

13.0 SAFEGUARDS

13.2 MATERIAL CONTROL AND ACCOUNTING

13.2.1 CONDUCT OF REVIEW

The staff reviewed the applicant's treatment of material control and accounting (MC&A) issues in the revised Construction Authorization Request (CAR) for the Mixed Oxide Fuel Fabrication Facility using the guidance in Section 13.2 of the Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility (NUREG-1718). The purpose of this review was to establish whether the applicant's design basis information for systems relevant to MC&A, and related commitments, will lead to an acceptable Fundamental Nuclear Material Control (FNMC) Plan that will meet 10 CFR Part 74 requirements.

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 in a licensee's possession, maintain knowledge of such materials, verify the presence of such materials, and detect the loss or diversion of such 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
- Alarm Resolution
- Quality Assurance and Accounting
- International Safeguards

13.2.1.1 Process Monitoring

The applicant identified a detailed segmentation of the main processes into process control subunits which are capable of monitoring the status of licensed material in process. The applicant also integrated MC&A features into the proposed facility's Manufacturing Management Information System (MMIS). The staff evaluated the applicant's process monitoring program and finds that this program consists of adequate design features in its abrupt loss detection capability, including process subdivision and measurement points, material control tests, location categorization, material substitution, trend analysis, material exemptions, and research and development operations.

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 licensed 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 finds that the applicant's program is capable of providing timely plant-wide detection of the loss of items, and real-time status of nuclear materials, including a system of item identification, item

classification, tamper-safing procedures, material accessibility, item accounting and control procedures, item measurements, sample items and item verification tests.

13.2.1.3 Alarm Resolution

The applicant identified features of an alarm resolution system which is capable of resolving the nature and cause of any MC&A alarm within an approved time period, notifying the NRC of any unresolved alarms, and establishing and maintaining the ability to respond to any suspected thefts of licensed nuclear material. The staff has reviewed the elements of this alarm resolution program and finds that the applicant's program commitments demonstrate it will have the ability to respond to and resolve MC&A alarms of potential loss of nuclear materials, including alarm resolution procedures, decision rules, response time, item discrepancies, alarm reporting responsibilities, and any suspected thefts.

13.2.1.4 Quality Assurance and Accounting

The applicant identified feasible approaches and methods with respect to the eleven elements of its MC&A quality assurance program, which includes management structure, personnel training and qualification, measurement systems, measurement control, physical inventory, records system and maintenance, shipments and receipts, scrap material control, human errors, independent assessment, and material custodial responsibilities. The staff has reviewed the elements of these quality assurance and accounting programs, and finds that these program commitments are appropriate and acceptable.

13.2.1.5 International Safeguards

The applicant outlined design features for potential future interaction involving the International Atomic Energy Agency and related international safeguards agreement and regulatory requirements. The staff finds that these design features are adequate.

13.2.2 EVALUATION FINDINGS

The staff concludes that the applicant provided adequate commitments to submit, as part of its application for a special nuclear materials possession and use license, an FNMC Plan that will meet the 10 CFR Part 74 requirements. The staff finds that, at the construction authorization approval stage, MC&A issues have been adequately addressed.

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 Nuclear Regulatory Commission, (U.S.) (NRC). 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.

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