

WM DOCKET CONTROL

Mr. K. C. CHAMBER  
Mail Stop 623-SS  
US Nuclear Regulatory Commission  
Washington DC 20558-59

Dear Kien:

SUMMARY OF EFFORT, JUNE 15 - JUNE 19, 1987

This memo describes the tasks which have been addressed during the time period indicated.

1. Completed the failure distribution generator for both packing and container failures. This subroutine produces a histogram of failures versus time, from which it derives both the probability density function and the cumulative distribution function.

2. Integrated the dissolution/transport model TRANS3, written last Fall, into the program. This is based on Chambre's three-dimensional prolate spheroid approximation to the waste form. This is the only transport model which will be included, since it is of higher accuracy than other analytical models which are available.

Enclosed is a Voucher for Professional Services for this time period.

Also enclosed is a brief description of work accomplished to date, a description of work to be done by June 30, 1987, and a suggested list of tasks to be addressed beyond that date.

The tasks planned for the next period are:

1. Complete coding, debugging and integration of the Aerospace pitting corrosion model.

2. Complete and integrate the convolution integral techniques.

If you have any questions, please call me.

Very Truly Yours,

*Gary*

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STATUS REPORT

*J Fuller*

19 June 1987

TASK: Prepare a complete, functional version of the Methodology Demonstration Report Model CONVO for use on a Personal Computer (PC).

ACCOMPLISHED TO DATE:

-- Prepared algorithms for solving the temperature history equation (B-1, page B-2 of the Demo. Report). Novel techniques were developed for handling the complex functions and variables involved, since the IMSL Library was not available.

-- Coded a four-point fit decay heat function curve based on ORIGEN2 data.

-- Coded techniques for creation of the Thermal Response Surface (TRS) using 16 values of time and 10 values of thermal diffusivity.

-- Prepared algorithms for interpolating on the TRS for all values of time and diffusivity within the expected range.

-- Prepared algorithms for generating uniform deviates (uniformly distributed random numbers) to create random input vectors for simulation purposes.

-- Coded algorithms for calculating container failure times due to uniform corrosion.

-- Coded the 3-D dissolution/transport routine TRANS3, based on prolate spheroidal geometry, to determine packing failure times.

-- Delivered a compiled TRANS3 file (RUN file) on floppy, together with user instructions, to solicit comments on approach.

-- Integrated and debugged the above elements, producing an extensive program which will provide the desired packing and container failure distributions (pdf and cdf), analogous to the original CONVO.

TO BE ACCOMPLISHED BY JUNE 30, 1987:

-- Complete coding and debugging of the Aerospace pitting corrosion model, and the integration of same into the overall program.

-- Complete and integrate the convolution integral option for combining the container and packing failure pdf's.

SUGGESTED TASKS FOR PERIOD BEGINNING JULY 1, 1987:

\* To Complete PC CONVO:

- Combine pitting and uniform corrosion. 2 days
- Implement the cascade option, as an alternate to the convolution approach. 3 days
- Prepare user interaction routines. 6 days
- Prepare output handling routines. 4 days
- Prepare user manual and flow charts. 30 days

\* To Extend PC CONVO Beyond the Methodology Demo. and Increase Its Utility:

- Prepare techniques to calculate releases, at the packing/rock interface, over time. 10 days
- Include radioactive decay in the transport model. 15 days
- Include advection as well as diffusion in the transport model. 60 days
- Begin the creation of parallel PC programs for salt and Tuff environments. 20 days

Total time expended: 130 days