

MAR 31 1988

CHP/A4171 VOL 4 COMMENTS

- 1 -

Dr. Charles G. Interrante, Program Manager  
Metallurgy Division - Corrosion Section  
National Bureau of Standards  
U.S. Department of Commerce  
Gaithersburg, MD 20899

Dear Dr. Interrante:

We have reviewed the draft of Volume 4 of "Evaluation and Compilation of DOE Waste Package Test Data, Biannual Report" covering the period August 1987 through January 1988 and are submitting our comments in the attachment to this letter.

Actions resulting from this letter are considered to be within the scope of FIN A-4171. No changes in costs or delivery of contracted products are authorized. Please notify me immediately if you feel this letter will result in additional costs or delay in delivery of contracted products.

Sincerely,



Charles H. Peterson, Project Manager  
Materials Engineering Section  
Technical Review Branch  
Division of High-Level Waste Management

cc Dr. Neville Pugh, Director  
Metallurgy Division

Dr. Dale Hall, Group Leader  
Corrosion Group, Metallurgy Division

Attachment:  
As stated

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PDR WMRES EUSDOC  
A-4171 PDR

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WM-11  
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MAR 3 1 1988

CHP/A4171 VOL 4 COMMENTS

- 2 -

OFFICIAL CONCURRENCE AND DISTRIBUTION RECORD

LETTER TO: Dr. Charles G. Interrante, Program Manager  
 Metallurgy Division - Corrosion Section  
 National Bureau of Standards  
 U.S. Department of Commerce  
 Gaithersburg, MD 20899

FROM: Charles H. Peterson, Project Manager  
 Materials Engineering Section  
 Technical Review Branch  
 Division of High-Level Waste Management  
 Office of Nuclear Material Safety and Safeguards

DATE:

MAR 3 1 1988

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CONCURRENCES

ORGANIZATION/CONCUREE	INITIALS	DATE CONCURRED
HLTR/CHPeterson	<u>CP</u>	88/03/31
HLTR/RAWeller	<u>RAW</u>	88/03/31

COMMENTS ON DRAFT REPORT

EVALUATION AND COMPILATION  
OF DOE WASTE PACKAGE TEST DATA  
VOLUME 4 - AUGUST 1987 TO JANUARY 1988

General Comments

1. The format and content of Volume 4 are consistent with those of the previous three volumes. However, in the light of recent discussions with NBS regarding the addition of information fields to each record in the data base, NBS should anticipate changes for Volume 5 in the preparation of each forthcoming monthly letter report. After proposed changes have been mutually agreed upon, existing records should be modified as time permits, but on a priority basis.
2. Each semiannual report should have a section entitled "Status of the Database" giving information on how many records by each material of interest are in the database as of the date of the report. These areas would include:
  - a. Iron
    1. Ferrous materials
    2. Ferrous alloys
  - b. Copper
  - c. Titanium
  - d. Glass
  - e. Ground waters
  - f. Minerals
  - g. Clays

This section should also state how many of the records are considered important to licensing and how many have been given a critical, i.e., an in-depth, review.

3. There should also be a section describing technical questions that have been identified by the reviews and indicating those NBS recommends for study.
4. We suggest certain editorial changes as indicated in the markup we are sending you.
5. The structure of the various sections of the report should be parallel. Section 2.0 has four subdivisions whereas Section 3.0 has only two although it covers radiation effects, pitting, copper alloys, corrosion

cracking, and sorption. Some subheadings should be used. Also, this section offers conclusions whereas none of the other main sections of the report do. Section 5.0 contains a subheading on technical issues, which would appear appropriate for all the major sections of the report.

6. Many of the sections appear to state what one investigator or another did but do not state any specific findings. The NRC is interested in identifying specific technical problems in time to formulate and carry out plans for developing answers to these problems.
7. Comments on the data reviews are given in the markup.

Specific Comments

1. p i, Line 11

Since this is an Abstract, insert after "During the reporting period" the words "August 1987 to January 1988".

