

13.0 SAFEGUARDS

13.2 MATERIAL CONTROL AND ACCOUNTING

13.2.1 CONDUCT OF REVIEW

The staff reviewed the applicant's Construction Authorization Request (CAR) for the Mixed Oxide Fuel Fabrication Facility (MFFF) according to Section 13.2 of NUREG-1718, "Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility." The purpose of this review was to determine if the application for construction approval adequately provides the necessary aspects on the basis of material control and accounting (MC&A) design information. The staff's acceptance review is to ensure that the applicant's design basis information for systems relevant to MC&A, and related level of commitments and program goals, will lead to an acceptable Fundamental Nuclear Material Control (FNMC) Plan. This Plan must meet or exceed the regulatory acceptance criteria in NUREG-1718, Section 13.2.4, and/or the regulatory requirements in Subpart E of 10 CFR Part 74.

The applicant is required to establish an MC&A system and related design bases to demonstrate how its system capabilities are used to meet the performance objectives specified in 10 CFR Part 74.51(a). The MC&A program is composed of two major systems. The material control system must be designed to protect against, detect, and respond to the loss or diversion of nuclear materials. The material accounting system must be designed to determine the quantities of nuclear materials, maintain knowledge of materials, verify the presence of materials, and detect the loss or diversion of materials. The staff reviewed and evaluated information provided by the applicant that is related to design bases for the proposed MC&A program. The following physical aspects of the MC&A design were reviewed:

- Process Monitoring.
- Item Monitoring.
- Receipt Measurement.
- Measurement Control.
- Physical Inventory.
- International Safeguards.

13.2.1.1 Process Monitoring

The applicant identified a detailed segmentation of the two main processes into process control subunits which are capable of monitoring the status of material in process. The applicant also integrated MC&A features into the facility's Manufacturing Management Information System (MMIS). The staff evaluated the applicant's process monitoring program, and determined that this program consists of adequate design features and is capable of monitoring internal transfers, storage, and processing of nuclear materials.

13.2.1.2 Item Monitoring

The applicant committed to an item monitoring program, which establishes item identification and the basis for verifying the presence and integrity of nuclear materials. The applicant also applied MC&A aspects of this program to the facility design and the highly automated remote-controlled process and manufacturing facility features, including its MMIS. The staff has reviewed the elements of this item monitoring program and determined that the applicant's

program is capable of providing timely plant-wide detection of the loss of items, and a real-time status of the location, identity, and quantity of nuclear materials.

13.2.1.3 Receipt Measurement

The applicant provided approaches and methods of measurements regarding feed materials, automated material weighing and sampling, validation of manual actions, and measurement confirmation and verification. The staff reviewed the use of process and manufacturing control instruments for MC&A measurements and found them appropriate and acceptable.

13.2.1.4 Measurement Control

The applicant described feasible approaches with respect to establishing and maintaining an effective measurement control program applied to the quality of measurement systems and material processing practices. The applicant also utilizes process controls, item controls, and quality assurance measures to identify, detect, and resolve material abrupt loss or theft. These program approaches are acceptable to the staff's review and evaluation.

13.2.1.5 Physical Inventory

The applicant's program contains the basic elements for scheduling, performing, and evaluating routine physical inventories, including an inventory cutoff and clean out, determination of quantities based on measurements, and inventory reconciliation. The staff found that the applicant's physical inventory program demonstrates its ability to verify and determine all quantities of nuclear materials.

13.2.1.6 International Safeguards

The applicant outlined design features for future interaction involving the International Atomic Energy Agency and related international safeguards agreement and regulatory requirements. The staff determined that the outline of a path forward and the design of MC&A features for international safeguards are adequate.

13.2.2 EVALUATION FINDINGS

The staff concluded that the applicant provided adequate commitments and goals for the design basis as it applies to material control and accounting (MC&A), and that these commitments and goals should result in an adequate MC&A program and an acceptable FNMC Plan that will meet or exceed the regulatory acceptance criteria outlined in NUREG-1718 and the regulatory requirements in 10 CFR 74.51 through 74.59. As a result, the staff determined that the applicant meets the requirements in the area of MC&A to approve construction of the facility under 10 CFR Part 70.

13.2.3 REFERENCES

- 13.2.3.1 Code of Federal Regulations, *Title 10, Energy*, Part 74, Subpart E, "Formula Quantities of Strategic Special Nuclear Material."

- 13.2.3.2 Nuclear Regulatory Commission, (U.S.) (NRC). NUREG-1280, "Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment, Rev. 1." NRC: Washington, D.C. April 1995.
- 13.2.3.3 _____. NUREG-1718, "Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility." NRC: Washington, D.C. January 2000.