U.S. Department of Energy
Office of River Protection

CCN: 034602

Contract Management Division Mr.
Michael K. Barrett

Dear Mr. Barrett:

CONTRACT NO. DE-AC27-01RV14136 - RESPONSE TO SAFETY EVALUATION REPORT CONDITIONS FOR ACCEPTANCE BEFORE AUTHORIZATION FOR CONSTRUCTION OF THE BASEMAT FOR THE HIGH LEVEL WASTE AND LOWACTIVITY WASTE PARTIAL CONSTRUCTION AUTHORIZATION REQUEST

References: 1) CCN 035515, Letter, R. C. Barr, OSR, to R. F. Naventi, BNI, "Draft Safety Evaluation Report (SER) of the High Level Waste and Low Activity Waste Partial Construction Authorization Request," 02-OSR-0267, dated June 17, 2002.

2) CCN 034798, Letter, R. F. Naventi, BNI, to W. J. Taylor, ORP, "Declaration of Readiness for Partial Construction Authorization Activities," dated June 12, 2002.

3) CCN 024322, Letter, R. C. Barr, OSR, to R. F. Naventi, BNI, "Phase A, Limited Readiness Inspection Report, IR-01-004," 01-OSR-0391, dated October 23, 2001.

4) CCN 022354, Letter, R. C. Barr, OSR, to R. F. Naventi, BNI, "Office of Safety Regulation Safety Evaluation Report of the Limited Construction Authorization Request," 01-OSR-0310, dated August 16, 2001

5) CCN 021691, Letter, A. R. Veirup, BNI, to M. K. Barrett, OSR, "Supplement to Response to U.S. Department of Energy, Office of Safety Regulation Question 01-LCAR-001 on the Limited Construction Authorization Request," dated July 26, 2001.

In the letter cited as Reference 1, the U.S. Department of Energy (DOE), Office of Safety Regulation (OSR) transmitted the draft Safety Evaluation Report (SER) with a number of conditions attached to authorization of the Partial Construction Authorization Request (PCAR). One set of conditions, labeled "Conditions for Acceptance Before Authorization for Construction

of the Basemat," contains four elements; Demand/ Capacity (D/C) ratios, Occurrence Reporting, Emergency Preparedness, and Procedures. With this letter, Bechtel National, Inc. is formally responding to these conditions.

Condition A. 1. - "Provide the demand/capacity ratios for the critical and highly stressed locations .:.".
Response: The requested ratios are provided with this letter (Attachment 1). This attachment includes tables that show the D/C ratio for a number of locations. In **every case, the ratio is shown to be less than one. The information presented has been discussed with the OSR reviewers and the material included in the response will be fully developed in a calculation scheduled to be released by July 22, 2002.**

Condition A. 2. - "Commit to use approved `Construction Occurrence Reporting Plan'...".
Response: As stated in the project response to OSR PCAR question LAW-PCAR-037, the project affirms that Procedure 24590-WTP-GPP-SIND-001-01-0, *Reporting Occurrences in Accordance with DOE Order 232. IA,* **is applicable during Partial Construction. This procedure was cited in the project Limited Construction Authorization Request document entitled** *Construction Occurrence Reporting Plan for Limited Construction,* **which was transmitted to the OSR in Reference 5, and approved by the OSR in Reference 4. The project hereby affirms that the** *Construction Occurrence Reporting Plan for Limited Construction* **and the Procedure, 24590-WTP-GPP-SIND***001-01-0, Reporting Occurrences in Accordance with DOE Order 232.1A,* **will continue to be applicable during Partial Construction, that the plan will be in force, and that all requirements stated in the plan and procedure will be met.**

Condition A. 3. - "Commit to use the approved `Emergency Management Program' and the Emergency Action Plan' ...".
Response: In Reference 3, the OSR determined that the project had a suitable program and plan in place, and authorized Limited Construction based on those plans. As requested, the project hereby affirms that for Partial Construction, the Program 24590WTP-GPP-SIND-019, *Emergency Management Program,* **and the Plan, 24590-WTPGPP-SIND-003,** *Emergency Action Plan* **will continue to be applicable, that the Program and Plan will be in force, and that all requirements stated in the Plan will be met.**

Condition A. 4. - "Confirm identification of specific procedures ...".

Response: As part of the PCAR readiness assessment, the functional organizations evaluated the applicable OSR Inspection Technical Procedures (ITP). The result of this evaluation was provided as Attachment 2 to Reference 5. A detailed response to each ITP applicable to PCAR activities including reference to the applicable procedures, as requested in Condition A.4., used by the functional organization to satisfy that requirement (Attachment 2). In addition, each functional organization evaluated the status of their procedures during the readiness review evaluation. The procedures listed in Reference 2, taken in combination with the procedures cited in the Lines of Inquiry for the PCAR, provide a comprehensive list of the procedures applicable to PCAR activities.