2. p i, Line 14

Two issues were identified for the Yucca Mountain site. Were any other technical issues identified in the 25 reviews given in Appendix A?

3. p i, Line 19

The source of the study of copper and copper alloys should be identified (DOE, NBS, national lab, etc.).

4. p iv, ¶2

Delete the second sentence.

5. p iv, ¶3

In the last sentence, identify when the principal technical questions were cited.

6. p v, ¶3

State briefly what the advantage(s) were for conversion of the database to permit use of the software "Advanced Revelation".

7. p 1, ¶4

The issue stated relative to the McCright work is not stated in the document review beginning p A-10. It was also identified by NRC Staff at the time of the EA reviews. Some rephrasing is needed to convey a more accurate perspective on this issue.

8. p 2, ¶1

If surface finish is a critical factor, the Executive Summary would be enhanced by stating this quantitatively, but briefly. For example, data from polished specimens had standard deviations only one-fifth as large as those from unpolished specimens, if this were the case.

9. p 2, ¶6

No reports on laboratory work at NBS under FIN A4171 are included in Volume 4. How will such work be reported?

10. p 2, ¶6

The results of the review of Zircaloy corrosion is to be released for NRC comments within the next several months, while those for the pitting corrosion study will be published in about 6 months. What determines these time schedules? Can some preliminary findings be made available to the NRC sooner?

11. p 3, ¶2

In what ways is Advanced Revelation "more powerful" than the previous software? How much faster is it?

12. p 4, ¶2

How were the five documents reviewed selected?

13. p 4, ¶3

Identify at least approximately the time period during which the temperatures in the repository are decreasing.

14. p 5, ¶1

Were the exposure periods continuous? Was the sensitization done by heating? Is SCC failure through cracking? "Low corrosion rates" and "more attack" should be expressed quantitatively. "Several cases" should be expressed as "in x out of y cases". Does "resistant to pitting" mean no pitting was observed?

15. p 5, ¶3

What kind of specimens were used that permitted crevice corrosion?

16. p 6, ¶1

Keep J- together with 13.

17. p 6, ¶2

We would gather that several test periods ranging from 14 to 280 days were used. State how many periods were used. The second sentence should then be "After these periods,..."

18. p 6, ¶5

If Bibler stated that "...radiolysis of Teflon increases the leaching rate of glass...", NBS should comment on this statement. One may make the observation that increased leaching was associated with radiolysis, but do the data permit making a cause-and-effect deduction?

19. p 7, ¶1

We suggest "mentioned" instead of "stressed".

20. p 7, ¶3

Quantify "intense gamma radiation".

21. p 7, ¶3

The text should state that (no)(very little)(insufficient) work has been done on elucidating the effect of temperature on the nature of the corrosion mechanisms.

22. p 7, ¶3

What is the danger anticipated for hydrogen absorption in materials used in waste packages?

23. p 7, ¶4

Recently, the database was searched for pitting corrosion models and none were found. The Beavers report reviewed discusses modeling studies of pit propagation. Was this report not in the data base at the time of the search?

24. p 8, ¶2

The Duncan work is characterized as "very limited testing" and having a "large scatter in the data". Could this have been noted by a preliminary scan of the document before undertaking a review of it? The results do not seem to be useful because of their uncertainty.

25. p 8, ¶3

Delete the first sentence as obvious. Begin the next with "An elaborate method..." Later in the paragraph, state whether the Salter studies were laboratory or paper studies.

26. p 9, ¶2

The first conclusion does not appear to be based on the summary of the reviews presented in Section 3.1. The second should be deleted as obvious. In their place, what would be useful is a (partial) list of open questions.

27. p 9, ¶4

Rephrase the lead-in sentence to the list to : "Several problem areas connected with the development of this site have been identified: "

28. p 10, ¶4

Where multiple authors are involved, we recommend the citation read, e.g., "(Westerman et al., 1986)".

29. p 10, ¶6

Delete "...cited by NBS...".

