

Attachment (1)  
Director of NRR, USNRC  
February 20, 1980

Fire Barrier Seal Upgrade Program

Sections 3.1.8(5), 3.1.8(6), 5.2.6, 5.5.6, 5.8.6 and 5.15.6 as well as Sections 3.2.2(1), 4.9.1, and 4.9.3 of the NRC Fire Protection Safety Evaluation Report for the Monticello Nuclear Generating Plant require unsealed fire barrier penetrations to be sealed and existing seals to be upgraded where necessary. To satisfy these requirements, the following actions will be taken.

1. New seals or replacement seals will be designed with a 3-hour rating. This rating will be substantiated by test data.
2. Existing seals will be reviewed and upgraded as necessary. All seals will be upgraded to a rating at least equal to the maximum fire loading on either side of the barrier. This rating will be substantiated by test data.
3. Seals in the following areas will be upgraded to a 3-hour rating. This rating will be substantiated by test data:
  - a. Reactor Building zone 3A barriers shared with zones 3B and 3E.
  - b. Lube oil storage tank room ceiling opening and wall pipe penetrations.
4. Unsealed penetrations in the cable spreading room and battery rooms will be sealed with new seals of a qualified design.

To develop a test program to determine the fire resistance of the existing penetration seal designs and to design and test a method of upgrading existing seals to a 3-hour rating or a rating based on the existing fire loading, we have obtained the assistance of Nuclear Services Corporation (NSC). They are providing engineering services for testing and upgrading penetration seals at both nuclear generating plants operated by Northern States Power Company, Prairie Island and Monticello. The Fire Protection Safety Evaluation Report for the Prairie Island plant contained requirements for a program of penetration seal testing and upgrading similar to those specified for Monticello. In this discussion we will describe the preliminary test and modification program formulated by Nuclear Services Corporation for both plants. A considerable savings in time and cost can be obtained by combining the testing required for both plants.

The electrical and mechanical penetrations at Monticello and Prairie Island were sealed with materials that have not passed the fire test and the hose stream test currently specified for such penetrations in ASTM E119-76 and IEEE 634-1978 (with NRC comments RS-809-5). Therefore, the existing

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penetrations must be tested and, if necessary, either replaced or modified so that the resultant configurations will pass these tests in accordance with today's requirements. The physical access to some of the existing penetrations make it impracticable if not impossible to remove the presently installed fireproofing material. Therefore, several different materials will be tested in an add-on configuration in which another material is built up over the existing material. See the attached preliminary notes, sketches, and list of material.

The material used in the penetrations at Monticello was primarily polyurethane foam, an Insta-Foam product. The material used at Prairie Island was primarily Thermal Insulating Wool which is an Owens-Corning fiberglass product. A primary concern at Monticello is the steel sleeve cable penetrations from the cable spreading room to the reactor building and to the turbine building. The only practical modification in this area is an add-on material over the existing configuration. Several test penetrations of this configuration will be tested. With the test sleeves filled with cable supplied by the plant using a 50% fill and sealed with polyurethane foam, the sleeve will be wrapped with a metal lath which is fastened to the wall and overlaid with different materials, including Flamemastic 77, Pyrocrete 241, Silicate Gel, and Intumastic 285.

Some of these same materials and also ICMS Product 60 will be tested as add-on modifications for the Control Room penetrations for both plants. The attached preliminary sketches were supplied to the test lab (Southwest Research) which laid out three test slabs. These slabs will allow testing of all of the configurations proposed by NSC and will also provide for spares to allow adding on additional designs. The attached sketches do not include the Silicate Gel upgrade which is being added. This is a new material developed by Southwest Research Institute and was very recently brought to the attention of NSC. There is some data, from a different application, that indicates that it may be adequate for our needs. The Intumastic 285 is being added on one of the extra penetrations as a possible solution. This material was designed to be used as a flame retardant on cable, but the manufacturer believes it to be an excellent candidate for protecting the sleeve penetrations in the cable spreading room at Monticello.

The specifications, ASTM & IEEE, state that a seal that has been qualified in a floor test is also qualified for use in a wall. Therefore, our plan is to use a floor slab and thereby qualify both wall and floor seals.

All penetration seals will be subjected to a 3-hour fire test and then the hose stream test. The temperatures are always monitored throughout the complete test. As complete a visual inspection as possible, with photographs, will be performed at 1-1/2 hours. Any test configuration that is good at 1-1/2 hours but fails at 3 hours, or fails the hose stream test, is a candidate for retest in a 1-1/2 hour test. For this purpose, the test lab has been requested to use an existing test slab and prepare selected penetration seals using the materials that require a lengthy cure time. This test slab will be held in readiness. Configurations passing a 1-1/2 hour test plus the hose stream test may be used to upgrade seals in areas of the plant where a rating of less than 1-1/2 hours is sufficient and 3-hour rated seals were not explicitly required by the NRC review.

