



DOCKET CONTROL
CENTER

Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

'86 APR 21 A11:14

APR 16 1986

Mr. John Linehan, Acting Chief
Repository Projects Branch
Division of Waste Management
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Linehan:

PACKING MATERIAL

This is in response to your letter of February 26, 1986, in which you requested information on the BWIP packing-material testing program that was discussed in a January 14, 1986 teleconference between the NRC, DOE/RL, and Rockwell Hanford staff. The information you have requested is provided as follows:

- Enclosed is the illustration of the SCP Conceptual Design of the BWIP Waste Package.
- The tests that have been performed to date on the bentonite/basalt packing material are Backpressure and Hydraulic Gradient Test, Main Hydraulic Conductivity Test, and Main Swelling Pressure Test. Also included are two test reports entitled "Hydraulic Conductivity and Moisture/Density Relationships of Candidate Packing Material" and "Chemical and Physical Properties of Waste Package Packing Materials." Other reports will be provided as they become available.
- Enclosed are the test matrices for the above mentioned tests (also included are pertinent work change instructions). These include the requested test procedures.
- In a subsequent teleconversation, M. J. Furman of my staff advised Paul Hildebrand that a decision had been made not to release the referenced pages of the Final Environmental Assessment prior to the official publication date. I trust that this delay will not significantly affect your activities.

WM Record File

1012

WM Project 10

Docket No. 10

PDR ✓ (w/b)

LPDR ✓ (B)

encl. 243
BWIP
R. 243

8608150342 860416
PDR WASTE
WM-10 PDR

Distribution:

Linehan
Hildebrand
(Re: 623-SS)

1779

Mr. John Linehan

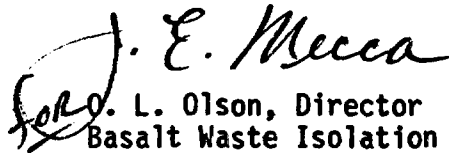
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APR 16 1986

- Also requested during the January 14 teleconference, but not requested in your letter, were estimates of the resaturation of the repository and waste package. These estimates are being made using the GEOTHER model, and the estimates for waste-package resaturation will be completed in December. These estimates will be provided to you when they become available.

Should you have any further questions on this information, please contact D. H. Dahlem on FTS 444-6406.

