



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 26 1979

NOTE TO: S. H. Hanauer

FROM: J. Angelo

SUBJECT: RESEARCH INFORMATION LETTER NO. 54, THE SET EQUATION TRANSFORMATION SYSTEM (SETS)

Your note dated July 19 requested me to prepare a draft "Official Program Office Comments . . ." for NRR on RIL #54, and suggested that I consult with other knowledgeable people within NRR so that the product is not limited to Task A-17.

Based on past discussions with NRC staff, and confirmed again this week, there is only one other licensing action program within NRR, in addition to Task A-17, that makes use of fault tree/event tree methods, and which, therefore, would have use for the SETS computer code. The other activity is the "Vital Area Analysis" conducted by the Division of Operating Reactors. Some time ago the Auxiliary Systems Branch Planned to make a study of the relative reliability of auxiliary feedwater systems, and one of the proposals for such a study included fault trees as the method. If such a study had been made or was currently underway then these fault trees could be independently evaluated by the NRC staff or a contractor using the SETS code.

With these thoughts in mind, I have prepared a draft of "Applications", "Impact", and "Comments/Remarks" for the evaluation form attached to the Crutchfield memo dated July 16, 1979. Although the SETS Code has potential for extensive use by the NRC staff, it is now limited to use by Task A-17 and by the Vital Areas Analysis simply because these two activities within NRR are the only ones that I am aware of that use fault trees/event trees as analyses methods. The proposed draft comments are as follows:

DESCRIBE APPLICATION TO REGULATORY PROCESS:

The improved version of the Set Equation Transformation System (SETS) is a computer code for evaluating large fault trees. There are currently two activities within NRR that use fault trees as an analysis method. These two activities are Generic Task No. A-17 and the Vital Area Analysis. The SETS Code provides the NRC Staff with the capability to independently audit the results of analyses that are based on fault trees, although in the case of Task No. A-17, the contractor who develops the fault tree also uses SETS Code to analyze the fault trees.

INSERT → (noted on next page)

DESCRIBE IMPACT OF RESULTS:

The SETS Code has no direct impact on the licensing process but may have an indirect impact because it permits the NRC staff to analyze large systems that might otherwise have to be analyzed by less efficient or less effective methods.

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The results of the more effective and efficient methods could lead to either a relaxation of existing requirements or could lead to new requirements or a tightening of an existing requirement.

COMMENTS/REMARKS:

The SETS Code is one of several computer codes that can be used to evaluate fault trees for common cause failures. There are a considerable number of other codes that can be used to evaluate fault trees. No attempt has been made here to determine the relative effectiveness or ease of using these various codes. It could be that each code of the approximate population of twenty fault tree evaluation codes has some particular merit depending on what the analyst is searching for primarily.

While the SETS Code has limited use in the licensing process now within NRR, its usefulness would be greatly increased when and if the NRR transgresses to a wider use of fault trees as a method of systems evaluations.


John Angelo, Task Manager
Generic Task No. 17

cc: M. Aycock
R. A. Clark

Insert: The SETS Code is an important feature in the methodology (computer code) used to identify type I vital areas (i.e. "... Those areas wherein successful sabotage can be accomplished by compromising or destroying the vital systems or components located within an area).

Type I vital areas are the most sensitive security areas in the plant and require the highest levels of physical protection. Identifying these areas is an important consideration in the staff's evaluation of physical security at a nuclear power plant. This analysis and evaluation is currently being used for all operating plant reviews and will also be an ongoing requirement in operating license reviews.

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