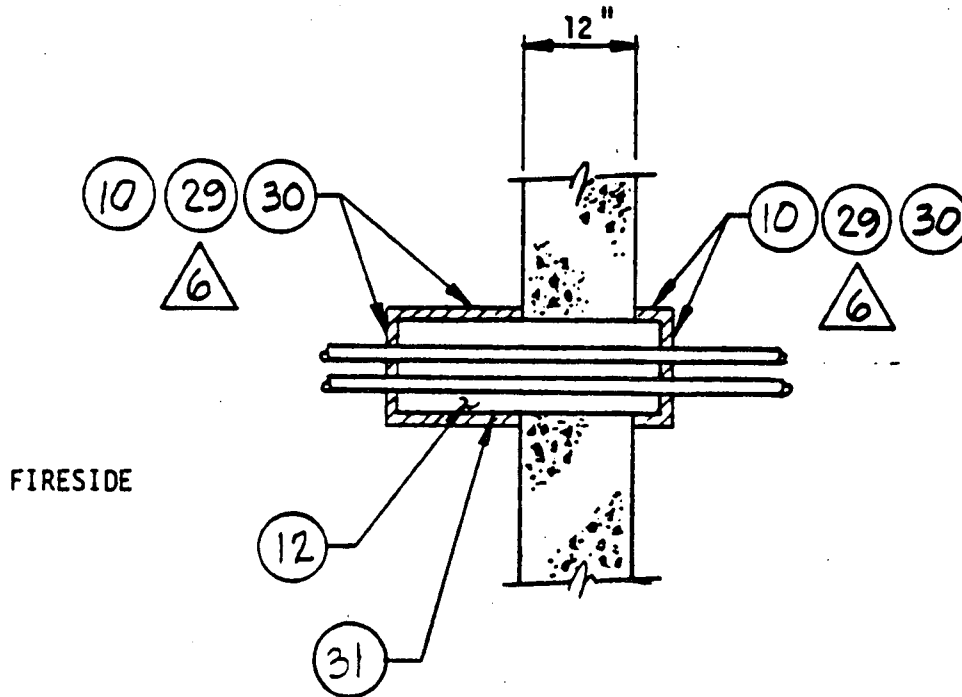
IEEE 634-1978 states that penetration seals that are unsymmetrical should be fire tested from each side. Therefore, the preliminary test plan includes additional test penetrations to comply with this requirement.

The attached sketches are for review and comment.

The penetration testing should be completed by May 1, 1980. Following evaluation of the test results, specific seal upgrade procedures will be developed and field work at both plants will begin. A completion date of October, 1980 is required. Any work which cannot be completed by that date will be reported to the NRC Staff and a revised schedule will be submitted for review.

If there are any comments related to the preliminary test plan we have described, they should be submitted to Northern States Power Company no later than March 15, 1980 to permit us to complete this project on schedule.

