Southern California Edison Company **INTERIM CALCULATION CHANGE NOTICE (ICCN)/ CALCULATION CHANGE NOTICE (CCN)**	CALC NO. C-259-1.01.11	ICCN NO./ N-1 PRELIM. CCN NO.	PAGE 1	TOTAL NO. OF PAGES 18
	BASE CALC. REV. 2	UNIT 2 & 3	CCN CONVERSION: CCN NO. CCN- 2	CALC. REV. 2
	CALCULATION SUBJECT: Evaluation of Spent Fuel Pool for Westinghouse High Density Racks			
CALCULATION CROSS-INDEX ☒ New/Updated Index Included ☐ Existing Index is Complete	ENGINEERING SYSTEM NUMBER/PRIMARY STATION SYSTEM DESIGNATOR 2202 / XE1		Q-CLASS II	
1. BRIEF DESCRIPTION OF ICCN/CCN:	CONTROLLED PROGRAM OR DATABASE IN ACCORDANCE WITH NES&L 41-5-1 ☐ PROGRAM ☐ DATABASE	PROGRAM/DATABASE NAME(S) ☐ ALSO, LISTED BELOW N/A	VERSION/RELEASE NO.(S)	

This CCN re-examines the spent fuel pool gate drop on the Westinghouse high density spent fuel racks. Sheets 6A, and 292B to 292N are added. Sheets 6 and 292A are also revised. This calculation change minimizes conservatisms used in the previous Westinghouse analysis. Buoyancy, rack and gate geometry are used to determine the depth of penetration in the rack. The effects of rigging and the load blocks of the cranes are also considered.

The results of this CCN show that only one fuel assembly would be damaged in the event of a gate drop. Fuel assemblies must not be stored on reconstitution spacers to ensure damage is limited to 1 assembly.

REGISTERED PROFESSIONAL ENGINEER
DAVE M. SCHAFER
4-22-94
No. C 042899
Expires 3-31-96
CIVIL
STATE OF CALIFORNIA

NOTE: This calculation does not contain any computations performed directly as part of the word processor. All calculations are performed using a hand calculator and are manually typed.

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INITIATING DOCUMENT (DCP/MMP, FCN, OTHER OIR 92-086 Rev. ____

2. OTHER AFFECTED DOCUMENTS (CHECK AS APPLICABLE FOR CCN ONLY):

☒ YES ☐ NO OTHER AFFECTED DOCUMENTS EXIST AND ARE IDENTIFIED ON ATTACHED FORM 26-503.

3. APPROVAL: DISCIPLINE/ESC: CIVIL

David M. Schafer DS 51363
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DVerbeck 4/29/94
NES&L DM (Signature) Date

4. ASSIGNED SUPPLEMENT ALPHA DESIGNATOR: ____

CONVERSION TO CCN DATE 5-2-94 Kathy Reel SCE CDM-SONGS

SCE 26-122-1 REV. 6/91

9610280173 961023
PDR ADOCK 05000361
P PDR

CALCULATION CROSS-INDEX

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Calculation No. C-259-1.01.11

Sheet No. ______

Calc. rev. number and responsible supervisor initials and date	INPUTS — These interfacing calculations and/or documents provide input to the subject calculation, and if revised may require revision of the subject calculation. Calc/Document No.	Rev. No.	OUTPUTS — Results and conclusion of the subject calculation are used in these interfacing calculations and/or documents. Calc/Document No.	Rev. No.	Does the output interface calc/document require revision? YES / NO	Identify output interface calc/document CCN, DCN, TCN/Rev. or FIDCN.
△ NVO 4/22/94	SO23-207-7-93 SO23-207-1-76 SO23-207-7-44 SO23-I-6.157	3 3 3 0	N-4072-001	3	NO	

SCE 26-424 REV. 6/91

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CALCULATION SHEET

BECHTEL

PROJECT SONGS 2 & 3 JOB NO. 18522-636 CALC. NO. C-259-1.01.11

SUBJECT EVAL OF SFP FOR WHDR SHEET NO. 6

REV	ORIGINATOR	DATE	CHECKER	DATE	REV	ORIGINATOR	DATE	CHECKER	DATE
0	A Palmquist	10/25/88	Y. Sen	10/31/88	2	A Palmquist	8/19/89	E. Alexandrian	9/28/89
0	A Palmquist	5/10/89	Y. Sen	5/10/89		[illegible]	2/22/94	[illegible]	2/22/94

SHEET 6A FOLLOWS

9. "SPENT FUEL POOL GATE DROP LOAD ANALYSIS", LOG NUMBER SO23-207-7-31-0.

