



**Entergy  
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September 20, 1994

OCAN099402

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Mail Station P1-137  
Washington, DC 20555

Subject: Arkansas Nuclear One - Units 1 and 2  
Docket Nos. 50-313 and 50-368  
License Nos. DPR-51 and NPF-6  
Revised Information for IE Bulletin 80-11, 180 Day Response

Gentlemen:

By letter dated January 29, 1981 (OCAN018120), the "Report on the Reevaluation of Concrete Masonry Walls" for Arkansas Nuclear One (ANO) Units 1 and 2 was submitted as the required 180 day response to IE Bulletin 80-11, "Masonry Wall Design." As a result of an internal review of IE Notice 87-67, "Lessons Learned from Regional Inspections of Licensees Action in Response to IE Bulletin 80-11," it has been determined that additional walls should be included in the final report. Revisions to the ANO-1 and ANO-2 reports are attached. Also, figures depicting the current configurations are attached.

As a result of an internal engineering evaluation, six walls in the auxiliary buildings will require modifications to meet the requirements of IE Bulletin 80-11. These walls are currently considered to be operable. The three ANO-1 walls are 4B-190/191, 4B-49/50, and 4B-43/44. The three ANO-2 walls are 24B-241/242, 24B-219/220, and 26B-9/10. The modifications will be installed by 1R13 which is currently scheduled to end November 4, 1996. Should you have any questions, please contact me.

Very truly yours,

Dwight C. Mims  
Director, Licensing

DCM/nbm  
Attachments

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## REVISIONS TO THE ANO-1 REPORT

### Concrete Block Walls with Seismic Category 1 Attachments other than Pipes:

The drawing depicting wall 4B-136/137 did not show the class 1 conduit EC1590 that penetrated this wall and was grouted, thereby making the wall act as a support. The following information should be added to tables 2 and 5, respectively.

TABLE 2  
**ANO-1 CONCRETE BLOCK WALLS WITH  
SEISMIC CATEGORY 1 ATTACHMENTS OTHER THAN PIPES**

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)
4B-136 -137	360'-0"	2'-0"	10'-0"	I

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall

TABLE 5  
**ANO-1 RESULTING STRESSES OF CONCRETE BLOCK WALLS  
WITH SEISMIC CATEGORY 1 ATTACHMENTS OTHER THAN PIPES**

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)	ANCHOR FORCE DBE (kips)	Method of Analysis (*)	
		OBE		DBE					
		fs	fm	fs	fm	fv	fv		
4B-136 -137	17.8	-	-	7.2	0.16	-	9.5	2.2	PL

Notes: (\*) S = Simple Beam, PL = Plate, and D = Dynamic Analysis; (#) = Single Wythe Wall

### Concrete Block Walls in Proximity to Safety-Related Systems:

Walls 4B-87, 4B-88/89 (Col. B-C), 4B-186A/187A, 4B-190/191, 4B-206/207, 4B-216/217, 6B-15/16 should be added to tables 3 and 6, respectively.

Specifically:

- (1) The eight class 1 conduits located adjacent to wall 4B-87 are clearly defined on electrical layout drawings;

- (2) The drawings depicting walls 4B-88/89 (col. B-C), and 4B-216/217 clearly note that class 1 equipment is in proximity. Field investigation showed class 1 conduits in proximity to wall 4B-206/207.
- (3) The two class 1 conduits located adjacent to wall 4B-190/191 are clearly in proximity when they are located in the field. The applicable electrical layout drawing does not show these conduits to be in proximity to the wall; and
- (4) The addition of the remaining two walls on ANO-1 (4B-186A/187A, 6B-15/16) is an engineering judgment call with regard to method of analysis (4B-186A/187A) or consideration of other structures having the potential of impacting a class 1 masonry wall (6B-15/16).