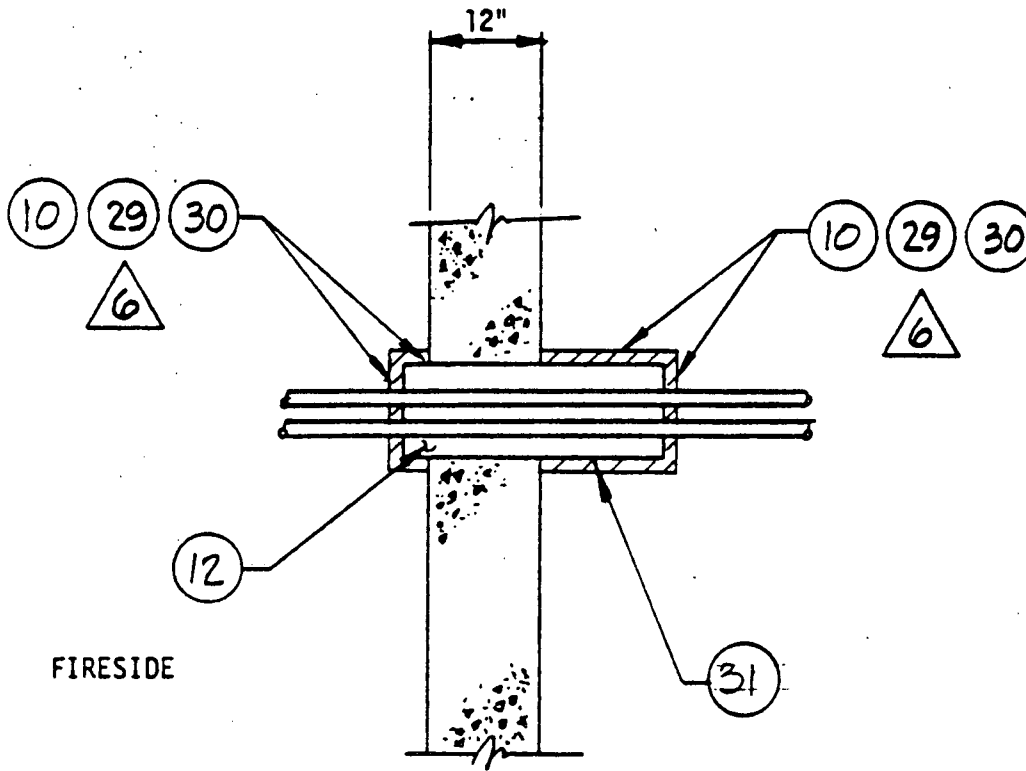
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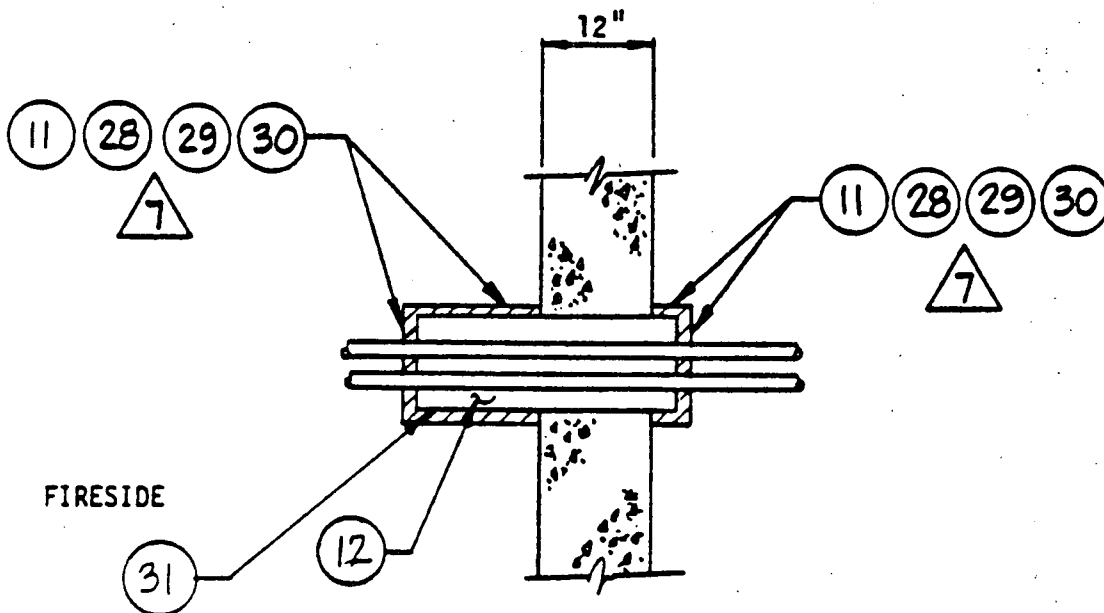
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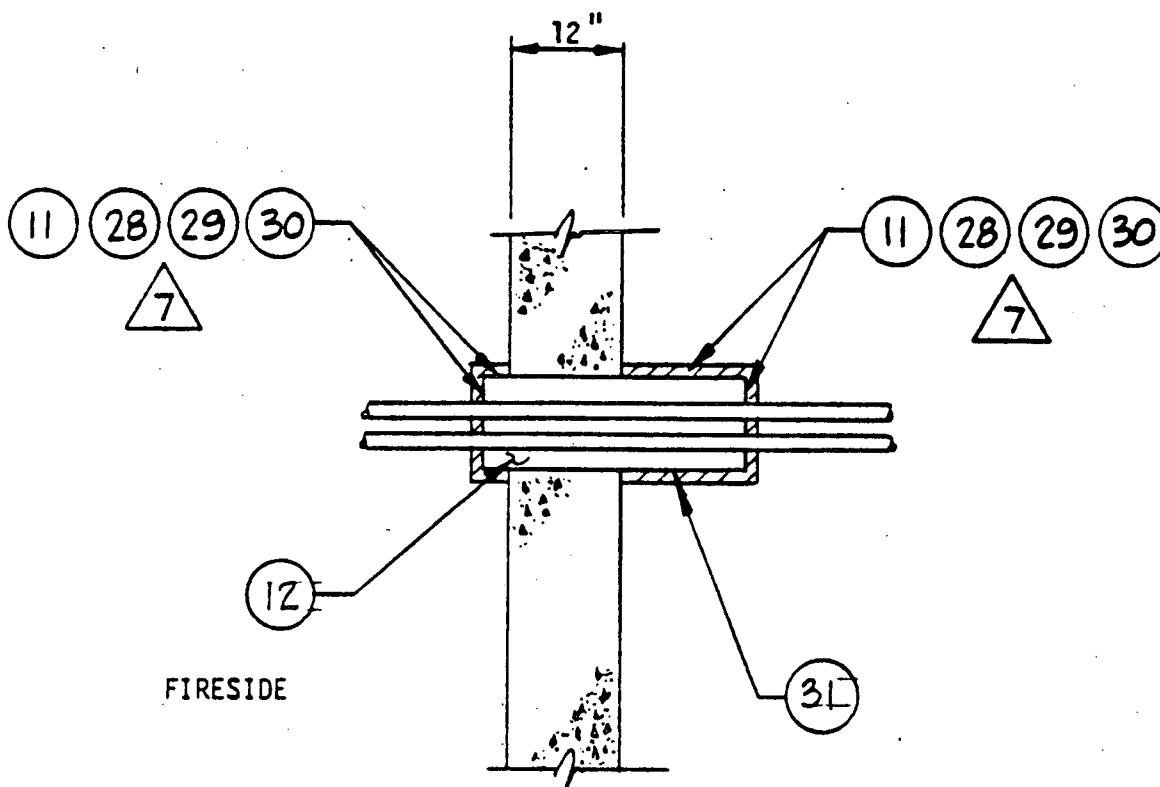
