

MASTER

ABSTRACT
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**AUTOMATED 741 DOCUMENT PREPARATION;
OAK RIDGE NATIONAL LABORATORY'S
AUTOMATED SAFEGUARDS INFORMATION SYSTEM (OASIS)**

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OASIS has been providing for Oak Ridge National Laboratory's total safeguard needs since being placed on line in April 1980. The system supports near real-time nuclear materials safeguards and accountability control. The original design of OASIS called for an automated facsimile of a 741 document to be prepared as a functional by-product of updating the inventory. An attempt was made to utilize, intact, DOE-Albuquerque's automated 741 system to generate the facsimile; however, the five page document produced proved to be too cumbersome in size and design to meet our needs. In response to this concern we have modified Albuquerque's programs to print an original 741 document utilizing standard DOE/NRC 741 forms. We feel we have incorporated the best features of both the automated and manually generated 741 documents. Through automation of the source data for 741 shipping documents we obtain greater efficiency while reducing possible errors. Through utilization of the standard DOE/NRC form we maintain continuity within the NMMSS system thus minimizing the confusion and redundancy associated with facsimiles. OASIS now fulfills the original concept of near real-time accountability by furnishing a viable 741 document as a function of updating the inventory.

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OASIS has been providing for Oak Ridge National Laboratory's total safeguard needs since being placed on line in April 1980. The system supports near real-time nuclear materials safeguards and accountability control. The original design of OASIS called for an automated facsimile of a 741 document to be prepared as a functional by-product of updating the inventory. An attempt was made to utilize, intact, DOE-Albuquerque's automated 741 system to generate the facsimile; however, the five page document produced proved to be too cumbersome in size and design to meet our needs. In response to this concern we have modified Albuquerque's programs to print an original 741 document utilizing standard DOE/NRC 741 forms. We feel we have incorporated the best features of both the automated and manually generated 741 documents. Through automation of the source data for 741 shipping documents we obtain greater efficiency while reducing possible errors. Through utilization of the standard DOE/NRC form we maintain continuity within the NMMSS system thus minimizing the confusion and redundancy associated with facsimiles. OASIS now fulfills the original concept of near real-time accountability by furnishing a viable 741 document as a function of updating the inventory.

SUMMARY

INTRODUCTION

The prime objective of OASIS is to provide effective, efficient, accurate, and timely user-oriented output. OASIS currently furnishes information for all of ORNL's safeguard information needs including accountability, materials management, NMMSS, criticality, safety, and physical security. With the introduction of automated 741 and 740 data, the method for providing NMMSS output has improved dramatically.

OASIS now generates a 741 document printed on standard, non-perforated 741 DOE/NRC forms and a 740 data tape. Thus, the accuracy and timeliness of this output, which is crucial in nuclear material safeguard control, is further enhanced. The efficiency of a centralized system such as OASIS is evident in this latest achievement by being able to provide NMMSS output utilizing data maintained in existing files. Also, our costs were minimized through utilization of DOE-Albuquerque's automated 741 system. Lastly, our automated 741 package can provide you an opportunity to obtain automated NMMSS output capability at a minimum investment of time and resources.

OASIS HARDWARE AND SOFTWARE

OASIS is based on a DEC 11/34 central processor with memory capacity of 256 thousand characters. Permanent storage consists of an industry compatible tape drive and two disk storage devices with a total capacity of 56 million characters. Peripheral devices include a 300 lines/minute printer, 2 hard copy terminals, and 8 video terminals.

The vendor supplied operating system is Resource Sharing Time Sharing/Extended (RSTS/E) designed to execute user tasks in a "round robin" time slicing scheme. Processor response is such that competition for resources is transparent to the user. The application was implemented as a structural design using the industry standard Common Business Oriented Language (COBOL). The data structure supports direct access of data items. Communications to and from terminals are handled directly by each computer program while task execution is controlled by "menu" selections.

OVERVIEW OF OASIS DESIGN

The OASIS system design has been developed with emphasis on user needs while simplifying operations. Specific system design emphasis was placed on modularity, generality, response, human engineering, system security, and auditability.

Particular attention was placed on providing for present and future automation to the maximum extent envisioned. We wanted the system to incorporate all features to permit each transaction to be processed as it occurred as near real-time as possible, including automated DOE 741 documents and 740 report data, with timely and accurate response to any sensitive situation.

The system is menu driven, that is task execution is controlled by menu selections. A tailored menu is presented to each group of terminals as part of the daily start-up procedure thus minimizing the need for computer knowledge. A selection from the menu provides subsequent questions necessary to execute the desired function.

A review of OASIS's method of input, the scope and depth of the data, and the usefulness of output will highlight the system attributes (see Exhibit A).

OASIS 741 MODULE

The OASIS 741 module (see Exhibit B) consists of ORNL's nuclear material inventory and transaction files, OASIS 741 interface, and a modified version of DOE-Albuquerque's automated 741 system. The interface programs read pertinent data that is available within OASIS's inventory and transaction files, selectively adds relative data, and prompts the user for any changes or additional information required. The modified automated 741 system performs additional edits, sorts and adds additional relative data, writes the 740 data, and prints the 741 document.

Nuclear Material Inventory and Transaction Files

ORNL nuclear material control policy is to prepare a copy of the 741 document to use as a packing slip. This practice provides timely information to receivers which minimizes questions and ensures that no nuclear material is shipped without proper authorization.

From a system's standpoint, this policy adds additional complexity since the 741 document must be prepared in advance of actual shipment. That is, the 741 document would need to be printed before our inventory is adjusted and 740 data transmitted. In order to accommodate for this requirement, two sources are required to obtain line item data for document preparation. The inventory file provides line item data prior to shipments. The transaction file furnishes line item data for other reportable transactions (i.e. burnup, decay, gains, losses, etc.).