Very truly yours,


J. E. Mecca

L. Olson, Director
Basalt Waste Isolation Division

BWI:MJF

Enclosures

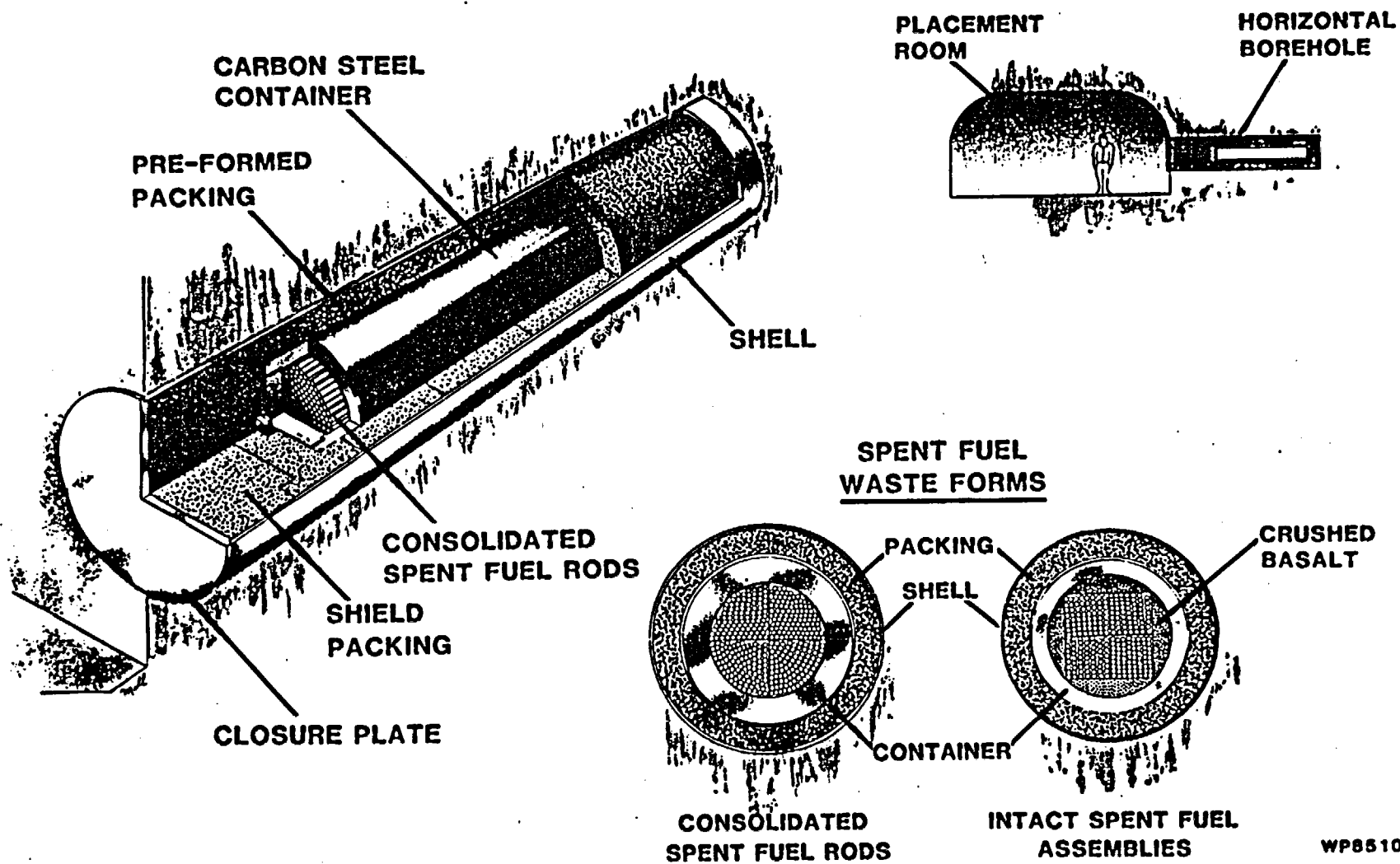


FIGURE 1

WP8510-35

BACKPRESSURE AND HYDRAULIC GRADIENT TEST MATRIX

WORK INSTRUCTIONS

1.0 TEST SUBJECT IDENTIFICATION/PURPOSE

Investigate the effects of hydraulic head gradient and back pressure on the hydraulic conductivity of packing material.

1.1 START DATE: October 1, 1985

2.0 GENERAL DESCRIPTION

2.1 TEST OBJECTIVES

Measure the hydraulic conductivity of packing material as a function of backpressure and hydraulic gradient to establish the experimental conditions needed to prevent changes in density of packing specimens during testing

2.2 TEST METHODS

Sample Preparation and Operation of Permeameter, BOP C-4.23

3.0 TEST CONDITIONS AND LIMITS

3.1 TEST CONDITIONS

Backpressure (3 levels) Pressure above vapor pressure of water at temp

- 1) 50 psi
- 2) 150 psi
- 3) 500 psi

Head gradient (3 levels)

- 1) 10 psi/inch
- 2) 30 psi/inch
- 3) 100 psi/inch

Temperature (1 level) 90°C

Clay density (1 level)	packing density	basalt/clay ratio
	1.6 g/cm ³	75/25 wt %

Total number of tests = 9

3.2 TEST LIMITS

As described in BOP C-4.23

3.3 TEST MATERIALS

Basalt, Reference Cohasset Entablature (RCE)
Groundwater, GR-4

4.0 TEST RECORDS

Test data are to be controlled per BOP C-4.3 and BOP C-4.3.6

5.0 DISPOSITION OF TEST MATERIALS

Any remaining solution samples after analysis will be discarded.
Solids remaining after analysis will be archived in the Materials Control Center as identified in BOP C-4.3

6.0 SPECIAL INSTRUCTIONS

None

Approved:

A handwritten signature in dark ink, appearing to read 'P.F. Salter', is written over a horizontal line.