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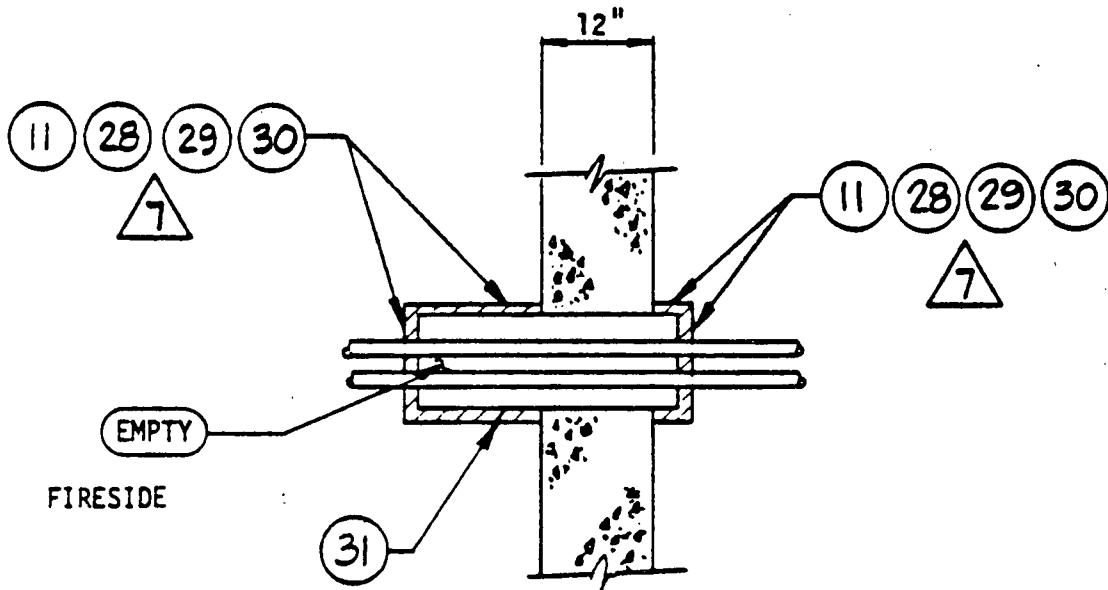
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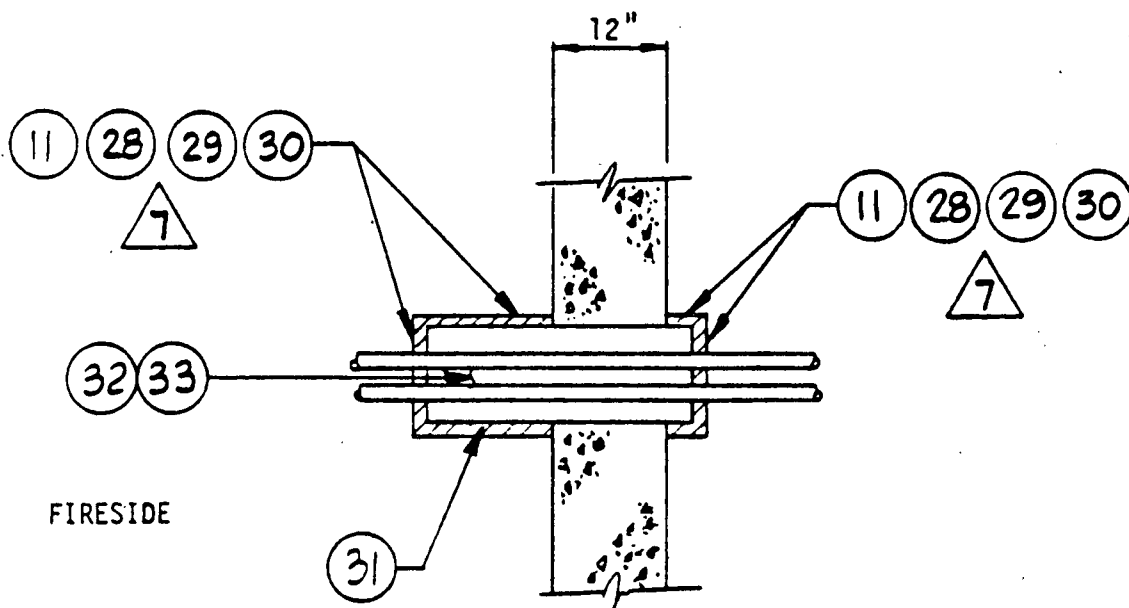