TABLE 3  
ANO-1 CONCRETE BLOCK WALLS IN PROXIMITY  
TO SAFETY-RELATED SYSTEMS

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)
4B-87	335'-0"	1'-0"	8'-0"	I
4B-88 -89 (COL. B-C)	335'-0"	2'-6"	16'-3"	I
4B-186A -187A	386'-0"	1'-6"	8'-8"	I
4B-190 -191	404'-0"	1'-0"	17'-8"	I
4B-206 -207	386'-0"	1'-0"	16'-0"	I
4B-216 -217	372'-0"	1'-0"	7'-3"	I
6B-15 -16	326'-0"	1'-0"	8'-0"	II

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall

TABLE 6  
ANO-1 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS IN PROXIMITY TO SAFETY-RELATED SYSTEMS

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)		ANCHOR FORCE DBE (kips)	Method of Analysis (*)
		OBE		DBE		OBE   DBE			
		fs	fm	fs	fm	fv	fv		
4B-87(#)	4.3	-	-	23.0	0.5	-	-	4.5	S
4B-88 -89 (B-C)	2.5	-	-	30.0	0.64	-	-	5.8	PL
4B-186A -187A	Peak	-	-	13.0	0.14	-	10.0	NA	S
4B-190 -191(#)	1.36	42.8	0.93	51.4	1.11	-	3.5	9.7	D
4B-206 -207(#)	8.8	16.9	0.37	19.6	0.42	-	18.0	5.14	D
4B-216 -217(#)	22.5	0.84	0.04	1.13	0.049	-	5.9	0.43	D
6B-15 -16(#)	9.5	2.7	0.06	3.6	0.08	-	3.4	1.45	D

Notes: (\*) S = Simple Beam, PL = Plate, and D = Dynamic Analysis; (#) = Single Wythe Wall

#### Seismic Support Walls:

These walls are required to be designed to withstand the same loading as the other IE Bulletin 80-11 walls since they provide the support needed for the IE Bulletin 80-11 walls to maintain their seismic qualification. The following two tables are new and were not included in the original IEB 80-11, 180 day response.

### ANO-1 SEISMIC SUPPORT WALLS

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)	REMARKS
4B-49 -50	335'-0"	2'-0"	8'-0"	I	
4B-53 -54	335'-0"	2'-0"	8'-0"	I	
4B-63 -64	335'-0"	2'-6"	8'-0"	I	
4B-69 -70	335'-0"	3'-6"	18'-0"	I	
4B-94 -95	335'-0"	1'-6"	6'-9" / 5'-6" / 14'-3"	I	3 wall sections
4B-120 -121	354'-0"	1'-6"	13'-0"	I	
4B-122 -123	354'-0"	1'-6"	13'-0"	I	
4B-150 -151	374'-0"	2'-0"	11'-6"	I	
4B-154 -155	372'-0"	1'-0"	15'-0"	I	
4B-196 -197	386'-0"	1'-0"	8'-8"	I	
4B-200 -201	386'-0"	1'-0"	8'-8"	I	
4B-208 -209	386'-0"	1'-0"	16'-0"	I	
4B-214 -215	386'-0"	1'-0"	16'-0"	I	
6B-7 -8	326'-0"	1'-0"	8'-0"	I	
6B-9 -10	326'-0"	1'-0"	8'-0"	I	
6B-17 -18	326'-0"	1'-0"	8'-0"	I	
6B-21 -22	326'-0"	1'-0"	8'-0"	I	
6B-37 -38	335'-0"	2'-0"	8'-0"	I	
6B-45 -46	354'-0"	1'-6"	8'-0"	II	

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall

**ANO-1 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS WHICH SUPPORT SEISMIC WALLS**

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)		MASONRY SHEAR STRESS (psi)	ANCHOR FORCE DBE (kips)	Method of Analysis (*)	REMARKS
		OBE	DBE				
		fs   fm   fs   fm	OBE   DBE				
				fv   fv			
4B-49 -50	3.4	5.9   0.13   7.4   0.16		-   10.2	7.5	D	operable but anchors need to be fixed; wall analyzed with 4B-43/44
4B-53 -54	7.7	-   -   13.5 0.29		-   9.0	4.2	PL	
4B-63 -64	14.6	-   -   3.9  0.08		-   5.0	1.2	PL	
4B-69 -70	61.2	-   -   4.0  0.03		-   -	1.2	PL	
4B-94 -95	peak	-   -   6.7  0.15		-   10.0	2.0	PL	
4B-120 -121	3.9	-   -   31.6 0.68		-   23.3	5.8	PL	
4B-122 -123	7.6	16.8 0.36 21.5 0.47		-   16.2	5.0	D	
4B-150 -151	36.4	-   -   2.2  0.023		-   2.6	-	S	
4B-154 -155	11.27	12.4 0.27 14.8 0.32		-   1.7	3.35	D	(#)
4B-196 -197	N/A	-   -   24.3   0.27		-   24.6	3.9	S	(#)
4B-200 -201	12.9	11.5 0.25 13.3 0.29		12.9   15.2	4.1	D	(#)
4B-208 -209	6.3	-   -   10.0   0.22		-   14.0	2.9	D	(#)
4B-214 -215	7.3	-   -   7.5   0.16		-   0.5	2.2	D	(#)