10. BECHTEL POWER CORP TOPICAL REPORT BC-TOP-9A, "DESIGN OF STRUCTURES FOR MISSILE IMPACT", REV 2, SEPT 1974.

11. LETTER FROM SCE (M. O. MEDFORD) TO USNRC, FEB 13, 1987, AD12-SO23-NRC, RE: NUREG-0612, LIFTS OF SPENT FUEL POOL GATES.

12. BECHTEL POWER CORP TECHNICAL REPORT "ANALYSIS OF SEISMIC SLOSHING", DESIGN AID, REPORT # SFPD-CS-81-01, JUNE 15, 1982

13. LETTER FROM C.C. MORGAN (W) TO R.L. BAKER (SCE), SCE P.O. SP00170, W LOG PA-83-0037, BPC CHRON 011167, DECEMBER 7, 1983.

14. AMERICAN CONCRETE INSTITUTE (ACI) 318-71, BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

15. MEMO FROM R. GUIZAR TO D. DAY, FILE: 18740-697, CHRON 012030, DATED 2/16/89, RE: SFP TEMPERATURES WHEN POOL IS POSTULATED TO BOIL.

16. LETTER FROM C.C. MORGAN (W) TO R. L. BAKER (SCE), SCE P.O. SP00170, W LOG PA-89-0103, BPC CHRON 013311, JULY 12, 1989, RE: HYDRODYNAMIC FORCES ON POOL WALLS (PHASE 3 RESULTS).

17. LETTER FROM C.C. MORGAN (W) TO R.L. MILLER (SCE), SCE P.O. SP00170, W LOG PA-89-0111, BPC CHRON 013392, JULY 24, 1989, RE: FINAL RACK FLOOR LOADS (PHASE 3 RESULTS).

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Project or DCP/MMP SONGS 2 & 3 Calc No. C-259-1.01.11

Subject Evaluation of Spent Fuel Pool for West, High Density Racks Sheet No. 6A

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	4/22/94					

SHEET 7 FOLLOWS

REFERENCES (Continued)

18. SO23-207-7-93, Rev 3; "Design Report for Two Region Spent Fuel Storage Racks, Volume 1 of 3" dated September 30, 1991.

19. SO23-207-1-76, Rev 3; "Spent Fuel Pool Liner Bulkhead Gate, Sh. 1"

20. SO23-207-7-44, Rev 3; "Spent Fuel Storage Rack Assembly (R2)"

21. AWS D1.1-1988: "Structural Welding Code"

22. "Formulas for Stress and Strain," Roark and Young, 5th Edition

23. SO23-I-6.157, Rev. 0, TCN 0-11; "Spent Fuel Pool Gate Removal/ Installation Procedure"

24. "Wright Electric Wire Rope Hoists"; Catalog; Babcock Industries, Inc.

25. "Spent Fuel Pool Reracking Licensing Report", Revision 6

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CCN 2

CALCULATION SHEET

PROJECT SONGS 2 & 3 JOB NO. 18522-696 CALC. NO. C-257-1-01.11

SUBJECT EVAL of SFP for WHDR SHEET NO. 292A

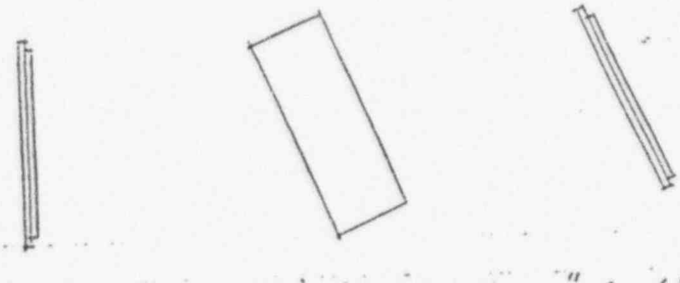
REV	ORIGINATOR	DATE	CHECKER	DATE	REV	ORIGINATOR	DATE	CHECKER	DATE	REV. INDICATOR
0	Y. Son	5/11/89	[illegible]	5/11/89						
	[illegible]	2/22/94	[illegible]	2/22/94						