P.F. Salter, Manager
Engineered Barriers Department

MAIN HYDRAULIC CONDUCTIVITY TEST MATRIX

WORK INSTRUCTIONS

1.0 TEST SUBJECT IDENTIFICATION/PURPOSE

Investigate the effects of temperature, hydraulic gradient, steam alteration, packing bulk density and clay density on the hydraulic conductivity of packing material.

1.1 START DATE: October 1, 1985

2.0 GENERAL DESCRIPTION

2.1 TEST OBJECTIVES

Measure the hydraulic conductivity of packing material with backpressure and low hydraulic gradients using a test matrix of specified temperatures, clay densities (obtained by varying the packing density and basalt/bentonite ratio) and steam treatments for comparison with existing data obtained with high hydraulic gradients and literature data.

2.2 TEST METHODS

Sample Preparation and Operation of Permeameter, BOP C-4.23

3.0 TEST CONDITIONS AND LIMITS

3.1 TEST CONDITIONS

Backpressure and Hydraulic Gradient

(1 level) as determined from previous backpressure and hydraulic gradient test

Temperature (3 levels)

- 1) 90°C
- 2) 150°C
- 3) 200°C

Clay density (4 levels)

packing density

basalt/clay ratio

- | | | |
|----|-----------------------|------------|
| 1) | 1.6 g/cm ³ | 75/25 wt % |
| 2) | 1.9 g/cm ³ | 75/25 wt % |
| 3) | 1.9 g/cm ³ | 65/35 wt % |
| 4) | 2.2 g/cm ³ | 65/35 wt % |

Steam effects (2 levels)

- 1) No steam
- 2) Steam for three (3) weeks at 250°C

Total number of tests = 24

3.2 TEST LIMITS

As described in BOP C-4.23

3.3 TEST MATERIALS

Basalt, Reference Cohasset Entablature (RCE)
Groundwater, GR-4

4.0 TEST RECORDS

Test data are to be controlled per BOP C-4.3 and BOP C-4.3.6

5.0 DISPOSITION OF TEST MATERIALS

Any remaining solution samples after analysis will be discarded.
Solids remaining after analysis will be archived in the Materials Control
Center as identified in BOP C-4.3

6.0 SPECIAL INSTRUCTIONS

None

Approved:



P.F. Salter, Manager
Engineered Barriers Department

MAIN SWELLING PRESSURE TEST MATRIX

WORK INSTRUCTIONS

1.0 TEST SUBJECT IDENTIFICATION/PURPOSE

Investigate the effects of temperature, hydraulic gradient, steam alteration, packing bulk density and clay density on the swelling pressure of packing material.

1.1 START DATE: October 1, 1985

2.0 GENERAL DESCRIPTION

2.1 TEST OBJECTIVES

Measure the swelling pressure of packing material using a test matrix of specified temperatures, clay densities (obtained by varying the packing density and basalt/bentonite ratio) and steam treatments for comparison with existing data obtained with literature data.

2.2 TEST METHODS

Sample Preparation and Operation of Permeameter, BOP C-4.23

3.0 TEST CONDITIONS AND LIMITS

3.1 TEST CONDITIONS

Backpressure, as required to prevent boiling

Temperature (3 levels)

- 1) 90°C
- 2) 150°C
- 3) 200°C

Clay density (4 levels)

packing density

basalt/clay ratio

- | | | |
|----|-----------------------|------------|
| 1) | 1.6 g/cm ³ | 75/25 wt % |
| 2) | 1.9 g/cm ³ | 75/25 wt % |
| 3) | 1.9 g/cm ³ | 65/35 wt % |
| 4) | 2.2 g/cm ³ | 65/35 wt % |

Steam effects (2 levels)

