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TITLE: SECURITY FEATURES OF A NUCLEAR MATERIAL ACCOUNTING SYSTEM

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92

SECURITY FEATURES OF A NUCLEAR MATERIAL ACCOUNTING SYSTEM

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ABSTRACT

The Los Alamos Nuclear Material Accounting and Safeguards System (MASS) is a near-real-time accountability system for bulk materials, discrete items, and material undergoing dynamic processing. MASS has evolved from an eighty-column card based process control system to a very sophisticated computer system. Recently the computer hardware was upgraded to a modern transaction oriented central computer system designed to accommodate extensive growth in the foreseeable future. The security of the MASS computer system is provided through various access controls. There are two kinds of access control to be addressed. They are physical access control to the hardware which make up the system, and access control to the software. There are many features which provide a measure of security to the hardware that will be discussed. Access to the software is controlled by a security password. Access to various transaction activities in the system is controlled through the level of MASS user privilege. Details of MASS user privilege will be discussed.

INTRODUCTION

A good accounting system is an essential component of an effective accountability and safeguards system for good control of nuclear material inventories. The Los Alamos Nuclear Material Accounting and Safeguards System (MASS) has evolved from a paper system to a very sophisticated computerized system over the past 25 years. The original "80-column" card system was developed by the Plutonium Metallurgy Group at the Laboratory. This system served the Laboratory well as long as the transaction activity remained at a few transactions per day. For several years MASS has been processing 20,000-25,000 transactions per month, and the growing transaction activity was taxing the system. Recently the computer hardware was completely replaced with a modern transaction oriented central computer system designed to accommodate extensive growth in the future. A crucial feature of the current system is the security of the data and the computer system. Good security can be achieved through proper access control to the complete system. This includes access to the computer hardware as well as access to the database and software.

HARDWARE ACCESS CONTROL

MASS consists of three separate systems that are not physically connected. The production system is a Tandem Nonstop TXP, the development/backup system is a Tandem EXT, and a Hewlett-Packard (HP) 3000.

The computers are isolated from public access by being located inside a vault-type room in the main accountability group building which is in a protected security area. Access to the building is restricted to Q-cleared personnel. Access to the computer room is controlled by a locked door preventing unauthorized entrance to the room. Entrance by visitors is authorized by computer operations personnel after legitimate access needs are determined. Visitors to the computer room are logged in and out and are escorted while inside the area.

Numerous special terminals throughout the Laboratory are used to communicate with the central computer through approved encryption gear and through protected distribution systems. Each terminal is located in a limited access area within a protected area. Only Q-cleared personnel with proper access authority can use these terminals. There are no telephone access lines to the computer.

DATA AND SOFTWARE ACCESS

There are two categories of people that interact with the MASS. First, there is the computer operations group (five people) which is responsible for the operation of the system. This group includes programmers and operators of the system, and they have access to the database and the programs. Finally, there are the many users who use the MASS to keep accurate records of their inventories. There are access controls to control the degree of access these users have to MASS. There are several steps to validate a

user on the MASS and provide him with access to privileges on MASS. First, the user's supervisor must establish the privileges required for the user to perform his job. Next the privilege request is validated by the material control and accountability group and approved by the system manager of MASS. After all the required approvals are completed the user's privilege information is entered into the system by the MASS operations staff. The user NAME/PASSWORD is then established in the valid user record and issued to the user by the operations staff. Every approved user of MASS must have a valid password. Once validated the user is given access to the initial menu that has seven options:

1. Transaction
2. Inquiry
3. Historical Inquiry
4. Print Label/list
5. Measurement Control
6. Edit 741 Data
7. Sign-off

The options available to a user depend on the user's privileges. All access to the MASS database is checked against a valid user record. In addition, account access is checked when options 1 through 4 are selected. It is important to note that MASS users have access only to the menu driven programs written by the programming staff. And even their access to these programs is restricted by their user privileges.

SECURITY OF DATA

There are special features of the Tandem Nonstop TXP that enhance the security of the data. This system is a

nonstop, fault-tolerant system providing its own on-site backup. On-site backup is also provided by the Tandem EXT. Data files are backed up daily and program sources are backed up whenever they are modified. Backup data tapes and the current and prior versions of the MASS software are stored in a separate vault in another building. Special security procedures are followed to insure the security of all classified and sensitive information.

CONCLUSIONS

Due to the sensitive and classified nature of the information processed on a nuclear material accounting system, security of the system is a very important issue. This security includes the hardware and the data and software. Limiting access to the computer hardware is just one step in securing the system. Access to the programs and the data is also very important. With careful thought all of this access control can be designed into the system.