



PUBLIC SERVICE COMPANY OF COLORADO

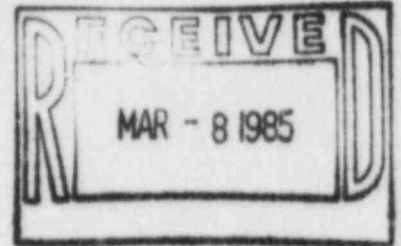
P. O. BOX 840 · DENVER, COLORADO 80201

OSCAR R. LEE
VICE PRESIDENT

March 1, 1985
Fort St. Vrain
Unit No. 1
P-85069

Regional Administrator
Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive
Arlington, Texas 76011

Attn: Mr. E. H. Johnson



SUBJECT: Masonry Block Walls

REFERENCES: Meeting Between Mr. J.R. Reesy
(PSC) and Mr. G.L. Plumlee (NRC)
on November 27, 1984. Telecon
between PSC and NRC on
January 16, 1985

Dear Mr. Johnson:

During a meeting between Mr. G.L. Plumlee, SRI, Fort St. Vrain and Mr. J.R. Reesy of PSC, concerning our response to question 14 posed by Mr. Robert Clark's letter dated July 21, 1982 (G-82232), Mr. Plumlee indicated it would be appropriate that PSC submit a series of sketches indicating how PSC reinforced each of the walls involved in rework as a result of IE Bulletin 80-11.

Attachment 1 to this letter is a list of the walls requiring rework under IEB-80-11, the detail of the reinforcement, to which side of the wall the reinforcement was installed and sketches indicating the configuration of the reinforcing.

PSC recommends that your staff review the NRC Safety Evaluation for FSV compliance with IEB-80-11 as the original SER was prepared with the understanding that all walls were reinforced utilizing bar straps installed in a vertical configuration.

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PDR ADOCK 05000267
G PDR

85-04
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H005
RETURN ORIGINAL
TO RIV

Attachment 2 to this letter is PSC's response to the NRC questions discussed during the telephone conference call between PSC and NRC on January 16, 1985.

PSC believes that since the request for the attached additional information is a direct result of conversations with the SRI and NRC, as referenced on Page 1 of this letter, an oath of affidavit is not required to accompany this letter.

Should you have any questions, please contact Mr. M. H. Holmes at (303) 571-8409.

Very truly yours,

O. R. Lee by Ala Warrington
O. R. Lee, Vice President
Electric Production

ORL/MM:pa

Attachment



SUCCESS BOND
75% COTTON FIBER

MASONRY BLOCK WALL REINFORCING SCHEDULE

<u>WALL #</u>	<u>CONSTRUCTION DETAIL</u>	<u>SIDE OF WALL APPLIED</u>
2	DETAIL 2	BOTH SIDES
3	DETAIL 3A	BOTH SIDES
3a	DETAIL 3A	BOTH SIDES
4	DETAIL 5	NORTH SIDE
	DETAIL 11	SOUTH SIDE
6	DETAIL 4A	WEST SIDE
	DETAIL 13A	EAST SIDE
7	DETAIL 4	WEST SIDE
	DETAIL 12	EAST SIDE
8	DETAIL 5A	SOUTH SIDE
	DETAIL 13	NORTH SIDE
9	DETAIL 5A	EAST SIDE
	DETAIL 13	WEST SIDE
11	DETAIL 3A	BOTH SIDES
12	DETAIL 3A	BOTH SIDES
14	DETAIL 1	BOTH SIDES
16	DETAIL 1	BOTH SIDES
20	DETAIL 1	BOTH SIDES
27	DETAIL 3A	BOTH SIDES
33*	DETAIL 6	BOTH SIDES OF SOUTH END
	DETAIL 10	NORTH SIDE OF WEST END
	DETAIL 6	SOUTH SIDE OF WEST END
49	DETAIL 7	SOUTH SIDE
	DETAIL 9	NORTH SIDE
50	DETAIL 1A	SOUTH SIDE (CLIP ANGLES AT TOP ONLY)
	DETAIL 4A	NORTH SIDE
57	DETAIL 7	EAST SIDE
	DETAIL 9	WEST SIDE
58	DETAIL 7	EAST SIDE
	DETAIL 9	WEST SIDE
59	DETAIL 7	EAST SIDE
	DETAIL 8	WEST SIDE
61	DETAIL 10	WEST SIDE
	DETAIL 6	EAST SIDE
62	DETAIL 8	WEST SIDE
	DETAIL 7	EAST SIDE
64	DETAIL 8	NORTH SIDE
	DETAIL 7	SOUTH SIDE
65	DETAIL 10	WEST SIDE
	DETAIL 6	EAST SIDE
69	DETAIL 7	EAST SIDE
	DETAIL 9	WEST SIDE
70	DETAIL 7	EAST SIDE
	DETAIL 9	WEST SIDE

* L-SHAPED WALL

MASONRY BLOCK WALL REINFORCING SCHEDULE

<u>WALL #</u>	<u>CONSTRUCTION DETAIL</u>	<u>SIDE OF WALL APPLIED</u>
71	DETAIL 7	EAST SIDE
	DETAIL 8	WEST SIDE
73	DETAIL 8	NORTH SIDE
	DETAIL 7	SOUTH SIDE
85	DETAIL 10	SOUTH SIDE
	DETAIL 7	NORTH SIDE
86	DETAIL 10	SOUTH SIDE
	DETAIL 7	NORTH SIDE
89	DETAIL 10	SOUTH SIDE
	DETAIL 7	NORTH SIDE
95	DETAIL 3	BOTH SIDES
98	DETAIL 3A	EAST SIDE
	DETAIL 4	WEST SIDE
99	DETAIL 3A	BOTH SIDES
100	DETAIL 7	NORTH SIDE
	DETAIL 10	SOUTH SIDE
101	DETAIL 7	NORTH SIDE
	DETAIL 10	SOUTH SIDE
102	DETAIL 8	EAST SIDE
	DETAIL 7	WEST SIDE
104	DETAIL 3	EAST SIDE
	DETAIL 1B	WEST SIDE
105	DETAIL 1A	BOTH SIDES
106	DETAIL 1A	BOTH SIDES

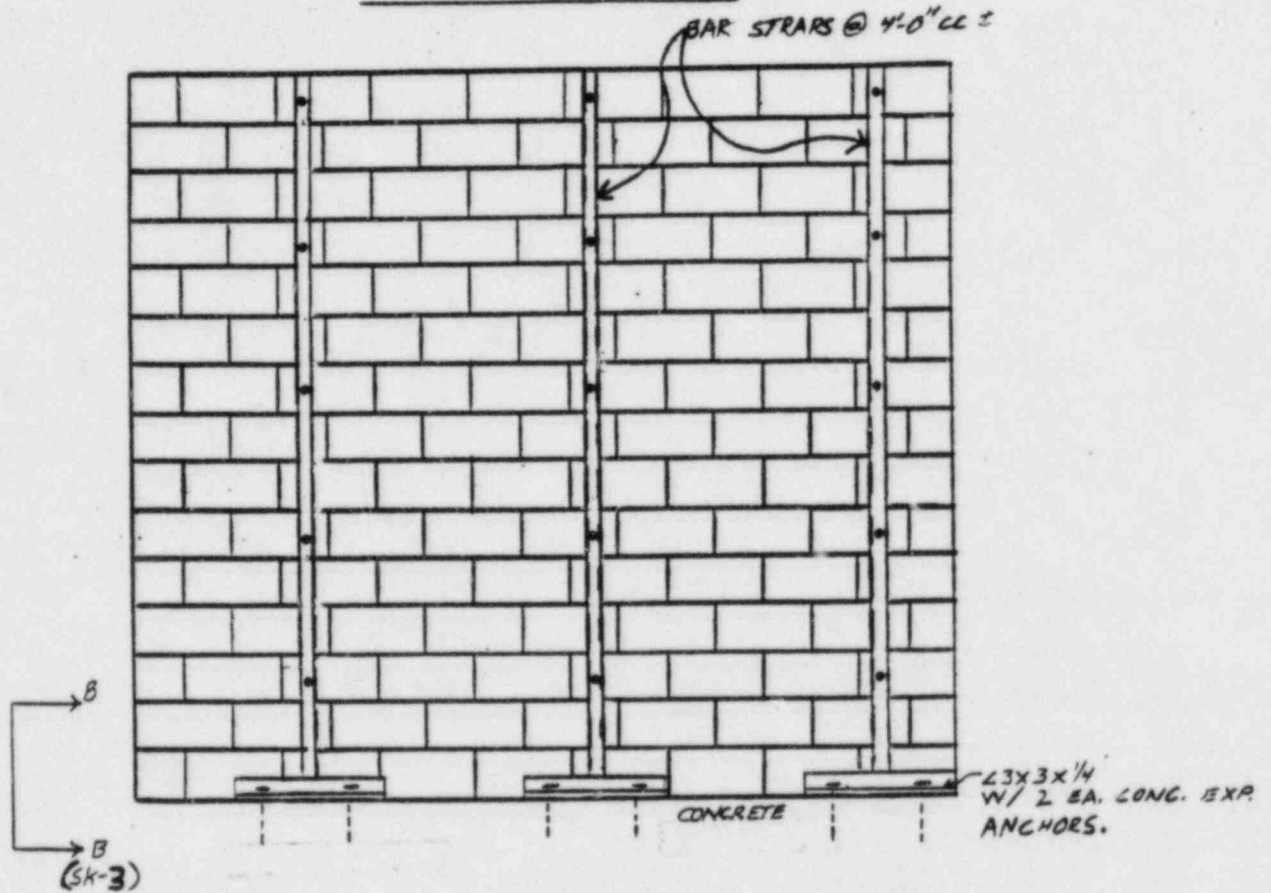


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FORT ST. VRAIN NUCLEAR GENERATING STATION
CALCULATION WORKSHEET

Form 344-24-4308

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

DETAIL 1, 1A



ELEVATION VIEW
DETAIL 1 + 1A

DETAIL	BAR STRAP SIZE
1	2" x 1/4"
1A	3" x 1/4"



