

A. W. SHINPOCH
Secretary



STATE OF WASHINGTON
DEPARTMENT OF SOCIAL AND HEALTH SERVICES

Olympia, Washington 98504-0095

October 29, 1985

Mr. C.E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. MacDonald:

Exxon Nuclear Company, Inc. requested that I, as State Health Officer, write to you to voice my objection to or acceptance of their proposal to transport certain transuranic materials not in strict conformance with 10 CFR 71. My staff has reviewed the exemption request made by Exxon on September 6, 1985. Since these boxes will be transported by knowledgeable staff from the Exxon facility adjacent to the Hanford Reservation to the US Ecology disposal site, on the reservation, with very limited use of public access roads, I see no problem with the use of these packages. Any other alternative would involve considerable occupational exposure.

Since most of the transportation would occur on U.S. Department of Energy roads, we contacted Mr. Gerald Yesberger at the Richland Operations office. He was also in agreement with the proposal.

If we can provide any additional information regarding this request, please contact Nancy Kirner of this office.

Sincerely,

A handwritten signature in cursive script, reading "John A. Beare".

John A. Beare, M.D., M.P.H.
Director
Division of Health - ET-21

cc: C.W. Malody

8512170386 851104
PDR ADOCK 07109207
C PDR

PROJECT: EXXON NUCLEAR JOB NO.
RC - 0015
CLIENT: G.L. GRANT
BY: T.E. MEIER
DATE: 6-25-85
JOB NO.: 139

MEIER ASSOCIATES
1332 Grandridge Blvd., Suite 102
Kennewick, Washington 99336

THE FLUID LOAD IS TEMPORARY
•• TAKE STRESSES TO YIELD

$$f'_c = 3,000 \text{ PSI} \quad f_y = 60,000 \text{ PSI}$$

$$\text{TRY } t = 6" \therefore d = 3"$$

$$F = \frac{bd^2}{12000} = \frac{12 \times 3^2}{12000} = .009$$

$$K_u = \frac{M}{F} = \frac{3.9}{.009} = 433$$

$$a_u = 4.02$$

$$\Delta_s = \frac{K_u}{a_u d} = \frac{3.9}{4.02 \times 3} = .32 \text{ in}^2/\text{FT}$$

USE #5 @ 12"
EACH WAY
 $\Delta_s = .31 \text{ in}^2/\text{FT}$

$$f_y = \frac{3134}{.25 \times 12 \times 3} = 102 \text{ PSI} \quad \text{O.K.}$$

USE #5 @ 12" E.W. ALL
AROUND $t = 6"$

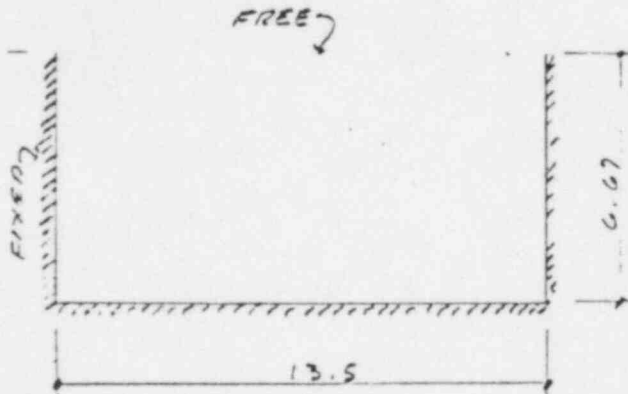
BASE DESIGN

THE PRESSURE IS 1025 PSF

$$a/b = 6.75/6 \approx 1$$

USE $T = 6"$ & #5 @ 12"

