calculation of the IOD for the two most recent tests.
   (e) Verify that the alarm threshold has been calculated according to the FNMC Plan and procedure.
   (f) Verify that the three sigma quality control limits have been calculated according to the FNMC Plan and procedure.
   (g) Review how the licensee monitors trends in the IODs.
   (h) Review response actions to any tests that have exceeded limits and verify that the response actions have been conducted according to procedure.

5. Review IOD history for the other process units since the last inspection. Identify any alarm indications and responses. Verify that the responses have been conducted according to procedure.

6. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-5

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-6) Detection Program for Enrichment Facilities

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the area of protection against and detection of unauthorized production of enriched uranium at enrichment facilities.

COMPETENCY AREAS**:** TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 24 hours

Note: Successful completion of SG-MCA-8 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-8 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85502, Detection Program
2. Licensee detection program procedure(s)
3. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. Describe the licensee's detection program plans and procedures, and the organizational structure that supports it.
2. Describe credible unauthorized production and unauthorized enrichment scenarios.
3. Discuss the types of safeguards controls, process data reviews, and process monitoring activities that are implemented in a detection program.

TASKS:

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 qualified inspector.

1. Prior to the site visit, review IP 85502, specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. Review the licensee's program for detection of unauthorized production of enriched uranium as described in the FNMC Plan, site procedures, and other detection program documents.

3. Review and discuss with the licensee the detection program structure, including plans and procedures used in the program, and the responsibilities of the various facility organizations in implementing the program.

4. Discuss the material flows and process configuration, including locations of, and mechanisms for, feeding, withdrawing, and sampling.

5. Review with the licensee credible scenarios for unauthorized production and unauthorized enrichment.

6. Discuss implementation of detection program activities and documentation.

7. Review a sample of the detection program activity documentation.

8. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-6

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-7) Resolution Program

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the area of alarm resolution and resolution of indicators of loss of nuclear material.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 16 hours

Note: Successful completion of SG-MCA-9 is a prerequisite to this activity.

REFERENCES**:**

All the references used in SG-MCA-9 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85313, Alarm Resolution (Cat I)
2. IP 852XX, Resolution Program (Cat II)
3. IP 85406, Resolution Program (Cat III)
4. IP 85503, Resolution Program (Cat III Enrichment)
5. Licensee resolution program procedures
6. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. For a Category I facility, discuss the licensee's program for resolving process monitoring and item monitoring alarms.
2. Discuss the licensee's methods for resolving significant SRDs.
3. Discuss methods used for resolving excessive inventory differences.
4. Discuss methods used to resolve item loss indicators.
5. Describe how an enrichment facility resolves indicators of unauthorized production of enriched uranium.

TASKS:

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 qualified inspector.

1. Prior to the site visit, review the applicable inspection procedure, specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. For a Category I facility, review the licensee's alarm resolution program, as described in the FNMC Plan and procedure.

3. For a Category I facility, discuss with the licensee any item monitoring or process monitoring alarms that have occurred since the last inspection. Review the response actions for the alarms including:

   (a) Assigned cause.
   (b) Documentation of investigation.
   (c) Was the response timely?
   (d) Reportable to NRC?

4. Review the licensee's program for resolving significant SRDs, as described in the FNMC Plan and procedure.

5. Review the NMMSS report on shipper-receiver difference analysis (TJ-8B). Determine whether the listed significant SRDs were resolved according to the FNMC Plan and procedure.

6. Discuss the licensee's SRD experience since the last inspection and identify any significant SRDs. Verify that the licensee responded to the significant SRDs according to the FNMC Plan and procedure.

7. Select recent receipts of two different material types (e.g., UF_6 cylinders and powder) reported on Form 741 and verify the limit of error calculation for the receiver and the combined limit of error calculation.