SH'T ~~295~~ 292B FOLLOWS

The bulkhead gate load drop evaluation performed on the previous sheets was based on the gate being dropped in the "non-tipped" (vertical) orientation. This is based on:

1) The gate is lifted in the vertical position.
2) The c.g. is directly above the point of impact (which is what the empirical equations are based on)
3) The frontal area is minimized (which minimizes the drag force & maximizes the impact velocity.)

For the above reasons and since the rack drop is the worst case drop, the "tipped" orientation needs no evaluation.



As evaluated "Tipped" orientation 1. "Tipped" orientation 2.

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Project or DCP/MMP SONGS 2 & 3 Calc No. C-259-1.01.11

Subject Evaluation of Spent Fuel Pool for West. High Density Racks Sheet No. 292 B

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	4/24/94					

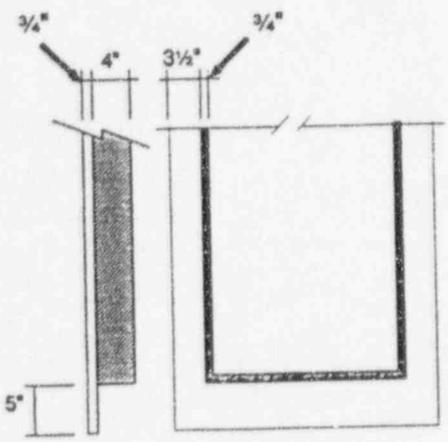
SPENT FUEL POOL GATE DROP ON WESTINGHOUSE HIGH DENSITY RACKS

The following pages (Sheets 292B through 292N) evaluate the drop of the spent fuel pool gate on a Westinghouse high density spent fuel rack. This calculation minimizes conservatisms used in the Westinghouse analysis and takes into account the gate and rack geometry as well as buoyancy to determine the depth of rack penetration. This analysis also considers the effects of rigging and the load blocks in accordance with NUREG-0612 guidelines.

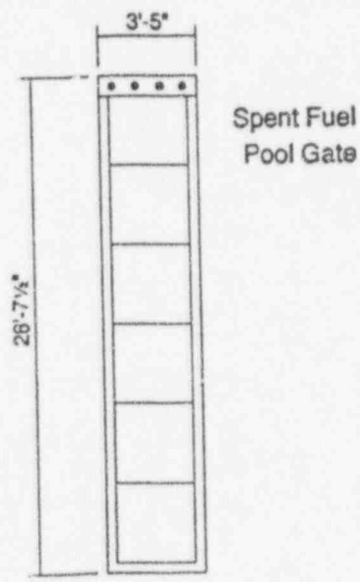
The drop of the gate was previously evaluated in Section 3.2.4.4 of Reference 18. This analysis supersedes the Westinghouse evaluation. There are two types of racks, Region I and II. The gate drop on a Region II rack will govern since there is a single cell wall between each assembly rather than 2 cell walls in a Region I.

The Westinghouse analysis considered the shape of the gate to be a 3/4" thick plate, 41 inches wide. The actual gate has a 3/4 by 4 inch stiffener plate perpendicular to the 3/4 inch plate at 5 inches from the bottom of the gate extending up the sides at 3½ inches from each edge. The stiffener plate will also transfer energy into the rack and reduce the penetration depth.

(Ref. 19)



Gate Bottom Detail



The gate drop height is limited to 30" per Technical Specification 3/4-9.7. This height is necessary to clear the bottom of the gate through the opening into the cask pool and maintain a 10" maximum clearance with a 1/2 inch margin.