GLOVE BOX ZONE DESIGN



FLUID PRESSURE
= $153 \times 6.7'$
= 1025 PSF



$$a/b = \frac{6.75}{6.67} \approx 1$$

$$a = \frac{13.5}{2} = 6.75$$

$$M_{01M_x} = +.0644(1025)(6.67)^2$$

$$= 2937 \text{ lbf/ft}$$

$$M_{01M_y} = +.0845(1025)(6.67)^2$$

$$= 3853 \text{ lbf/ft}$$

$$R_y = .4584(1025)6.67$$

$$= 3134$$

PROJECT: EXXON NUCLEAR JOB
No. EC-0015

CLIENT: G.A. GRANT
BY: T.E. MEIER
DATE: 6-25-85
JOB No.: 139

MEIER ASSOCIATES
1332 Grandridge Blvd., Suite 102
Kennewick, Washington 99336

THE GLOVE BOX WILL BE
PICKED UP WITH SLINGS
WRAPPED UNDER THE BOX
SO LIFTING FIXTURES ARE
NOT REQUIRED

CHECK THE LOAD TRANSFER
@ THE CONST. JOINT WHEN
THE BOX IS FILLED:

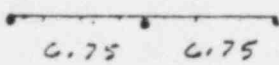
$$P = 5 \times 6.17 \times 12.5 \times 150 \\ = 57,844 \text{ lbs}$$