**ANO-1 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS WHICH SUPPORT SEISMIC WALLS**  
(continued)

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)	ANCHOR FORCE DBE (kips)	Method of Analysis (*)	REMARKS	
		OBE		DBE						
		fs	fm	fs	fm					OBE
						fv	fv			
6B-7 -8	11.6	2.8	0.07	16.1	0.21	-	5.6	1.5	D	(#)
6B-9 -10	168	-	-	0.6	0.02	-	0.05	0.2	PL	(#)
6B-17 -18	4.3	-	-	22.4	0.49	-	9.0	4.8	S	(#)
6B-21 -22	153	-	-	0.6	0.02	-	0.05	0.2	PL	(#)
6B-37 -38	4.2	-	-	22.7	0.49	-	9.0	5.6	S	
6B-45 -46	7.4	14.4	0.31	18.5	0.4	-	17.1	5.2	D	

Notes: (\*) S = Simple Beam, PL = Plate, and D = Dynamic Analysis; (#) = Single Wythe Wall

## REVISIONS TO THE ANO-2 REPORT

### Concrete Block Walls Supporting Seismic Category 1 Pipes:

Wall 24B-1/26B-5 should be added to table 1.

TABLE 1  
ANO-2 CONCRETE BLOCK WALLS SUPPORTING  
SEISMIC CATEGORY 1 PIPES

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)	SYSTEM
24B-1 26B-5	317'-0"	2'-0"	15'-6"	I	HPI RECIRC.

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall

### Concrete Block Walls with Seismic Category 1 Attachments other than Pipes:

Walls 24B-166/167, 24B-207/208, 24B-241/242 should be added to tables 2 and 5, respectively.

- (1) The drawing depicting wall 24B-166/167 clearly shows class 1 conduits penetrating the wall;
- (2) The class 1 conduits that penetrate wall 24B-241/242 are clearly noted on the electrical layout drawings; and
- (3) The class 1 conduits penetrating or in proximity to wall 24B-207/208 were added by DCPs 83-2217 & 85-2075D, respectively. A review of the design evaluation questions associated with these DCPs indicates there was a "Design Evaluation Question # 20" that is essentially identical to the question included in the current form # 6010.001H. The concern was with the attachment of junction boxes to the wall, not with conduit field routed through or in proximity to the wall in question.

TABLE 2  
**ANO-2 CONCRETE BLOCK WALLS WITH  
SEISMIC CATEGORY 1 ATTACHMENTS OTHER THAN PIPES**

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)
24B-166 -167 (#)	354'-0"	1'-0"	14'-8"	I
24B-207 -208	372'-0"	2'-0"	9'-0"	I
24B-241 -242 (#)	386'-0"	1'-0"	14'-0"	I

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall; (#) = Single Wythe Wall

TABLE 5  
**ANO-2 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS WITH SEISMIC CATEGORY 1 ATTACHMENTS  
OTHER THAN PIPES**

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)		ANCHOR FORCE DBE (kips)	Method of Analysis (*)	REMARKS
		OBE		DBE		OBE   DBE				
		fs	fm	fs	fm	fv	fv			
24B-166 -167	17	-	-	4.2	0.09	-	15.1	1.3	PL	(#)
24B-207 -208	10.9	7.3	0.2	6.2	0.17	1.5	-	1.5	D	
24B-241 -242	9.08	32.9	0.71	28.4	0.61	52.2	-	7.3	D	Operable; 12" Wythe, requires mod.(#)

(\*) PL = Plate and D = Dynamic Analysis; (#) = Single Wythe Wall

**Concrete Block Walls in Proximity to Safety-Related Systems:**

Walls 24B-10/11, 26B-7/8, 26B-9/10, 26B-17/18, 24B-219/220 should be added to tables 3 and 6, respectively.

- (1) The class 1 piping and valves in proximity to walls 24B-1/6B-5, 24B-10/11, 26B-7/8, 26B-9/10, & 26B-17/18 are clearly shown on piping layout and/or isometric drawings;
- (2) The class 1 cable trays in proximity to wall 24B-219/220 are clearly shown on the electrical tray layout drawing.