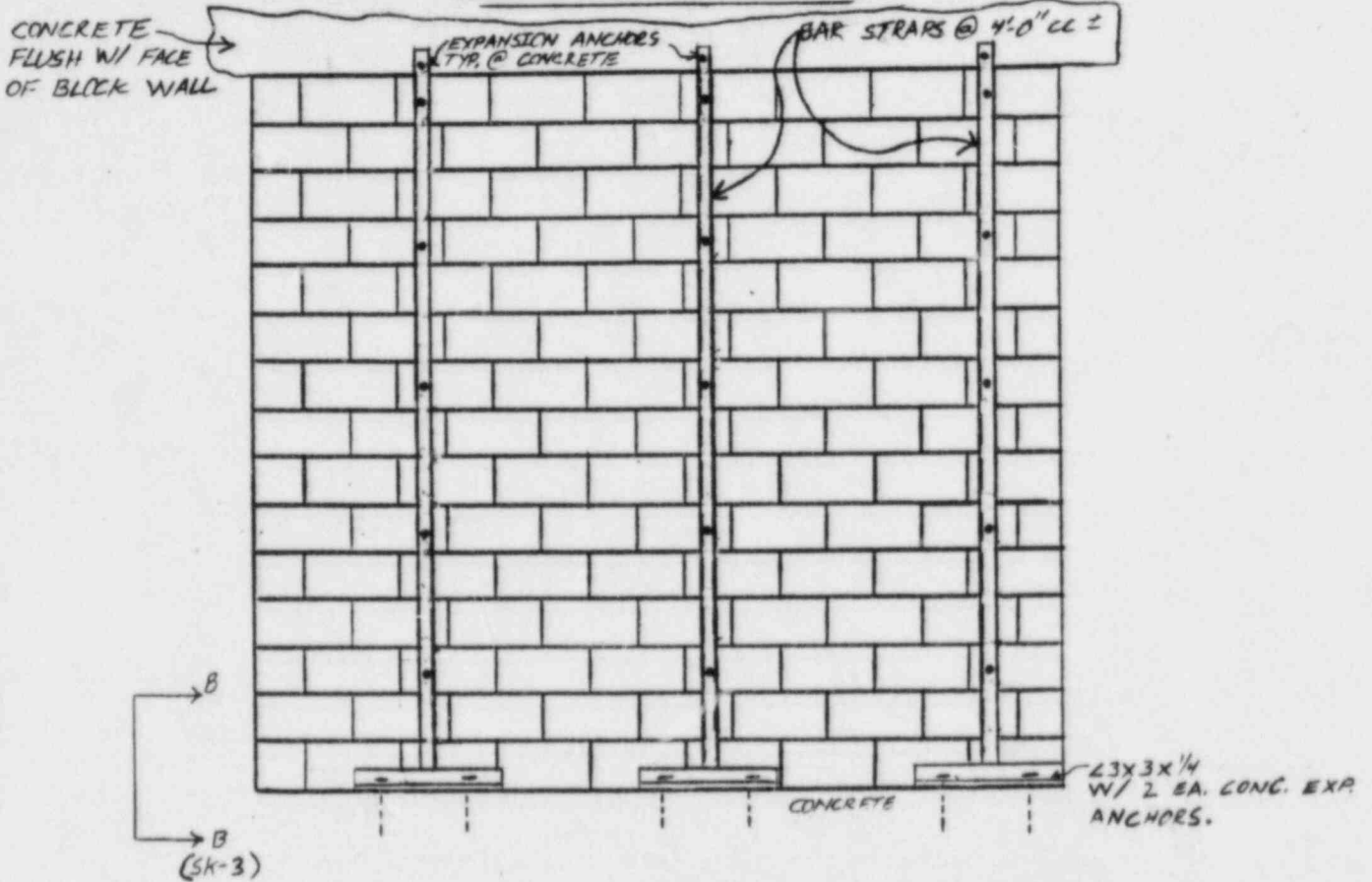
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ATTACHMENT 1
PAGE 4 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE	CALC. REV.	PAGE OF
REVIEWED BY	DATE		

DETAIL 1B



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
1B	3" x 1/4"



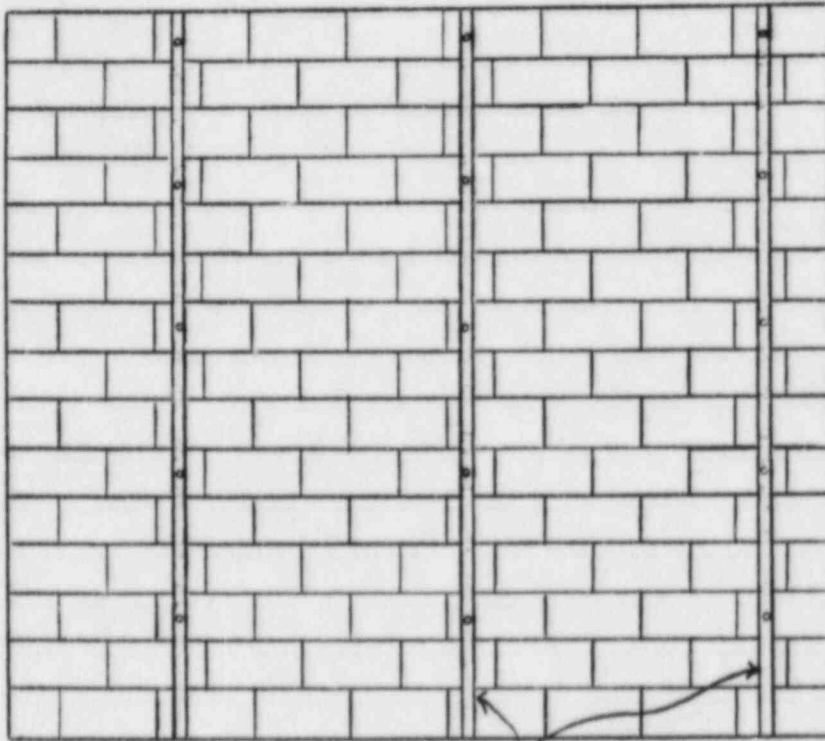
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ATTACHMENT 1
PAGE 5 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

DETAIL 2+2A



BAR STRAPS @
 4'-0" ±

ELEVATION VIEW
DETAIL 2+2A

<u>DETAIL</u>	<u>BAR STRAP SIZE</u>
2	2" x 1/4"
2A	3" x 1/4"



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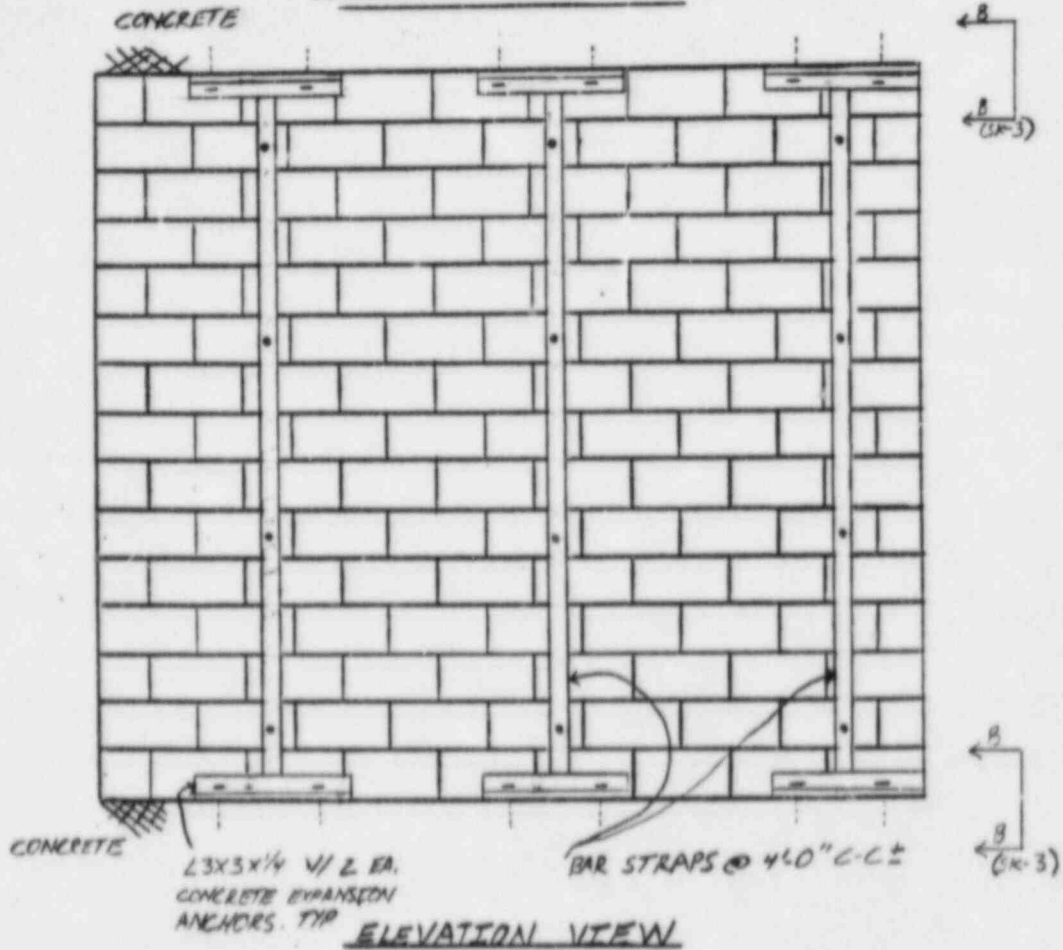
ATTACHMENT 1