$$\text{PERIMETER} = 13.5(2) + 5(2) = 37'$$

$$\text{LOAD/FT} = 57,844 / 37 = 1568 \text{ lbs}$$

$$f_s = P/A = \frac{1568 \times 1.7}{.51} = 5596 \text{ PSI} \quad \text{O.K.}$$

ASSUME 3~ ROLLER SUPPORTS

$$P = 6 \times 6.7 \times 13.5 \times 150 \\ \approx 82 \text{ K}$$


$$P/FT = 82 / 13.5 \\ = 6.1 \text{ K/FT}$$

21K 40K 21K

$$40 \text{ K} / 6 = 6.7 \text{ K/FT @ THE CENTER SUPPORT ROLLER}$$

I RECOMMEND A MINIMUM OF
4~ ROLLER SUPPORTS @ 4.5' C/C
TO REDUCE THE CONCENTRATED
LINE LOAD ON THE FLOOR

Flexure 1.1—Coefficients for rectangular sections with compression reinforcement

$$\rho = \omega \frac{f'_c}{f_y} = \frac{A_s}{bd}$$

$$\frac{c}{d} = 1.18 \frac{\omega}{\beta_1}$$

$$\frac{a}{d} = \beta_1 \frac{c}{d}$$

$$\beta_1 = 0.85$$

$$K_u = \phi f'_c \omega (1 - .59\omega)$$

$$a_u = \phi f_y (1 - .59\omega) / 12,000$$

$$A_s = \frac{M_u}{a_u d}$$

$$F = \frac{M_u}{K_u}$$

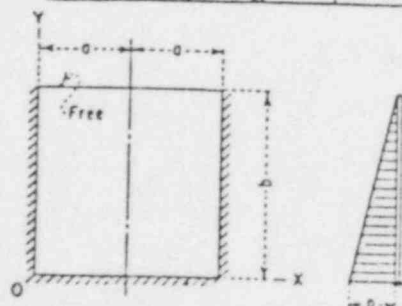
$$J_u = 1 - \frac{a}{2d}$$

A_s in square inches and M_u is in ft - kips

$f'_c = 3,000$												
ω	K_u	$f_y = 40,000$		$f_y = 50,000$		$f_y = 60,000$		$f_y = 80,000$		c/d	a/d	J_u
		ρ	a_u	ρ	a_u	ρ	a_u	ρ	a_u			
.020	53	.0015	2.96	.0012	3.71	.0010	4.45	0.0008	5.93	.028	.024	.988
.030	80	.0023	2.95	.0018	3.68	.0015	4.42	0.0011	5.89	.042	.035	.982
.040	105	.0030	2.93	.0024	3.66	.0020	4.39	0.0015	5.86	.056	.047	.976
.050	131	.0038	2.91	.0030	3.64	.0025	4.37	0.0019	5.82	.069	.059	.971
.060	156	.0045	2.89	.0036	3.62	.0030	4.34	0.0022	5.79	.083	.071	.965
.070	181	.0053	2.88	.0042	3.60	.0035	4.31	0.0026	5.75	.097	.083	.959
.080	206	.0060	2.86	.0048	3.57	.0040	4.29	0.0030	5.72	.111	.094	.953
.090	230	.0068	2.84	.0054	3.55	.0045	4.26	0.0034	5.68	.125	.106	.947
.100	254	.0075	2.82	.0060	3.53	.0050	4.23	0.0038	5.65	.139	.118	.941
.110	278	.0083	2.81	.0066	3.51	.0055	4.21	0.0041	5.61	.153	.130	.935
.120	301	.0090	2.79	.0072	3.48	.0060	4.18	0.0045	5.58	.167	.142	.929
.130	324	.0098	2.77	.0078	3.46	.0065	4.15	0.0049	5.54	.180	.153	.923
.140	347	.0105	2.75	.0084	3.44	.0070	4.13	0.0052	5.50	.194	.165	.917
.150	369	.0113	2.73	.0090	3.42	.0075	4.10	0.0056	5.47	.208	.177	.912
.160	391	.0120	2.72	.0096	3.40	.0080	4.08	0.0060	5.43	.222	.189	.906
.170	413	.0128	2.70	.0102	3.37	.0085	4.05	0.0064	5.40	.236	.201	.900
.180	434	.0135	2.68	.0108	3.35	.0090	4.02	0.0068	5.36	.250	.212	.894
.190	455	.0143	2.66	.0114	3.33	.0095	4.00	0.0071	5.33	.264	.224	.888
.200	476	.0150	2.65	.0120	3.31	.0100	3.97	0.0075	5.29	.278	.236	.882
.210	497	.0158	2.63	.0126	3.29	.0105	3.94	0.0079	5.26	.292	.248	.876
.220	517	.0165	2.61	.0132	3.26	.0110	3.92	0.0082	5.22	.305	.260	.870
.230	537	.0173	2.59	.0138	3.24	.0115	3.89	0.0086	5.19	.319	.271	.864
.240	556	.0180	2.58	.0144	3.22	.0120	3.86	0.0090	5.15	.333	.283	.858
.250	575	.0188	2.56	.0150	3.20	.0125	3.84	0.0094	5.12	.347	.295	.853
.260	594	.0195	2.54	.0156	3.17	.0130	3.81	0.0098	5.08	.361	.307	.847
.270	613	.0203	2.52	.0162	3.15	.0135	3.78	0.0101	5.04	.375	.319	.841
.280	631	.0210	2.50	.0168	3.13	.0140	3.76	0.0105	5.01	.389	.330	.835
.290	649	.0218	2.49	.0174	3.11	.0145	3.73			.403	.342	.829
.300	667	.0225	2.47	.0180	3.09	.0150	3.70			.416	.354	.823
.310	684	.0233	2.45	.0186	3.06	.0155	3.68			.430	.366	.817
.320	701	.0240	2.43	.0192	3.04	.0160	3.65			.444	.378	.811
.330	718	.0248	2.42	.0198	3.02					.458	.389	.805
.340	734	.0255	2.40	.0204	3.00					.472	.401	.799
.350	750	.0263	2.38							.486	.413	.794
.360	766	.0270	2.36							.500	.425	.788
.370	781	.0278	2.35							.514	.437	.782

- When $h_f / d \geq a/d$, beam is designed as rectangular section; when $h_f / d < a/d$, beam is designed as a T section (See Flexure 2).
- Values of ρ above upper solid line are for percentages smaller than ρ_{min} , $\rho_{min} = 200/f_y$. See section 10.5, ACI 318-71.
- Values of ρ below lower solid line would exceed $\rho_{max} = 0.75 \rho_{br}$. For values of ρ_{max} see values of $(\rho_w - 0.75 \rho_f)_{max}$ in Flexure 2. See Section 10.3.2, ACI 318-71.
- For deflection see Section 9.5 ACI 318-71 and "Deflection" chapter in this handbook.
- Check for Crack Control where $f_y > 40,000$. See Section 10.6, ACI 318-71 and under chapter "Reinforcement" in this handbook.
- The capacity reduction factor $\phi = 0.9$ has been included in the table values.
- For use of this Table, see Flexure Examples 1 to 10, 15, 16

