AUG 2 1988

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 NBS' Monthly Letter Report for May 1988 for FIN A-4171, "Evaluation and Compilation of DOE Waste Package Test Data." Comments on the MLR are presented below in Attachment 1.

Perhaps it is timely to restate our perception of the purpose of the database NBS is compiling for the NRC. As you know there are other databases available to us which give us access to lists of documents and to (eventually) the complete contents of those documents. The NBS database is intended to go beyond this capability and access the significant information content of the documents. Thus, it is useful to know there are 175 (for example) documents dealing with stress corrosion cracking. However, someone still has to read these documents and decide which ones present definitive information on environments in which this failure mode can occur as well as causes and mechanisms for it. The challenge is to exercise judgment in selecting documents for in-depth review and then extracting the significant results and conclusions. We continue to be receptive to any suggestions from NBS on improvements in the database structure and contents as well as productivity.

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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,

C. H. Peterson

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

Enclosures: Att. 1

cc: w/Att. 1:

Dr. Neville Pugh, Director
Metallurgy Division

Dr. David Anderson, Group Leader
Metallurgy Division

DISTRIBUTION WITH ATT. 1

Central File	NMSS/RF	HLTR/RF	
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ATTACHMENT 1
COMMENTS ON MONTHLY LETTER STATUS REPORT
MAY 1988 (FIN A4171-7)

1. Cover letter

   Please change two items in the distribution to read as follows:

   NMSS PM (4)
   WM Docket Control Center (1-Original)

2. Pg 2, NNWSI, ¶2

   The summary comment on the Knauss report states that the authors think that the increase in dissolution rate above pH 6 suggests a change in mechanism. We would like to see NBS challenge such statements. The change in pH simply means the concentration of hydroxyl ions has increased and thus if there is a reaction dependent on such ions the law of mass action would necessarily indicate an increase in reaaction rate but not necessarily a change in mechanism.

3. Pg 2, NNWSI, ¶3

   Rephrase the lead sentence to make clear one is now talking about the second report, e.g.:

   "In the second report, the possible mechanisms..."

4. Pg 3, NNWSI, ¶1

   Similarly:

   "The third report describes..."

5. Pg 3, NNWSI Reports

   The Ross report on disruption scenarios and the Oversby report on testing for non EQ3/6 data seem to be somewhat remote from direct waste package concerns. Similarly, UCRL-53767 on geomechanics of spent fuel testing, the Ramirez report on electromagnetic mapping of in situ water, and UCRL-53795 on tuff/J-13 interactions should be reviewed by rock mechanics, hydrology and geochemistry, respectively. Please minimize the time spent, at this time, on these reports.

By way of guidance, our focus should be on reports dealing directly with questions such as those previously identified as issues:

Penetration of the waste canister
Dissolution of the waste form (glass, spent fuel)
Escape of radionuclides from the canister
Speciation of the emerging radionuclides
Internal degradation of the canister

We need both intensive coverage of particular subjects but also sufficient coverage of other subjects to be able to make a determination as to how far to pursue information on such other, perhaps secondary, subjects.

Thus, the report on carbon-14 in waste packages might merit inclusion in Category 1 in preference to one of the reports on spent fuel dissolution. If the latter reports are being generated monthly, perhaps it would be sufficient to review the summary (quarterly, semiannual, or annual) report. The report on thermodynamics of ruthenium perhaps should also be merely entered into the data base at this time with some comments as to the apparent quality of the information.

All of these reports do have some relevance to waste package concerns, but resources do not permit more than cursory examination of peripheral areas. We have to assume that other disciplines are covering these areas. Perhaps some interim approach is needed. One suggestion would be to include in the MLRs a two or three sentence description of what each report deals with.

6. Pg 6, Vitrified Waste Form Reports

In Category 1, the review of PNL summary report on leaching mechanisms has been underway for several months. When will this review be completed?

In Category 2, Item 6 should be moved into Category 3. Item 2, the proceedings of the MRS Symposium includes a large number of papers. Is it possible to scan this volume and select perhaps a half-dozen of the (apparently) most relevant papers for review?

7. Pg 7, Task 2

We had inquired some time ago as to output from this task. As suggested previously, as a reviewer completes his/her review of a particular document, it should be possible at that time to itemize one or more tests or investigations worthy of pursuit. Perhaps we should have a monthly

seminar to review observations of reviewers and thereby identify the most attractive possibilities.

8. Pg 7, Task 3 - Laboratory Testing

We request that an updated test plan and schedule be submitted by the end of August 1988 for all the laboratory investigations underway. The test plan need not go into great detail, but should indicate what tests are contemplated and what the purpose of each is. Please include a summary of significant findings. This information is needed for planning for the coming fiscal year.

9. Pg 8, Zircaloy Corrosion

It is reported that Zircaloy passivates in J-13 water. As we understand it, there is still some small current under these conditions. To what corrosion rate does this correspond? Please also report the breakdown voltage in terms of the standard hydrogen electrode. What is the nature of the plot of degradation vs time? Is it linear? Is there much scatter in the data?

10. Pg 9, Search Strategy

We request that the search strategy be included in each month's MLR. Again we note that the strategy does not specifically search for models. In view of our efforts to investigate the question of extrapolation of short term data, we need input on progress being made in modelling and determination of mechanisms.