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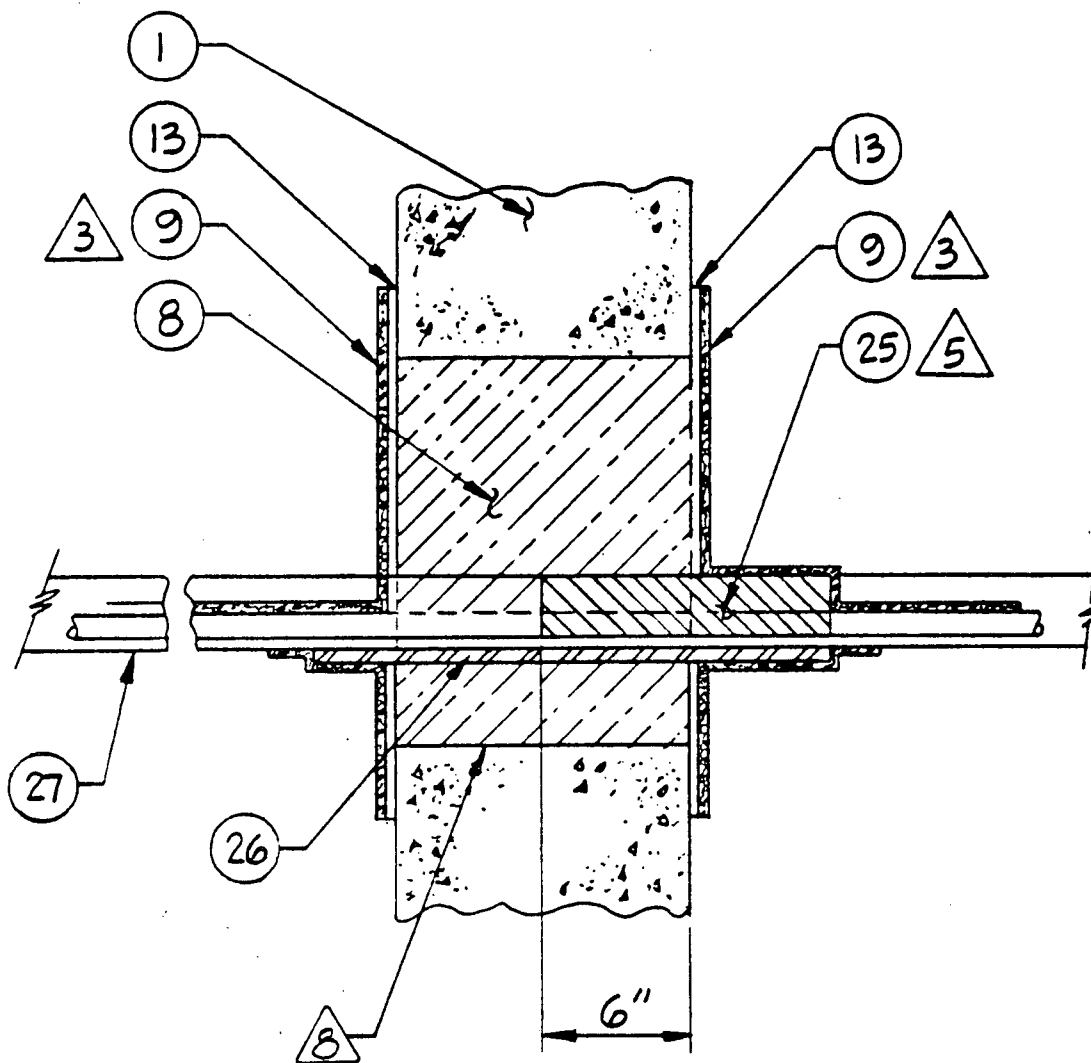
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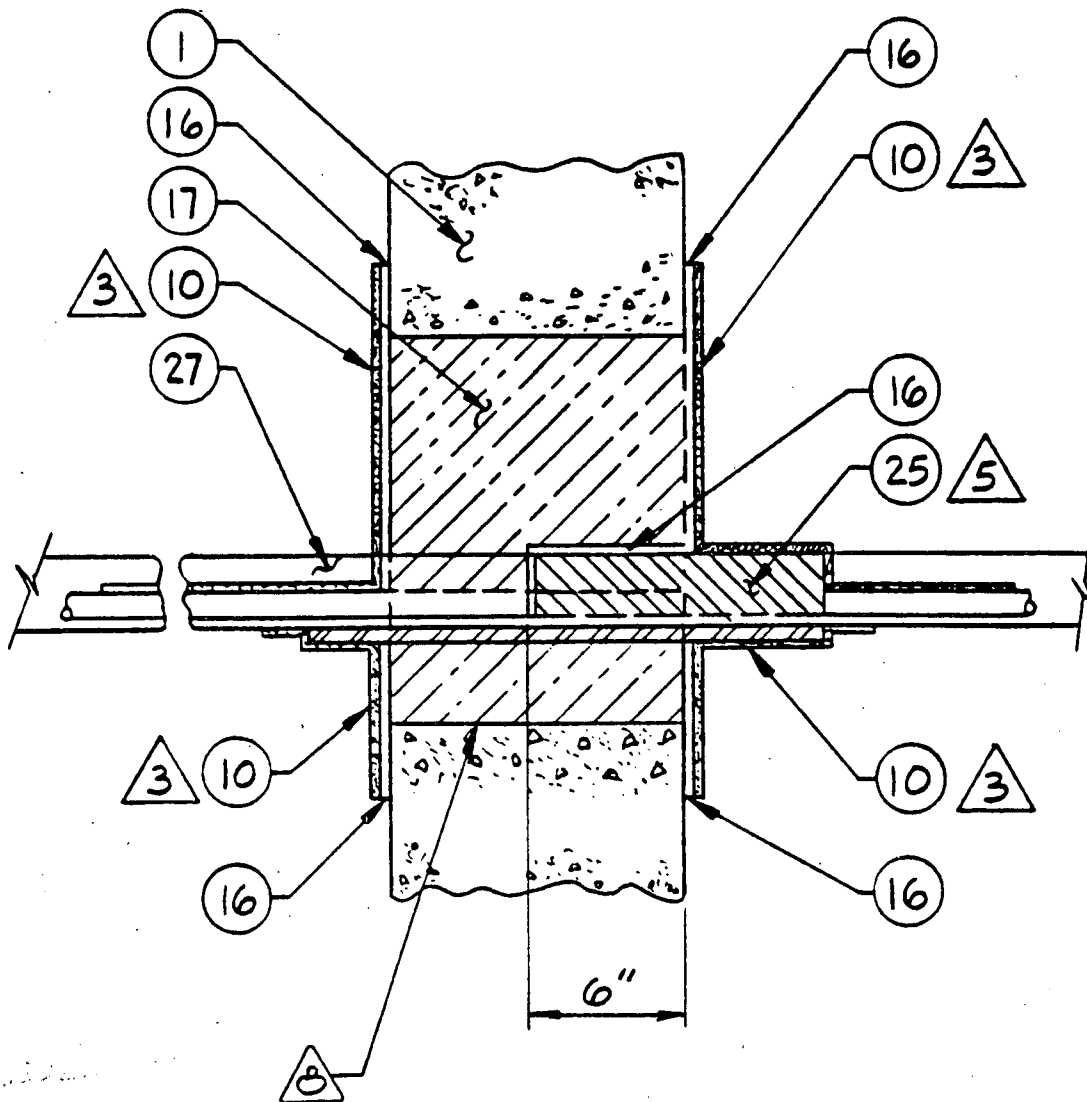
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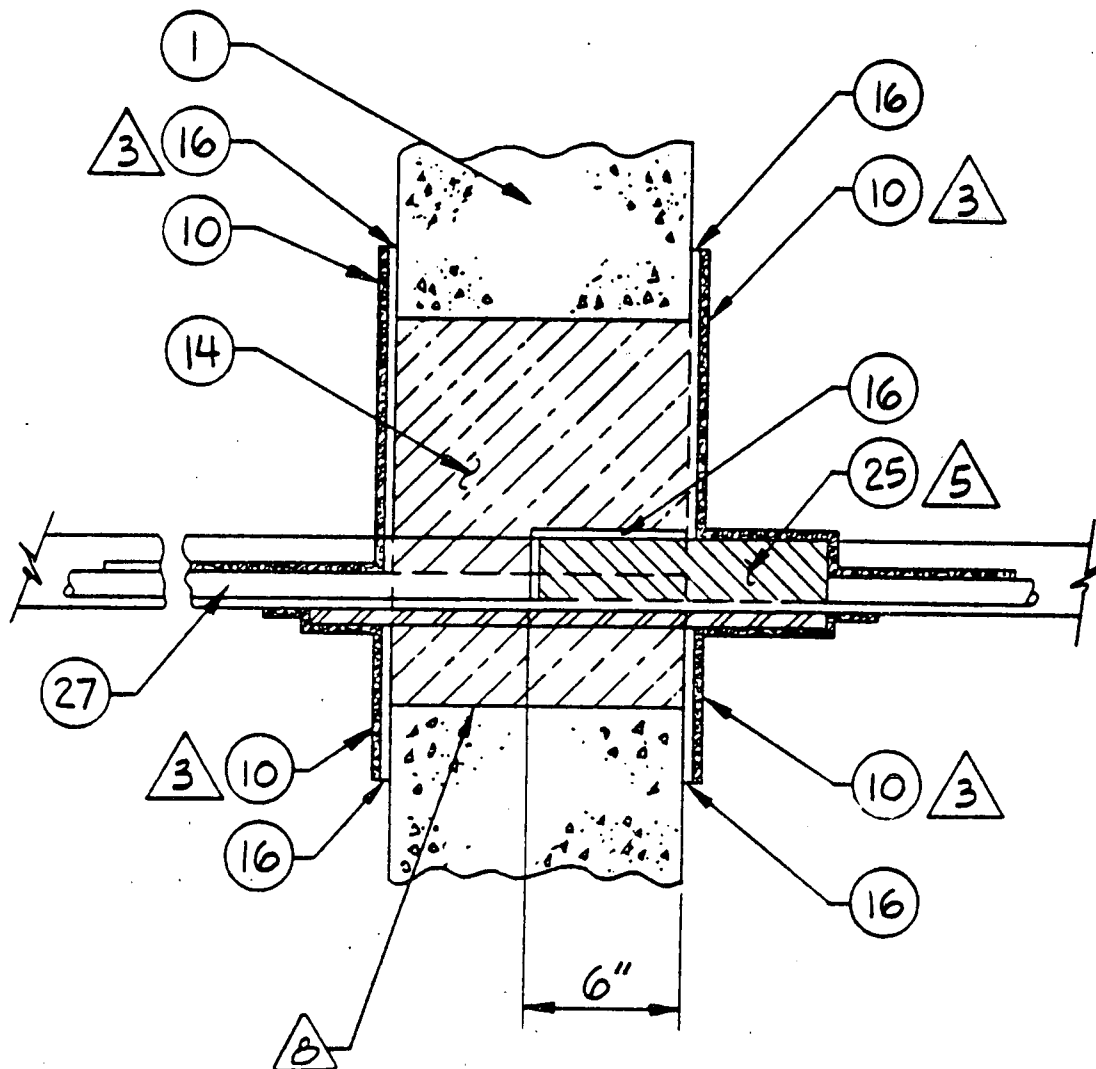