PAGE 6 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

DETAIL 3,3A



DETAIL	BAR STRAP SIZE
3	3" x 1/4"
3A	2" x 1/4"



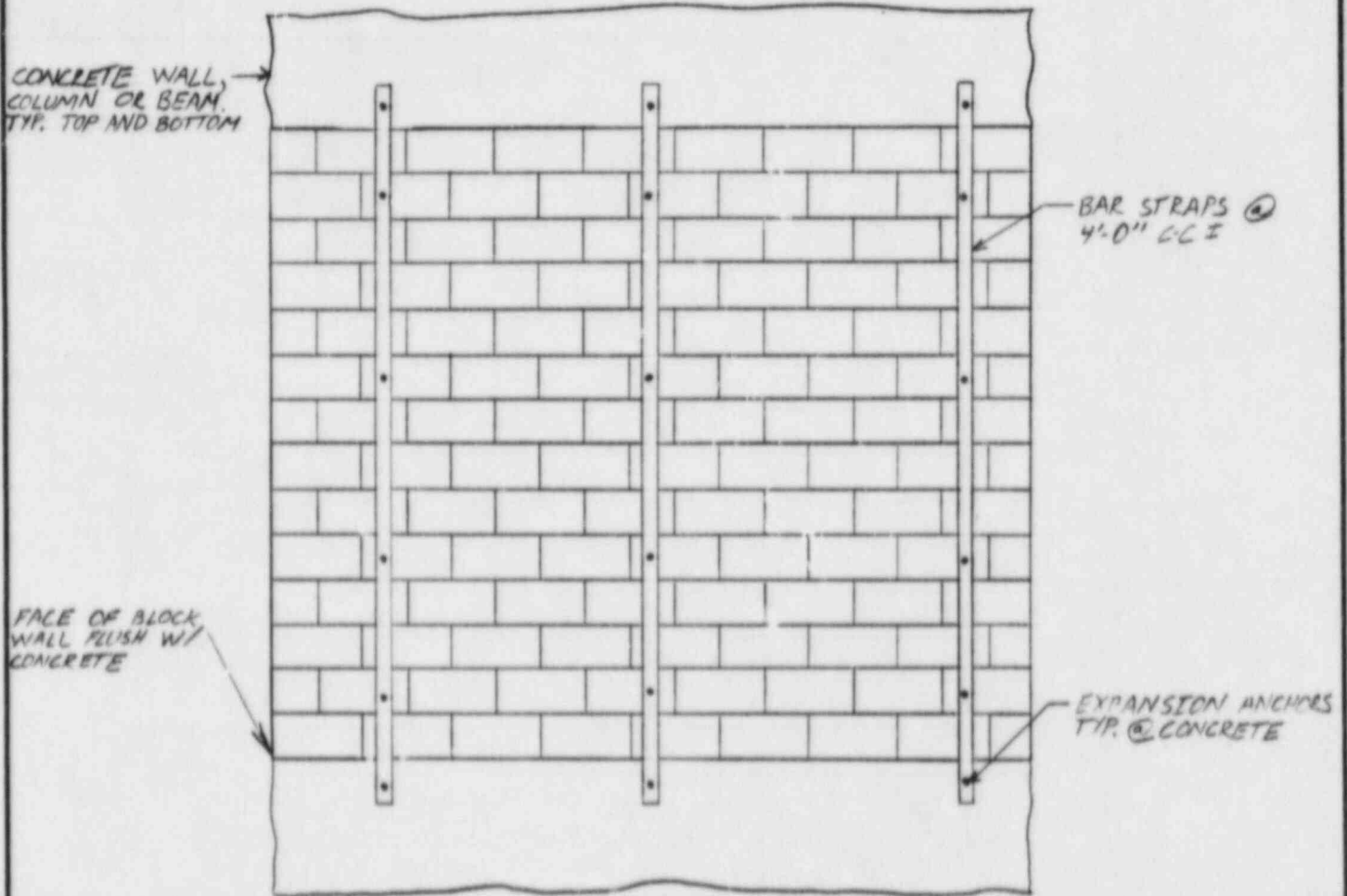
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 CALCULATION WORKSHEET

ATTACHMENT 1
PAGE 7 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE	CALC. REV.	PAGE OF
REVIEWED BY	DATE		

DETAIL 4, 4A



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
4	2" x 1/4"
4A	3" x 1/4"



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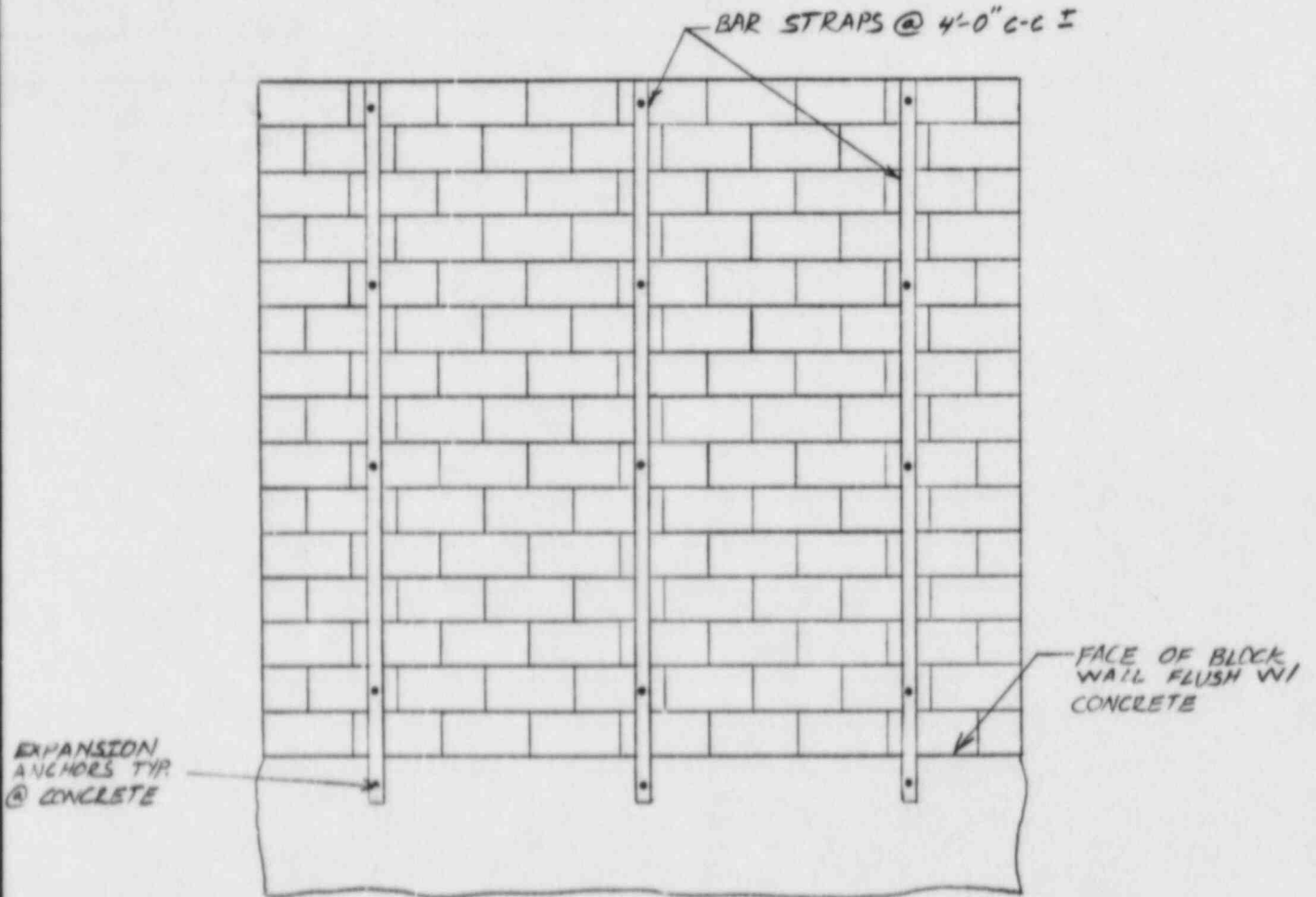
ATTACHMENT 1

PAGE 8 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

DETAIL 5,5A



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
5	3" x 1/4"
5A	2" x 1/4"