	y/b	x/a	M_x						M_y					
			0	0.2	0.4	0.6	0.8	1.0	0	0.2	0.4	0.6	0.8	1.0
$a/b = 1/8$	1.0	0	+0.082	+0.004	+0.002	+0.000	-0.001	-0.002	-0.002	0	0	0	0	0
	0.8	0	+0.0251	+0.0011	+0.0005	+0.0000	-0.0003	-0.0005	-0.0005	+0.0002	+0.0001	+0.0000	-0.0000	-0.0001
	0.6	0	+0.0496	+0.0021	+0.0009	+0.0001	-0.0006	-0.0009	-0.0011	+0.0004	+0.0002	+0.0000	-0.0001	-0.0002
	0.4	0	+0.0751	+0.0031	+0.0014	+0.0001	-0.0008	-0.0014	-0.0016	+0.0006	+0.0003	+0.0000	-0.0002	-0.0003
	0.2	0	+0.0942	+0.0038	+0.0016	+0.0000	-0.0010	-0.0017	-0.0019	+0.0008	+0.0003	+0.0000	-0.0003	-0.0005
	0	0	+0.0460	0	+0.0001	+0.0003	+0.0005	+0.0006	+0.0006	0	+0.0005	+0.0014	+0.0023	+0.0030
	R_x		+0.0460	+0.0136	+0.0543	+0.0839	+0.1004	+0.1056						
$a/b = 1/4$	1.0	0	+0.0147	+0.0022	+0.0012	+0.0002	-0.0006	-0.0012	-0.0014	0	0	0	0	0
	0.8	0	+0.0523	+0.0046	+0.0022	+0.0002	-0.0012	-0.0021	-0.0024	+0.0009	+0.0005	+0.0002	-0.0000	-0.0002
	0.6	0	+0.1015	+0.0083	+0.0037	+0.0002	-0.0023	-0.0038	-0.0042	+0.0017	+0.0007	+0.0000	-0.0005	-0.0010
	0.4	0	+0.1514	+0.0114	+0.0049	+0.0001	-0.0032	-0.0051	-0.0057	+0.0023	+0.0008	+0.0004	-0.0013	-0.0019
	0.2	0	+0.1954	+0.0102	+0.0037	-0.0004	-0.0030	-0.0043	-0.0047	+0.0020	+0.0004	-0.0011	-0.0022	-0.0029
	0	0	+0.0304	0	+0.0004	+0.0010	+0.0016	+0.0020	+0.0021	0	+0.0020	+0.0052	+0.0081	+0.0100
	R_x		+0.0304	+0.0309	+0.1052	+0.1563	+0.1856	+0.1950						
$a/b = 3/8$	1.0	0	+0.0189	+0.0066	+0.0040	+0.0008	-0.0020	-0.0039	-0.0045	0	0	0	0	0
	0.8	0	+0.0885	+0.0117	+0.0056	+0.0006	-0.0031	-0.0054	-0.0062	+0.0023	+0.0012	+0.0004	-0.0002	-0.0007
	0.6	0	+0.1541	+0.0176	+0.0075	+0.0001	-0.0049	-0.0079	-0.0088	+0.0035	+0.0013	-0.0006	-0.0020	-0.0032
	0.4	0	+0.2107	+0.0208	+0.0079	-0.0007	-0.0061	-0.0090	-0.0099	+0.0042	+0.0009	-0.0019	-0.0042	-0.0061
	0.2	0	+0.1691	+0.0145	+0.0045	-0.0012	-0.0042	-0.0057	-0.0061	+0.0029	+0.0001	-0.0022	-0.0039	-0.0051
	0	0	+0.0102	0	+0.0008	+0.0020	+0.0030	+0.0038	+0.0040	0	+0.0039	+0.0099	+0.0152	+0.0188
	R_x		+0.0102	+0.0474	+0.1488	+0.2154	+0.2526	+0.2645						
$a/b = 1/2$	1.0	0	+0.0326	+0.0151	+0.0088	+0.0015	-0.0046	-0.0084	-0.0097	0	0	0	0	0
	0.8	0	+0.1315	+0.0216	+0.0099	+0.0007	-0.0059	-0.0099	-0.0112	+0.0043	+0.0020	+0.0002	-0.0011	-0.0019
	0.6	0	+0.1972	+0.0273	+0.0108	-0.0005	-0.0079	-0.0119	-0.0132	+0.0055	+0.0015	-0.0020	-0.0047	-0.0070
