

THE AEROSPACE CORPORATION



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February 15, 1984

Mr. Kien C. Chang
Mail Stop 623-SS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

WM Record File
A-4165

WM Project 10,116
Docket No.

PDR ✓
LPDR B,NS

Distribution:

K. CHANG X TICKET
PH
(Return to WM, 623-SS)

Dear Mr. Chang:

MONTHLY REPORT -- JANUARY

Attached is the Monthly Progress Report for the project entitled,
"Preparation of Engineering Analysis for High-Level Waste Packages
in Geologic Repositories" (FIN A-4165-4).

Please call me if you have any questions.

Very truly yours,

Kenneth W. Stephens
Manager, Technology Assessments
Eastern Technical Division

KWS/gbf

- cc: G.E. Aichinger SD/PMR (letter only)
- Office of the Director, NMSS
- Director, Div. of Waste Management, NMSS (2)
- J.T. Greeves, Engineering Branch, NMSS
- E.A. Wick, Engineering Branch, NMSS
- M.B. McNeil, Waste Management Branch, RES
- Branch Chief, Waste Management Branch, RES

Attachment

84 FEB 16 AM 1:15

WM DOCKET CONTROL
CENTER

8409120116 840215
PDR WMRES EECAEROS
A-4165-4 PDR

An Affirmative Action Employer

GENERAL OFFICES LOCATED AT 2350 EAST EL SEGUNDO BOULEVARD EL SEGUNDO CALIFORNIA

REPORT PERIOD: January 1984

MONTHLY PROGRESS REPORT

FIN A-416⁶-4

CONTRACTOR: The Aerospace Corporation, Washington, D.C.

SPONSOR: Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards

WORK PERFORMED/TECHNICAL PROGRESS

Work during January involved: (1) completion of the draft event trees, (2) participation in the BWIP geochemistry workshop, and (3) review of the DSTP on repository environmental parameters.

Scheduled Work

The majority of the effort during January was devoted to completion of the draft event trees depicting events leading to radionuclide release (delivered on 7 February). Whereas the fault trees represent the entire collection of events and sequences leading to package failure and radionuclide release, event trees represent scenarios showing the paths between particular initiating events and the ultimate consequences (radionuclide release or the lack thereof).

The event trees included in the 7 February delivery were chosen to illustrate selected scenarios from the large number of possible paths. Because corrosion mechanisms are generally believed to be the most likely cause of package failure, the base case for each package design (CHLW and SF) represents water-induced corrosion as a breach mechanism and water-borne radionuclide flow as the means of release. In addition, scenarios were selected to represent combinations of events (e.g., tunnel loading in combination with corrosion), quality-control-related failures, and less likely events such as human intrusion and earthquakes.

The examination of mathematical techniques for quantitative analysis of fault trees and event trees continued. The preliminary work on this subject was included in Appendix B of the 7 February event tree report. The approach being pursued is to examine first the standard fault tree/event tree computer codes to clarify whether those techniques are suitable for quantitative analysis of the waste package trees without additional modification. In addition, alternative reliability assessment techniques are being examined, namely, convolution-integral and discrete-event-simulation approaches. Small test cases will be used to examine the relative merits of the standard and alternate techniques.

Special Support

During January, K.W. Stephens attended the BWIP geochemistry workshop held in Richland, WA. 9-12 January. His trip report was transmitted to K.C. Chang of NRC on 3 February. In addition to serving its geochemistry purposes, the workshop identified a number of waste package reliability issues which are relevant to the work of NRC contractors such as Aerospace, BNL, and ORNL. Those issues will be explored further in the waste package workshop to be held in Richland the last week in March.

As requested, Aerospace reviewed the Draft Staff Technical Position on Repository Environmental Parameters Relevant to Assessing the Performance of High-Level Waste Packages. Comments were generated concerning the structure of the document, its policy implications, and technical aspects of the models.

WORK PLANNED FOR NEXT MONTH

During February, Aerospace will continue the examination of methods DOE and others will be using for waste package failure and radionuclide-release analysis. The report scheduled for 30 April will compare those methods against the fault tree/event tree approach and will recommend a method (or combination) for use in NRC independent analysis of waste packages.

An Aerospace program-review briefing is scheduled for 14 February at the NRC offices in Silver Spring, in conjunction with the program review for the ORNL environmental parameters project (FIN B-0288).

CONTRACT MANAGEMENT SUMMARY REPORT

FORM APPROVED
OMB NO 32R-0120

1. Contract Identification FIN A-4165-4 Engineering Analysis for High Level Waste Packages		2. Reporting Period 10/1/83 through 9/30/84		3. Contract Number F04701-83-C-0084													
4. Contractor (Name and Address) The Aerospace Corporation Washington, D.C.				5. Contract Start Date 10/1/83													
6. Contract Completion Date																	
7. Months																	
	O	N	D	J	F	M	A	M	J	J	A	S			8. FY 1984		
9. Cost Status														9. Cost Plan Date 10/83			
Cum \$ (1,000's)	700															10. Planned Costs Prior FYs -	
	600															11. Actual Costs Prior FYs -	
	500															12. Total Estimated Costs for Contract \$750K	
	400															13. Total Contract Value \$750K	
300															14. Unfilled Orders Outstanding -		
200															15. Estimate for Subsequent Reporting Period -		
100																	
0																	
16. Planned		62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5			
17. Actual		30.5	40.5	52.5	64.0												
18. Variance		32.0	22.0	10.0	(18.5)												
19. Cum Variance		32.0	54.0	64.0	82.5												
10. Manpower Status (Direct Labor)																	
Cum Man - Months	70															16. Manpower Plan Date 10/83	
	60															17. Planned Manpower Prior FYs -	
	50															18. Actual Manpower Prior FYs -	
	40															19. Total Estimated Manpower for Contract 71 man-months	
30															20. Total Contract Manpower -		
20																	
10																	
0																	
21. Planned		5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9			
22. Actual		3.5	4.9	4.9	5.0												
23. Variance		(2.4)	(1.0)	(1.0)	0.9												
11. Major Milestone Status																	
a. Progress Reports		Monthly															
b. Event Trees (draft)		Delivered 2-7-84															
c.																	
d.																	
e.																	
f.																	
g.																	
h.																	
i.																	
12. Remarks January costs include \$162 travel. There are no uncosted obligations. There are no subcontracts.																	