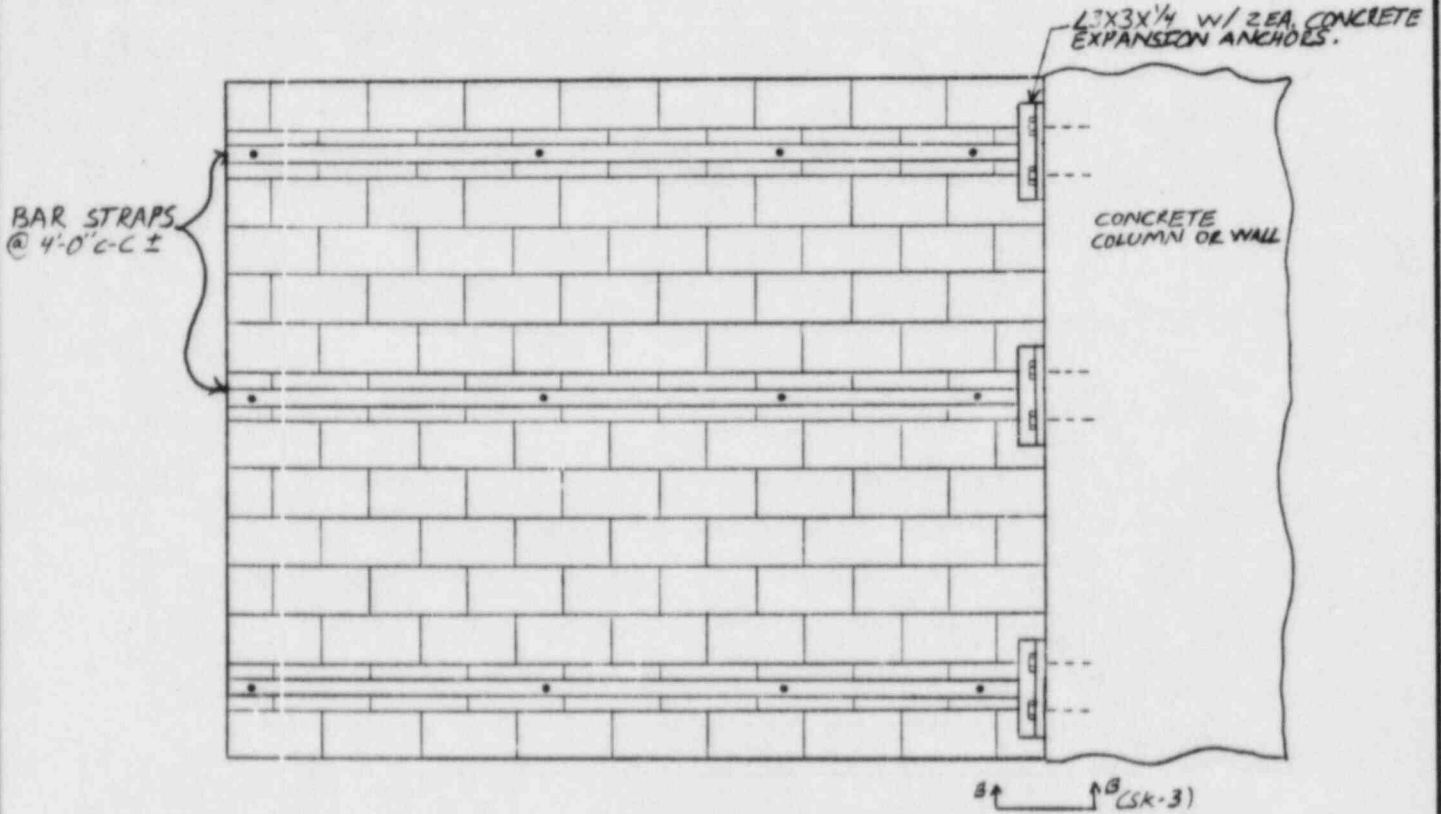


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Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE	CALC. REV.	PAGE OF
REVIEWED BY	DATE		

DETAIL 6



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
6	3" x 1/4"



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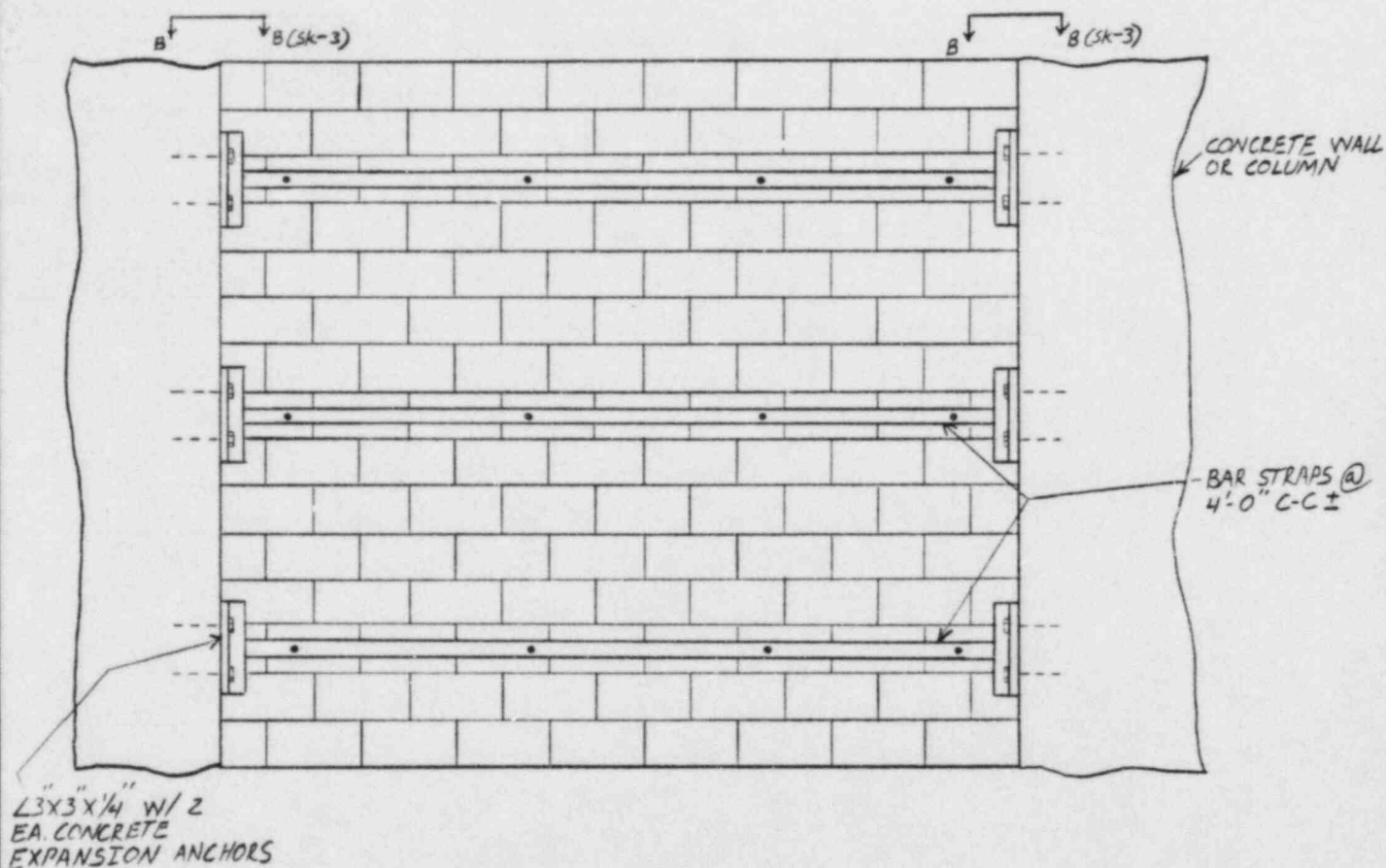
ATTACHMENT 1

PAGE 10 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE	CALC. REV.	PAGE OF
REVIEWED BY	DATE		

DETAIL 7



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
7	3" x 1/4"

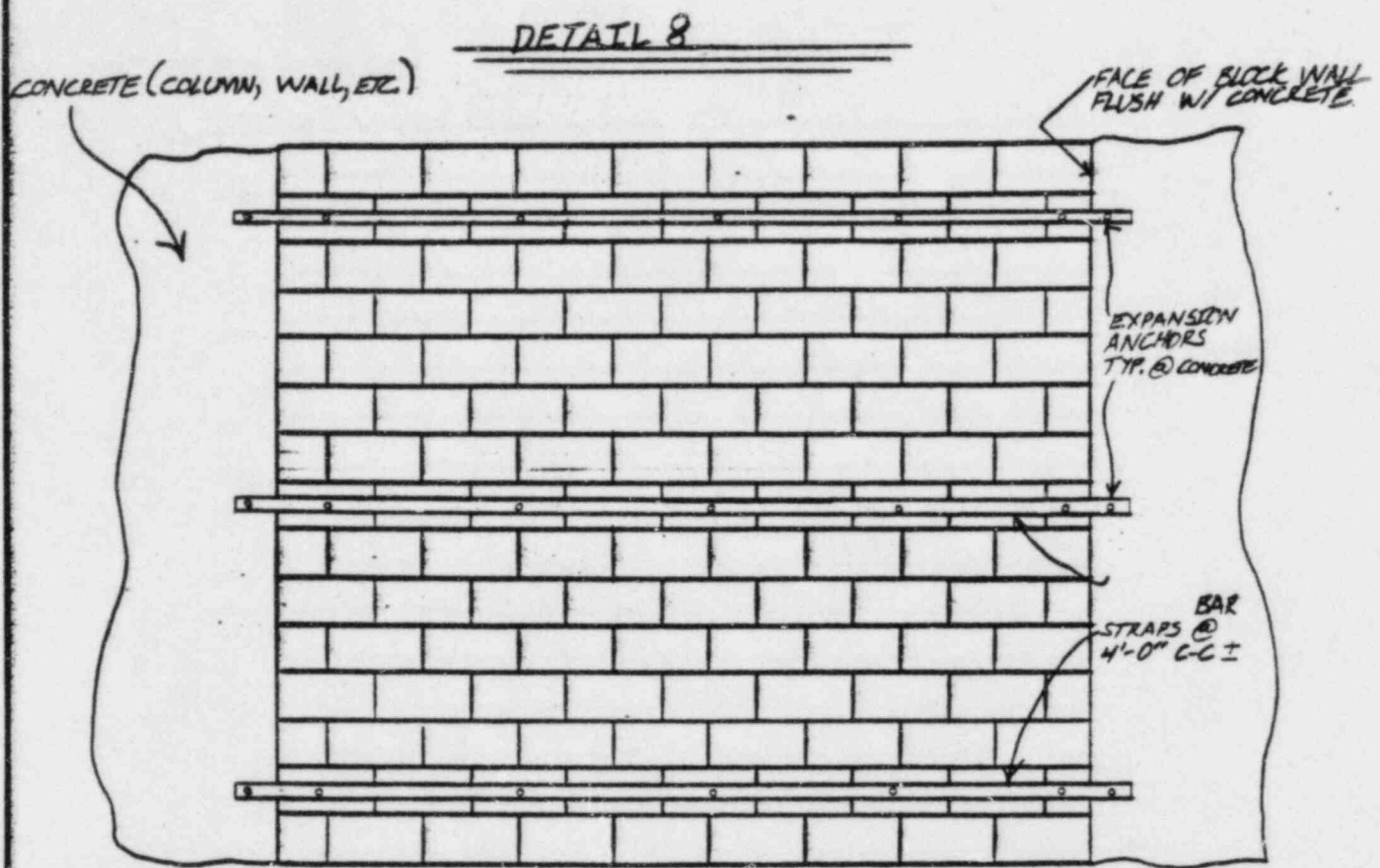


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ATTACHMENT 1
PAGE 11 OF 19

Form 344-24-4308

CALCULATION FOR		CALCULATION NUMBER		
PREPARED BY	DATE			
REVIEWED BY	DATE	CALC. REV.	PAGE	OF



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
8	3" X 1/4"