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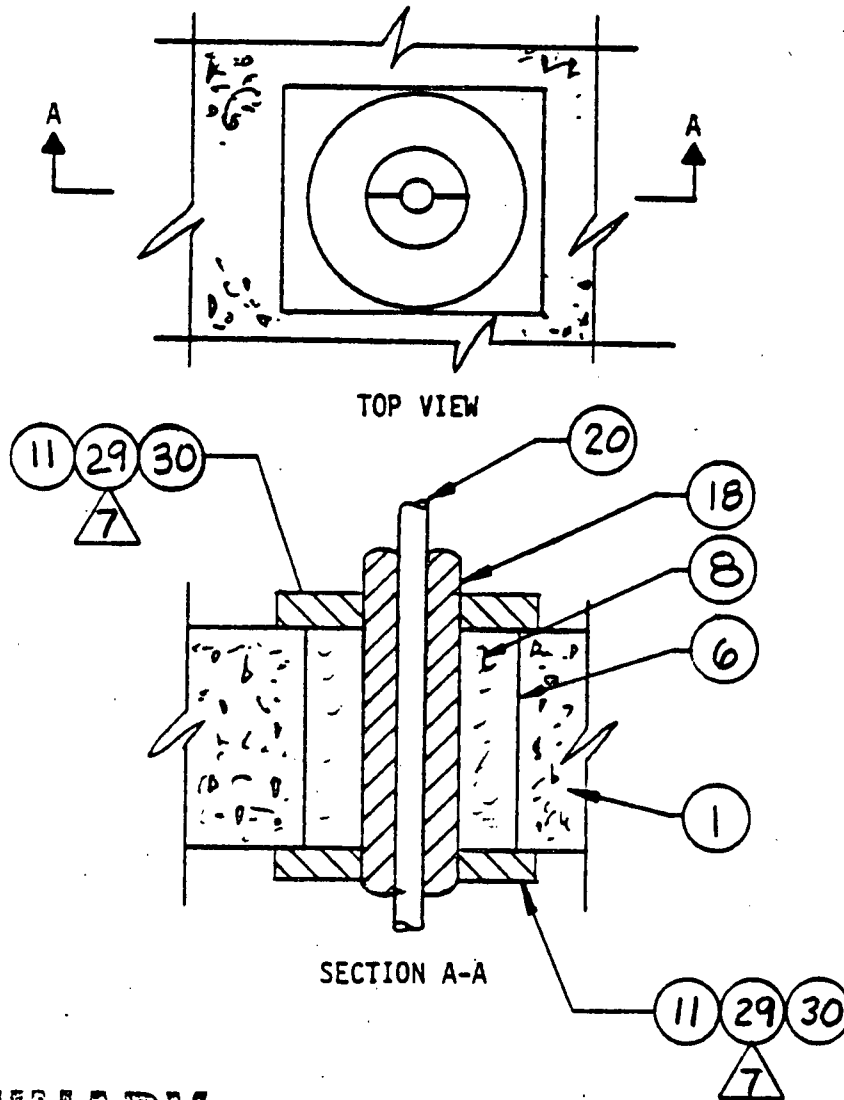
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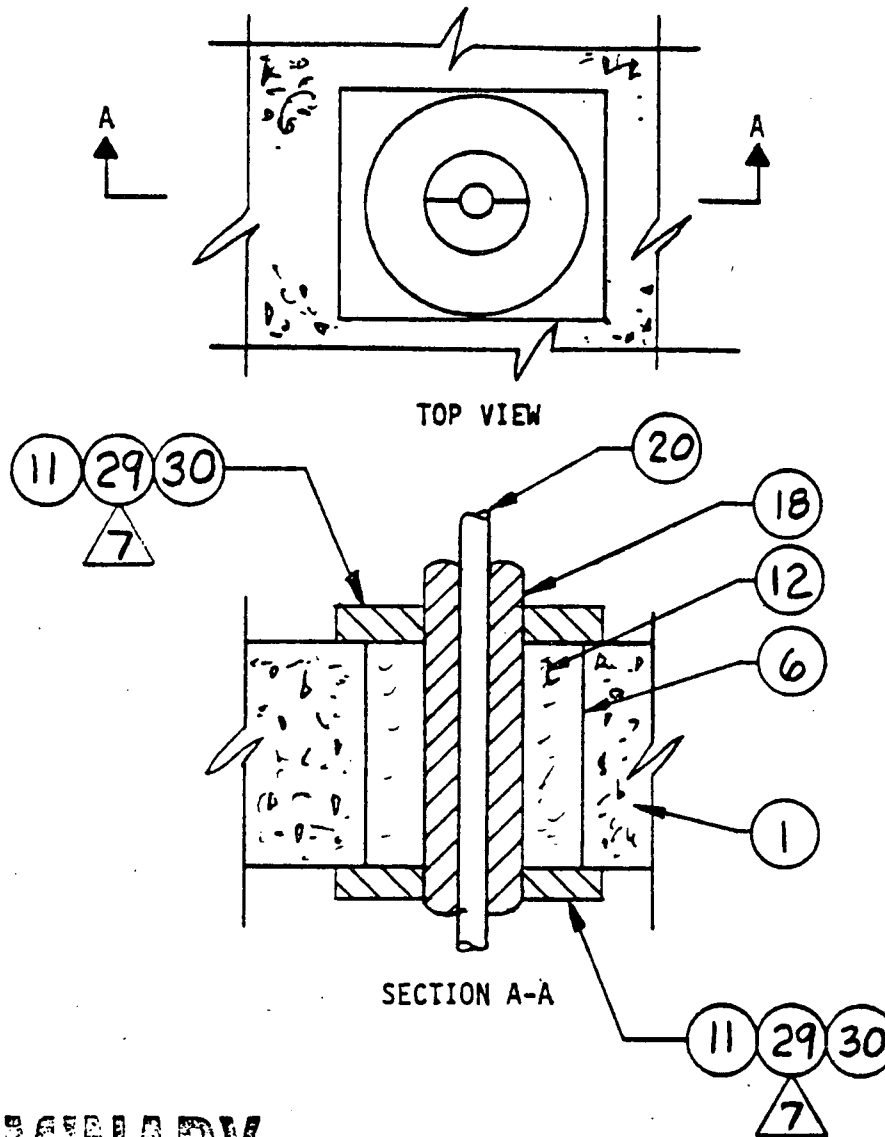
