

DOCKET NO: 70-3098

LICENSEE: CB&I AREVA MOX Services, LLC  
Aiken, South Carolina

SUBJECT: SAFEGUARDS EVALUATION REPORT: SUBMITTAL DATED JANUARY 29, 2015, CB&I AREVA MOX SERVICES FUNDAMENTAL NUCLEAR MATERIAL CONTROL PLAN REVISION

## **1.0 BACKGROUND**

By cover letter dated January 29, 2015, CB&I AREVA Mixed Oxide Services, LLC (MOX Services) submitted a rewrite of the Fundamental Nuclear Material Control Plan (FNMCP). The licensee submitted the January 2015 revision in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70.34, requesting the NRC approval of the January 2015 revision of the FNMCP. Prior to the submittal of the January 2015 revision, the existing approved FNMCP was originally written for the license application for the Mixed Oxide Fuel Fabrication Facility (MFFF) in Aiken, South Carolina which was approved in December 2010. The progress of construction has necessitated revisions to the FNMCP to be consistent with planned operating conditions. The background, proposed changes, and basis for changes were provided in the submitted enclosures which contained the page mark-ups indicating the proposed changes, and a copy of the revised FNMCP with the proposed changes incorporated.

The major changes in the January 2015 revision involved a total rewrite of the document, and the evaluation of the submittal was processed in accordance with 10 CFR 70.34 to ensure that the applicable material control and accounting (MC&A) requirements were met. The applicable MC&A requirements are found in 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material." Specifically, the review was performed to ensure that the licensee's revised FNMCP describes the MC&A system, how the system features and capabilities specified in 10 CFR 74.51(b) are achieved and maintained and how such features and capabilities are used to achieve the general performance objectives listed in 10 CFR 74.51(a).

The staff used NUREG-1280, Revision 1, "Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment," to determine if the licensee's revised FNMCP meets the requirements in 10 CFR Part 74, Subpart E.

## **2.0 DISCUSSION**

The staff reviewed and evaluated information provided by MOX Services in the January 2015 submittal. The enclosures to the cover letter identified all of the major changes. The attachment to the enclosure listed by chapter each proposed major change and its corresponding basis for change.

During the review of the January 29, 2015, submittal, the Material Control and Accounting Branch (MCAB) staff identified additional information that was needed before final action could be taken. A licensing visit was conducted during the week of September 14, 2015, to discuss the January 29, 2015, submittal. Subsequently, a request for additional information (RAI), was issued to the licensee on November 23, 2015. The RAI included general comments related to the entire revision, as well as specific comments on the General Discussion and Quality Assurance chapters of the revised FNMCP. On December 2, 2015, MOX Services provided

Enclosure 2

responses to these RAI questions in the form of FNMCP change pages and description of the changes made. The MCAB staff reviewed the licensee's responses to the RAI and found the changes to be acceptable. A summary of the changes and the staff's evaluation by chapter is listed below:

#### General Discussion Chapter

- Revised MC&A organization and management structure.
- Updated acronyms and terms associated with various facility's processes and security licensing documents.
- Modified MFFF and process descriptions to reflect current physical conditions and facility operations [REDACTED]

The General Discussion chapter of the FNMCP provides the plan organization, five general performance objectives set forth in 10 CFR 74.51(a), plant and process general description, policies and procedures, glossary of terms and acronyms, a summary description of the MFFF's MC&A program, two-person rule, and daily administrative checks. This information is supplemental regarding the facility and the MC&A system. Therefore, the staff finds the information provided in this General Discussion chapter to be appropriate and adequate.

#### Chapter 1 – Strategic Special Nuclear Material (SSNM) Loss Detection Capability at MFFF

- Updated and revised all process control units and associated measurement points.
- Updated drawings for process monitoring and material balance areas (MBA) boundaries.
- Updated repetitive affirmation statements in various sections of the chapter to better clarify how the MC&A program will meet the regulations.
- Moved compliance items of this chapter to the Policies and Procedures section of the Quality Assurance chapter.

The intent of 10 CFR 74.53 is to require the licensee to implement a production process monitoring program that is capable of monitoring the status of material in process and that will provide early indications of diversion or theft and a prompt detection system for significant abrupt loss involving at least five formula kilograms of SSNM from processing operations.

Chapter 1 of the licensee's FNMCP provides the unit process detection capability for both aqueous and MOX process monitoring programs to include process subdivision and measurement points, material control test criteria, location categorization, material substitution, trend analysis test, and the process monitoring program. Therefore, the staff finds the information in Chapter 1 acceptable and in accordance with 10 CFR 74.53 to provide a high probability of the timely detection of any abrupt material loss of five formula kilograms or more of SSNM.

#### Chapter 2 – Item Monitoring

- Modified the item monitoring program description to more appropriately incorporate the changes resulting from the Atomic Safety and Licensing Board hearing.
- Updated repetitive affirmation statements in various sections of the chapter to better clarify how the MC&A program will meet the regulations.

- Moved compliance items of this chapter to the Policies and Procedures section of the Quality Assurance chapter.

The intent of the 10 CFR 74.55 is that licensees establish the capability to detect a five formula kilograms or greater loss in item form using any statistical test that has a 99 percent power of detection and to ensure timely plant-wide detection of the loss of items that total five formula kilograms or more.

Chapter 2 of the licensee's FNMCP describes **[REDACTED]**. The staff finds the licensee's item monitoring program for ensuring timely plant-wide detection of the loss of items that total five formula kilograms or more acceptable and in accordance with 10 CFR 74.55.