TABLE 3  
ANO-2 CONCRETE BLOCK WALLS IN PROXIMITY  
TO SAFETY-RELATED SYSTEMS

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)
24B-10 -11	317'-0"	1'-4"	8'-8"	I
24B-219 -220 (#)	386'-0"	1'-0"	16'-0"	II
26B-7 -8	326'-0"	2'-3"	22'-0"	I
26B-9 -10	326'-0"	1'-3"	16'-4"	I
26B-17 -18	335'-0"	1'-6"	17'-0"	I

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall; (#) = Single Wythe Wall

TABLE 6  
ANO-2 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS IN PROXIMITY TO SAFETY-RELATED SYSTEMS

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)		ANCHOR FORCE DBE (kips)	Method of Analysis (*)	REMARKS
		OBE		DBE		OBE   DBE				
		fs	fm	fs	fm	fv	fv			
24B-10 -11	peak	-	-	14.0	0.30	-	14.0	4.3	PL	
24B-219 -220	7.89 (OBE)	27.4	0.59	31.0	0.67	-	21.2	6.9	D	operable - mod. required(#)
26B-7 -8	4.1	31.0	0.31	29.2	0.29	18.0	-	2.3	D	
26B-9 -10	2.2	36.7	0.52	44.0	0.62	-	45.0	8.4	D	
26B-17 -18	5.9	11.8	0.25	13.0	0.28	-	18.4	4.3	D	

(\*) PL = Plate and D = Dynamic Analysis; (#) = Single Wythe Wall

**Concrete Block Walls Supporting Seismic Category 1 Pipes:**

Wall 24B-1/26B-5 should be added to table 4.

TABLE 4  
**ANO-2 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS SUPPORTING SEISMIC CATEGORY 1 PIPES**

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)	ANCHOR FORCE DBE (kips)	Method of Analysis (*)	REMARKS
		OBE		DBE					
		fs	fm	fs	fm				
		<u>OBE   DBE</u>							
						<u>fv</u>   <u>fv</u>			
24B-1 26B-5	4.9	9.13	0.20	11.7	0.25	40.5   -	3.8	D	Fy = 200# My = 92533 in.-lb.

(\*) D = Dynamic Analysis

### Seismic Support Walls

These walls are required to be designed to withstand the same loading as the other IE Bulletin 80-11 walls since they provide the support needed for the IE Bulletin 80-11 walls to maintain their seismic qualification. The following two tables are new and were not included in the original IEB 80-11, 180 day response.

#### ANO-2 SEISMIC SUPPORT WALLS

WALL NO.	FLOOR EL.	WALL THICK.	WALL HEIGHT	WALL TYPE(*)
24B-60 -61	335'-0"	4'-0"	14'-8"	I
24B-70 -71	335'-0"	3'-9"	16'-4"	I
24B-74 -75	335'-0"	2'-0"	10'-4"	I
24B-102 -103	335'-0"	2'-0"	8'-0"	I
24B-126 -127	354'-0"	1'-6"	11'-3"	I
24B-130 -131	354'-0"	1'-6"	11'-6"	I
24B-132 -133	354'-0"	2'-3"	11'-0"	I
24B-168 -168A	374'-6"	1'-6"	6'-9 1/2"	I
24B-169 -170	374'-6"	1'-6"	8'-1"	I
24B-181 -182	372'-0"	1'-0"	11'-0"	I
24B-201 -202	372'-0"	1'-0"	12'-0"	I
24B-225 -226	386'-0"	1'-0"	14'-8"	II
24B-239 -240	386'-0"	1'-0"	9'-4"	I
24B-277	404'-0"	1'-0"	8'-0"	II
26B-15 -16	335'-0"	1'-6"	6'-8"	I