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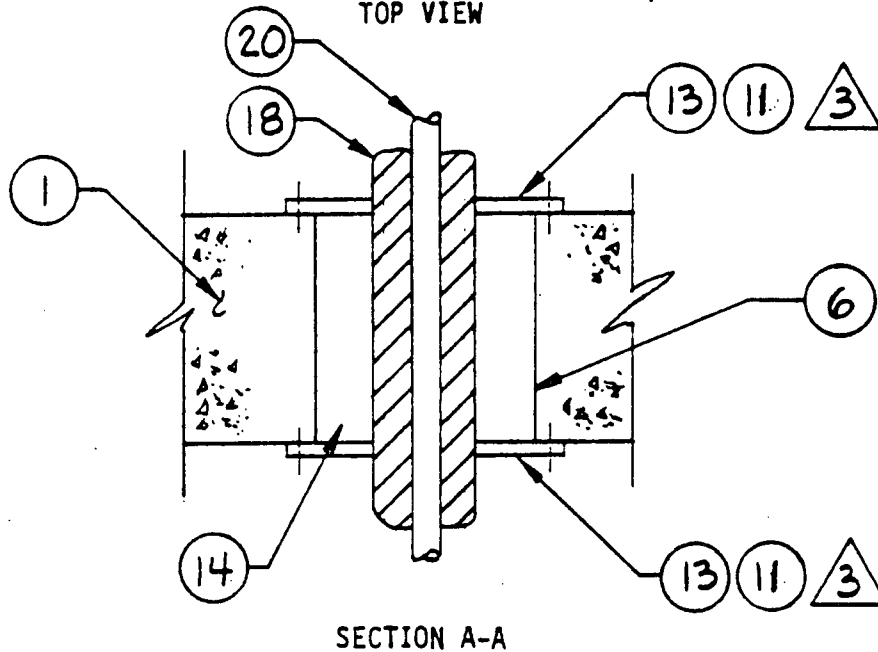
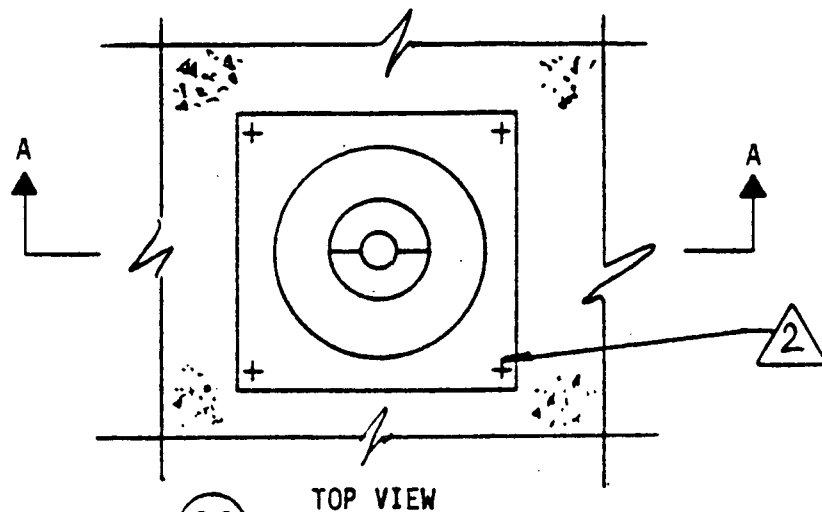
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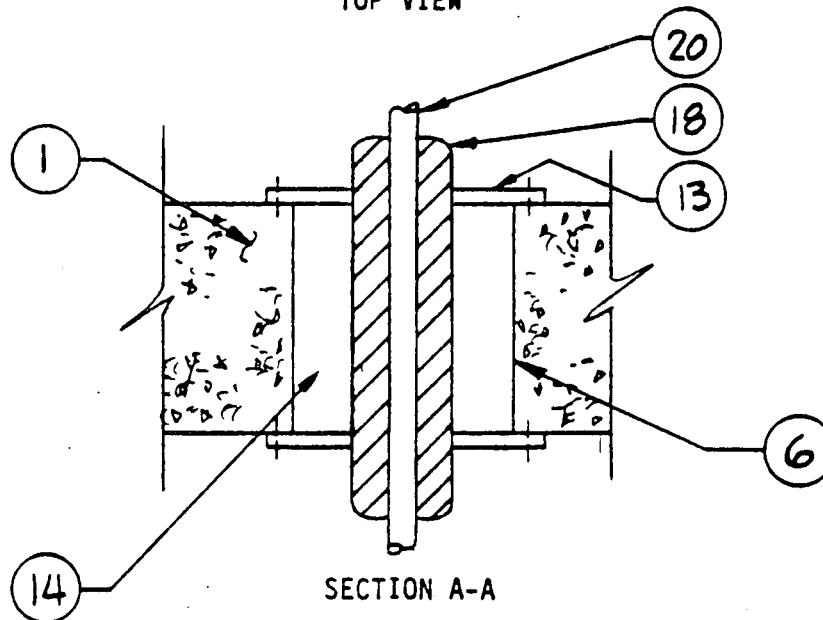
