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This document was prepared primarily for preliminary or internal use. It has not received full review and approval. Since there may be substantive changes, this document should not be considered final.

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INTERIM REPORT

NRC Research and Technical
Assistance Report

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Nuclear Power Plant Design Concepts
for
Sabotage Protection

Ninth
Quarterly Progress Report

April-June 1980

NRC Research and Technical
Assistance Report

1. Phase I Report: The main body of the Phase I Report was completed and a limited number of draft copies distributed for review and comment. This report documents the work on Tasks 1 through 7 of the original program plan, that is

- Baseline Plant Characterization
- Plant Design Options
- Damage Control Options
- Alternate Plant Configurations
- Physical Protection System
- Preliminary Reference Designs
- Evaluation of Preliminary Reference Designs

We have drawn a number of conclusions about plant design from this initial activity.

A. Structural design changes for PWR plants (that is, changes to building or plant arrangement) in and of themselves do not appear to provide significant additional protection against either the external or internal sabotage threat. Or stated another way, all other things being equal, just changing arrangement doesn't lead to significant changes in protection.

B. Design changes can, however, facilitate the implementation of more effective physical protection systems. For example,

- 1) Design changes that restrict VA access to a few well-defined routes, if appropriately combined with administrative controls and work rules, can increase the protection against the insider threat.

- 2) Design changes that restrict outside access to a few routes (e.g., reduced number of outside doors), appropriately coupled with increased physical protection (stronger doors, more surveillance at selected locations, additional intrusion detection) will increase the protection against the external threat.

However, it must be observed that design changes that significantly revise plant layouts so as to limit access routes to VAs and reduce outside access are practical only for new plants.

In addition, we have concluded that damage control by running repair and/or jury rigging does not appear to be a viable counter to sabotage because of the associated operational impacts and the potential for an adversary to interfere with the damage control effort. However, damage control accomplished by using installed systems may have some potential for countering sabotage (or accidents), but this method requires additional study and probably some revision to current regulatory practice.

Review copies of the report have been sent to the NRC staff, the ACRS Subcommittee on Safeguards and the members of the Design Study Technical Support Group. In addition, the results have been reviewed with the staff and the ACRS Subcommittee. In general those reviews have been favorable, but specific comments and recommendations will be taken into account in the final editing of the report for publication.

Volume II (Appendices D, E, F, and G) has been prepared for printing and will be printed at the same time as Volume I.

Volume III (the classified appendices) is still been reworked and will follow as soon as practicable.

2. DSTSG Meeting: On June 19 the Design Study Technical Support Group met at Sandia to discuss and evaluate the Phase I Report. Several members of the DSTSG had reservations about the conclusions in the original draft (conclusions cited above reflect revisions to the original draft). There was some concern expressed about the costing and other details which will be taken into account in final editing. A major point of concern for several members of the DSTSG was the primary emphasis on future design in view of the post-TMI slowdown in new construction. The opinion was expressed that attention should be paid to the potential of retrofitable design changes for improving protection. It was also pointed out that Phase I had really focussed on PWRs and that it should be established whether or not similar comments held for BWRs.

3. Phase II Study: As a result of the Phase I work and the reviews thereof, we have concluded and recommended that the Phase II effort outlined in the Program Plan (detailed designs of selected alternatives) not be pursued. Rather, we should extend the preliminary analyses in the following areas:
 - A. Phase II of this program should address in greater detail the values of the plant design measures considered in this study for protection against the insider threat. Quantitative methods under development in the NRC safeguards program as well as qualitative

evaluations should be used to assess the promising design alternatives with various insider protection systems.

- B. The potential of damage control, or perhaps more precisely operator actions, to counter sabotage and security problems should be pursued further. This additional study should define any regulatory revisions that would be necessary to take account of such concepts in licensing procedures. The analyses of BWR plants should be expanded to determine whether the conclusions regarding the value of structural design changes and the value-impact comparisons are similar to those for PWR plants.
- C. A more detailed assessment of possible design improvements for existing (rather than future) plants should be undertaken. Such an assessment should focus on methods for decreasing component or systems vulnerabilities whether by changes in hardware or procedures.

A detailed description of efforts proposed for Phase II will be forthcoming in the next quarter.