8. Review the licensee's program for resolving excessive IDs, as described in the FNMC Plan and procedure.

9. Review the licensee's inventory differences from the most recent inventory. Identify any IDs that exceeded limits. Verify that the licensee responded to the excessive IDs according to the FNMC Plan and procedure.

10. Review the licensee's program for resolving item discrepancies, as described in the FNMC Plan and procedure.

11. Discuss any item discrepancies that occurred since the last inspection. Verify that the licensee responded to the discrepancies according to the FNMC Plan and procedure.

12. For an enrichment facility, review the licensee's program for resolving indicators of unauthorized production, as described in the FNMC Plan and procedure.

13. Discuss with the licensee the indicators that have occurred since the last inspection. Verify that the licensee responded to the indicators according to the FNMC Plan and procedure.

14. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-7

Material Control & Accounting Inspector On-the-Job Training

(OJT-MCA-8) Recordkeeping and Independent Assessments

PURPOSE:

The purpose of this activity is to familiarize you with inspection activities associated with the areas of recordkeeping and independent assessments.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE INSPECTION

LEVEL OF EFFORT: 16 hours

Note: Successful completion of SG-MCA-10 is a prerequisite to this activity.

REFERENCES:

All the references used in SG-MCA-10 are appropriate for this module. Most of the efforts in this OJT will rely on licensee procedures and the site's FNMC Plan. References selected should support the actual inspection effort.

1. IP 85407, Assessment Program
2. IP 85408, Recordkeeping
3. Licensee recordkeeping and assessment program procedures
4. Licensee FNMC Plan and MC&A-related license conditions

EVALUATION CRITERIA:

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

1. Discuss how the licensee's recordkeeping system ensures establishment of auditable records sufficient to demonstrate that requirements have been met and that the records have been maintained for the required time periods.
2. Discuss the licensee's program for independently assessing the effectiveness of the MC&A system.

TASKS:

> 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 qualified inspector.

1. Prior to the site visit, review the applicable inspection procedure(s), specific guidance in "MC&A Inspection Procedures" (ML081920186), previous inspection reports, FNMC Plan, and MC&A-related license conditions.

2. Review the licensee's recordkeeping system as described in the FNMC Plan and recordkeeping procedure(s). Discuss the recordkeeping system with the licensee.

3. Review a sample of records. This task may have been covered while verifying records for other inspection activities. Check the records for:

   (a) Proper retention period.
   (b) Accuracy of information.
   (c) Proper authorizations.

4. Review the licensee's assessment program as described in the FNMC Plan and procedure. Discuss the assessment program with the licensee including:

   (a) Independence of assessment team.
   (b) Scope of assessment.
   (c) Response to assessment findings.

5. Review the most recent assessment. Determine if all areas of MC&A were covered as specified in the FNMC Plan. Determine if the assessment was conducted in a timely manner and whether the licensee adequately responded to the assessment findings.

6. Review a sample of Nuclear Material Transaction Reports (741s) for recent shipments and/or receipts. Some 741s may have been reviewed as part of the resolution of SRDs, covered in OJT-MCA-7. Verify that the records were completed in accordance with NUREG/BR-0006. If possible, observe licensee staff generate 741 documents.

7. Meet with your supervisor or the person designated as a resource 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: Material Control & Accounting Inspector Technical Proficiency Level Signature Card Item OJT-MCA-8