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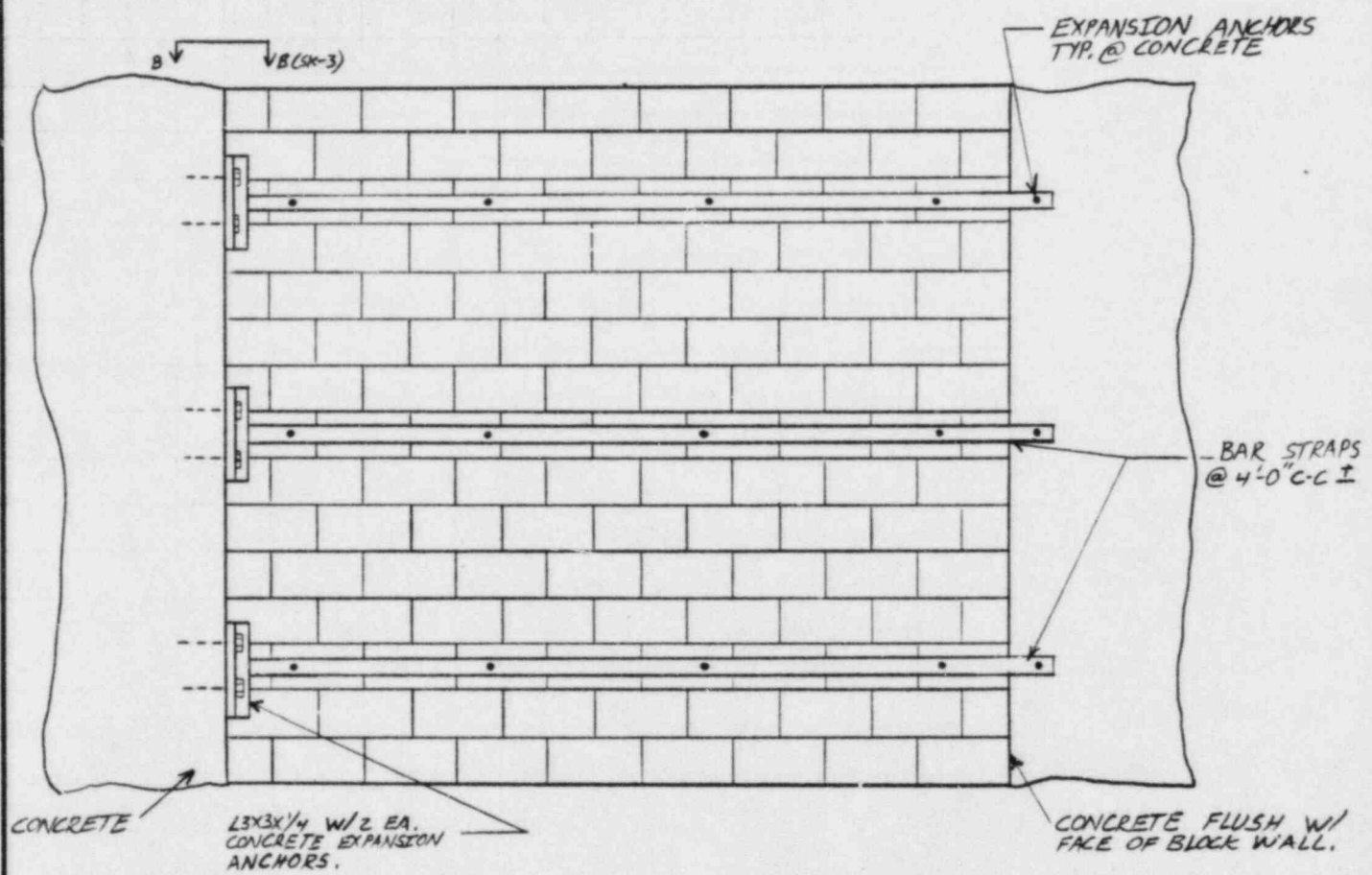
ATTACHMENT 1

PAGE 12 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

DETAIL 9



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
9	3" x 1/4"



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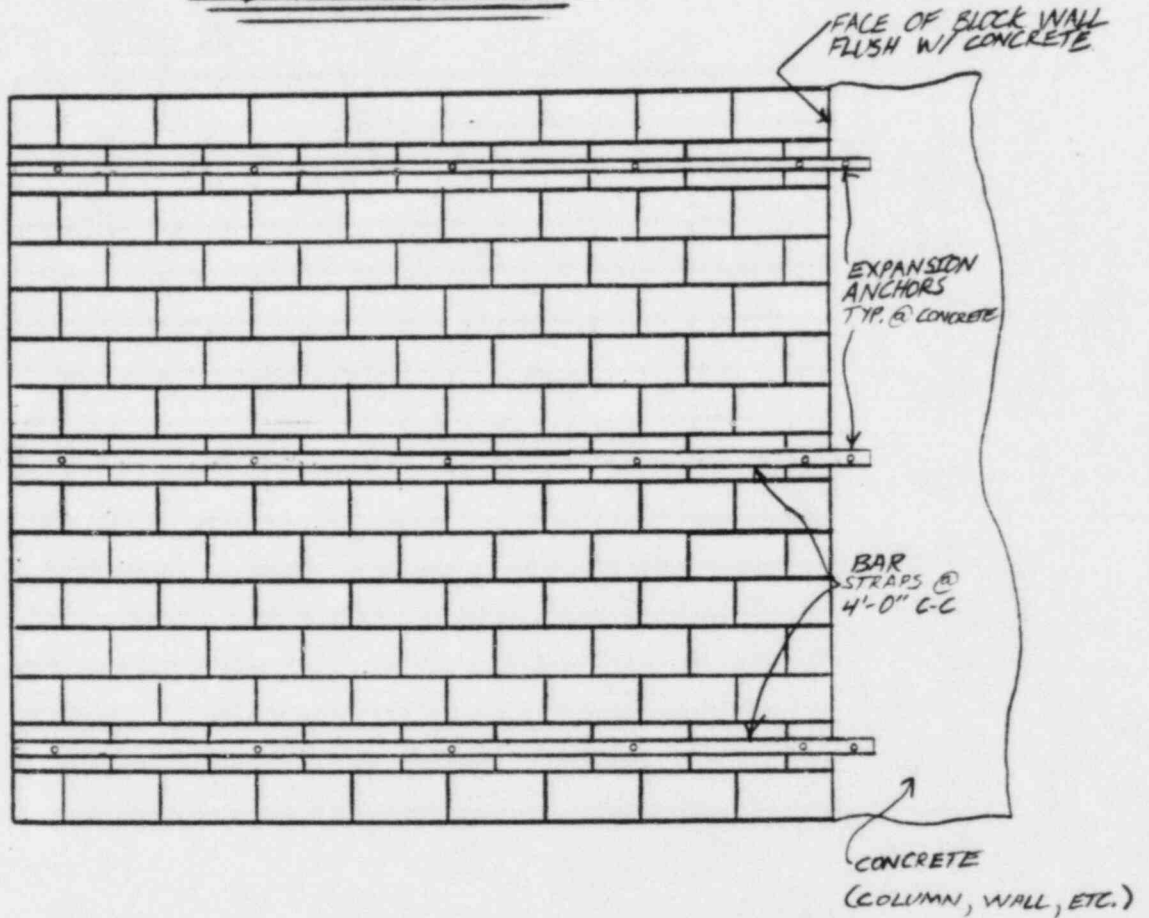
ATTACHMENT 1

PAGE 13 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER		
PREPARED BY	DATE		PAGE	OF
REVIEWED BY	DATE	CALC. REV.		