11. Financial Reports

As discussed recently, there are still some questions about the meaning of some of the items in the financial reports being submitted. NBS currently is sending us Cost Center Reports and Labor Journal Reports. The latter are for each pay period and appear to be complete. The CCRs cover one or more pay periods, which makes it difficult or impossible to compare figures from the two sets of reports. For example, we can add the LJR figures for pay periods 1 and 2 of CY88 and compare them with the differences in totals shown in the CCRs for pay periods 2 of CY88 amd 26 of CY87. The total labor and overheads are shown as 50920 for the LJRs and 49462 for the CCRs. To what is the difference due? There is also a difference of 4035 in the subtotal for the sponsoring division, and although the LJRs show 4247 for "Other Divisions", only 135 is shown on the CCRs.

The tabulations for other costs in the CCRs do not make clear how much was spent in the current month because of the carryover of unliquidated obligations. For the purposes of tracking expenditures on a monthly

basis, we suggest the format shown in Table A be used. Please advise if you wish to make any changes in this format. The one-line statement should be continued, but the detailed statements may be discontinued. Please advise, however, if there is a significant change in the distribution of charges in the direct labor category.

12. Attachment B - Draft Reviews

Glass et al. Gamma Radiation Effects on Corrosion (of stainless steels)

a. AMOUNT OF DATA

Under "Tables", Item 1 states that the composition of "the metal" was given. Was only one composition used?

b. Under "Figures", Item 3 is confusing: what is the "open circuit potential of pressure"? Was a voltage or a pressure plotted against time?

c. Item 5 suggests hydrogen peroxide was added dropwise as a 30% solution. This does not appear to be good experimental technique; greater accuracy would be obtained by adding 5 ml of a dilute solution. Was the solution analyzed for peroxide to determine whether any was consumed during the test? Were blanks run? NBS should pose questions like these to help make an assessment as to the quality and credibility of the data.

d. In Item 7, what was the oxygen content of the argon used as a purge gas? Was the oxygen content of the purged solution measured? What kind of gas distributor was used? What was the effect of the argon purge?

e. Reading the descriptions of the figures supports the following observations with respect to the structure of the document review:

1) The review should state how many tests or kinds of tests were done, e.g. x potentiodynamic scans of three metals, or 3 x 4 x 5 matrix with three replicates.

2) The descriptions of the figures should include what was shown by each figure.

f. The conclusions include speculations by the writers. Were these discussed in the report?

g. The first conclusion is not new. How do the authors distinguish between effects attributable to peroxide added and radiolytically produced oxidizing substances?

h. Was there any attempt to determine whether certain species were in fact adsorbed?

Table A

Cost Report for (Month, Year)

	Current Expense	Unliquidated Obligations	Cumulative Expense
Compensation			
Sponsoring Division			
Professional			
Technical Support			
Other Divisions			
Project Management			
Administration			
Benefits			
Overhead			
Other Costs			
Sci/Tech Services			
Supplies			
Equipment			
Travel			
Personnel Expense			
Other			
Totals			

Notes

1. Compensation is Base Rate plus Leave Surcharge.
2. Sci/Tech Services is the sum of NBS Cost Center Statement (CSS) Items 27.7 and 29.7.
3. Supplies is the sum of CSS Items 26.1 through 26.7.
4. Equipment is the sum of CSS Items 31.1 and 31.3.
5. Travel is the sum of CCS Items 21.0 through 21.5.
6. Personnel Expense is the sum of CSS Items 11.5, 22.6, 26.8, 29.3, 29.4, and 67.2.
7. Other is the sum of all other items on the CSS. If any item in this group is more than 5% of the total monthly expense, identify such item.

i. What is the basis for conclusion 3 that the (observed) potential shifts are due to generation of oxidizing species in the solution layers adjacent to the stainless steel surfaces?

j. There should be some conclusion about the extent of pitting observed.

k. Conclusion 5 begins with a statement that "...the susceptibility of 316L stainless steel to pitting is not increased under gamma irradiation...". We would consider this as an example of a highly significant finding and of the kind of information that needs to be flagged by inclusion in the document reviews. As a preliminary finding, it clearly needs to be followed up. Did the authors discuss their speculations on reactions with oxygen vacancies and on film-repair?

l. The expectation of no spontaneous repassivation noted under GENERAL COMMENTS OF REVIEWER appears to oppose the finding stated in k, above.

m. The authors' abstract is an example of a poorly written one. Basically, it is vague and non-specific. In view of the limited resources available for this task, it is recommended that abstracts not be included unless they clearly state what questions were addressed, what kind of study was performed, what was found, and what the significance of the work is.

Reed and Konynenburg. Effect of Ionizing Radiation on Moist Air Systems.

a. As a literature review, this document can serve as an important branch point in conducting a search for information on its subject. Therefore, each reference cited and discussed should be identified, significant findings should be noted, and an opinion of the reviewer entered as to whether the findings appear valid. If the information in the document is not judged relevant to waste package concerns, then it should not be reviewed. This suggests that the database structure should include some indication of the character of the review. Perhaps under GENERAL COMMENTS OF THE REVIEWER the first entry should be a characterization such as Type 1, or Critical Review. Even though this may be obvious by the length of the review, in conducting a search for information one could then search first for Type 1 reviews.

b. The authors' abstract in this case is appreciably better than the one for the previous document. The mention of "mechanistic evidence" identifies this document as one that should be reviewed in greater detail. The abstract could be improved by inclusion of at least one or two of the most important findings.