	0.4	0	+0.2421	+0.0277	+0.0092	-0.0019	-0.0082	-0.0115	-0.0125	+0.0055	+0.0004	-0.0042	-0.0076	-0.0097
	0.2	0	+0.1607	+0.0160	+0.0041	-0.0017	-0.0044	-0.0055	-0.0058	+0.0032	-0.0002	-0.0026	-0.0039	-0.0046
	0	0	-0.0045	0	+0.0014	+0.0033	+0.0050	+0.0061	+0.0065	0	+0.0068	+0.0167	+0.0252	+0.0307
	R_x		-0.0045	+0.0744	+0.1942	+0.2699	+0.3108	+0.3236						
$a/b = 3/4$	1.0	0	+0.1061	+0.0406	+0.0196	+0.0013	-0.0115	-0.0190	-0.0214	0	0	0	0	0
	0.8	0	+0.2077	+0.0433	+0.0177	-0.0003	-0.0119	-0.0184	-0.0205	+0.0087	+0.0031	-0.0012	-0.0042	-0.0061
	0.6	0	+0.2408	+0.0426	+0.0145	-0.0026	-0.0124	-0.0174	-0.0189	+0.0085	+0.0010	-0.0055	-0.0102	-0.0139
	0.4	0	+0.2542	+0.0349	+0.0091	-0.0039	-0.0102	-0.0130	-0.0138	+0.0070	-0.0011	-0.0075	-0.0115	-0.0137
	0.2	0	+0.1337	+0.0163	+0.0031	-0.0017	-0.0031	-0.0033	-0.0033	+0.0033	+0.0001	-0.0000	+0.0014	+0.0029
	0	0	-0.0196	0	+0.0028	+0.0064	+0.0093	+0.0111	+0.0117	0	+0.0139	+0.0320	+0.0465	+0.0554
	R_x		-0.0196	+0.1256	+0.2666	+0.3496	+0.3923	+0.4055						
$a/b = 1$	1.0	0	+0.1985	+0.0644	+0.0253	-0.0013	-0.0172	-0.0252	-0.0276	0	0	0	0	0
	0.8	0	+0.2564	+0.0601	+0.0210	-0.0028	-0.0161	-0.0226	-0.0245	+0.0120	+0.0034	-0.0026	-0.0065	-0.0095
	0.6	0	+0.2485	+0.0515	+0.0149	-0.0047	-0.0145	-0.0189	-0.0201	+0.0103	+0.0003	-0.0075	-0.0125	-0.0159
	0.4	0	+0.2411	+0.0372	+0.0078	-0.0049	-0.0100	-0.0118	-0.0122	+0.0074	-0.0021	-0.0076	-0.0099	-0.0107
	0.2	0	+0.1108	+0.0154	+0.0025	-0.0006	-0.0006	-0.0000	+0.0003	+0.0031	+0.0018	+0.0060	+0.0116	+0.0175
	0	0	-0.0241	0	+0.0044	+0.0096	+0.0137	+0.0161	+0.0169	0	+0.0220	+0.0482	+0.0683	+0.0804
	R_x		-0.0241	+0.1691	+0.3199	+0.4038	+0.4457	+0.4584						
$a/b = 3/2$	1.0	0	+0.3127	+0.0857	+0.0207	-0.0087	-0.0199	-0.0232	-0.0238	0	0	0	0	0
	0.8	0	+0.2929	+0.0730	+0.0158	-0.0086	-0.0172	-0.0194	-0.0198	+0.0146	+0.0023	-0.0042	-0.0072	-0.0085
	0.6	0	+0.2352	+0.0560	+0.0094	-0.0083	-0.0134	-0.0142	-0.0141	+0.0112	-0.0013	-0.0077	-0.0096	-0.0094
	0.4	0	+0.2148	+0.0359	+0.0038	-0.0053	-0.0065	-0.0057	-0.0053	+0.0072	-0.0021	-0.0023	+0.0012	+0.0059
	0.2	0	+0.0897	+0.0132	+0.0021	+0.0025	+0.0050	+0.0069	+0.0076	+0.0026	+0.0077	+0.0220	+0.0356	+0.0444
	0	0	-0.0204	0	+0.0079	+0.0158	+0.0212	+0.0243	+0.0252	0	+0.0396	+0.0791	+0.1062	+0.1214
	R_x		-0.0204	+0.2452	+0.3564	+0.4668	+0.4966	+0.5047						