DETAIL 10



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
10	3" x 1/4"



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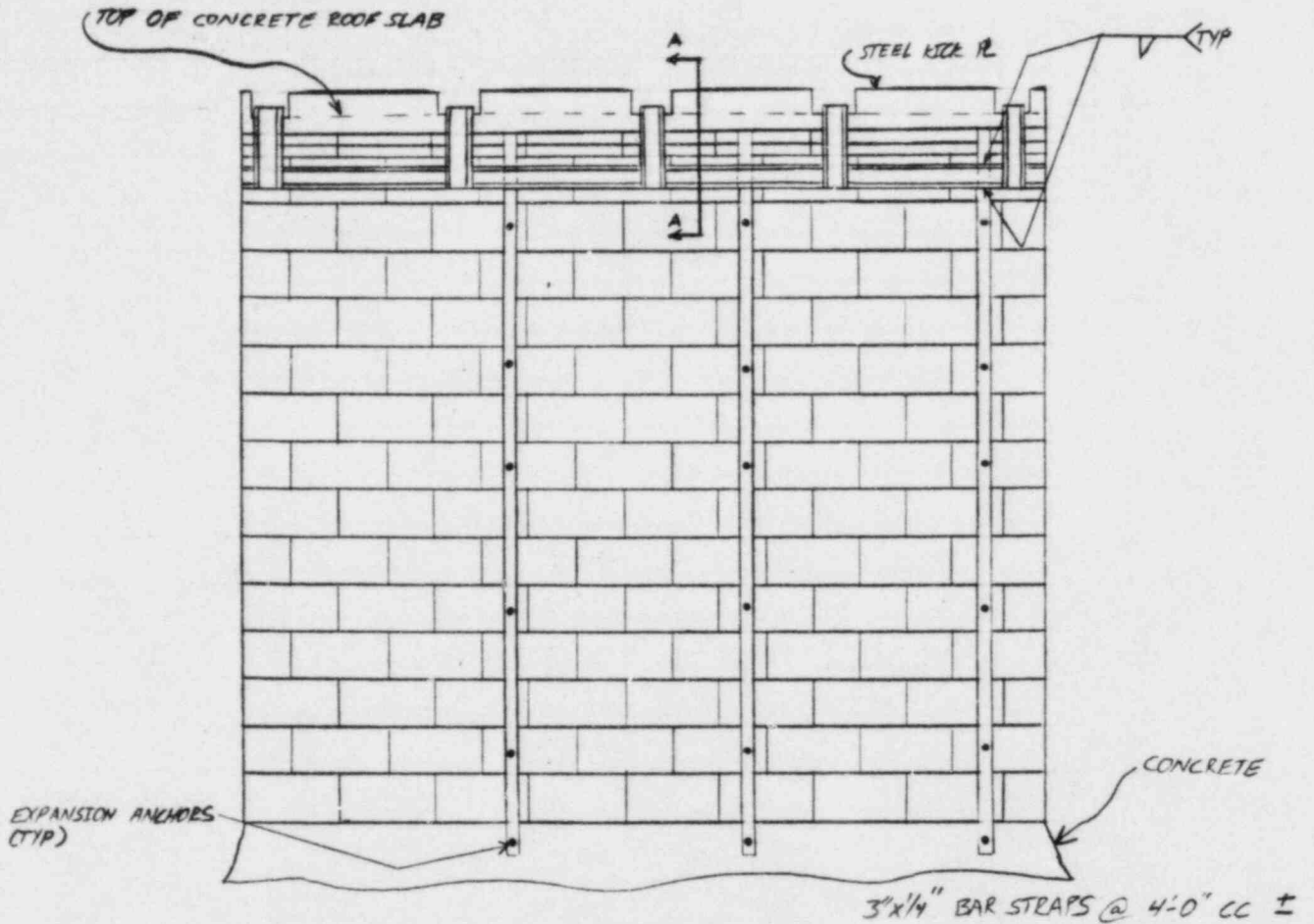
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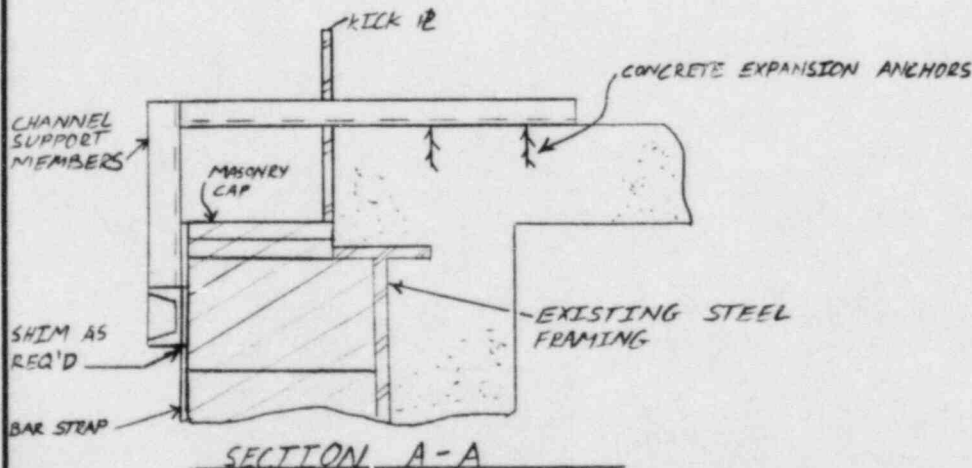
Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER		
PREPARED BY	DATE			
REVIEWED BY	DATE	CALC. REV.	PAGE	OF

DETAIL II



ELEVATION VIEW



SECTION A-A



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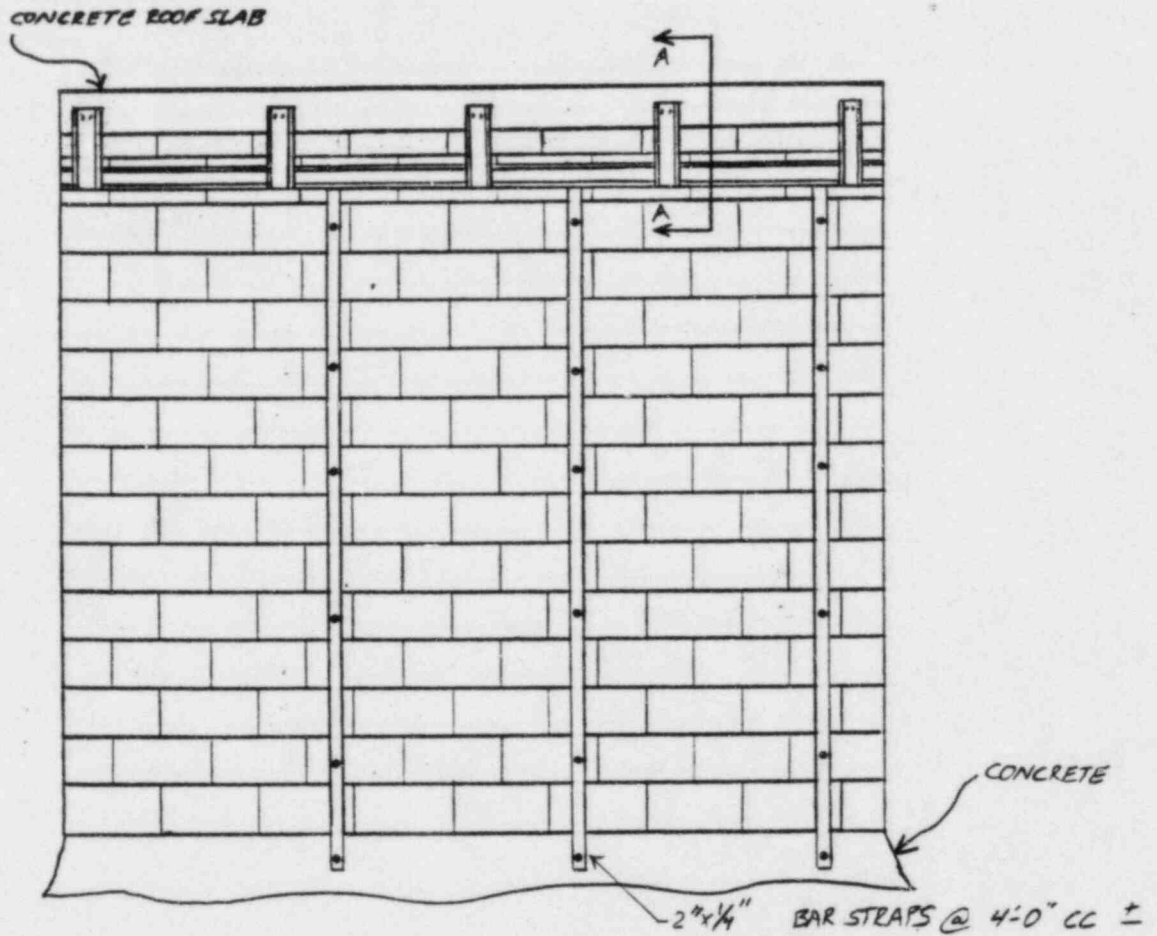
ATTACHMENT 1

PAGE 15 OF 19

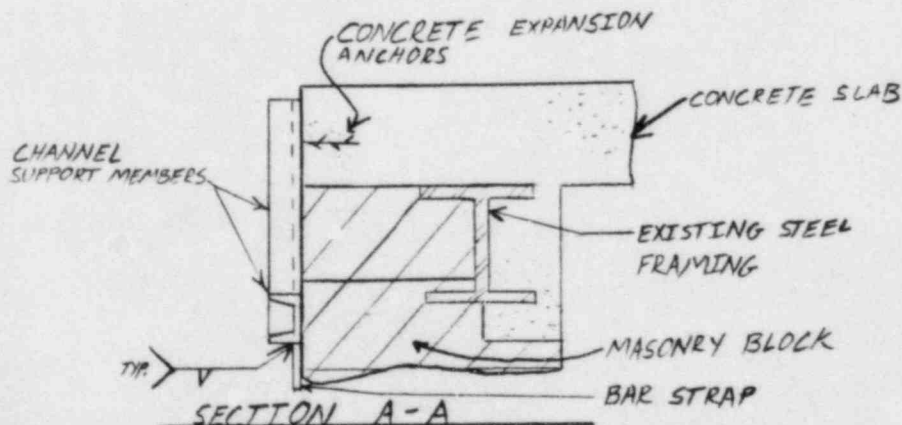
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PREPARED BY	DATE		
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DETAIL 12