Notes: (\*) I = Shield Wall or Firewall and II = Partition Wall

**ANO-2 RESULTING STRESSES OF  
CONCRETE BLOCK WALLS WHICH PROVIDE REQUIRED SEISMIC SUPPORT**

WALL NO.	FREQ (cps)	FLEXURAL STRESS (ksi)				MASONRY SHEAR STRESS (psi)		ANCHOR FORCE DBE (kips)	Method of Analysis (*)	REMARKS
		OBE		DBE		OBE   DBE				
		fs	fm	fs	fm	fv	fv			
24B-60 -61	-	-	-	-	-	-	-	-	D	(similar to 24B-70/71)
24B-70 -71	28.3	2.7	0.02	15.7	0.37	-	9.0	1.2	D	
24B-74 -75	2.6	17.5	0.38	21.0	0.45	-	14.0	4.4	D	
24B-102 -103	peak	-	-	21.3	0.46	-	8.5	5.0	S	
24B-126 -127	15.6	6.4	0.09	15.2	0.33	5.9	-	2.7	D	
24B-130 -131	18.46	4.5	0.06	5.1	0.07	-	5.7	1.9	D	
24B-132 -133	5.8	-	-	20.0	0.56	-	19.7	5.4	PL	
24B-168 -168A	19.2	1.1	0.02	1.5	0.02	-	3.13	0.68	D	
24B-169 -170	19.2	-	-	6.3	0.09	-	3.2	1.6	D	
24B-181 -182	13.9	19.2	0.42	15.2	0.33	2.2	-	5.2	D	(#)
24B-201 -202	23.5	0.16	0.04	1.9	0.04	-	4.1	0.9	D	(#)
24B-225 -226	peak	28.8	0.62	-	-	24.0	-	3.8	PL	(#)
24B-239 -240	3.14	29.0	0.63	-	-	32.0	-	4.6	PL	(#)
24B-277	17.8	-	-	21.0	0.46	-	14.0	5.2	PL	(#)
26B-15 -16	11.4	-	-	18.7	0.20	-	7.6	1.6	D	

