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September 12, 1980

Mr. Paul W. O'Connor, Project Mgr.  
Operating Reactors Branch 5  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Dresden Station Unit 1  
Chemical Cleaning Solidification  
Test Results  
NRC Docket No. 50-10

Dear Mr. O'Connor:

Enclosed for your use is information pertaining to the July 9 and 10, 1980, field demonstration of the Dresden 1 chemical cleaning solidification system. Attachment "A" outlines the corrosion test results for  $t=0$ ,  $t \geq 30$  days, and  $t \geq 60$  days sampling intervals.

Also enclosed, in Attachment "B", are the results of a laboratory corrosion rate study which is being performed. These results were previously discussed with NRC staff personnel at Dresden on August 14, 1980.

Please address any questions concerning this matter to this office.

One (1) signed original and thirty-nine (39) copies of this transmittal are provided for your use.

Very truly yours,

Robert F. Janecek  
Nuclear Licensing Administrator  
Boiling Water Reactors

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## ANALYSIS OF 30 & 60 DAY CORROSION TEST RESULTS

(Ref: Test Procedures for NS-1 Solidified Waste; handout prepared for the NRC, dated July 9, 1980)

The purpose of this test was to determine the corrosion rate of a barrel containing a solidified simulated radwaste produced using actual procedures, equipment and personnel at the Dresden Station Chemical Cleaning Facility.

The  $t \geq 30$  & 60 day results clearly indicate that the samples are well within the 50% minimum wall thickness criteria set by the NRC.

However, it must be stressed that these numbers reflect attempts to make a field demonstration into a "controlled experiment." It would be technically unjustifiable and scientifically unsound, to attempt to extrapolate "meaningful data," from the results of this one barrel and apply it to the barrels which will be generated as a result of the chemical cleaning.

The extrapolation of these data may not necessarily yield relevant long term corrosion rates due to many uncontrollable variables. These variables include tolerances of barrel and paint thickness, distortion due to sample removal, and non-linearity in corrosion rates. As a result, the precision and accuracy of this field test may have affected the reliability of the data (i.e. the sample measurements). This prevents us from attaching significant importance to the corrosion rates in "Attachment A".

To provide more meaningful data, additional laboratory investigations were initiated. This program consisted of placing metal barrel coupons in samples of simulated NS-1 radwaste which had been solidified by the DOW process. These coupons were obtained from DOT 17H carbon steel drums which are representative of the actual barrels which will be used to hold the chemical cleaning radwaste. Both sides of the coupon were in contact with the solidified NS-1. Corrosion rates for these specimens were determined on a weight loss basis. A correction factor was applied to account for the external paint film being removed from the samples during removal from the solidified blocks. The 39 and 229 day results are presented in "Attachment B."

These data show very little corrosion occurs between the solid matrix and the barrel. These low rates indicate insignificant corrosion can be expected for an extended storage period. It is important to distinguish the basic difference between the two attachments. Although the results presented in "Attachment A" are within the NRC imposed guidelines, the data were derived from a field demonstration. "Attachment B" on the other hand, reflects the results of a more precise laboratory investigation.

