

MAY 13 1988

CHP/A4171 F&C GUIDE R1

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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 NBS recommendations with respect to modification of the waste package database structure in your letter of April 27, 1988. As we have discussed, the objective is to add certain information that would enhance the utility of the database for NRC needs, which are ultimately future licensing concerns but currently are concerns with management of technical assistance contracts.

We also wish to take advantage of the TLSS (Transitional Licensing Support System) in operation here at the NRC. One consideration is the full text retrieval capability of this system with future capability for figures and graphs. This means that your staff can focus on determining the information content of each document reviewed. The present database does have much descriptive information, but more emphasis needs to be placed on what was found or learned by the author's investigations.

Attachment 1 is based on our discussions and your recent recommendations and represents the proposed next step in the evolution of the database. Your staff should review this document within the next two weeks so that if there are any further modifications these may also be incorporated in the revised structure.

Some effort should be devoted to devising tests of the database in its ability to provide answers to technical questions. For a given question, a search might identify 20 to 30 documents that appear relevant. Perhaps there are other ways in which the information in these documents can be indexed to expedite scanning them for the few that provide the desired information. Another step is to write state-of-the-art papers on particular subjects such as stress corrosion cracking of stainless steels. A near term objective is to effect closure on as many of the technical issues on materials of construction as possible. These efforts should involve collaboration with the Office of Nuclear Research (RES) and coordination with forthcoming work at the Center.

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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,

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

Enclosure: As noted

cc: Dr. Neville Pugh, Director
Metallurgy Division

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

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ATTACHMENT 1

WASTE PACKAGE DOCUMENT REVIEW FORMAT AND GUIDELINES

DATA SOURCE

Guidelines: Enter full document reference as per appended illustrations. The listing should give the reader enough information to enable him to obtain a copy of the document.

Format: Authors. Title of Document. Document Number. Contractor and Sponsor, if any. Journal Name: Volume Number, Issue Number, Inclusive page numbers. Publisher, City. Date Published.

Example 1: Ogura, K. and Ohama, T. Pit Formation in the Cathodic Polarization of Passive Iron, II. Effects of Ions. Corrosion: Vol. 37, No. 10, 569-574. 1981.

Example 2: Knauss, K. G., Oversby, V. M., and Wolery, T. J. Post Emplacement Environment of Waste Packages. In: Scientific Basis for Nuclear Waste Management VII, Materials Research Symposia Proceedings, Boston, MA, November 1983, G. L. McVay, editor. Vol. 26: 301-318. North-Holland, Elsevier Science Publishing, Inc., New York. 1984.

Example 3: Braithwaite, J. W. and M. A. Molecke. Nuclear Waste Canister Corrosion Studies Pertinent to Geologic Isolation. SAND79-1935J. For U.S. DOE by Sandia National Laboratories, Albuquerque, NM. October 1979.

DATE REVIEWED

Guidelines: Give the date the review was completed. Add additional dates for subsequent revisions.

Example: 11/25/86; Revised 12/01/86.

PURPOSE/SCOPE (New)

Guidelines: Enter verbatim, in quotes, the author's stated purpose. If no purpose was stated, the reviewer's perception of the purpose should be entered. Here, as elsewhere in the review, it shall be understood that all material in quotes are the author's words and all material not in quotes represent paraphrases or interpretations by the reviewer. Enter the scope in a separate statement. Scope may be omitted if sufficient description of the boundaries of the work is given in other sections of the review.

Example: "The purpose of this work was to investigate the effect of pH on the passivation of selected stainless steels."

Or: The purpose of this work (appears to have been) to investigate the effect of pH on the passivation of selected stainless steels.

"This work was limited to use of deionized water and J-13 well water, and also did not include prestressed specimens."

CONTENTS (New)

Guidelines: Give a summary description of the contents of the document.

Format: Total number of pages, figures and tables. Titles of main sections with number of pages in each.

Example: 70 pages with 46 figures and 20 tables. Literature survey of stress corrosion cracking: 15 p. Geochemical conditions in tuff: 1 p. Test methods: 14 p. C-Ring test results: 25 p. Water chemistry measurements: 8 p. Discussion and Conclusions: 2 p.

TYPE OF DATA

Guidelines: Item (1) should show the nature of the work reported, e.g., Experimental, Theoretical, Literature Review, Data Analysis.

Item (2) should list the phenomena studied, e.g., Corrosion, Creep, Fatigue, Leaching, Pitting, Hydrogen Embrittlement, Debonding, Dealloying, etc.

Example: (1) Literature Review
(2) Passivation of stainless steels

MATERIALS/COMPONENTS

Guidelines: List the materials studied and if used in particular forms list those forms. It is not necessary to be exhaustive.

Example: Incoloy 825 and Types 304L, 316L and 321 austenitic stainless steels. C-Ring specimens.

TEST CONDITIONS (Revised)

Guidelines: Give the test plan, if any. List experimental conditions.

Example: Test Plan 2 Materials x 2 Test Environments x 3 Test Times x
 3 Replicates = 36 specimens.
 Conditions Materials: 304L, 316 Stainless steels
 Environments: Deionized water, J-13 wellwater
 Times: 3, 6, 12 months
 Forms: 0.75-in 0.125-in tubing, 1 x 3 x 0.25-in coupons
 Pretreatment: Annealed, as-is

METHODS OF DATA COLLECTION/ANALYSIS (Revised)

Guidelines: Give concise description of test methods. State what was measured and how it was measured.

