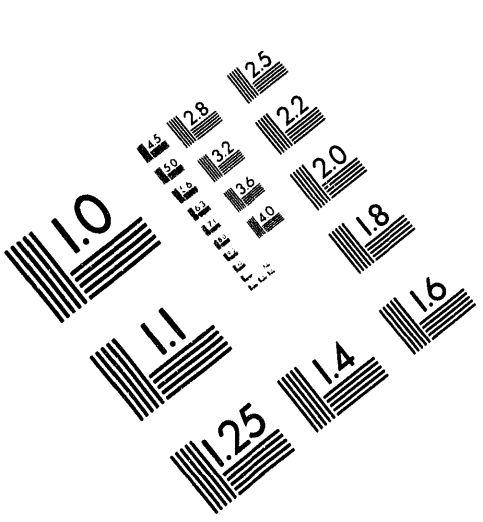

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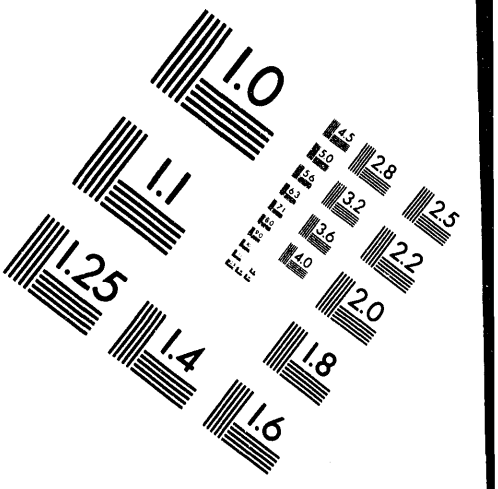

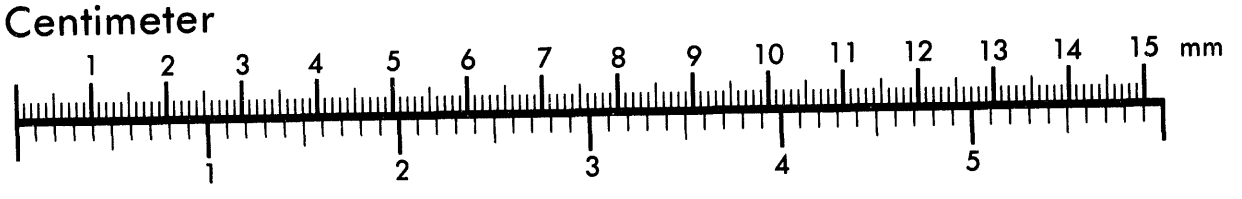

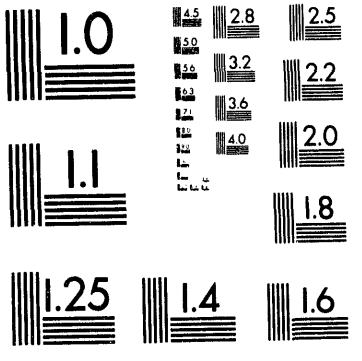

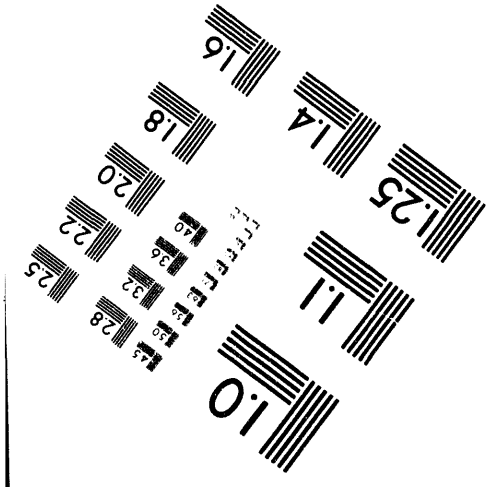

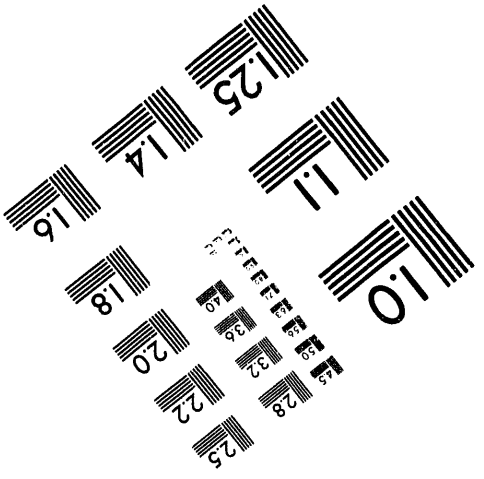

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IMPLEMENTATION OF PERFORMANCE TESTING TO SUPPORT AN INSIDER VULNERABILITY ASSESSMENT AT THE SAVANNAH RIVER SITE(U)

by

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DISCLAIMER

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ABSTRACT

Category I and II facilities must have an insider vulnerability assessment (VA) developed per DOE Order 5633.3A. This VA identifies the critical system elements that must be tested by the performance testing program. Once this VA is developed and all necessary upgrades to the critical system elements are implemented, the upgrades must be performance tested (PT). Per DOE Order 5633.3A, each facility has a safeguards and security system to provide defense-in-depth. The safeguards and security system assures that the level of risk is not increased if a single element is defeated. The VA determines both the amount of risk associated with a single critical element and if the increase in risk is acceptable. Compensatory measures and upgrades to the critical system elements are made when the increase in risk exceeds an acceptable level. This paper will describe the methodology used to performance test compensatory measures and upgrades resulting from an insider VA for a Category I process facility at the Savannah River Site. Outsider threats are not considered in this paper. They are the responsibility of the Protective Force and are performance tested by that organization.