In addition, the entire set of project procedures as provided in the project procedures index is the basis for all project activities including those associated with the PCAR. Based on the statements above, the project hereby confirms that the procedures associated with PCAR activities have been identified as requested in Condition A.4., and further notes that the project is committed to complying with applicable procedures for each activity.

If you have any questions or comments, please contact Mr. Bill Spezialetti at (509) 371-4654.

Very truly yours,

A. R. V eirup

Prime Contract Manager
KF/es

Attachments: Basemat Wall Dowels

cc:

Allen, B. T. w/a Barr, R. C. w/a Beranek, F. w/o Betts, J. P. w/o Chen, K. w/a DOE Correspondence Control w/a Erickson, L. w/o Fein, K. O. w/a Garrett, R. L. w/a Houghton, D. w/a Klein, D. w/a Naventi, R. F. w/o PDC w/a Schwier, J. F. w/o Shugars, D. w/a Spezialetti, W. R. w/a Struthers, D. J. w/o Swailes, J. H. w/a Taylor, W. J. w/a Treadwell, J. S. w/a

WTP MS6-R1
OSR 6-60
WTP MS -P1
WTP MS4-Al
ORP H6- 60
ORP H6-60
RP H6-60
W P MS6-R1
WTP MS -P1
W P MS5-G
WTP MS6-P1
WTP M 4-Al
WTP MS5-
ORP H6-60
WTP MS4-A2
WTP MS6-P1
ORP H6-60
ORP H6-60
ORP H6-60
ORP H6-60

Attachment 1 to CCN

034602 BASEMAT WALL

Basemat Wall Dowels

The following discussion relates to the Demand/Capacity ratios for the basemat wall dowels. This is supplementary information to previously submitted OSR response to HLW-PCAR-131.

An evaluation was performed to determine peak gradients in all heated areas. The walls in the heated areas (Pour Tunnel, Rinse Tunnel, Canister Decontamination, Silver Mordenite Room/ Secondary Off-Gas Fan Room, Secondary Off-Gas Oxidizer and Wet Process Cell) have been surveyed to determine the largest through-wall thermal gradient; results are summarized below.

Cell	Wall	Tmax	Thermal Gradient	Analysis Gradient
Decon	North	108	56	56
	East	114	68	68
	West	114	68	68
Rinse	North	135	110	70
	South	108	56	56
	East	114	68	68
	West	98	36	36
Oxidizer	North	96	32	32
	South	93	26	26
	East	94	28	28
	West	89	18	18
Pour Tunnel	North	92	24	24
	South	82	4	4
	East	86	12	12
	East, base	94	28	28
	West, North End	94	28	28
SBS Enclosure	North	105	50	50
	South	105	50	50
	West	96	32	32
Wet Process Cell	North	92	24	24
North Section	South	92	24	24
	East	93	26	26
	West	94	28	28
South Section	North	120	80	70
	South	98	36	36
	East	105	50	50
	West	104	48	48

Notes

Tmax is the maximum temperature contour at mid-depth from the CFD analyses. Calc No. 24590-HLW-RPT-HV-02-002, Rev 0

Thermal Gradient - Since the CFD report provided only the mid-depth temperature for the walls,

the gradient was calculated by assuming the variation of the temperature is linear through the thickness and the cool side wall temperature is 80 degrees. The thermal gradient is the difference between the two surface temperatures. Thus, the surface temperature is equal to the mid-depth temperature
plus the difference between the mid-depth temperature and

Analysis Gradient - An upper limit cut-off of 70 degrees is imposed on the gradient since the surface temperature is limited to 150 degrees and the cool side temperature is 80 degrees

In the "Notes" section in the table above, it is stated in the Thermal Gradient part that it is assumed that the cool side wall temperature is 80° F. It should be clarified that an 80'F cool side temperature is conservative for determining thermal gradients. It is conservative because in Calculation 24590-HLW-RPT-HV-02-002, Rev 0, all the thermal contour wall plots are determined with boundary conditions of 80° F. The minimum outside temperature of the walls is 80° F. When Computational Fluid Dynamics (CFD) analyses are performed, the outside wall temperature may rise above 80° F, which would reduce the through-wall gradient.

This table shows the north wall of the Rinse area, the north wall of the southern section of the Wet Process Cell, east and west walls of the Decontamination (Decon) area have the largest thermal gradient, 68° and 70° F. The Wet Process Cell wall is unusual in that the lower portion is approximately 20 feet thick (the width of the Transfer Tunnel) in the lower portion which is where the hotter surface temperature is located. This very thick section is not critical. The west wall in the Decon area is not constrained between Elevation -16 feet and Elevation 11 feet and therefore is not critical since areas of lower constraints produce lower thermal moments. The vertical span of the east wall (which includes the east wall of the Rinse Tunnel) in the Decon area is constrained by a 4 foot thick slab (span approximately 27 feet) at Elevation 0 feet but on one side only. The north wall of the Rinse Tunnel spans from Elevation -16 feet to Elevation 11 feet. At the base, the wall frames into an 11 feet thick section of the basemat and is restrained by a 4 feet thick slab on both sides at the top (Elevation 11 feet). The span of these slabs is 20 and 22 feet.