Example: Pieces of tubing were bent into a C-Ring shape, which was then a torus of unspecified diameter with a 60° sector left open. Stress was imposed by tightening a threaded bolt mounted on a diameter of the torus so as to pull the arms together. A 60° notch was cut into the outside surface of the torus opposite the opening of the C. No dimensions were given.

After the test period, specimens were cut from the test pieces and after suitable preparation were examined microscopically for microcracks.

AMOUNT OF DATA (Revised)

Guidelines: This field should probably be deleted, but may be retained and not used further.

RESULTS AND CRITIQUE (New)

Guidelines: Significant results of the investigations should be entered here along with critical and evaluative comments by the reviewer. Of particular interest is whether the reviewer agrees with the findings and whether he can identify any flaws, deficiencies, and limitations of the findings. The objective is to determine whether the purpose of the investigator was achieved and whether any final conclusions can be formulated.

Example: No difference in crack initiation was observed between sensitized and unsensitized specimens. However, the author noted that the carbon contents of the specimens were all at the low end of the permissible range for the grades of steels used. Thus, they were less likely to become sensitized. The work should be repeated with steels with higher carbon contents.

UNCERTAINTIES IN DATA

Guidelines: Enter information by the author as to the uncertainties in quantitative data and reliability of the findings.

Example: "The transition temperature for the glass tested was 645°C \pm 35°C."

"Because of the scatter in the data, extrapolation beyond five years does not appear warranted."

DEFICIENCIES/LIMITATIONS IN DATABASE

Guidelines: This information is more appropriately included with the associated findings in the Results section above. Use of this section should then be discontinued.

KEYWORDS

Guidelines: Use the database keyword checklists to choose words which accurately reflect the information given in the document and the document review. Consider the author's keywords. If he has used words not in the database checklists, or if the reviewer believes words not on the database checklists better describe the information content, these may be used and also added under the category "other" at the end of each checklist.

CONCLUSIONS (New)

Guidelines: Enter the author's conclusions in quotes. Sometimes, the document will not have a section explicitly identified as "Conclusions". The reviewer should enter either his understanding of appropriate conclusions or a note to the effect that no conclusions can be drawn. In addition, the reviewer should enter a critical review of the conclusions. A distinction should be made between "Results" and "Conclusions".

Example: "The crack paths are usually difficult to determine but some are definitely intergranular and some are transgranular." This is a result. A conclusion would address the question of what effect the experimental conditions had on the type of cracking. The reviewer might, for example, enter a statement that crack paths were apparently independent of grain boundary locations for the conditions used. He might then comment as to whether this is consistent with his understanding of cracking, or suggest that this finding be compared with the work of others.

GENERAL COMMENTS OF REVIEWER

Guidelines: Enter any comments that do not fit better in one of the preceding fields. The objective is to give the viewer of the review an accurate and fair assessment of the document so that such a viewer would make the correct decision as to the usefulness of the document for answering his questions. Do not enter statements like "More information is needed".

Example: The work reported appears thorough. Adequate controls were included in the test plan. The quality of the data is excellent as indicated by the relatively small standard deviations observed.

RECOMMENDATIONS (New)

Guidelines: List any additional tests the reviewer thinks might be done to firm up the conclusions or explore the effects observed. These tests should occur to the reviewer as a result of his critical review. Newly identified problems will be used to update the NBS list of potential areas of investigation.

Example: The tests should be repeated using unstressed controls which should be examined for pre-existing cracks.

RELATED HLW REPORTS

Guidelines: The numbers of any reports known to be related to the document under review should be entered here.

APPLICABILITY OF DATA TO LICENSING

Ranking: Key Data () Supporting Data ()

Guidelines: Put an X in the Key Data box if the document contains information that is of sufficient quality that it must be considered by the NRC in an evaluation of a licensing application. It must meet at least one of the following criteria:

- (1) It is an in-depth review of the pertinent literature.
- (2) It contains data that is especially significant after being assessed for scientific quality and merit.
- (3) It contains data with such a small uncertainty that it must be considered in a performance evaluation of a license application.

Otherwise, put an X in the Supporting Data box.

Licensing Issues

- (a) Relationship to Waste Package Performance Issues Already Identified
- (b) New Issues
- (c) General Comments

Guidelines: Leave blank if the issues are not clear to the reviewer.

Example:

- (a) Relationship to Waste Package Performance Issues Already Identified

The report provides supporting data for Issue 2.1.3.1 regarding how radiolysis affects the chemical nature of the groundwater reaching

the waste package container and for Issue 2.3.5 regarding how the release rate of radionuclides is likely to be affected by radiation.

- (b) New Issues
- (c) General Comments

The relationship to the cited Issues appears peripheral.

AUTHOR'S ABSTRACT (New)

Guidelines: Do not automatically include the abstract. Many are poorly written, do not give useful information, and do not adequately describe the contents of the document. A good abstract will state what was done, state how the work relates to some larger problem, and give some quantitative findings as well as some important conclusions.