Moment = (Coefficient)(pb^2)
Reaction = (Coefficient)(pb)

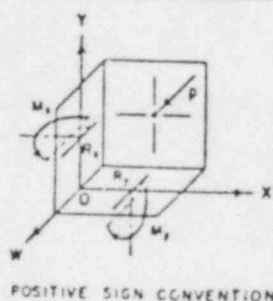


FIGURE 4.—Plate fixed along three edges, moment and reaction coefficients, Load IV, uniformly varying load.



ACME
CONCRETE
COMPANY

June 24, 1985

George Grant, Inc.
P.O. Box 786
Richland, Wa. 99352

Attn: Dennis Carl

Re: Exxon Nuclear, Job #RC-0015, Line Item 24

Dear Mr. Carl:

The theoretical cubic foot weight of our 8 sk grout mix, Mix No. 7681 is 147.00 lbs. per cubic foot, with the following batch weights.

2750 lbs. of concrete sand
752 lbs. of cement
56 gal. of water
3969

Assuming that the cement will use 3 gal of water per sack for hydration and the sand has an absorption of 1.5%, the approximate dried cubic foot weight would be 135.59 lbs. per cubic foot.

If I can be of further help, please feel free to call me.

Sincerely,

ACME CONCRETE CO.

Steve Wittstock
Quality Control

SJW:cd

CAVITY CONCRETE



Dennis



June 20, 1985

George Grant, Inc.
P.O. Box 786
Richland, Wa. 99352

Attn: Dennis Carl

Re: Exxon Nuclear Job #RC-0015, Line Item 24

Dear Mr. Carl:

The theoretical unit weight of our P.C. concrete, Mix No. 6511, is 152.57 lbs. per cubic foot, with the following batch weights.

1452 lbs. of concrete sand
1820 lbs. of 3/4 aggregate
610 lbs. of cement
28.5 gal. of water
4119.4

Assuming that the cement will use 3 gal of water per sack for hydration and the aggregate has an absorption of $\frac{1}{2}\%$ and the sand has an absorption of 1.5%, the approximate unit of a dried cubic foot would be 148.6 lbs. per cubic foot.

If I can be of further help, please feel free to call me.

Sincerely,

ACME CONCRETE CO.