The north wall of the Rinse Tunnel and the east wall in the Decon area are both well constrained. Considering the induced moment and the joint rotation at the end on the walls identifies the bounding case. For a fixed end beam subjected to a thermal gradient, the induced moment is independent of the beam length. As the beam or slab departs from this fixed end condition, the final moment is dependent on joint rotation. Since the joint restraint is higher for the north wall of the Rinse Tunnel than the east wall of the Decon area, the moments will be somewhat higher in the Rinse Tunnel wall and therefore is the bounding condition.

The model of the north wall of the Rinse Tunnel was a vertical section through the wall and included the slabs at Elevation 11, north and south of the wall. The wall was taken as fixed at the base of the wall, Elevation -16, since the concrete is approximately 11 feet thick on the south side of the north wall. The slabs at the top are 4 feet thick and have a 22-foot span on the south side and a 20-foot span on the north side. The thermal gradient on the north wall is 70° F and 40° F on the ceiling. For this thermal loading and the support conditions, the maximum moment is at the base. For the uncracked case, the moment at the base of the wall is 3378 kip-in. The vertical reinforcing in the wall is one #11 per foot on each face. The cracked analysis of this wall reduces the moment to approximately 511 kip-in. The effects of the thermal gradient are included in the thermal Demand/Capacity (D/C) tables below.

The evaluation discussed above defines the location where the highest D/C ratio occurred in which through-thickness thermal gradient was the dominant load (cut ms5e-16 in D/C table where the dominant loading condition is thermal). Another evaluation was performed in which the highest D/C ratio was determined in which the bulk temperature was the dominant load. Two locations were evaluated where bulk temperature effects were dominant; south end of the Wet Process Cell (cut b5e-21) and north wall of Decon Cave (cut mnle-21). The associated through-thickness gradient at these locations was also evaluated and included in the D/C tables.

In the D/C tables, note that both interior walls and exterior (foundation walls) were evaluated in determining highest D/C ratios.

HLW Loading Breakdown at Critical Section in Basemat Wall Dowels
(Dominant Loading Condition is Seismic)

Load Comb	Cut	**Controlling**	**Units**	**Dead**	**Live**	**Thermal**	**Seismic**	**Static Soil**	**D**	D/C
OTEz011	s2e-10	Vn	~.'	-68	-4	0	-1991	-31	-2094	0.99
aEz001	sr3e-10	Vn	~.'	-248	-21	-229*	-1843	88	-2253	0.99
OTExlll	hr22e-21	Mtr	~.~	-649	-38	0	-2062	-10	-2759	0.99
aEx111	s3Le-21	Mtr		-5140	-636	-1987*	-29323	-390	-37476	0.98
aExlll	hb3e-11	Vn		246	18	68*	2149	-16	2465	0.98

Notes:

1. Vn = in-plane shear, Mtr = Transverse moment
2. Dowel design is governed by controlling load of Vn and Mtr
3. Values for individual loads are taken from Ref 00020
4. Individual loads are factored based on Load Combination
5. Units correspond to the controlling load

References:

00003 CALC 24590-HLW-DGC-Sl3T-00003, Rev 1

00020 CALC 24590-HLW-SOC-S15T-00020, Rev

HLW Loading Breakdown at Critical Section in Basemat Wall Dowels
(Dominant Loading Condition is Thermal)

Load Comb	Cut	**Controlling**	**Units**	**Dead**	**Live**	**Thermal Bulk**	**Thermal Gradient(')**	**Seismic**	**Static Soil**	**D**	**D/C**
lEz001	ms5e-16	Mtr	Ft Kip	2610	83	4399	4040	12939	383	24454	0.72
lEz011	b5e-21	Mtr	Ft Kip	1386	94	4337	741	5372	113	12043	0.95
aEz101	m le-21	Mtr	Ft Kip	285	27	2831	906	4474	-32	8491	0.92

Notes:

1. Mtr = Transverse moment, Vn = in-plane shear
2. Dowel design is governed by controlling load of Mtr and Vn
3. Values for individual loads are taken from Ref 00020
4. Individual loads are factored based on Load Combination
5. Denotes thermal load component of TI (Normal Operations)

References:

00003 CALC 24590-HLW-DGC-S13T-00003, Rev 1
00020 CALC 24590-HLW-SOC-S15T-00020, Rev 1