30. p 11, ¶1 and 2

Delete the statements about information not being directly applicable to the tuff site but are supplementary in nature, unless NBS can make the connection more specific. It would be acceptable at this stage to simply state this work was nearly complete at the time of the deletion of two potential repository sites and was therefore completed rather than discarded.

31. p 11, ¶3

NBS should comment on Barkatt's conclusion about the superiority of the pulsed flow technique. The contract calls for evaluation as well as compilation of a database.

32. p 12, ¶1

Something seems inconsistent: if Chapter 1 of Mendel, 1984, provides experimental data, why is the information considered by NBS to be qualitative? In any case, what are some examples of this qualitative information?

33. p 12, ¶2

Surely there must be something useful in Chapter 7 of Mendel.

34. p 12, ¶3

Which five papers on leaching?

35. p 12, ¶4

This paragraph appears to repeat material stated earlier. Also, were there no specific findings of importance?

36. p 12, ¶5

The tentative conclusion that "...There are indications that the ionic strength has a significant effect on the leach rate..." is obvious to a student of general chemistry on the basis of the Law of Mass Action. If the report has nothing better than this to offer, we would recommend setting it aside.

37. p 13, ¶1

The report states that "...the tests confirmed that the solubility of Si in aqueous media is lower when Al is present and that Al has a lower solubility in the presence of Si..." The second part is redundant, and overall the statement is a complicated way of saying something that would have been expected without testing.

38. p 13, ¶1

Are temperature and pH the only variables affecting solubilities?

39. p 18, ¶4

Explain "...the common five metal epsilon ruthenium phase..."

40. p 22, ¶4

The text refers to three figures in which the normalized mass loss is plotted against time. Although it is probably true that only persons familiar with glass leaching would be reading these reviews, it is possible to lose sight of the fact that the ordinates really represent a calculated glass loss assuming congruent leaching, and not the loss of the particular element measured in the leachate. The text should include some words to clearly make this distinction.

41. p 23, ¶3

What is the NBS/NRC directory of nuclear waste data? From whom is it received?

FROM

Dept of Commerce

DATE OF DOCUMENT	DATE RECEIVED	NO
2/29/88	3/4/88	WM-88036
LTR	MEMO	REPORT
XX		
ORIG.	CC	OTHER
	XX	
ACTION NECESSARY	CONCURRENCE	DATE ANSWERED
<input checked="" type="checkbox"/>	<input type="checkbox"/>	BY 3/25 4/1
NO ACTION NECESSARY	COMMENT	
<input type="checkbox"/>	<input type="checkbox"/>	
CLASSIF	POST OFFICE	FILE CODE:
	REG. NO.	486.1
DESCRIPTION (Must Be Unclassified)	REFERRED TO	DATE
Dft Biannual Report Aug 1987 through January 1988	RBallard	3/4
	CPeterson	
ENCLOSURES		
Action closed per letter to Charles Interrante, NBS from Charles Peterson dated 3/31/88.		
REMARKS		

FROM <b>Dept of Commerce</b>		DATE OF DOCUMENT <b>2/29/88</b>	DATE RECEIVED <b>3/4/88</b>	NO <b>WM-8803</b>
TO <b>Charles Peterson</b>		LTR <b>XX</b>	MEMO	REPORT
CLASSIF		ORIG.	CC	OTHER
POST OFFICE		<b>XX</b>		
REG. NO.		ACTION NECESSARY <input checked="" type="checkbox"/>	CONCURRENCE <input type="checkbox"/>	DATE ANSWERED
DESCRIPTION (Must Be Unclassified)		NO ACTION NECESSARY <input type="checkbox"/>	COMMENT <input type="checkbox"/>	BY <b>3/25 4/1</b>
ENCLOSURES		FILE CODE: <b>406.1</b>		
<b>Action closed per letter to Charles Interrante, NBS from Charles Peterson dated 3/31/88.</b>		REFERRED TO	DATE	RECEIVED BY
		<b>RBallard</b>	<b>3/4</b>	
		<b>CPeterson</b>		
REMARKS				