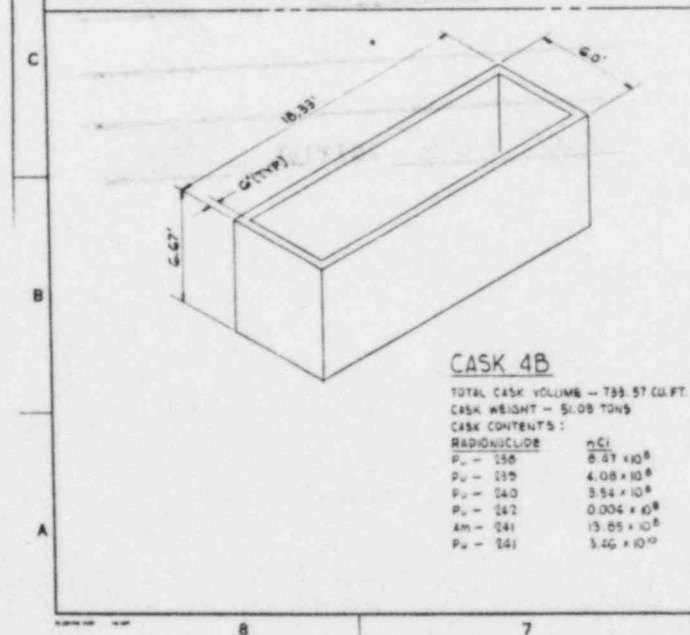
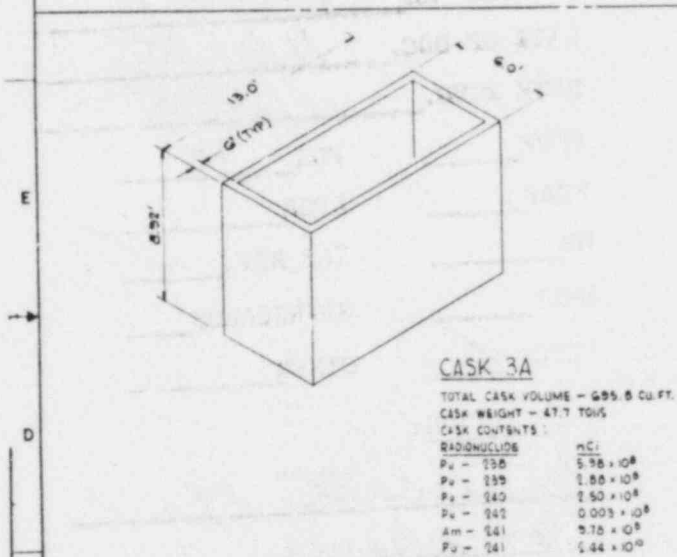
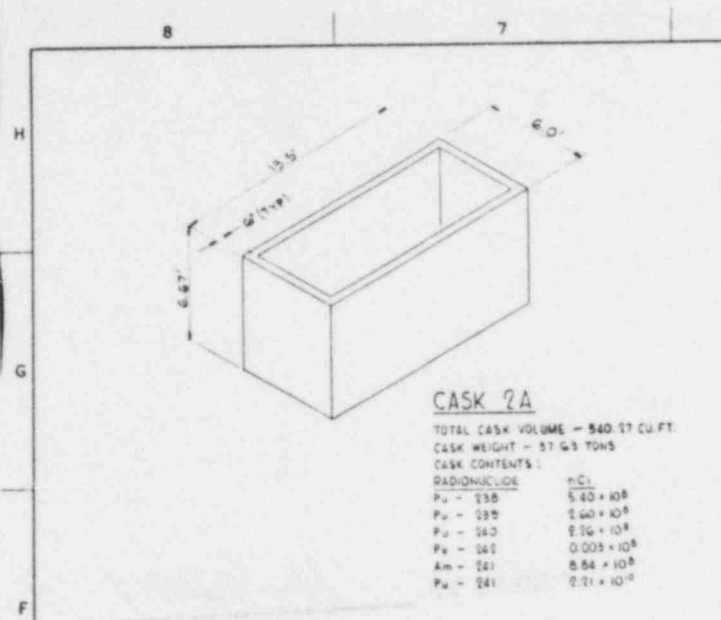
A handwritten signature in dark ink, appearing to read "Steve Wittstock", is written over the printed name.

