

Safeguards First Principles Initiative at the Nevada Test Site

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ABSTRACT

The Material Control and Accountability (MC&A) program at the Nevada Test Site (NTS) was selected as a test bed for the Safeguards First Principles Initiative (SFPI). The implementation of the SFPI is evaluated using the system effectiveness model and the program is managed under an approved MC&A Plan. The effectiveness model consists of an evaluation of the critical elements necessary to detect, deter, and/or prevent the theft or diversion of Special Nuclear Material (SNM). The modeled results indicate that the MC&A program established under this variance is still effective, without creating unacceptable risk. Extensive performance testing is conducted through the duration of the pilot to ensure the protection system is effective and no material is at an unacceptable risk. The pilot was conducted from January 1, 2007, through May 30, 2007. This paper will discuss the following activities in association with SFPI:

1. Development of Timeline
2. Crosswalk of DOE Order and SFPI
3. Peer Review
4. Deviation
5. MC&A Plan and Procedure changes
6. Changes implemented at NTS
7. Training
8. Performance Test

INTRODUCTION

The Nevada Test Site (NTS) was selected as a test bed for the Safeguards First Principle Initiative (SFPI) in early 2006. The goal of the SFPI was to develop an objective-based standard for developing, implementing, and evaluating Nuclear Material Control and Accountability (NMC&A) programs to be adopted National Nuclear Security Administration (NNSA) wide.

The overall scope of the SFPI was to:

1. Develop an objective-based standard.
2. Validate the standard through discussions with subject matter experts.

3. Validate the standard through design and implementation of a test bed.
4. Revise the standard based on validation results.
5. Acquire an independent review and validation by HA-61, the Office of Security Evaluations, and NA-74, Defense Nuclear Security Performance Assurance.
6. Following validation, adopt as policy by NNSA.

The expected result of the SFPI is a risk-based model for the MC&A program. It communicates the importance of the individual MC&A system elements to security managers. MC&A will be able to use the model to make informed decisions on the expenditure of funds (both operations and technology deployment). The model will allow MC&A elements to be quantified into the overall system effectiveness equation. At worst, MC&A will have a process to facilitate prioritization of decisions such as where to leverage scarce resources. It will provide a sound basis for deviations to policy, and enhance the ability to educate, train, and mentor new personnel in the MC&A program.

DEVELOPMENT OF TIMELINE

It was essential to develop a timeline to capture the changes being made, the implementation of those changes, and completion dates of those changes. Many of the changes relied upon the completion of other changes, and a negative domino effect would have been created if the timeline was not adhered to. The timeline tracked the progress of the implemented changes. Where there were issues, this was easily identified and solutions provided to ensure the progress of SFPI.

CROSSWALK

Several crosswalks were completed. A crosswalk of the SFPI Deviation to the MC&A Plan was completed to ensure that changes were incorporated. A crosswalk was also completed of the Deviation to the Site Safeguards and Security Plan (SSSP) and the Device Assembly Facility (DAF) Security Plan. This was done to ensure that changes to the MC&A program were not in conflict with the SSSP and DAF Security Plan. Lastly, when changes had been made to the MC&A Plan, based on the deviation, a crosswalk of the U.S. Department of Energy (DOE) Manual DOE M 470.4-6 “Nuclear Material Control and Accountability,” to the MC&A Plan was completed to ensure all other DOE requirements were still included in the MC&A Plan.

PEER REVIEW

A peer review of the documentation related to SFPI was completed. The peer review consisted of others who have been involved with SFPI from conception. NTS also participated as part of the peer review for Y-12, who was also a test bed for the SFPI.

DEVIATION

Because the SFPI changes were outside of the DOE manual requirements, a deviation was necessary. The deviation required NNSA site approval and was also approved by the NA-70 office in Washington, D.C. This deviation laid the groundwork for the changes implemented into the MC&A Plan and implementing procedures.

MC&A PLAN AND IMPLEMENTING PROCEDURES

The MC&A plan incorporated changes specifically for implementation as a pilot for the NA-70 SFPI at NTS and describes how these requirements are in place in order to maintain an efficient and effective MC&A program that focuses on providing the following information considered essential to an effective Safeguards and Security (S&S) protection program:

1. Detection of unauthorized activities in time to prevent theft or diversion of *Category* I or II quantities of special nuclear material (SNM)
2. Verification that NTS receives SNM that was shipped
3. Assurance that SNM is being protected according to its strategic importance
4. Verification that no SNM is missing following a security event
5. Identification and quantification of SNM missing following a security event

The implementing procedures incorporated the specific changes.

CHANGES IMPLEMENTED AT NTS

The changes implemented at NTS included site wide roll up, Material Balance Area (MBA) structure, MBA Custodian, physical inventory, material surveillance, and measurements. Because of the number of changes, all MC&A employees have become involved in SFPI. Employees participated in collecting documentation that was essential in proving the methodology of the model. SFPI has proven to create a “think outside the box” attitude. It is a continuing process, and as new projects begin at the NTS, SFPI will be the standard. The SFPI changes made have and will continue to positively affect time and effort, which will ultimately reduce cost. NTS MC&A is currently participating in a Lean Six Sigma process to determine effective ways to document this cost reduction.

TRAINING

NTS MC&A has a dedicated training officer. As the SFPI changes were made to the MC&A Plan and flow-down documents, it was crucial that the training officer ensure training was changed as necessary.

PERFORMANCE TESTING/ASSESSMENTS

One manner in which the initial SFPI model effectiveness ratings were achieved was through past performance testing and assessments. The future of the model must be supported by performance testing and assessments. The number of performance tests and assessments has doubled and will continue to grow and be one of the most important factors to continue to evaluate the effectiveness of the MC&A program under SFPI. The performance test/assessment coordinator has enlisted other MC&A employees to assist in these performance tests and assessments, so again, all of the MC&A employees have taken an active role in the SFPI process.

CONCLUSIONS

In conclusion, the SFPI process has been challenging, and many lessons were learned. However, the benefits far outweigh any obstacles we met. The MC&A organization, as a whole, learned to look at the DOE Manual requirements and how SFPI changes affected NTS. This was accomplished without losing site of the importance of implementing a well-characterized objective-based program. With SFPI the ultimate goal of maintaining a graded safeguards program of control and accounting of nuclear material to detect and deter theft and diversion is attainable.