



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

DEC 14 1982

MEMORANDUM FOR: E. G. Arndt
Mechanical/Structural Engineering
Branch, DET, RES

FROM: Jocelyn Mitchell
Accident Evaluation Branch, DSI, NRR

SUBJECT: ORNL CONTAINMENT LEAK TEST SENSITIVITY STUDY

It is with reluctance that I have concurred with the Statement of Objectives and Limitations of the subject study.

I am concerned that, even though no conclusion is to be drawn as to acceptability of any containment leakage rate, the limitations of the study will be forgotten, and it will be used for purposes that were never intended.

Of particular concern is the omission over our objection of significant leakage pathways that bypass or thwart the containment function, such as Main Steam Isolation Valve leakage or containment purge. Further, leakage of Engineered Safety Features components in recirculation mode is not to be considered. Therefore, the risk that is calculated by ORNL may be but a small part of the total risk for cases where gross failure of the containment is not postulated. Because of the exclusion of pathways that can be of major importance in total risk determination, the "importance" of the single pathway that is to be investigated can never be determined by this study. Even though I pointed this out at the meeting, I feel that it must be emphasized again.

For risk of latent effects such as cancers or fatalities, small leakage rates produce linear consequences. That is, the risk of latent cancer fatality for 1.0%/day leakage is ten times that for 0.1%/day leakage. Until a leakage rate that has to be considered a mechanism for reduction of the containment inventory is reached, this should hold true. It does not appear appropriate, therefore, to expend valuable resources on this trivial aspect of the problem. For high leakage rates, however, an additional affect must be considered, that is the threshold effect of early fatalities. Because of this, doubling the leakage rate may produce much more than double early fatalities.

If CRAC analyses are to be used in the study, and the study is to be carried out to extreme "leakage" rates that could be considered containment failure, the assumption in CRAC that high doses will be detected and persons removed after 24 hours exposure may come into play even though "evacuation" is not assumed.

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E. G. Arndt

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The most interesting - and useful - part of this study will be the test data analyzed or the "qualification" of a method of analysis, that is your item 4. I would suggest that as much of the program's resources as possible be expended on this item.

Jocelyn Mitchell

Jocelyn Mitchell
Accident Evaluation Branch
Division of Systems Integration, NRR

cc: R. Mattson
R. Houston
J. Murphy
K. Seyfrit
J. Huang

Cy to:

Flanagan ✓

Dougan ✓

Blond ✓

Murphy ✓

Glynn ✓

12/13/82



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

(Flanagan)

12/22/82

Dear George,

The meeting memo is intended to clarify your work objectives, and to indicate the priorities.

The Mitchell memo is attached for information only. It is not intended to provide direction or priorities.

Smiley

FOIA-85-143

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EC-89; Containment Leak Test Sensitivity Study
Addendum

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RES Lead: G. Arndt

Lab Principal Investigator: Thomas Burns

Lab Manager: George Flanagan

1. REGULATORY PROBLEM: a) Evaluate validity of current leak rate criteria, b) develop "standard" leak rate, rather than plant-specific rates.
2. TECHNICAL PROBLEM: Determine relationship between leakage and dosage.
3. OBJECTIVES OF THE PROGRAM: 1) Determine changes to risk contribution by the containment system as the leak rate changes. 2) Furnish a method for comparing test and operational data to estimate actual leakage probabilities at times between tests.
4. HOW OBJECTIVES ARE RELATED TO SAFETY: 1) The adequacy of NRC regulations on leakage, and 2) The adequacy of the leaktight integrity of containments.
5. ATTACK OF PROBLEM: Utilize background data and analyses available at ORNL, Sandia, and NRC/DRA as input for study.
6. WHAT HAS BEEN DONE: Objectives and limitations have been clarified, as well as information and data sources for ORNL.
7. WHAT ARE EXPECTED ACHIEVEMENTS: 1) Sensitivity analysis of offsite risk in terms of dose to public for various leak rates. 2) Risk reduction comparison of gross containment integrity check with A.P. T tests, and 3) Practicality of single leak criterion for all containment types.
8. WHEN WILL IT END AND WHAT WILL BE THE FINAL PRODUCT AND THE TOTAL EXPENDITURE:
End: FY83 Product: report covering 1,2,3,7 Total \$: \$50k
9. HOW WILL THESE RESULTS BE APPLICABLE TO THE LICENSING PROCESS: Influence revisions to 10CFR 50, Appendix J, proposed RG endorsing ANSI/ANS 56.8-1981, and tech specs.
10. ANY REMARKS THAT BEAR ON THE CONTRACT:

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Addendum

Test Sensitivity

FIN B0489 -- Containment Leak Studies

ORNL

FY 1983
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FY 1984
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FY 1985