OASIS 741 Interface

The interface program reads shipping data from the nuclear material inventory file. The program then adds additional known factors such as shipper RIS, shipper's address, etc., and formats the data for entry into the automated 741 system. Other reportable transactions are read from the transaction file. The interface program selects, sorts, and summarizes compatible line items and transactions to minimize the number of documents. We found most nuclear material transactions to be routine and repetitive in nature which makes them readily adaptable for automation.

Modified Automated 741 System

The automated 741 system accepts data that has been formatted for the system by the OASIS 741 interface. Additional information such as the receiving RIS address is added at this point. All data then goes through a series of comprehensive logic and syntax checks. If the transaction passes all tests, a 741 document is printed and 740 data are prepared.

SUMMARY

The OASIS 741 module, through utilization of available DOE software, was developed for less than \$16,000.

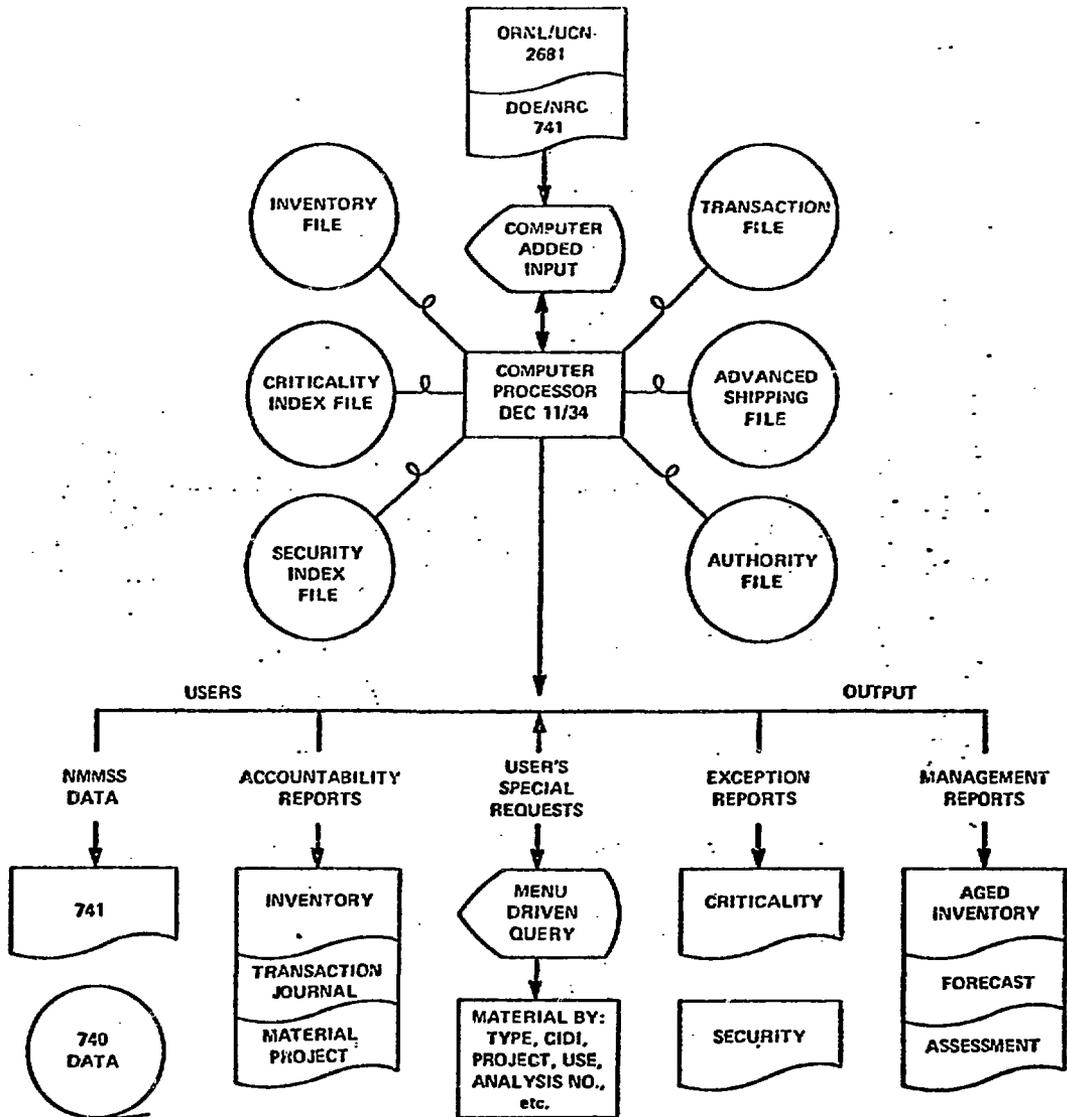
The automated 741/740 output supports a complete safeguards system and further emphasizes efforts placed on near real-time accountability. There is no visual dissimilarity between the OASIS prepared 741 document and a conventionally prepared document. The difference lies in the efficient and timely manner in which the automated 741 document is prepared. Also, the numerous logic and syntax checks made on the content improve the reliance which can be placed on 741/740 output.

In conclusion, we feel that our safeguards program at ORNL has been strengthened by the OASIS 741 module, that we have strengthened our program at a minimum cost by using the existing DOE-Albuquerque automated 741 system, and that we have a product which overcomes the stigma associated with automated 741 documents.

Nuclear Materials Accountability

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ORNL AUTOMATED SAFEGUARDS INFORMATION SYSTEM
DATA FLOW CHART



OASIS AUTOMATED 741 MODULE