### Chapter 3 – Alarm Resolution

- Revised the alarm resolution program description to more appropriately describe and clarify operations and plant activities.
- Updated alarm resolution procedures and associated flowcharts for all aqueous and MOX process control units.
- Revised and tabulated MFFF MC&A measurements for all process units.
- Updated repetitive affirmation statements in various sections of the chapter to better clarify how the MC&A program will meet the regulations.
- Moved compliance items of this chapter to the Policies and Procedures section of the Quality Assurance chapter.

The intent of the alarm resolution program in 10 CFR 74.57 is to require licensees to resolve the nature and cause of any MC&A alarm as generated from process monitoring and item monitoring activities within an approved time period, and to provide alarm reporting in case the alarm in question remains unresolved.

Chapter 3 of the licensee's FNMCP describes the alarm resolution program developed to respond promptly to alarms indicating a potential loss of SSNM and determine whether the alarm was caused by an actual loss or by a system error. The licensee describes the general alarm resolution procedures, alarm reporting, and all procedures and flowcharts for aqueous and MOX control unit series. Additionally, the licensee establishes and maintains ability to respond rapidly to alleged thefts or alarms occurring external to the MC&A system. Therefore, the staff finds the licensee's plan for maintaining an alarm resolution program acceptable and in accordance with 10 CFR 74.57.

### Chapter 4 – Quality Assurance

- Updated the management structure and MC&A organization.
- Revised the Policies and Procedures section of this chapter to update MC&A core procedures from generic to specific topics and consolidate compliance items from other chapters.
- Clarified measurement timeframe for receipts of incoming fuel material.
- Clarified how holdup measurements will be executed.
- Added specifics and clarification to the record management system.

- Updated repetitive affirmation statements in various sections of the chapter to better clarify how the MC&A program will meet the regulations.

The intent of 10 CFR 74.59 quality assurance program and accounting requirements is to ensure that licensees establish and maintain a management structure, personnel qualification and training, measurement systems and measurement control program, physical inventory program, accounting records system, and internal controls to include shipments and receipts, scrap control, human errors, independent assessment, and SSNM custodianship.

Chapter 4 of the licensee's FNMCP provides a management structure that includes defined responsibilities for the planning, coordination and administration of MC&A functions, independence of MC&A functions from production responsibilities, separation of duties such that control and cross-checks can be implemented for validation and reliability purposes, and use of MC&A procedures on a consistent basis to effectively implement MC&A activities and functions. A training and qualification program to ensure the effectiveness of the MC&A program for MC&A personnel is described in this chapter. This chapter also describes the formal measurement program implemented with measurement systems used to substantiate the element and fissile isotope content of all SSNM received, shipped, discarded, and listed in the physical inventory. In parallel with the measurement systems, a measurement control program was developed to ensure the measurement systems used for MC&A measurements are monitored and controlled to a level of effectiveness sufficient to satisfy the capabilities required for detection, response, and accounting in accordance with 10 CFR 74.59(e). The program for compliance with the physical inventory requirements of 10 CFR 74.59(f) is described to include the facility preparation for aqueous polishing and MOX processing, inventory performance, and inventory reconciliation.

Chapter 4 also describes an auditable records system sufficient to demonstrate that the requirements of 10 CFR 74.53, 74.55, 74.57, and 74.59 have been met. Additionally, an internal controls system was described in this chapter and includes procedures for shipping and receiving SSNM, scrap and waste inventory control practices, checks and balances incorporated in the MC&A system to minimize the rate of human errors affecting MC&A information. The program independently assesses the performance of the MC&A system from an effectiveness perspective relative to the performance objectives defined in 10 CFR 74.51(a) and the system capabilities defined in 10 CFR 74.51(b). The program for the execution of custodial responsibility is described to include the facility's custodial areas, duties and custody of SSNM in material balance areas. Therefore, the staff finds that the licensee describes acceptable practices and methods for a quality assurance and accounting requirements program to ensure that the requirements of 10 CFR 74.59 are met.

#### Appendix A

- Updated information regarding the MMIS and MC&A positions and job descriptions.
- Updated and tabulated typical measurement uncertainties and sensitivities and typical references standards and calibration frequency.
- Updated statistical methods associated with the standard error of an inventory difference calculation.

The appendix is supplemental information, and the staff finds the information provided to be appropriate and adequate. In addition to the changes listed above, minor editorial changes, including typographical errors, were made throughout the document.

Based on the staff's review and evaluation of the submittal and MOX Services' response to the RAI, the staff has determined that, while the January 29, 2015, revision (further revised on December 2, 2015) of the FNMCP is a major rewrite of the previously approved FNMCP, the revised document continues to meet the requirements of 10 CFR Part 74, Subpart E, "Formula Quantities of Strategic Special Nuclear Material," and follows the format and content recommended by NUREG-1280, Revision 1. Therefore, the revised FNMCP dated January 29, 2015 (further revised on December 2, 2015) is approved.

### **3.0 ENVIRONMENTAL REVIEW**

The staff has determined that the FNMCP changes are related to safeguards matters, which are categorically excluded from the requirements to prepare a site-specific environmental assessment. Therefore, in accordance with 10 CFR 51.22(c)(12), neither an environmental assessment nor an environmental impact statement is warranted for this action.

### **4.0 CONCLUSION**

The staff concludes that the MOX Services revised FNMCP is an acceptably robust document for facility operations that contains appropriate and necessary commitments to meet applicable MC&A requirements as stipulated in 10 CFR Part 74. The MOX Services FNMCP revision, dated January 29, 2015, as revised, continues to describe acceptable methods for achieving the general performance objectives in 10 CFR 74.51(a) and the system features and capabilities of 10 CFR 74.51(b). Therefore, the staff approves the revised FNMCP.

#### **PRINCIPAL CONTRIBUTORS**

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