This analysis conservatively considers that the spent fuel pool water elevation is at its lowest allowed height. As the gate strikes the rack, the rack deforms. The max height of any fuel is 13.2 inches below the top of the rack (Ref. 18). The depth of penetration into the rack will determine if any fuel assemblies could be potentially damaged. For purposes of this calculation, any contact of the gate with a fuel assembly will result in that assembly being considered as damaged.

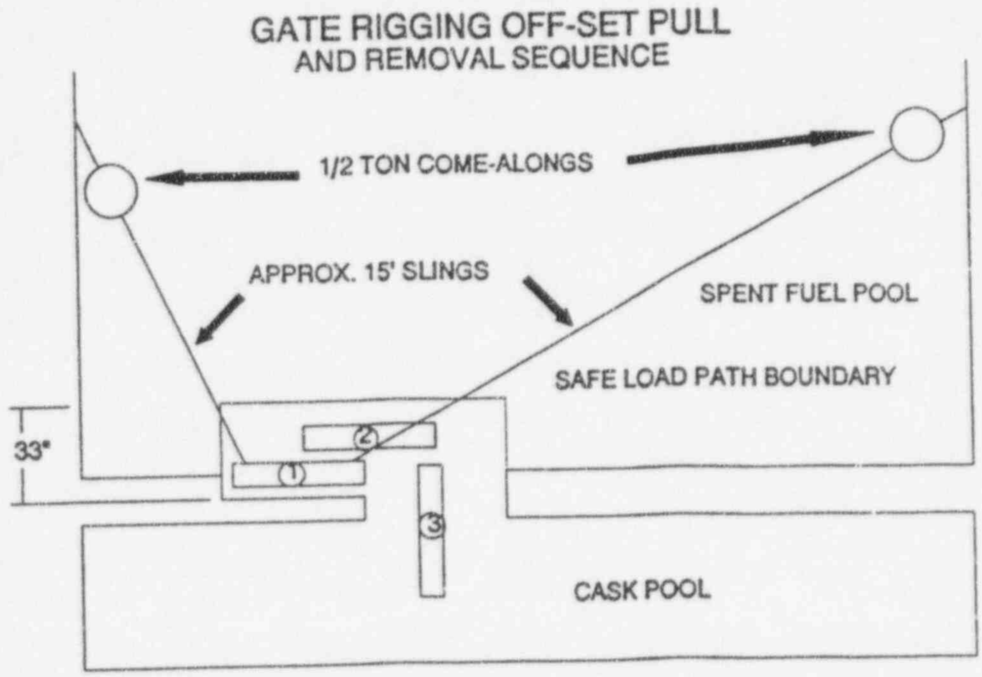
The rack will absorb all impact energy by deforming the rack. The elastic strain energy is negligible compared to the plastic strain energy. Since the bulk of the gate is a 3/4 inch thick plate, as compared to the cell wall thickness of 0.11", there will be minimal energy absorption by the gate.

GATE HANDLING METHODS (Ref. 23)

There is a gate at each end of the pool to consider. The transfer pool gate is handled by the new fuel crane without any special provisions. The cask pool gate is handled using the cask crane and requires special rigging. The cask crane will not travel far enough to allow centering of either hook over the gate. An offset pull is required using slings and come-alongs attached to the Spent Fuel Handling Machine (SFHM) rails or the SFHM bridge.

The come-alongs are supported by either the SFHM or rails with long slings to the gate. The come-alongs do not support any vertical weight of the gate. The come-along weight would not be seen by the gate during an impact due to the sling lengths being much longer than the drop height and each weighing less than 50 pounds.

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	M. SCHAFER	4/22/94	R. C. BLASCHKE	4/24/94					



The cask crane load block for the main and auxiliary hoists cannot travel over the spent fuel pool. If the supporting wire rope broke, the hook and lower block would fall straight down into the cask pool. As the hook falls, the rigging goes slack and the hook will continue to fall straight down into the cask pool never reaching the spent fuel pool.

The main hook and load block dimensions are physically larger in all dimensions to the canal opening width. As such, the cask crane main hook and load block need not be included in the drop weight. However, the auxiliary hoist load block should be included because it could fit through the canal opening and be pulled toward the pool. The aux. hoist is a 10 ton electric wire rope type by Wright Hoists. The hook and load block weight is approximately 265 pounds per manufacturer's catalog data (Ref. 24).

