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WM Project 10, 11, 16
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To: Kien Chang

From: Loren Zaremba *LZ*

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XLPDR (B, N, S)

Subject: Activity Report, March 30 - April 12, 1987

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Chang

PART I OF USER'S MANUAL

(Return to WM, G23-SS)

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I have received comments from Ken Stephens on Part I of the user's manual for the computer codes which were used in the methodology demonstration during FY86 of the Aerospace contract. Part I deals with the codes used to determine the temperature history of the waste package. Ken was generally complimentary regarding the style and content of the report. He also found a number of errors and inconsistencies which I will correct in the final version. I also spoke with John Vogelwede regarding NRC's formal requirements for the documentation of computer codes. He said that NRC had published a related document, NUREG-0585 and that ITS currently had a draft guideline. Also the Geotechnical Branch, DWM had some work in this area done under contract. John is preparing a memo on this subject and will send me a copy when it is completed.

I spoke with Gary Fuller and Robert Moler regarding Part I. Robert had no comments. Apparently there was some confusion because I wanted Gary, not Robert to review the report. Gary said he would get Robert's copy from him and provide me with his comments.

PART II OF USER'S MANUAL

During the period from March 30 to April 12 (weeks 25 and 26 of my contract) I continued to work on Part II of the user's manual, which deals with the code called CONVO. This code was used to perform the probabilistic performance assessment of waste package lifetime in the FY86 methodology demonstration. I have now completed the Introduction, a section which discusses the General Features of the code, and a section describing the Code Structure. I will send the completed sections to the typist this week. During weeks 27 and 28 I plan to complete a section describing Code Use, including input formats, and begin preparing a sample problem. During weeks 29 and 30 I hope to complete Part II. Shortly after that I will provide NRC with draft copies. This will leave me with 10 working days on my contract to incorporate comments and provide NRC with the final drafts of Parts I and II.

NEW REPORTS

I have seen two new reports in the NRC library at the Phillips building which may be of interest. The first is a Battelle report (BMI-OCRD-25) which deals with analytical solutions to two and three dimensional diffusion problems in porous media for 4-member decay

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chains. This report may be important to waste package work because it provides analytical solutions for the diffusion problem which include radioactive decay. Decay tends to increase the concentration gradient, which increases the release rate. The transport models which we used to predict nuclide diffusion through the packing in the FY86 demonstration did not include decay, and were thus somewhat non-conservative. The Battelle report should be reviewed in detail to determine if the methods are suitable for waste package performance assessment, and if it is possible to develop a code to perform the calculations. If so, this would enable us to examine the effects of decay on release and determine the extent to which the previous calculations are non-conservative.

The second report may be of interest to John Vogelwede and Gary Fuller. It was published by Los Alamos (LA-10883-MS) and is entitled "FORTRAN Compiler Performance Benchmarks for the IBM Personal Computer". The report compares the performance and ease of use of Microsoft 3.31, Lahey F77L and IBM Professional FORTRAN. The conclusion is that the Lahey compiler is generally easier to use, but speed depends on the particular application.