- 1) No steam
- 2) Steam for three (3) weeks at 250°C

Total number of tests = 24

3.2 TEST LIMITS

As described in BOP C-4.23

3.3 TEST MATERIALS

Basalt, Reference Cohasset Entablature (RCE)
Groundwater, GR-4

4.0 TEST RECORDS

Test data are to be controlled per BOP C-4.3 and BOP C-4.3.6

5.0 DISPOSITION OF TEST MATERIALS

Any remaining solution samples after analysis will be discarded.
Solids remaining after analysis will be archived in the Materials Control
Center as identified in BOP C-4.3

6.0 SPECIAL INSTRUCTIONS

None

Approved:



P.F. Salter, Manager
Engineered Barriers Department

Internal Letter



Rockwell International

Date January 14, 1986

No . 75100-86-007

TO: *(Name, Organization, Internal Address)*

• A. F. Noonan

FROM: *(Name, Organization, Internal Address, Phone)*

• G. T. Harper, Manager
• Engineered Barriers Department
• 1135 Jadwin/1100 Area

Subject: • Changes in L2D3 Work Instructions for D. P. Trott and
R. G. Alexander

The following change has been made after consultation between R. G. Alexander, D. P. Trott, J. F. Relyea and M. I. Wood and is satisfactory to all concerned.

Work instructions for "Main Hydraulic Conductivity Test Matrix" and "Main Swelling Pressure Test Matrix" (R. G. Alexander) and work instruction for "Flow-Through Tracer Test Matrix" (D. P. Trott/J. I. Gould) should be changed as follows:

Section 3.1 under "Steam Effects" should be changed from;

"2) Heat for three (3) weeks..."

to;

"2) Heat for one (1) week..."

The temperature (200°C) and relative humidity (90%) conditions for the steam treatment are to remain the same.

G. T. Harper, Manager
Engineered Barriers Department

GTH/JFR/dmt

cc: R. G. Alexander
D. P. Trott
M. I. Wood
LB/File
BRMC (2) 3503/002/W350

Internal Letter



Rockwell International

Date October 21, 1985

75120-85-002

TO Name Organization Internal Address Phone

R. C. Edwards

FROM Name Organization Internal Address Phone

P. F. Salter

Engineered Barriers Department

1135 Jadwin/1100 Area

6-7207

Subject CHANGES IN WORK INSTRUCTIONS FOR R.A. CARLSON ON L2D3

The following changes have been made after consultation between R. A. Carlson, J. F. Relyea and M. I. Wood and are satisfactory to all concerned.

- I. Add two cyclic tests to the "Backpressure and Hydraulic Gradient Test Matrix" to determine the effects of dry heat and moist heat alone and the effects of cycling dry and moist heat.
 - A. After completion of the first test in this matrix, heat the test sample at 200°C and one atmosphere (ie. no backpressure) for three weeks. Upon completion of the dry heat treatment, again measure the hydraulic conductivity of the sample. After measurement of the hydraulic conductivity, heat the sample at 200°C and 90% relative humidity for three weeks. After completion of the moist heat treatment, again measure the hydraulic conductivity.
 - B. After completion of the second test in this matrix, heat the test sample at 200°C and 90% relative humidity for three weeks. Upon completion of the moist heat treatment, again measure the hydraulic conductivity of the sample. After measurement of the hydraulic conductivity, heat the sample at 200°C and one atmosphere for three weeks. After completion of the dry heat treatment, again measure the hydraulic conductivity.
- II. Make the following change to section 3.1 for both the "Main Hydraulic Conductivity Test Matrix" and the "Main Swelling Pressure Test Matrix".

Under "Steam Effects" change from:

2) Steam for three (3) weeks at 250°C to:

2) Heat for three (3) weeks at 90% relative humidity and 200°C.


P. F. Salter, Acting Manager
Engineered Barriers Department

PFS/JFR/tb

cc: R. C. Carlson

M. J. Smith

M. I. Wood

LB/File

BRMC (2) 3503/002/W350