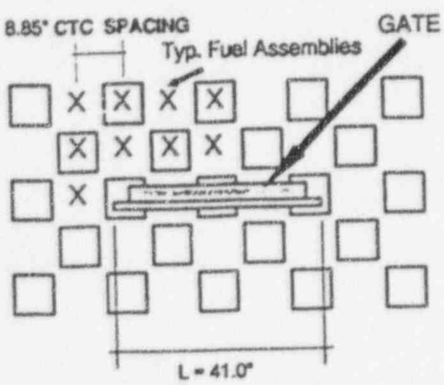
If the gate were to drop while halfway between the pools, it will land on the floor of the opening which is above the rack. This scenario is bounded by the gate drop analysis for the pool liner plate.

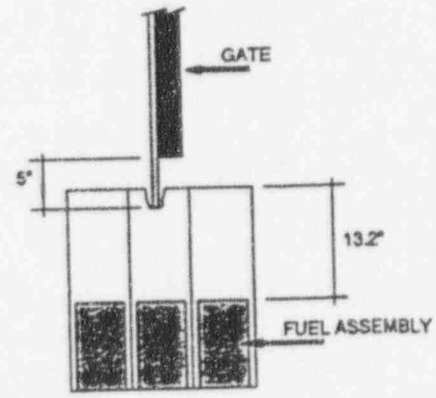
The 5 ton new fuel handling crane can pass directly over the spent fuel pool to remove the transfer pool gate. For this case, the rigging and load block shall be included as part of the dropped weight.

The cask crane auxiliary hoist load block governs by inspection since the hoist has twice the capacity of the new fuel crane. Therefore, consider the drop of the gate on a Region II rack with the rigging and load block weight for the cask crane auxiliary hoist.

CASE 1: Straight Drop

The worst case drop configuration results in the gate striking the middle of 4 cell walls. All other potential drop scenarios strike more cell wall length such that there is a greater resisting force.





(Ref. 20)

After the gate penetrates 5 inches, the side stiffener plate will strike the rack. Since the gate bottom is only 3/4" thick, the initial failure mode expected is a local "knife edge" cut into the cell wall as shown.

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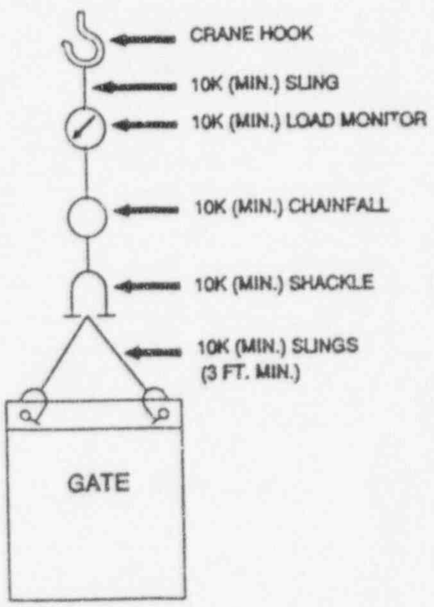
Project or DCP/MMP SONGS 2 & 3 Calc No. C-259-1.01.11

Subject Evaluation of Spent Fuel Pool for West. High Density Racks Sheet No. 292 F

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	4/24/94					

DETERMINE DROP WEIGHT

The drop weight of the gate shall include the rigging and load block as required by NUREG-0612. Use the cask crane auxiliary hoist hook weight. Rigging weights are based on published manufacturer data for typical components for the configuration shown in the gate removal procedure:



(Ref. 23)

	Weights
10T Hook & Block =	265 lbs
Load Cell =	50 lbs.
3 Slings =	30 lbs.
Chainfall =	100 lbs.
3 Shackles =	20 lbs.
Total =	465 lbs.