INTRODUCTION

DOE Order 5633.3A requires that a VA be performed to evaluate the potential for the unauthorized accumulation of a Category I quantity of special nuclear material (SNM) from multiple locations within the same protected area (PA) through either a single occurrence or a protracted diversion. The VA identifies critical system elements which must be tested. Critical system elements may include safeguards and security equipment, procedures and/or people. PTs are then performed to determine the capability of the MC&A system elements under conditions as close as possible to those that might occur in the event of an actual diversion of material. The PTs focus on perceived weaknesses and develop scenarios to test those preceived weaknesses. Various aspects must be considered including the following items: demonstration that the system performs as specified; testing individual detection elements; performance criteria; and frequency of tests.

DISCUSSION

To be successful you must develop a safeguards and security (S&S) acceptance and validation test program plan. The purpose of this S&S performance test acceptance and validation plan is to document the testing process, identify a comprehensive set of tests, and develop a schedule for testing. To maintain the required element of surprise, the testing must be spread out over several months and carefully planned and scheduled. The plan describes the performance tests necessary to validate the effectiveness of the safeguards and security measures There are four basic tasks associated with this program plan.

(1) Obtain concurrence from different organizations such as: Operations, Oversight (MC&A and Security), Protective Force, and DOE.

(2) Develop test plans for each critical system element to be tested. These plans should include as a minimum:

- test objectives
- scenario description
- test methodology
- evaluation criteria
- test controls
- resource requirements
- test coordination requirements
- operational impact of testing program
- compensatory measures
- coordination and approval process
- references

(3) Carry out the PTs. Typical tests might include:

- unauthorized movement of SNM
- falsification of paperwork for material transfer
- untrained personnel performing work
- violation of two-person rule
- diversion of SNM from a near real-time computer system

Document the results during the PT with the use of observation sheets for the controllers and trusted agents. The element of surprise contributes to a more valid and unbiased test.

(4) Prepare formal reports for each PT. The report should summarize the scenario and define the accept/reject criteria for the test. In the report state whether the PT passed or failed and any corrective action generated as a result of the test.

EXAMPLE SCENARIOS

Three different scenarios which may be used for PTs of a Category I or II facility are listing below.

The first scenario has a test objective to ensure that empty containers are monitored for SNM prior to leaving the Material Access Area (MAA).

The Protective Force is required to monitor all empty containers with a SNM detection instrument prior to allowing them to leave the MAA. In this scenario, the trusted agent places SNM in the bottom of an empty container. The trusted agent and an operator try to remove the container from the MAA. The test is terminated when the Protective Force takes the correct action after discovering the diverted SNM or when the Protective Force gives notification that the container may be removed from the MAA and therefore not detecting the hidden SNM.

The test objective of the second scenario is to ensure that the cognizant technical function (CTF) verification is performed.

Material crossing an MAA boundary requires that the CTF of the facility verify whether an independent measurement is needed to confirm the material prior to its leaving the MAA. In this scenario, a non-CTF (trusted agent), falsifies the paperwork to transfer the material out of the MAA. This test is terminated when the Protective Force determines the signature is forged or when the Protective Force does not catch the forged signature paperwork to permit the material to cross the MAA and therefore not detect the SNM leaving the MAA on falsified paperwork.

The test objective of the final scenario is to ensure the accuracy of the Daily Administrative Check (DAC) for the facility.

The DAC is performed each day by randomly selecting a statistical sample of a facilitiy's inventory and then physically verifying the location of each item selected. In this scenario, the DAC program is run early for the day. The printout of the items to be checked is given to the trusted agent. He proceeds to move several items listed on the DAC to different locations. Then the list of items is given to the operators who will perform the DAC. This test is terminated when the operators determine the material is not in its proper location or when the operators determine all items are found and therefore not detecting the SNM in the wrong locations.

SUMMARY

A generic methodology for planning and performing PTs for an insider VA has been presented. The acceptability of any risk is documented as part of the SSSP/MSSA (Site Safeguards and Security Plan/Master Safeguards and Security Agreement). Several realistic scenarios were presented to illustrate the nature of performance testing.

ACKNOWLEDGMENTS

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REFERENCES

1. U. S. Department of Energy, Control and Accountability of Nuclear Materials, DOE Order 5633.3A, Feb 22, 1993

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