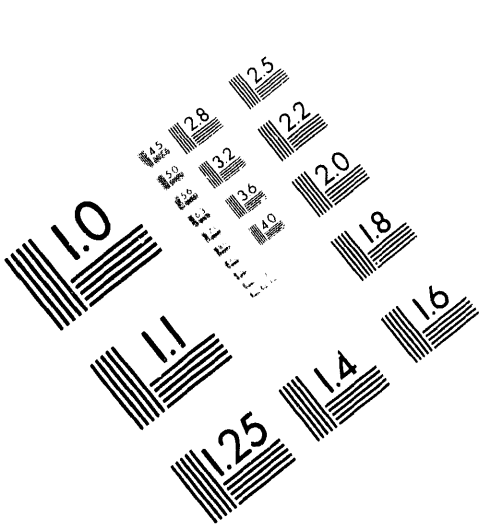

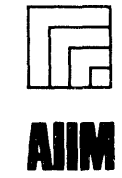

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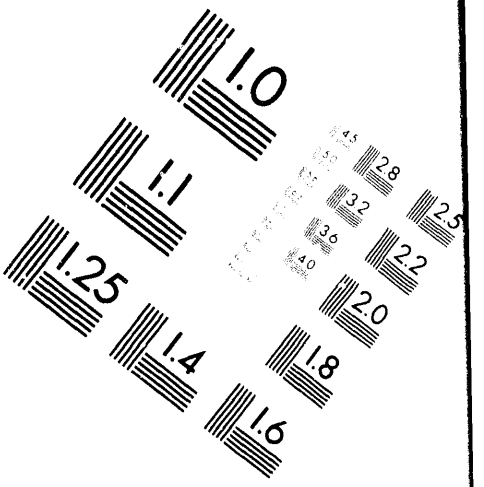

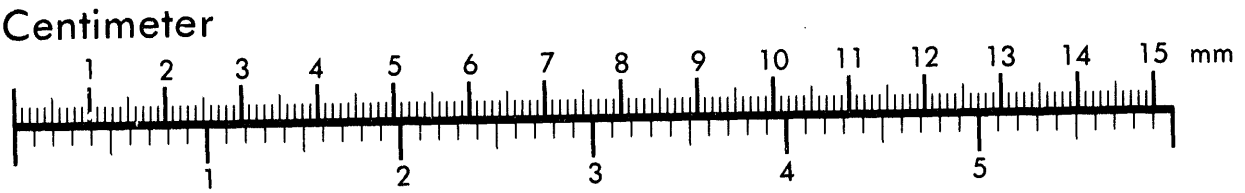

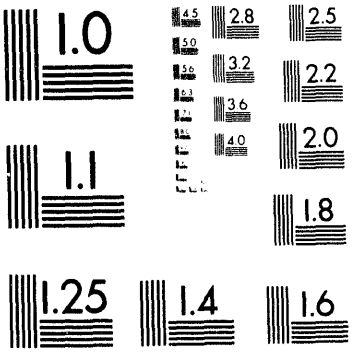

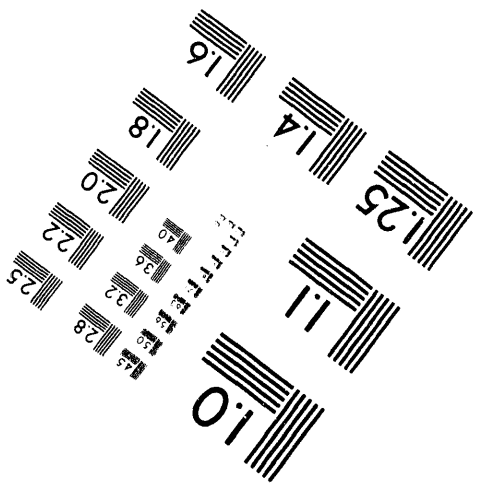

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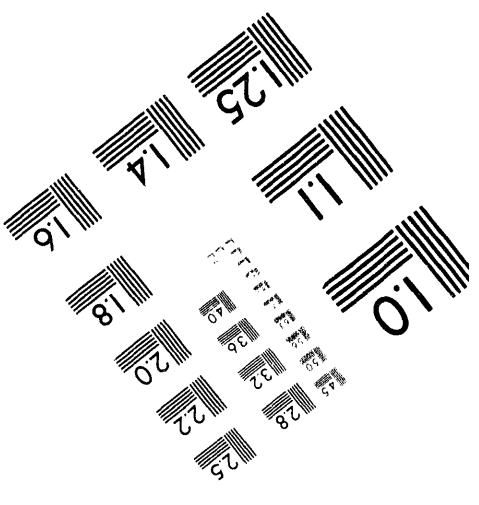