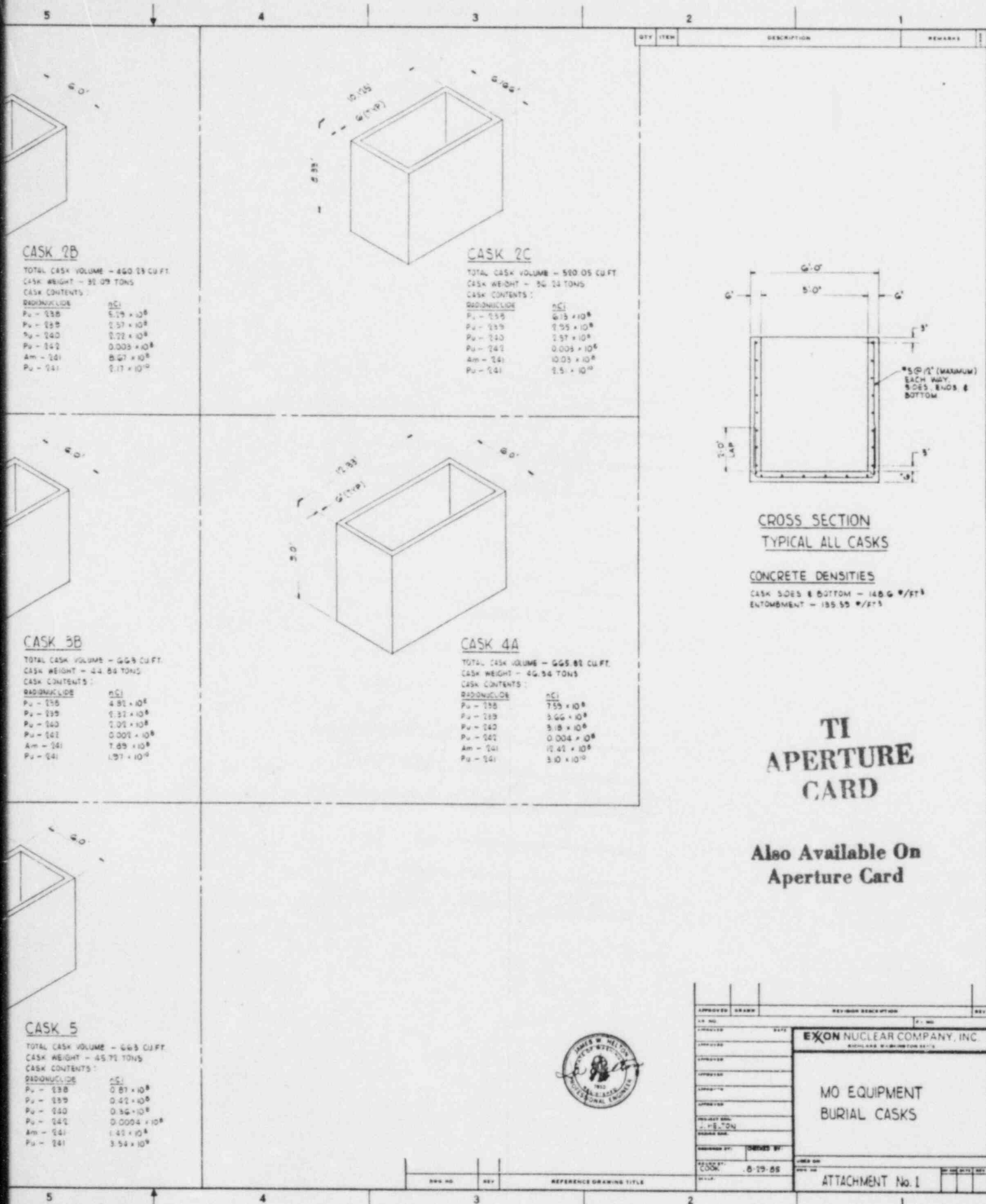
Steve Wittstock
Quality Control

SJW:cd

SHELL CONCRETE







85/217D386 - 01

DOCKET NO. 71-9207
CONTROL NO. 26157
DATE OF DOC. 11/04/85
DATE RCVD. 11/12/85
FCUF _____ PDR ☒
FCAF _____ LPDR _____
WM _____ I&E REF. ☒
WMUR _____ SAFEGUARDS _____
FGTC ☒ OTHER _____

DESCRIPTION:

Certificate of
Compliance
Amendment request

12/12/85 INITIAL Cec