ELEVATION VIEW





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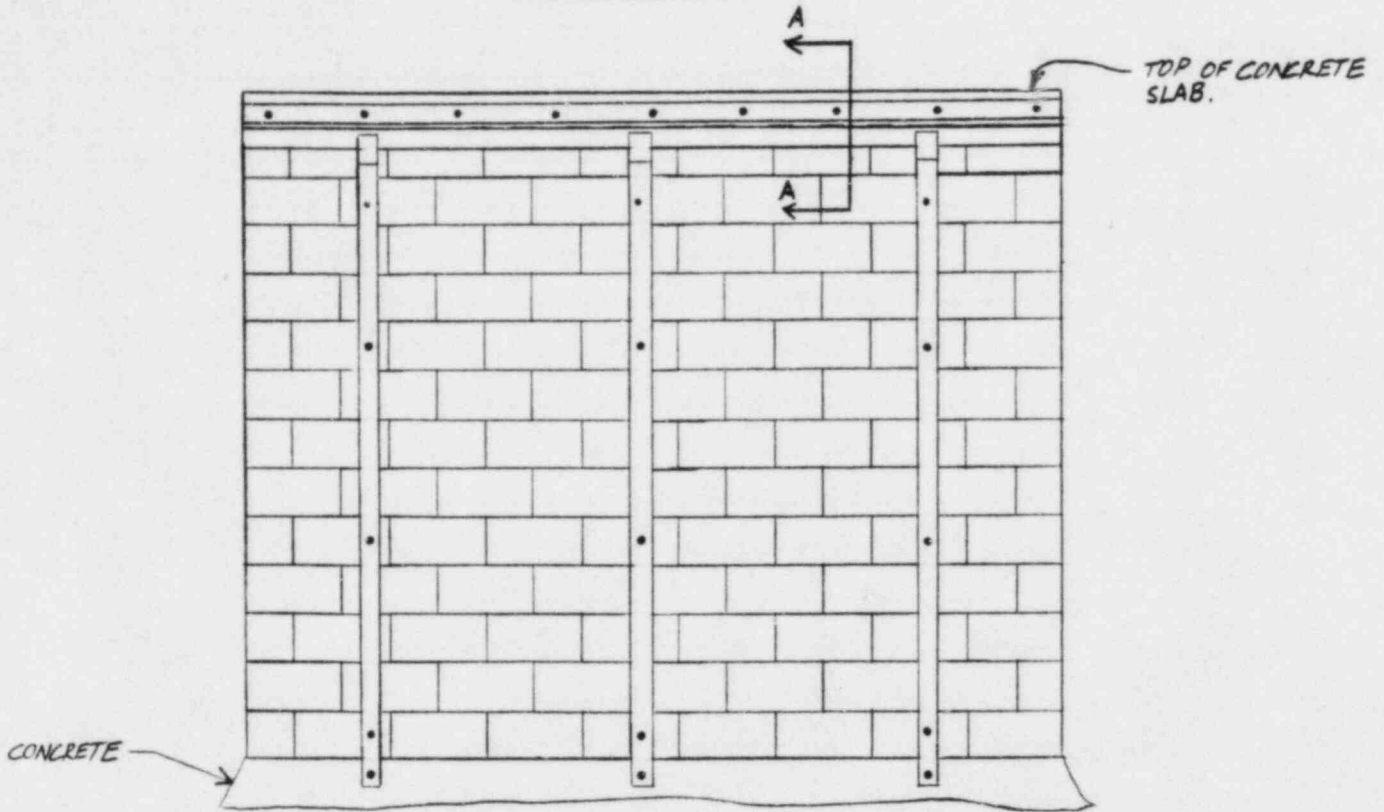
ATTACHMENT 1

PAGE 16 OF 19

Form 344-24-4309

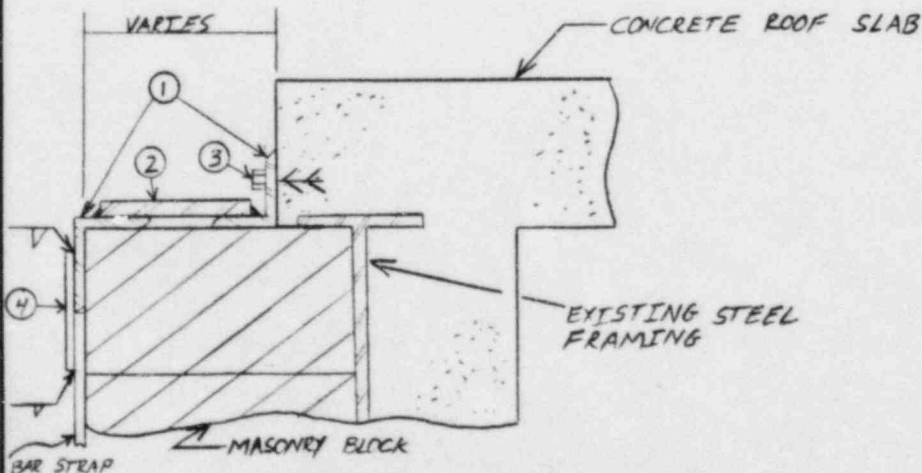
CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

DETAIL 13 + 13A



ELEVATION VIEW

DETAIL	BAR STRAP SIZE
13	2" x 1/4"
13A	3" x 1/4"



SECTION A-A

MAT'L LIST

- ① ANGLES , ASTM A-36
- ② STEEL PLATE , ASTM A-36
- ③ CONCRETE EXPANSION ANCHOR
- ④ BAR STRAP TO ANGLE SPLICE PLATE, ASTM A-36



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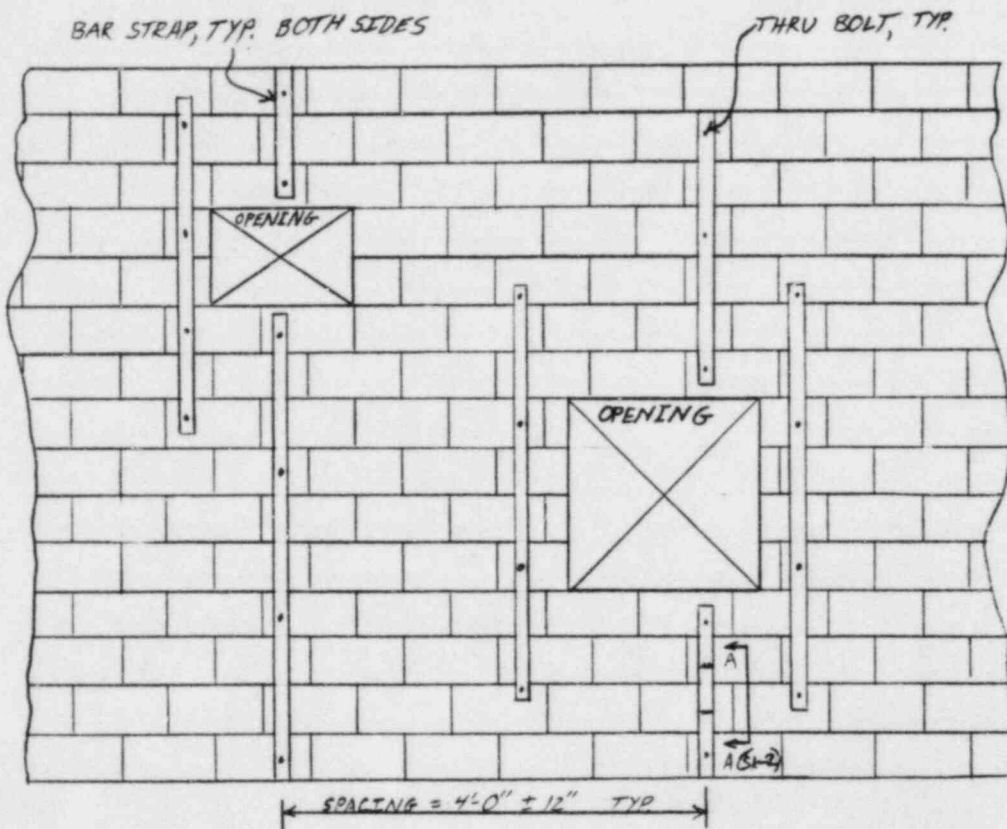
ATTACHMENT 1