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IMPLEMENTATION OF MC&A PERFORMANCE TESTING AT THE SAVANNAH RIVER SITE (U)

by

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DOE Contract No. **DE-AC09-89SR18035**

DISCLAIMER

IMPLEMENTATION OF MC&A PERFORMANCE TESTING AT THE SAVANNAH RIVER SITE* (U)

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ABSTRACT

This paper describes the implementation of material control and accountability (MC&A) performance testing requirements at the Savannah River Site. Department of Energy (DOE) Order 5633.3A, CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS, provides selected MC&A elements requiring performance testing as well as the minimum performance requirements. MC&A Performance Testing Programs must also meet the requirements of DOE Order 5630.16A, SAFEGUARDS AND SECURITY ACCEPTANCE AND VALIDATION TESTING PROGRAM. The Savannah River Site has formed a Safeguards and Security Acceptance and Validation Testing (SSAVT) Program Council, chaired by the Savannah River Operations Office SSAVT Program Manager. This Council's charter is to provide site wide development, implementation, and guidance regarding the requirements associated with DOE Order 5630.16A. Membership of the Council includes safeguards and security personnel from the Operations Office, from the site security contractor, Wackenhut Services, Inc. (WSI), and from the site managing and operating contractor, Westinghouse Savannah River Company (WSRC). This paper describes how WSRC MC&A is implementing requirements from both 5633.3A and 5630.16A within the MC&A Performance Testing Program, and how the MC&A Program fits into the site wide SSAVT Program. This paper will also describe the collaboration of MC&A testing with security testing and vulnerability analysis testing to eliminate redundancy and enable the applicable requirements to be met in a cost effective manner.

INTRODUCTION

DOE Order 5633.3A, CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS, provides selected MC&A elements requiring performance testing as well as minimum performance requirements. MC&A Performance Testing Programs must also meet the requirements of DOE Order 5630.16A, SAFEGUARDS AND SECURITY ACCEPTANCE AND VALIDATION TESTING PROGRAM. This order establishes policy requirements and responsibilities for an SSAVT Program. To provide guidance in implementing the requirements of 5630.16A, the Savannah River Site has formed an SSAVT Council, chaired by the Savannah River Operations Office (SROO) SSAVT Program Manager. The WSRC MC&A Section is in the process of implementing the requirements from both 5633.3A and

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5630.16A into an MC&A Performance Testing Program. This MC&A Performance Testing Program will be incorporated into the site wide SSAVT Program.

PERFORMANCE TEST IMPLEMENTATION SCHEDULE

The Savannah River Site controls and accounts for nuclear material in thirty-six (36) Material Balance Areas (MBAs). Prior to the development of this performance testing program, MC&A performance tests were being conducted on an individual MBA basis during the routine assessments performed by the Assessment Group. However, all of the requirements of 5630.16A were not met as specified. To fully comply with DOE Orders, the MC&A Section developed a Performance Test Implementation Schedule to define the steps leading up to implementation of the program. This implementation schedule included target dates for completion of each step. The implementation schedule includes:

- Develop a site-wide listing of critical system elements
- Develop generic performance test scenarios for each critical system element
- Document the Site MC&A Performance Test Plan
- Design a record keeping system
- Develop Facility Performance Test Plans

Full implementation of the Performance Test Program is scheduled for August 1995.

DEVELOPMENT OF POTENTIAL CRITICAL SYSTEM ELEMENTS

The first step in the implementation plan was the development of a list of potential critical system elements for MC&A. DOE Order 5630.16A defines a critical system element (CSE) as "a component of a larger system which directly affects the ability of that system to perform a required function." Critical system elements may include safeguards and security equipment, procedures and/or people. CSEs must include elements that can detect-in-time-to-prevent (i.e., material access controls, two-person rule), and elements that can effectively account for special nuclear material (i.e, accounting systems, measurement methods).