Gate Weight:

The gate is made from stainless steel plates with a rubber seal. The major components are summarized below:

ITEM	SIZE	QTY	UNIT	WT lbs.
SS Plate	3/4 x 28'-1" x 3'-5"	1	32.123 psf	3082
SS Plate	3/4 x 4" x 22'-0"	2	10.21 p/f	449
SS Plate	3/4 x 4" x 2'-8.5"	8	10.21 p/f	221
SS Plate	7/8 x 8 x 3'-5"	1	23.82 p/f	81
SS Clip Plates	3/16 x 2" x 2"	254	0.2127 #	54
Rubber Seals	3/16" x 3" x 58'-6"	2	1.25 p/f	146
Misc. Items	Bolts/Guide Rollers	Lot		150
Rigging		Lot		465
TOTAL				4648

Total Gate Wt = 4.65 Kips

Buoyant Gate Weight:

Consider the minimum allowable low water elevation for maximum impact weight.

Low water elevation H_w = 57'-6"
Bottom elevation of gate before drop H_G = 36'-4"

Top of gate is: Gate Length - (Water Elev. - Drop Elev.)

[28'-7½"] - ([57'-6"] - [36'-4"]) = 7'-5½" out of the water

Gate is approximately 75% submerged before the postulated drop.

NOTE: Gate will not be totally submerged at the time of impact.

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	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	4/ /94					

For the drop, take 3/4 of the gate as submerged. The gate will become lighter from buoyant forces as it drops. For conservatism, gate weight will be taken as a constant weight and the rubber seal water displacement will be neglected.

Max. Normal Pool Operating Temperature = 140°F (Ref. 25)
Use density, ρ = 61.4 pcf

Buoyant weight (P_b) = Wt of object (P) - Wt displaced water (P_v)

$$P_v = .75 \times 61.4\ pcf \times \left[\frac{.75\ in \times 41\ in}{144\ in^2/ft^2} \times 28.625\ ft + \frac{.75\ in \times 4\ in}{144\ in^2/ft^2} \times (2 \times 27.5\ ft + 8 \times 2.71\ ft) \right]$$

$$P_v = 355\ lbs.$$

$$P_b = 4650 - 355 = 4295\ lbs.$$

DETERMINE DEPTH OF PENETRATION:

From Reference 18, the depth of penetration, d, is obtained by conservatively assuming that perfect plastic deformation is initiated when the shear stress in the cell wall reaches 57% of the compressive yield strength. The stainless steel material yield stress is also given as 27,500 psi which includes temperature variation effects. This analysis assumes shear behavior dominates. Since the cells are stainless steel plate material, formed into square welded boxes, which are in turn, welded to each adjacent cell, there is very little chance that the cell walls would buckle under load. Therefore, a shear behavior analysis is adequate.

For a uniformly distributed load, P, across the edge of a plate, the maximum shear stress is:

$f_v = 0.318\ P / (t * w)$ [Ref. 22, Table 33, Case 7]

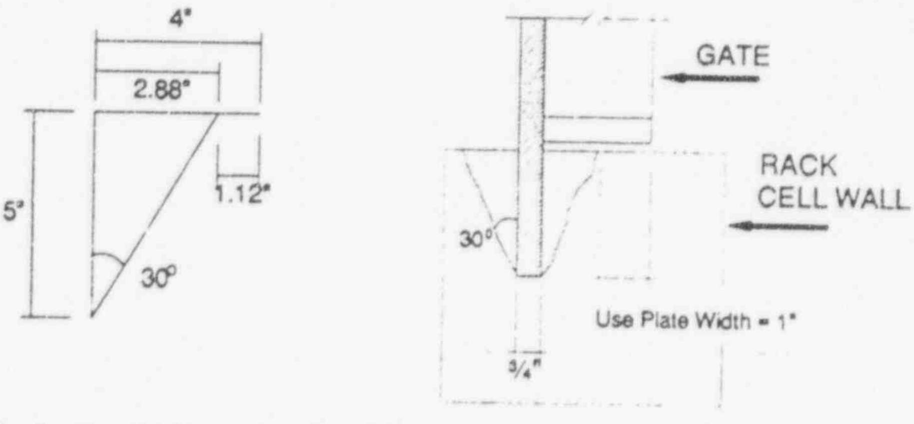
Where:
$f_v = 0.57\ F_y$
P = Total load on cell wall edge
t = Cell wall thickness = 0.110 in.
w = Width of dist. load = 0.75 in.