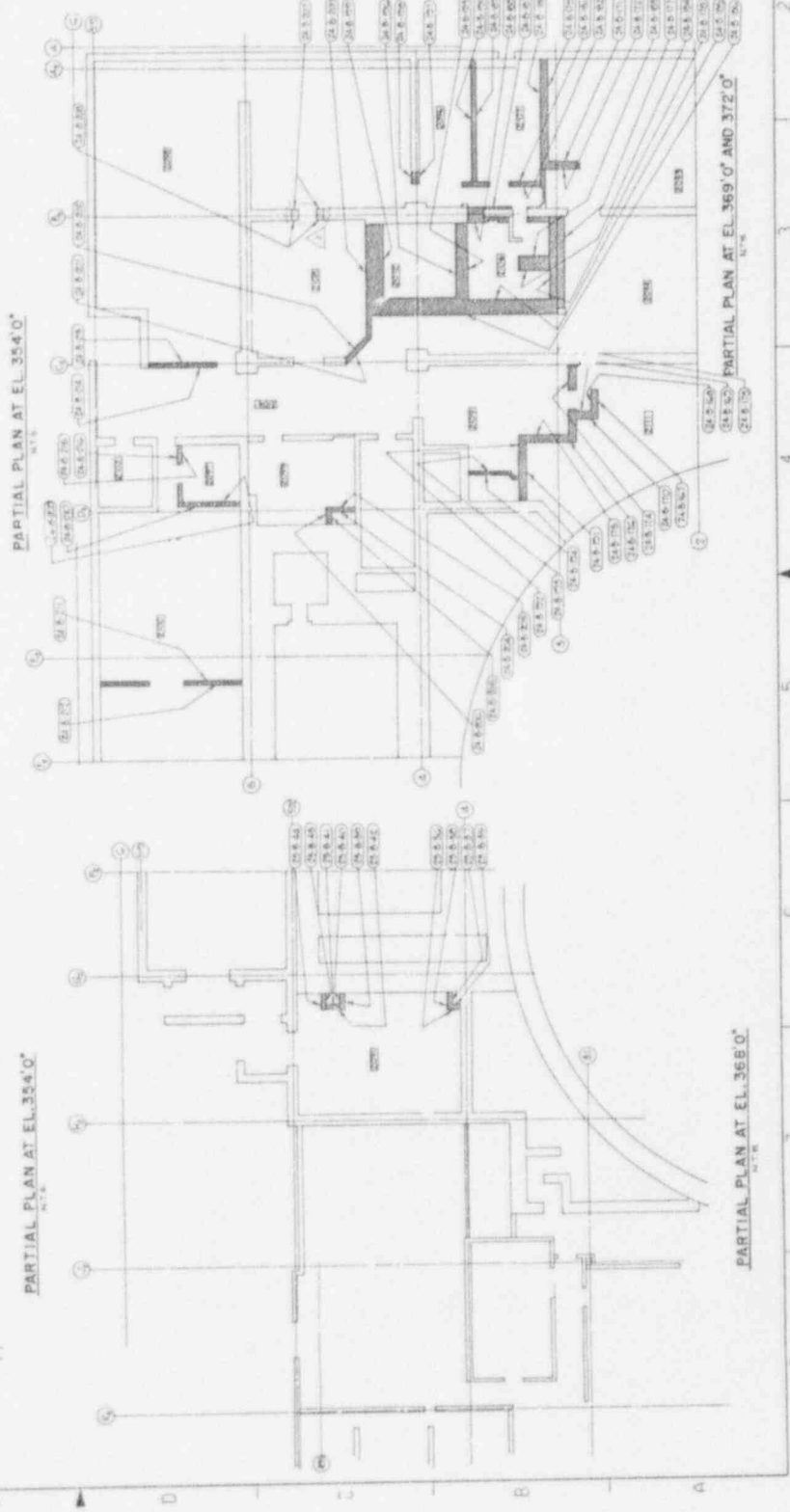
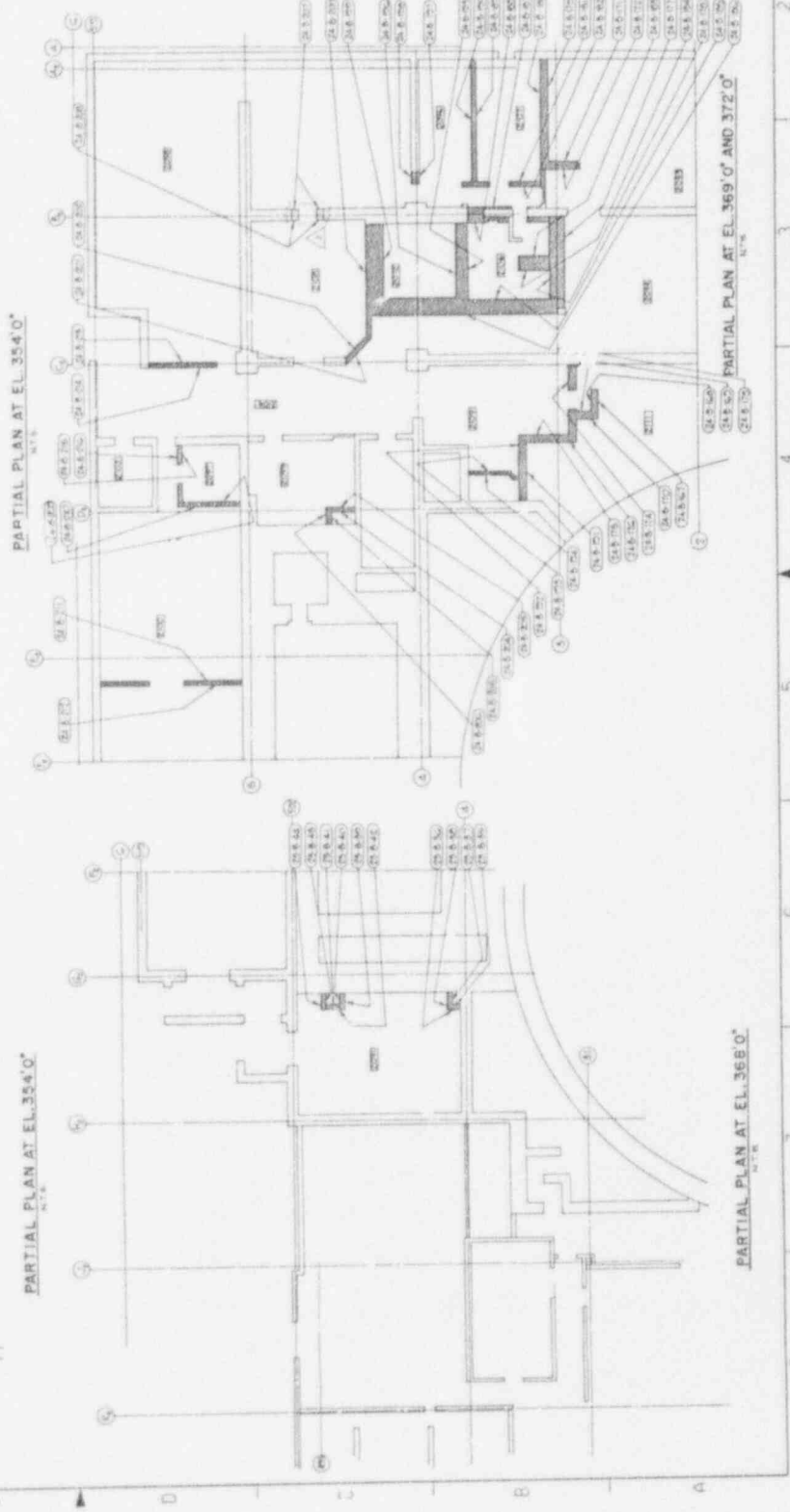
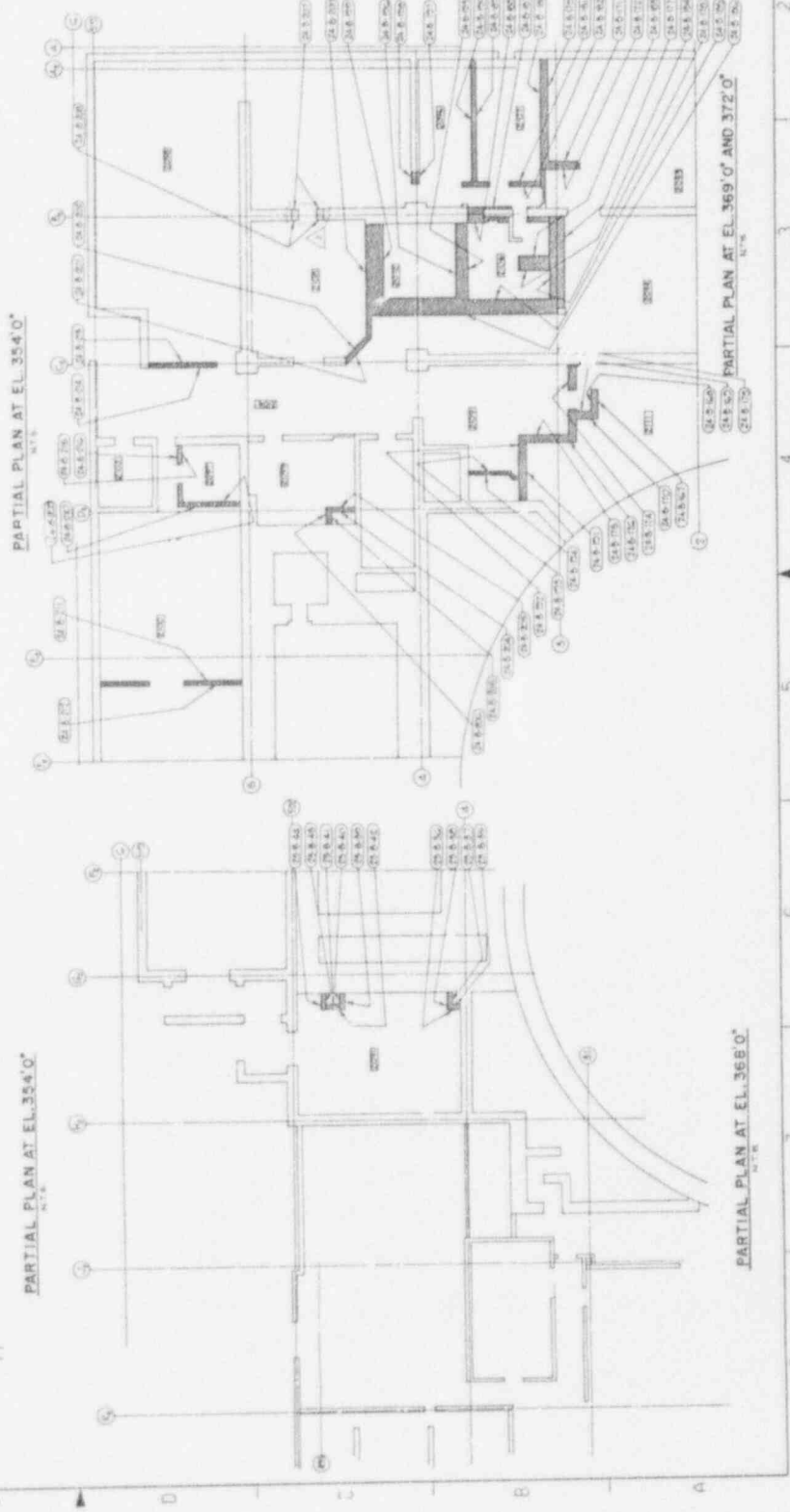
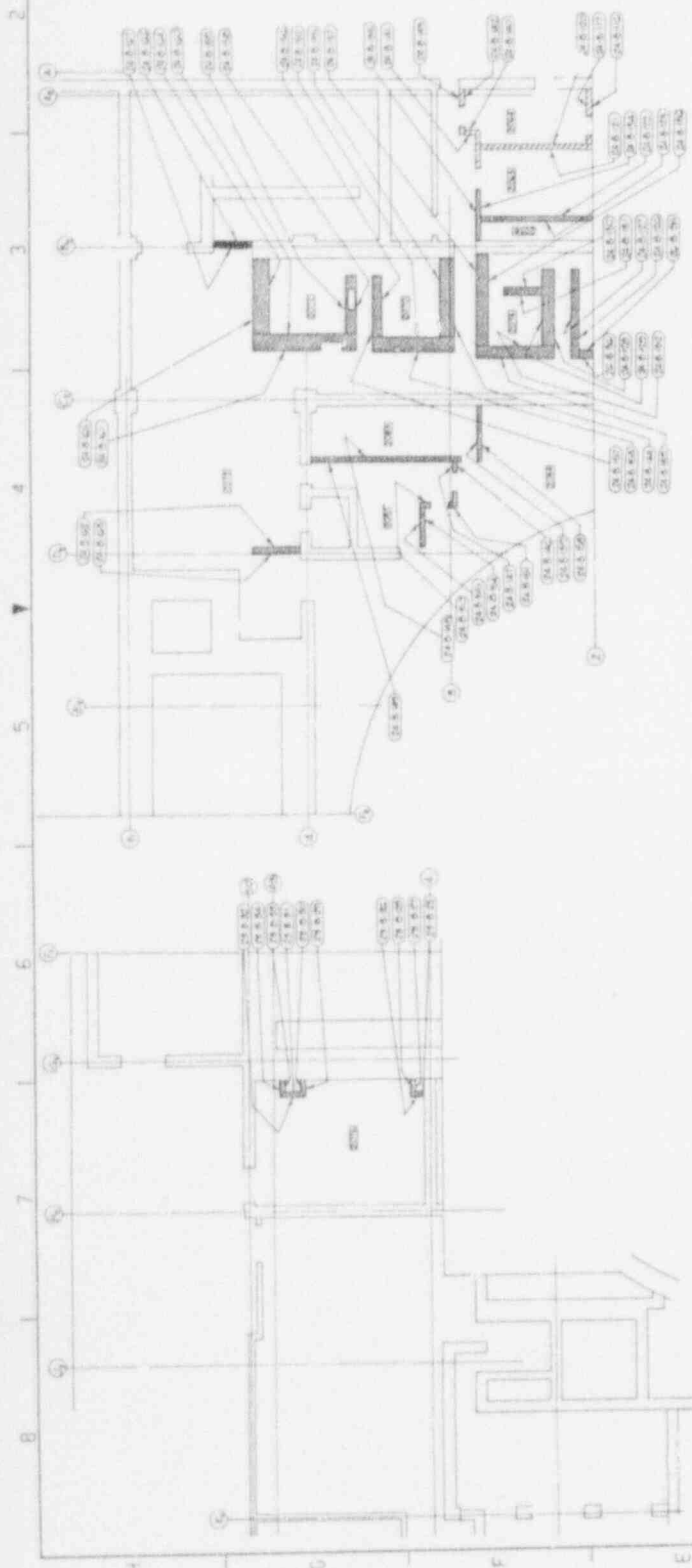
Notes: (\*) S = Simple Beam, PL = Plate, and D = Dynamic Analysis; (#) = Single Wythe Wall









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 <b>ENERGY</b>	Building no <b>C-2271</b>	Page <b>2</b>	Revision <b>0</b>
	BLOCK WALL ELEVATIONS KEY PLAN		

PARTIAL PLAN AT EL. 354'0"

PLAN AT EL. 369'0"

PLAN AT EL 386'0"

PARTIAL PLAN AT EL. 404'0"

PARTIAL PLAN AT EL. 386' 0"

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BLOCKWALL, ELEVATION  
KEY PLAN

100

C-2271

60

100

1