MATERIAL CONTROL & ACCOUNTING INSPECTOR TECHNICAL PROFICIENCY LEVEL SIGNATURE CARD AND CERTIFICATION

Inspector Name _____	Employee Initials / Date	Supervisor's Signature / Date
Training Courses		
Completion of the four required introductory MC&A training courses in IMC 1247 Appendix A or equivalent if no offerings		
Statistical Concepts in Nuclear Material Control and Accountability (MCA-130) or equivalent if no offerings		
Physical Inventories for MC&A (MCA-260) or equivalent if no offerings		
Fundamentals of NDA Assay (LANL)		
NMMSS Training for NRC		
Statistical Concepts in Nuclear Safeguards (LANL) or equivalent if no offerings		
Individual Study Guides (SG)		
(SG-MCA-1) Code of Federal Regulations (CFRs)		
(SG-MCA-2) Fundamental Nuclear Material Control Plans		
(SG-MCA-3) Management Structure		
(SG-MCA-4) Measurement Systems and Measurement Control		
(SG-MCA-5) Item Monitoring/Item Control		
(SG-MCA-6) Physical Inventory		
(SG-MCA-7) Process Monitoring		
(SG-MCA-8) Detection Program for Enrichment Facilities		
(SG-MCA-9) Resolution Program		
(SG-MCA-10) Recordkeeping and Independent Assessments		
On-the-Job Training (OJT) Activities		
(OJT-MCA-1) Management Structure		
(OJT-MCA-2) Measurement Systems and Measurement Control		
(OJT-MCA-3) Item Monitoring/Item Control		
(OJT-MCA-4) Physical Inventory		
(OJT-MCA-5) Process Monitoring		

(OJT-MCA-6) Detection Program for Enrichment Facilities		
(OJT-MCA-7) Resolution Program		
(OJT-MCA-8) Recordkeeping and Independent Assessments		

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, MC&A Inspector Technical Proficiency Level Equivalency Justification, if applicable.

Copies: Inspector
HR Office
Supervisor

FORM 1: MC&A INSPECTOR TECHNICAL PROFICIENCY LEVEL EQUIVALENCY JUSTIFICATION	
Inspector Name _____	Identify equivalent training and experience for which the inspector is to be given credit.
Training Courses	
Completion of the four required introductory MC&A training courses in IMC 1247 Appendix A or equivalent if no offerings	
Statistical Concepts in Nuclear Material Control and Accountability (MCA-130) or equivalent if no offerings	
Physical Inventories for MC&A (MCA-260) or equivalent if no offerings	
Fundamentals of NDA Assay (LANL) or equivalent if no offerings	
NMMSS Training for NRC	
Statistical Concepts in Nuclear Safeguards (LANL) or equivalent if no offerings	
Individual Study Guides (SG)	
(SG-MCA-1) Code of Federal Regulations (CFRs)	
(SG-MCA-2) Fundamental Nuclear Material Control Plans	
(SG-MCA-3) Management Structure	
(SG-MCA-4) Measurement Systems and Measurement Control	
(SG-MCA-5) Item Monitoring/Item Control	
(SG-MCA-6) Physical Inventory	

(SG-MCA-7) Process Monitoring	
(SG-MCA-8) Detection Program for Enrichment Facilities	
(SG-MCA-9) Resolution Program	
(SG-MCA-10) Recordkeeping and Independent Assessments	
On-the-Job Training (OJT) Activities	
(OJT-MCA-1) Management Structure	
(OJT-MCA-2) Measurement Systems and Measurement Control	
(OJT-MCA-3) Item Monitoring/Item Control	
(OJT-MCA-4) Physical Inventory	
(OJT-MCA-5) Process Monitoring	
(OJT-MCA-6) Detection Program for Enrichment Facilities	
(OJT-MCA-7) Resolution Program	
(OJT-MCA-8) Recordkeeping and Independent Assessments	

Supervisor's Recommendation: Signature / Date: _____

Division Director's Approval: Signature / Date: _____

Copies to: Inspector
HR Office
Supervisor

Attachment 1: Revision History for IMC 1247 Appendix C5

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback 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	ML090400911
N/A	ML13217A222 06/11/14 CN 14-012	This document has been revised to update required, refresher and post qualification training requirements. Some of the trainings are no longer available. 16 hours of Refresher Technical Training Seminar, S-101 and S-301 has been added as a Refresher training requirement.	None	ML14084A482
N/A	ML22242A184 11/07/22 CN 22-024	This document has been revised to update training and add references for Category II fuel facilities.	N/A	N/A