The load, P_1 per inch depth, to cause plastic flow for 3/4" Plate:

$$P_1 = \frac{0.57\ F_y\ t\ w}{0.318} = \frac{0.57 \times 27{,}500\ psi \times 0.110\ in \times 0.75\ in}{0.318}$$

$P_1 = 4067\ lbs.$

The 3/4 inch plate has already penetrated the rack and continues to penetrate 5 inches below the 4" reinforcing plate. When the 4" wide reinforcing plate hits the top of the cell, the wall will already be damaged from the initial impact from the vertical plate. The damaged area will make approximately a 20 to 30 degree angle with the bottom of the vertical plate as it penetrates the wall. As such, only a fraction of the wall remains available for further energy absorption. Take an angle of 30° from the bottom of the vertical angle.



The load, P_2 per inch depth, for 3/4 inch plate plus 1" of reinforcing plate: where w = 1.75 in.

$$P_2 = \frac{0.57\ F_y\ t\ w}{0.318} = \frac{0.57 \times 27{,}500\ psi \times 0.110\ in \times 1.75\ in}{0.318}$$

$P_2 = 9489\ lbs.$

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	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	4/xx/94					

The 3/4" plate alone will hit for the first 5 inches of penetration. Then the reinforcing plate hits to a depth of (d - 5) inches. The impact energy must equal the resisting energy. The depth of penetration is also included as part of the impact energy to account for the additional energy to its final resting depth. This is conservative since the velocity is decreasing once the gate hits the rack.

Impact Energy = Energy absorbed

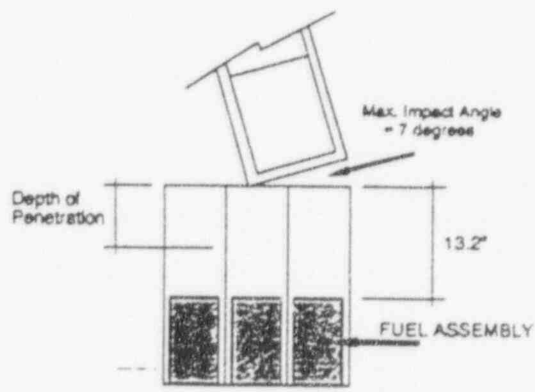
$$P_b \times ht(in) = 4 \text{ walls} \times [P_1 (5 \text{ in}) + P_2 (d-5) \text{in}]$$

$$4295 \ lbs \times (30 + d)\ in = 4 \times \left[4067 \ lbs \times 5 \ in + 9489 \ lbs \times (d - 5) \ in \right]$$

$$d = 7.0 \ in. < 13.2 \ in.$$

OK

In this case, the gate could potentially damage 5 rack cells. None of the fuel assemblies would be directly hit by the gate.



Consider a rigging failure that would result in an angled impact:

The worst case energy impact occurs as the center of gravity is directly over the gate bottom corner. If the gate impacted at a 45 degree angle only a portion of the dropped weight would strike at the bottom corner. A 45 degree impact is not likely to occur. The very top of the gate would have to travel nearly 9 times further than the drop height. The postulated rigging failure is the breakage of a sling.

Two lifting points are used on top of the gate per procedures. If a lower sling breaks, the center of gravity would be directly below the remaining lift point. If the gate dropped after the second lift point failed, the gate would land at a slight angle on the rack. Since the center of gravity is over the corner the gate could then fall on its edge toward the center of the pool after the initial impact. Because the center of gravity is so high, the effects of this secondary collision must also be evaluated. Case 2 evaluates the angled corner drop and Case 3 evaluates the secondary impact.

CASE 2: Angled Drop

MAXIMUM IMPACT ANGLE:

θ = arctan (41"/343.5")

= 6.8 degrees

Say 7 degrees

The net absorbed energy remains a linear function of the depth. And the depth of penetration at the gate physical center will remain approximately the same. That is the depth of penetration increases to:

$d' = 7.0 + 41/2 (\tan 7^\circ) = 9.5$ inches < 13.2 inches OK

There is additional conservatism from a rigging failure that occurs with the gate already at 30" above the rack. Neglecting any additional elongation in the rigging, the drop height decreases to:

$ht = 30 - (41" \times \sin 7^\circ) / 2 = 27.5$ inches

HENCE, NO FUEL IS IMPACTED BY THE GATE.

