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Author(s): Leon D. Chapman

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Responsible NRC Individual and NRC Office or Division

Richard C. Robinson, SAFER:RES

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87115

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U.S. Nuclear Regulatory Commission
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LETTER REPORT

PHYSICAL PROTECTION OF NUCLEAR FACILITIES

Progress Report
September 1980

Prepared by
Leon D. Chapman
Safeguards Methodology Development Division 4416
Sandia National Laboratories

Prepared for
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PHYSICAL PROTECTION OF NUCLEAR FACILITIES

Progress Report

SUMMARY

The in-house activity for September in the vital area analyses of operating reactor facilities was slowed because a large number of key personnel were on vacation during this period; only one facility was analyzed during September.

Contractual support was provided by Pritsker & Associates, Inc., Science Applications, Inc. (SAI), and TERA, Inc. SAI continued their work on the expansion and revision of generic sabotage fault trees (GSFTs) and the analysis of the insider reactor sabotage problem. Pritsker & Associates, Inc. continued efforts centered on development of a graphical input/output (I/O) package for the Safeguards Network Analysis Procedure (SNAP).

FACILITY CHARACTERIZATION

In-House Activities

Vital Area Analyses

The vital area analyses of operating reactor facilities, which are being performed jointly by the Los Alamos National Scientific Laboratory (LANSL) and Sandia National Laboratories, Albuquerque (SNLA) for the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards (NRC/NMSS), continued during September. Because a number of key LANSL personnel were on vacation during much of September, data from only one facility, PWR 24, was received and analyzed.

Contractual Support

SAI continued their assistance in the expansion and revision of GSFTs developed by SNLA. These refinements will facilitate the use of the fault trees. During September, Revision 1 of the report "Recommended Modifications of the GSFT to Provide an Integrated Treatment of Transients and LOCAs" was submitted to SNLA for review.

The work by TERA, Inc. on interfacing the IMPORTANCE computer code and the Set Equation Transformation System (SETS) computer program is nearly complete. A version of the IMPORTANCE code will be

delivered to SNLA in the near future. In addition, a seminar on the IMPORTANCE computer program will be presented at SNLA on 28 October 1980. At that time, the use of the IMPORTANCE code to quantify the fault tree minimal cut sets (which can be obtained using the SETS computer code) will be discussed.

EVALUATION METHODOLOGY

Contractual Support

SNAP Application Development

SNAP Graphical I/O -- Seventeen commands have been added to the design of the graphics input editor. These commands are in the form of macro commands which permit the user to generate whole network segments easily and quickly. Examples of these commands are

PATH -- A command used to construct a SNAP network that traverses a user specified path through the facility.

PATROL -- A command used to construct a SNAP network that models N guards patrolling one or more path segments.

INQUIRE -- A command whose parameters will specify information to be displayed on the terminal.

In addition, the command design of the entire SNAP I/O graphics system has been reviewed and refined. All commands have been reviewed and modified, if necessary, for syntax consistency. The command hierarchy has been refined and better defined.

An internal design document, "SNAP Operating System User's Guide," is currently being written. This guide will serve as the initial design standardization document for the software.

Insider Reactor Sabotage Analysis

SAI work on insider reactor sabotage analysis centered on the analysis of the study facilities using alternative physical protection system (PPS) configurations previously defined. Several additional computer runs using these configurations will be needed to assure complete coverage of all expected vital area configurations.

During September, work was begun on the evaluation of the effectiveness of the PPS and on estimating the impact of various PPS configurations. In order to assist in the evaluation, a simulation model of the facility work force was developed using the Q-GERT simulation language. It is felt that this approach will provide a good estimate of the manpower impact of the alternate configurations.

Second and third draft papers related to operational zoning and time zoning have been completed and forwarded to the Nuclear Regulatory Commission (NRC). The functional zoning alternative and reevaluation of the value-impact analysis suggested by the NRC in July are

being undertaken, and the results of this analysis will be addressed in a final report, presently scheduled for completion about 1 November 1980.