PAGE 17 OF 19

Form 344-24-4309

CALCULATION FOR		CALCULATION NUMBER	
PREPARED BY	DATE		
REVIEWED BY	DATE	CALC. REV.	PAGE OF

TYPICAL REINFORCING DETAIL AROUND OPENINGS

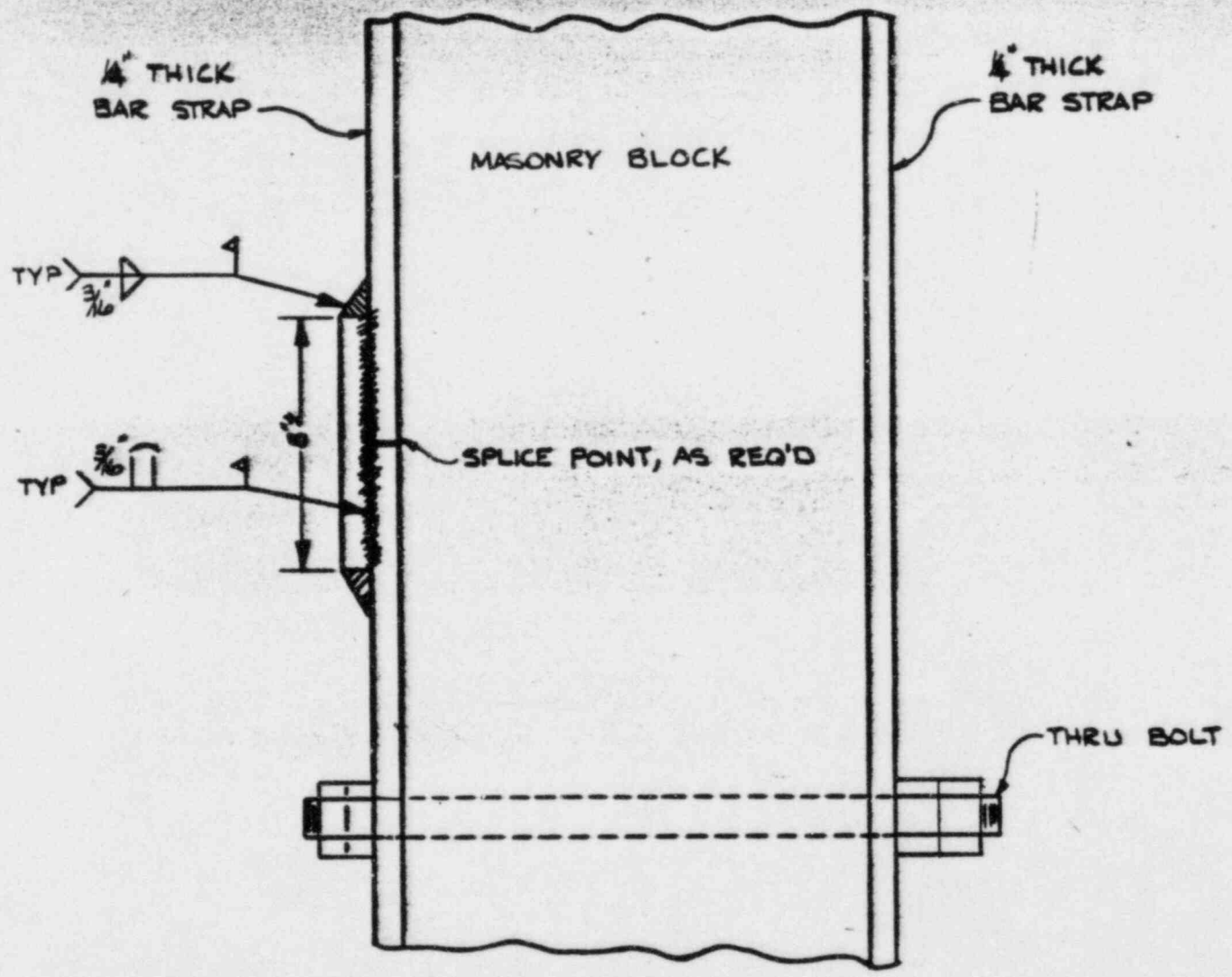


NOTES:

- 1) SPLICE BARS MIN. OF TWO (2) BLOCK WIDTHS
- 2) SPLICE BOTH SIDES OF LARGE OPENINGS (TWO (2) OR MORE BLOCK LENGTHS)
- 3) BAR SPACING 4'-0" C-C UNLESS NOTED. TOLERANCE = ± 12
- 4) BAR STRAPS ON FRONT AND BACK SIDES OF WALL.
- 5) BOLT SIZE = 5/8" Ø, DOUBLE NUT

SK-1

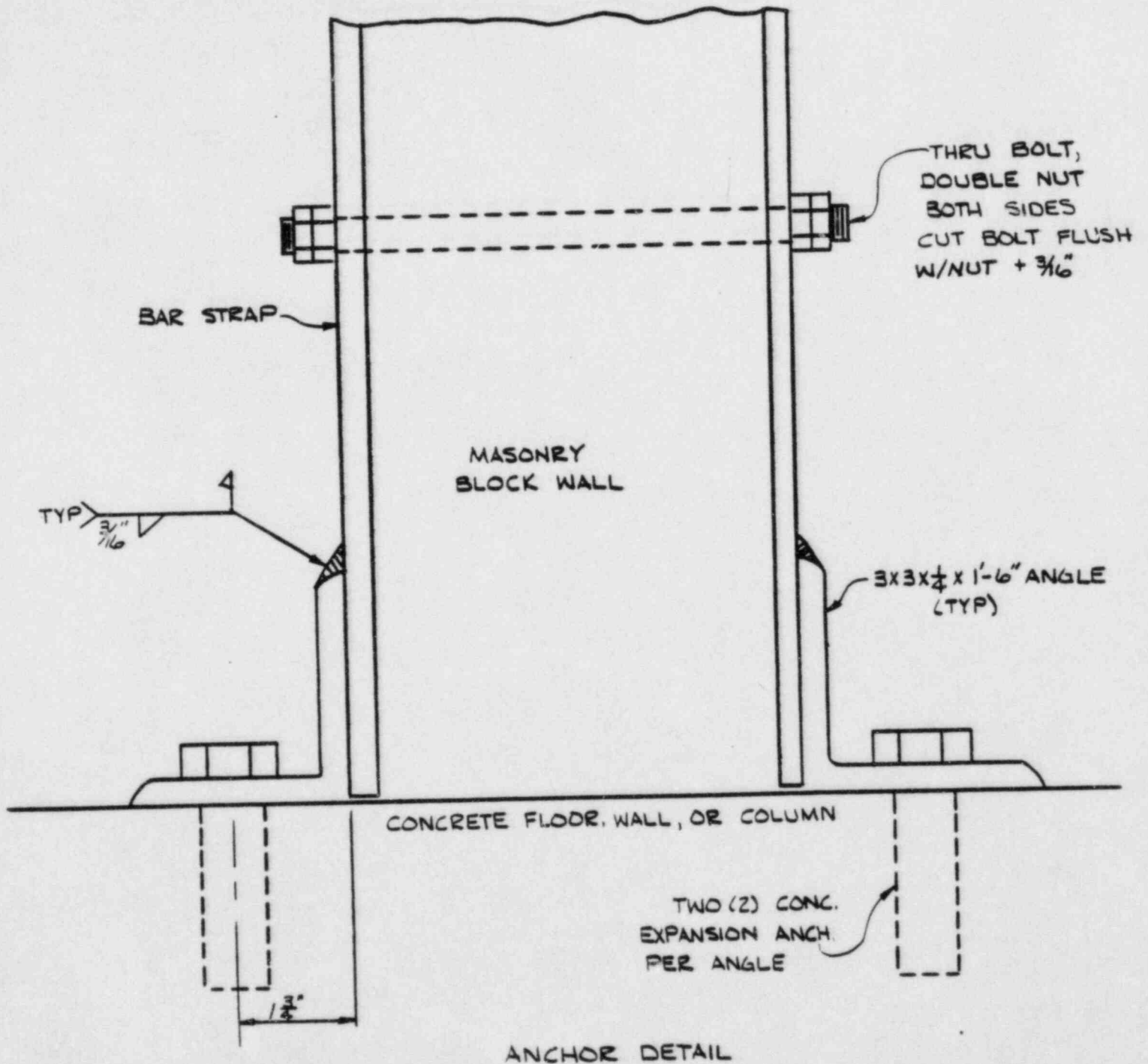
SK-2



SECTION A-A

BAR STRAP SPLICE DETAIL

SK-3



NRC QUESTION 1

Provide details of modifications which will be made to the tops of turbine room walls #4, #6, #7, #8, and #9 in order to qualify these boundaries as pinned joints.

PSC RESPONSE 1

Lateral restraints will be added to the tops of these walls as shown in Attachment 1, Pages 14 through 16. This work will be completed by August 2, 1985.

NRC QUESTION 2

Provide information on the number of unmortared-stacked block walls at FSV and their proximity to safety-related components.

PSC RESPONSE 2

PSC performed a field audit of all stacked block walls at FSV and identified a total of 13. It was determined that 6 of the 13 could potentially impact safety related components if failure were to occur during a seismic event. The largest of these 6 walls, #97, is to be removed completely since it is no longer required for shielding as originally intended. The remaining 5 walls will be mortared in place, as required, to withstand the seismic forces. This work will be completed by August 2, 1985.

NRC QUESTION 3

Describe the acceptance criteria used in examining reactor building walls with cracked mortar joints between the masonry and concrete walls.

PSC RESPONSE 3

PSC believes that the full scale test performed on wall #87 adequately demonstrates that the boundary between masonry and concrete is capable of resisting design seismic loads. At the time of testing, the boundaries of wall #87 contained cracks similar to those currently found in other reactor building walls. However, to eliminate further discussion on this subject, PSC will extend all bar straps past the masonry-concrete boundary and anchor the straps to the concrete or install clip angles as shown in Attachment 1, Pages 3 through 16. All strap extensions, clip angles and anchors will be designed to resist seismic loads.

These modifications will affect walls number 3, 3a, 4, 6, 7, 8, 9, 11, 12, 27, 49, 62, 65, 85, 86, 89, 95, 98, 99, 100, 101, 104 and will be completed by August 2, 1985.

NRC QUESTION 4

Does a change notice deviation request exist which allows the deletion of one bar strap on one side of a rectangular penetration through wall #12.

PSC RESPONSE 4

No deviation request exists which allows for the deletion of a bar strap on one side of the penetration through wall #12. A field audit was performed to examine all walls which have been reinforced to insure that all penetrations were properly framed out with bar straps. No other walls were found to have discrepancies. Therefore, PSC considers the missing strap on wall #12 to be an isolated incidence. The missing strap on the penetration in question will be installed as originally specified by August 2, 1985.

NRC QUESTION 5

Is bar strap design adequate to transfer shear load from masonry to bolts and prevent damage to masonry blocks from bolt bearing.

PSC RESPONSE 5

Calculations were performed to analyze the shear stress transferred from the masonry to the bolts and to analyze the compression stress in the masonry resulting from bolt bearing. The results of these calculations demonstrate that actual masonry and steel stresses are within the allowables dictated by IEB-80-11 and that the strap design is adequate as installed. These calculations are available for review in our office.