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	4/22/94					

Case 3: Secondary Impact

As the gate strikes the rack with the center of gravity over a bottom corner, there is a 50/50 chance of it falling over on its side toward the center of the spent fuel pool. The new drop height becomes the difference between the center of gravity from a standing position to that on its side.

Drop height = 343.5/2 - 41/2 = 151.25 inches

The gate will impact: 343.5 / 8.85 = 38 cell walls

The Resistive forces remain approximately the same as in Case 1, except that the reinforcing plate strikes at 3.5 inches (free edge on side) instead of 5 inches (Ref. 19).

$$4295\ lbs \times (151.25 + d)\ in = 38 \times \left[4067\ lbs \times 3.5\ in + 9489\ lbs \times (d - 3.5)\ in \right]$$

$d = 3.8\ in. < 13.2\ in.$

OK

In this case up to 76 cells could be damaged. Again, no fuel assemblies would be impacted.

As the gate rotates, it will penetrate deeper into the first cell. For conservatism, let the gate rest flat at a depth of 9.5 inches from the angled drop in Case 2. As it rotates to 45 degrees, the corner will go deeper into the cell by 1/2 the cell width.

d = 9.5 + 8.85/2 = 13.9 inches > 13.2 inches

Hence, 1 fuel assembly may be directly impacted during the secondary impact. The cell walls will cause the corner of the gate to remain centered within the cell. It is therefore, not credible for this impact to occur between any cells such that a second fuel assembly could be damaged.

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	M. SCHAFER	4/22/94	R. C. BLASCHKE	4/28/94					

CHECK GATE STIFFENER PLATE

It was assumed that the gate remains rigid when the 3/4 x 4" stiffener plate impacts the rack. The stiffener plate should resist the force applied by the rack cell.

$$P_1 = \frac{0.57\ F_y\ t\ w}{0.318} = \frac{0.57 \times 27{,}500\ psi \times 0.110\ in \times 1.00\ in}{0.318}$$

P_1 = 5422 *lbs.*

Check stiffener as a cantilever plate:

M = 5422 x 4" = 21.7 K-in

Cell spacing = 8.85 in.

$S = 8.85 \times (.75)^2 / 6 = 0.83\ in^3$

$f_b = M/S = 26.1$ Ksi < $.75\ F_y$ = 27 Ksi OK

Check Weld:

P = 5422 / 8.85" = 613 #/in.

Weld provided = 3/8" Fillet 2" Length every 6" both sides(Ref. 19)

Weld capacity (Ref. 21, AWS D412, E60XX)

P_w = (2 x 2" / 6") x 4.77 k/in

= 3.18 K/in > 0.6 K/in

OK

Therefore, the stiffener plate is okay.

REV	ORIGINATOR	DATE	IRE	DATE	REV	ORIGINATOR	DATE	IRE	DATE
	D. M. SCHAFER	4/22/94	R. C. BLASCHKE	7/1/94					

Sheet 293 Follows

GATE DROP ON SPENT FUEL RACK CONCLUSIONS

The gate can strike and damage a single fuel assembly during a drop scenario. The rotation of the gate after an initial impact will cause the gate to touch a fuel assembly. Since the cell walls will keep the gate corner centered within the cell there is no chance that another assembly could be affected. The cell walls above the assemblies may be damaged in as many as 76 cells. This will make removal of fuel assemblies in those cells very difficult. Adjacent cells may also experience some deformations resulting in assemblies being stuck within the racks. This is considered acceptable since the fuel assemblies will remain intact.

This calculation is based on all fuel assemblies being at or below 13.2 inches from the top of the rack. Fuel assemblies should not be stored on spacers while the gate is being removed or installed to ensure only one assembly could be damaged. (That is, no fuel on reconstitution spacers.)

There will not be gross deformations in the body of the rack that would alter the center to center spacing of the fuel assemblies. As such, fuel criticality for the spent fuel assemblies in the vicinity of the damaged rack cells would not be adversely affected.

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