IML:mnh/6492A  
Attachments  
9/10/80

"Attachment A"  
Corrosion Test Results

| Coupon # | Identification Code |    |   | Wall Thickness (inches) |         |            | % Corrosion* |
|----------|---------------------|----|---|-------------------------|---------|------------|--------------|
|          |                     |    |   | Point 1                 | Point 2 | Mean Value |              |
| 1        | 00                  | Tp | 1 | .0475                   | .0485   | .04800     | -            |
| 2        | 00                  | Tp | 2 | .0470                   | .0480   | .04750     | -            |
| 3        | 00                  | Cr | 1 | .0440                   | .0460   | .04500     | -            |
| 4        | 00                  | Cr | 2 | .0440                   | .0450   | .04450     | -            |
| 5        | 00                  | Bm | 1 | .0450                   | .0450   | .04500     | -            |
| 6        | 00                  | Bm | 2 | .0445                   | .0465   | .04550     | -            |
| 7        | 30                  | Tp | 1 | .0470                   | .0480   | .04750     | 1.04%        |
| 8        | 30                  | Tp | 2 | .0465                   | .0470   | .04675     | 1.58%        |
| 9        | 30                  | Cr | 1 | .0435                   | .0440   | .04375     | 2.77%        |
| 10       | 30                  | Cr | 2 | .0435                   | .0440   | .04375     | 1.69%        |
| 11       | 30                  | Bm | 1 | .0440                   | .0440   | .04400     | 2.22%        |
| 12       | 30                  | Bm | 2 | .0445                   | .0445   | .04500     | 1.10%        |
| 13       | 60                  | Tp | 1 | .0465                   | .0470   | .04675     | 2.60%        |
| 14       | 60                  | Tp | 2 | .0460                   | .0470   | .04650     | 2.10%        |
| 15       | 60                  | Cr | 1 | .0430                   | .0440   | .04350     | 3.33%        |
| 16       | 60                  | Cr | 2 | .0430                   | .0440   | .04350     | 2.25%        |
| 17       | 60                  | Bm | 1 | .0435                   | .0445   | .04400     | 2.22%        |
| 18       | 60                  | Bm | 2 | .0440                   | .0445   | .04425     | 2.75%        |
| 19       | 90                  | Tp | 1 |                         |         |            |              |
| 20       | 90                  | Tp | 2 |                         |         |            |              |
| 21       | 90                  | Cr | 1 |                         |         |            |              |
| 22       | 90                  | Cr | 2 |                         |         |            |              |
| 23       | 90                  | Bm | 1 |                         |         |            |              |
| 24       | 90                  | Bm | 2 |                         |         |            |              |

\* % Corrosion Determined  
Using the Following  
Equation:

$$\frac{\left( \text{Control Sample Measurements} \right) - \left( \text{Sample Measurement at } T \geq 30, T \geq 60 \text{ or } T \geq 90 \right)}{\left( \text{Control Sample Measurements} \right)} \times 100 = \% \text{ Corrosion}$$

"ATTACHMENT B"  
BARREL METAL SURVEILLANCE SAMPLES

DOT Drum Samples Solidified in Spent NS-1 (4 pucks - 2 drum Sample/Puck)  
 Drum Samples - Drum DOT 17H Carbon Steel - External Painted

Solvent NS-1 -- 1050 PPM Fe 600 PPM Ni  
 Net Wt. Solvent 3,956 g  
 Boiled Down to 560 g (Factor of 7)

| <u>Sample No.</u> | <u>Contact Size (Immersed 3.9" total)</u> | <u>Painted Wt.g.</u> | <u>Corrected Weight (No Paint)</u> | <u>After Testing Wt.</u> | <u>Metal Loss, g.</u> | <u>Placed In Test</u> | <u>Removed From Test</u> | <u>Days Tested</u> |
|-------------------|---|----------------------|------------------------------------|--------------------------|-----------------------|-----------------------|--------------------------|--------------------|
| 1                 | 1 15/16"                                  | 11.084               | 11.027                             | 11.0119                  | 0.0161 (0.137%)       | 10/5/79               | 11/13/79                 | 39                 |
| 2                 | 2 3/16"                                   | 11.780               | 11.719                             | 11.7031                  | 0.0159 (0.136%)       | 10/5/79               | 11/13/79                 | 39                 |
| 3                 | 1 15/16"                                  | 11.316               | 11.258                             | 11.249                   | 0.0090 (0.080%)       | 10/5/79               | 5/22/80                  | 229                |
| 4                 | 2 3/16"                                   | 11.3389              | 11.2805                            | 11.269                   | 0.0115 (0.102%)       | 10/5/79               | 5/22/80                  | 229                |