



Department of Energy

Nevada Operations Office
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Las Vegas, NV 89193-8518

WBS #1.2.5.2
QA: N/A

FEB 21 1990

John J. Linehan, Director
Repository Licensing Project Directorate
Division of Waste Management
U.S. Nuclear Regulatory Commission
4-H-3
Washington, DC 20555

RESPONSE TO THE U.S. NUCLEAR REGULATORY COMMISSION (NRC) REQUEST FOR THE YUCCA MOUNTAIN PROJECT OFFICE (PROJECT OFFICE) PARTICIPANT COMPUTER CODE WAPPA

Reference: Letter, Linehan to Stein, dtd. 9/5/89

The referenced letter requested that the U.S. Department of Energy provide the NRC with current versions of several computer codes that are being utilized by the Yucca Mountain Project, including a code designed to evaluate "Waste Package Performance Assessment," known as WAPPA.

As part of its work as a Project Office participant, Lawrence Livermore National Laboratory (LLNL) evaluated the validity of WAPPA's application to the Yucca Mountain site activities. The results of the evaluation are summarized in Enclosure 1 and its attachment, and documented in a LLNL report entitled "Waste Package Performance Assessment: Deterministic System Model Program Scope and Specification," October 1986 (O'Connell and Drach). This report is Enclosure 2.

Many of WAPPA's conceptual models and assumptions are geared to a repository in salt below the water table, and these concepts are not applicable to the Yucca Mountain site and design concepts. The WAPPA program also has conceptual errors and coding errors. For these and several other reasons, the Yucca Mountain Project does not currently plan to use WAPPA. However, a copy of the computer code may be obtained from the National Energy Software Center at Argonne National Laboratory, and a copy of the computer code report referenced in the attachment to Enclosure 1 is available from the National Technical Information Service.

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John J. Linehan

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If you have any questions or comments, please contact David C. Dobson of my staff at (702) 794-7940 or FTS 544-7940, or William J. O'Connell of LLNL at (415) 422-8789 or FTS 532-8789.



Carl P. Gertz, Project Manager
Yucca Mountain Project Office

YMP:DCD-2030

Enclosures:

1. Ltr 1/23/90 Jardine to Dobson
2. UCRL-53761

cc w/encl:

Gordon Appel, HQ (RW-331) FORS
Robert Loux, NWPO, Carson City, NV

cc w/o encl:

M. A. Glora, SAIC, Las Vegas, NV
J. L. King, SAIC, Las Vegas, NV
A. R. Jennetta, W, Las Vegas, NV



Lawrence Livermore National Laboratory

LLYMP9001127
January 23, 1990

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David Dobson
Yucca Mountain Project
Nevada Operations Office
P. O. Box 98518
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REFERENCE: LLYMP8911022 dated 10/26/89, Ltr C. Gertz to L. Jardine

SUBJECT: Response to (NN1-1990-0330) Request for Transmittal of Yucca Mountain Project Office (YMPO) Participant Computer Codes to the US Nuclear Regulatory Commission (NRC)

Dear David:

The NRC requested the waste package computer code WAPPA, which was developed for the salt repository project (1). We examined the WAPPA program in 1984-1985, and found it non-useful for the Yucca Mountain project, for reasons we summarize in an attachment. We are not using the program now, but we believe that the report (see attachment) is available from the National Technical Information Service (NTIS) from microfilm, and that the computer code, or a slightly updated version produced by ONWI in about 1987, is available from the National Energy Software Center at Argonne National Lab.

If you wish further information, please feel free to contact William J. O'Connell of my staff at 415-422-8789 or FTS 544-8789.

Leslie J. Jardine
Technical Project Officer
Yucca Mountain Project

LJ/WO/ec

Attachment

cc:
M. Cloninger
A. Jennetta, T&MSS (Westinghouse)

ENCLOSURE 1

ATTACHMENT

Technical Evaluation of the WAPPA Code's Suitability to Yucca Mountain

Many of WAPPA's conceptual models and assumptions are geared to a repository in salt below the water table, and these concepts are not applicable to the Yucca Mountain site and design concepts. This is amplified in our report (2), pages 5-7 (a copy is enclosed).

The WAPPA program also has conceptual errors and coding errors. Two conceptual problems are:

1. The gamma ray attenuation model is wrong; see our report (2), pages 39-40. The model gives incorrect results which are obvious to a casual inspection. The problem was found to be a conceptual one, a misinterpretation of the reference used.
2. The stress corrosion cracking model is described in the WAPPA report (1), p. 117-118, 236, and 259; and a verification test is described, p. 130, test no. 4 and Appendix F. The model used depends on an initial crack size greater than zero, and the code has a variable for initial crack size. However, there is no way to input an initial crack size, as determined by the input description in Ref. (1), p. 309-313 and by inspection of the source code. Thus the code as released cannot exercise the stress corrosion cracking model. The report (1) provides no mention or explanation of the discrepancy between the theory and test sections of the report and the input section of the report.

Because the basic concepts were specific to other repository sites and not suitable for Yucca Mountain, we did not try to identify all the errors nor to correct them. Thus our list is incomplete, but enough to deter us from further consideration of this code.

REFERENCES

1. "WAPPA: A Waste Package Performance Assessment Code" by INTERA Environmental Consultants Inc. for Battelle, Office of Nuclear Waste Isolation, Report ONWI-452 (April 1983).
2. W. J. O'Connell and R. S. Drach, "Waste Package Performance Assessment: Deterministic System Model Program Scope and Specification", UCRL-53761, Lawrence Livermore National Laboratory, Livermore CA (October 1986).