DOE-wide performance requirements are stated for seven MC&A system nuclear material loss detection elements in DOE Order 5633.3A, Chapter I.4.c. Minimum performance levels were established for these elements to provide a level of consistency across the complex in the protection of special nuclear material. These elements are: access controls, material surveillance, tamper-indicating devices, portal monitoring, accounting records system, inventory confirmation/ verification measurements, and inventory difference (ID) control limits. Using these seven required elements as a starting point, MC&A developed a list of potential critical system elements for five MC&A topical areas: Program Management, Accounting, Measurements, Inventory, and Containment. The following thirty-five (35) potential critical system elements were identified based on function, process, protection layers, graded approach, and subject matter expert opinion using applicable DOE Orders, WSRC manuals, facility vulnerability assessments (VAs), and other DOE policy related documents. These elements are termed potential critical

system elements because they may not apply to all MBAs.

POTENTIAL CRITICAL SYSTEM ELEMENTS

I. PROGRAM MANAGEMENT
- A. Graded MC&A Program
- B. Training/Qualification
- C. Emergency Plans and Procedures
- D. Defense-in-Depth
- E. Termination of Safeguards
- F. MC&A Procedures
- G. Internal Review and Assessment Program
- H. Occurrence Investigation and Reporting

II. ACCOUNTING
- A. Accounting System*
- B. Accounting Data
- C. Inventory Differences
- D. Shipper/Receiver Differences
- E. Hold Accounts
- F. Control Indicators
- G. Transaction Records

III. MEASUREMENTS
- A. Process Monitoring
- B. Confirmation/Verification Measurements*
- C. Inventory Difference Control Limits*
- D. Out-of-Control Systems
- E. Detection Capability of Waste Monitors
- F. Target Quantities for Precision and Accuracy
- G. Measurement Methods
- H. Training and Qualification
- I. Sampling Programs
- J. Measurement Control
- K. Statistical Control

IV. INVENTORY
- A. Inventory Process
- B. Inventory Measurements*
- C. Inventory Reconciliation
- D. Additions/Removals

V. CONTAINMENT
- A. Material Access Controls*
- B. Data and Equipment Access Controls
- C. Material Surveillance*
- D. TIDs*
- E. Portal Monitoring*

*Indicates critical elements required to be tested by DOE Order 5633.3A.

GENERIC PERFORMANCE TEST SCENARIOS

Once the CSEs were identified a generic performance test scenario was developed for each potential critical system element. Where possible performance tests already documented and in use as part of the MC&A Assessment Program were used. Additional tests were developed utilizing guidance from the OSE Inspectors Guide and the Introduction to Performance Testing for MC&A course taught by the DOE Central Training Academy. These generic test scenarios will function as a living document, being added to and modified as needed.

DEVELOPMENT OF FACILITY TEST PLANS

MC&A is currently working with MBA personnel to identify facility-specific CSEs. All potential CSEs are examined to determine which are critical to the particular facility. Each MBA's CSEs and applicable test scenarios will then be documented in the facility's test plan. Test plans will include such information as test controls, operational impacts, and required coordination and approvals.

RECORD KEEPING

All tests will be recorded and a record keeping system designed to ensure that information is readily available to audit teams. Proper record keeping will avoid redundant testing, provide trending information, and track routine test schedules.

SAFEGUARDS AND SECURITY TESTING COLLABORATION

Many safeguards and security elements, such as portal monitoring, are applicable to more than one program. These overlapping elements will be identified, and no redundant testing will occur. One program will test the element, and the test results will be available to other programs as necessary. The routine performance testing data will also be available to support VAs, and results from specific VA tests will be incorporated into the Performance Test Program.

SRS SSAVT PROGRAM PLAN

The MC&A Performance Test Program Plan will be incorporated into the Savannah River Site SSAVT Program. DOE Order 5630.16A defines Nuclear Materials Control and Accountability as a relevant key program element. The incorporation of the MC&A critical system elements and the MC&A Performance Test Plan into the SSAVT for the Savannah River Site is an integral part of the site's compliance with DOE Order 5630.16A.

SUMMARY

In summary, the Safeguards and Security Acceptance and Validation Testing Program at the Savannah River Site will encompass an MC&A Performance Testing Program which will meet the requirements of DOE Order 5633.3A and DOE Order 5630.16A. This program will incorporate MC&A testing with security and vulnerability analysis testing to eliminate redundancy and ensure that applicable requirements are met in a cost-effective manner. The SSAVT Program at the Savannah River Site is being developed under a team approach by SROO, WSRC, and WSI, with Total Quality being a primary factor.

REFERENCES

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5. Guide to the Evaluation of Selected Materials Control and Accountability (MC&A) Detection Elements, May 16, 1994.

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