



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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JAN 23 1984

MEMORANDUM FOR: R. Wayne Houston, Assistant Director
for Reactor Safety
Division of System Integration

FROM: Frank Rowsome, Assistant Director
for Technology

SUBJECT: REVIEW OF GESSAR-II DESIGN IMPROVEMENT

As per your request, attached please find comments on GESSAR-II design improvements as provided in your memo of January 6, 1984. DST has no substantive comments on the list of design improvements provided in the memo attachment, since the list was prepared jointly between DST and DSI.

It is noted that in the assessment of potential design improvements for the GESSAR-II 238 Nuclear Island structural systems analysis (see Enclosure) and the programs for maintaining high reliability should also be pursued as part of the overall safety improvement considerations as well as considering the potential reduction of core damage frequency and risk.

DST will continue to collaborate in the planning and implementation of the task for GESSAR-II design improvements. We recommend an early meeting with GE so the staff can provide guidance to GE.

Please contact D. D. Yue (x28129) if you have any questions.

A.C. Shadawi

for Frank Rowsome, Assistant Director
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Division of Safety Technology

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1. Comments on GESSAR-II Design Improvements

GE should perform an importance ranking analysis of systems needed to mitigate and prevent core melt sequences. Structural analysis (Reference 5) of these systems to identify weak links and subsequent systematic assessment of potential failure modes (e.g., CCF, improper maintenance, procedural blind spots in testing, etc.) and the decision rationale for the adequacy of these systems would appear to be a promising means of risk reduction.

2. VALUE-IMPACT ANALYSIS GUIDELINES FOR REVIEW OF GESSAR-II DESIGN IMPROVEMENT

Step (4) in the process guidelines (Reference 1) would require GE to perform cost-benefit analyses for a selected subset of potential design improvements. Our experience with such analyses, which in current and recent NRC practice have taken the form of regulatory analyses or value-impact analyses, indicates that the results are generally sensitive functions of the analytical approach, underlying assumptions, and trade-off standards employed. Therefore, to assist in sound conduct and meaningful review of these analyses, we suggest the following:

- (1.) GE should proceed with the analyses in a manner reasonably consistent with NRC value-impact analyses. NRC's analyses have not followed any precisely set pattern, but NUREG/BR-0058, NRR Office Letter 16 (most current revision), and NUREG/CR-3568 (References 2 to 4) will be helpful as references for scope, content, general approach, and information display. With the aid of these general guidelines, GE should aim at a sound evaluation and clear reporting of findings, taking such departures from these references as the subject may demand.

- (2.) GE's analysis reports should be particularly careful to include explicit statement of the following:
 - (a) Data sources relied on.
 - (b) Assumptions underlying the calculations; calculation bases.
 - (c) Trade-off coefficients and equivalences used.
 - (d) Intermediate calculational results, such as core-melt frequency changes, accident consequences, and major cost elements.

- (3.) The analyses should include:
 - (a) Discussion of the nature and magnitude of uncertainties.
 - (b) Unquantified factors that may affect the value-impact relation.
 - (c) Sensitivity analyses showing how results would be affected by alternative assumptions, calculation bases, and trade-off coefficients, within reasonable ranges.

REFERENCES

1. Memorandum for Assistant Directors for DSI, DST, DE, DL and DHFS from R. W. Houston, A/D for Reactor Safety, DSI, "Review of GESSAR-II Design Improvement," January 6, 1984.
2. NUREG/BR-0058, "Regulatory Analysis Guidelines of the U. S. Nuclear Regulatory Commission," NRC/EDO, January 1983.
3. NRR Office Letter No. 16, Revision 1, "Regulatory Analysis Guidelines," March, 14, 1983.
4. NUREG/CR-3568, "A Handbook for Value-Impact Assessment," Pacific Northwest Laboratory, December 1983.
5. General Electric Report APED-5538, "The Design Structure System", September 1968.