



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

K Cook

JAN 09 1984

WM DOCKET CONTROL  
CENTER

MEMORANDUM FOR: Everett Wick, WMEG/NMSS  
FROM: Michael McNeil, WMB/RES  
SUBJECT: PITTING OF CARBON STEEL IN BWIP GROUNDWATERS

John Beavers (BCL) just called me and told me that they have completed an important corrosion measurement in commercial cast carbon steel in BWIP-type groundwaters. The experiment was done in 10-fold concentrated groundwater at 250°C with the sample only partially submerged (to simulate performance in the 30-year time frame). The sample showed catastrophic pitting above the water line.

Dr. Beavers will make an series of further tests in an effort to understand this phenomenon. One possibility (which is being explored) is that this is due to the inclusions in the commercial alloy and will not occur in a clean steel.

'84 JAN 10 10:09  
RECEIVED  
JAN 20 1984  
T.R. McNeil  
ASA P  
This  
See me  
11:45

Michael B. McNeil  
Waste Management Branch  
Office of Nuclear Regulatory Research

WM Record File 101 WM Project 10  
Docket No. \_\_\_\_\_  
PDR ☒ \_\_\_\_\_  
LPDR ☒ \_\_\_\_\_  
Distribution: \_\_\_\_\_  
EWick \_\_\_\_\_  
RWR:gt \_\_\_\_\_  
(Return to WMA, 523-SS) C2

M. Smith  
You may  
want to  
call Beavers  
and ask him  
about his  
results.

SK Cook  
1/16/84.  
8401190543



Rockwell International

Rockwell Hanford Operations  
Energy Systems Group

No. 10330-84-008

COPIES TO

TELEPHONE CONFERENCE

		Time 2:00 pm	Date January 27, 1984
R. L. Fish	W. J. Anderson	<input type="checkbox"/> Incoming	<input checked="" type="checkbox"/> Outgoing
R. P. Anantatmula	E. L. Moore	With R. L. Fish & R. P. Anantatmula	
T. B. McCall <i>TBM 2/3/84</i>	J. H. LaRue <i>JHL</i>	Representing Engineered Barriers Design Development and Analysis Group	
M. J. Smith <i>MJS 2/5/84</i>	L. R. Fitch/E. B. Ash	With J. A. Beavers	
F. Salter	P. E. Lamont	Representing Battelle Columbus Laboratories (BCL)	

Commitment Made

☐ Yes

☒ No

File

Purpose Of Telecon

To discuss NRC Memorandum, McNeil to Wick, "Pitting of Carbon Steel in BWIP Groundwater"  
(See attached memorandum).

Text Of Telecon

We called Dr. Beavers to inquire in more detail concerning the test conditions and results reported in the subject NRC Memorandum (attached). The very first thing he said was, "I'm not convinced that I had pitting." He went on to explain that the observed "pits" may have been the result of voids in the cast steel or fall-out of inclusions caused by preferential dissolution. He is going to examine the specimens in detail to see if this indeed is the case. Neither of these possibilities would be of concern from a corrosion susceptibility perspective, but would be related to processing.

John is going to repeat the experiment using identical parameters and using more specimens to see if the results are reproducible. A portion of each of two cylindrically shaped specimens (only one specimen exhibited anomalous behavior) was exposed to deaerated 250°C synthetic groundwater at composition levels ten (10) times greater than the actual anion and cation concentrations measured in Grande Ronde groundwater. The other portion of each of the two specimens was exposed above the groundwater level to a nitrogen/steam cover. The anomalous behavior was observed above the water line only (not at the interface).

In other groundwater environment corrosion tests conducted for 1000 hr. on cast and wrought low carbon steel, the tests indicated uniform corrosion rates (linear kinetics assumed) of 1 to 2  $\mu\text{m}/\text{yr}$  using standard (1x) synthetic basalt groundwater and 6 to 8  $\mu\text{m}/\text{yr}$  using "10x" composition groundwater.

*R. L. Fish*  
R. L. Fish/R. P. Anantatmula  
(Signature)

*1/31/1984*  
(Date)



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Rockwell Hanford Operations  
Energy Systems Group

No. 10700-84-035

COPIES TO

TELEPHONE CONFERENCE

		Time 8:15 a.m.	Date January 31, 1984
P. A. Salter	R. J. Wright (NRC)	<input type="checkbox"/> Incoming	<input checked="" type="checkbox"/> Outgoing
M. J. Smith	R. F. Cook (NRC)	With Bob Wright, Dave Brooks Phil Justus	
J. H. LaRue	L. R. Fitch	Representing NRC	
A. C. Rutz	J. E. Mecca (DOE-RL)	With P. A. Salter, J. H. LaRue, A. C. Rutz	
F. B. Ash	P. Lamont (DOE-RL)	Representing Basalt Waste Isolation Project	
Commitment Made <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		File Geochemistry	

Purpose Of Telecon

Nuclear Regulatory Commission (NRC) requested some clarification regarding Tables I and IV of SD-BWI-DIC-001 (Status of NRC Concerns Pertaining to the SCR)

Text Of Telecon

Tasked with the preparation of NRC's response(s) to DIC-001, Mr. Brooks questioned the completeness of Table IV, "Open Items from Tables II and III." Specifically, he wondered why the items listed in Table I, "Major Open Items Identified at June 13-17, 1983 Meeting with Nuclear Regulatory Commission" were not also listed in Table IV. Mr. Rutz responded by explaining that the initial (i.e., May 1983) rationale for the development of Table I was independent of that for Tables II, III and IV and was in direct response to Department of Energy-Richland Operation Office's request for a tabulation of issues posing significant cost and schedule impact on the project. [Note: the rationale for the September 1, 1983 "revision" was, as the title suggests, to tabulate major open items identified at the June issue clarification meetings with the NRC. This was not stated during the conversation although it should be obvious.]

Mr. Brooks stated that he will address, in NRC's response, both Tables I and IV as was requested by Ms. Salter.

(Signature)

(Date)



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Rockwell Hanford Operations  
Energy Systems Group

No. 10110-84-024

COPIES TO

TELEPHONE CONFERENCE

Time

Date

11:00

2/7/84

E. B. Ash

S. M. Price

☒ Incoming

☐ Outgoing

F. R. Cook - NRC

K. Westbrook

With

K. Westbrook

G. S. Hunt

R. J. Wright - NRC

Representing

NRC

J. H. LaRue *JHY*

L. R. Fitch

With

S. M. Price/Geology Communicator

O. L. Olson - DOE-RL

Representing

BWIP/Rockwell

Commitment Made

☐ Yes

☒ No

File

Rec. Ret. (2) - Letterbook

Purpose Of Telecon

To discuss timing of phone call regarding NRC/DOE/BWIP Geology Meeting

Text Of Telecon

Kristine called to relay that Bob Wright would be back in the office on

Monday, February 13, 1984. She suggested that it would be most

beneficial to place a phone call on the day of his return at 11:00 (PST)

to discuss the contents of the upcoming NRC/DOE/BWIP geology meeting.

I also discussed with her the borehole location information that

she had listed in the February 3, 1984 telecon to Jim Mecca of DOE;

this information should be available at the time of the geology

meeting.

*S. M. Price*  
(Signature)

*2/9/84*  
(Date)