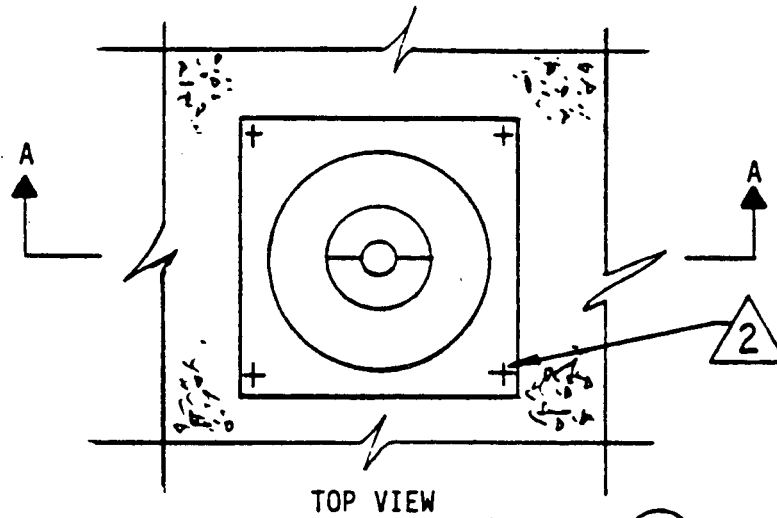
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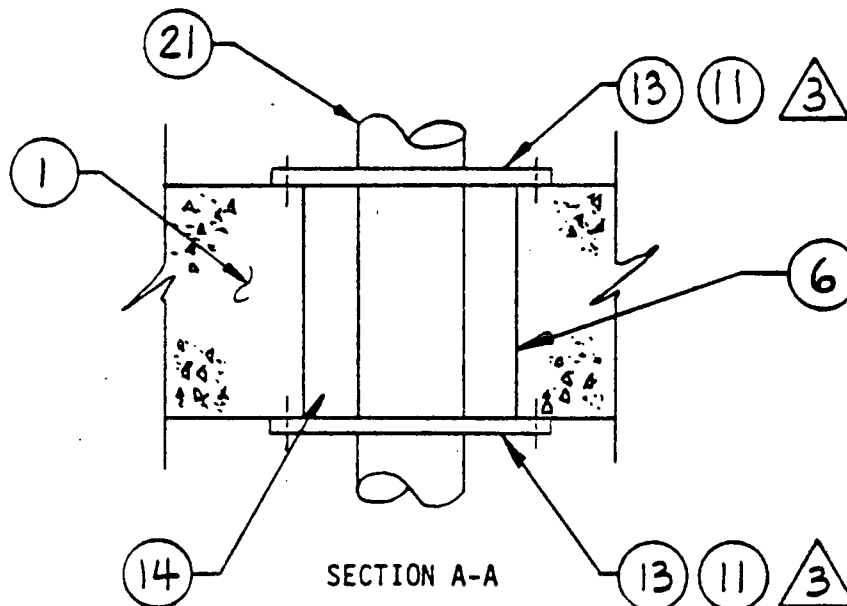
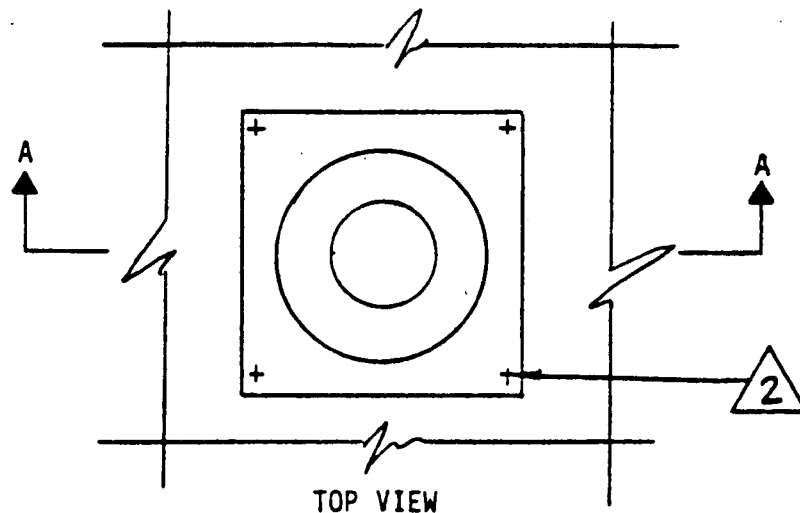
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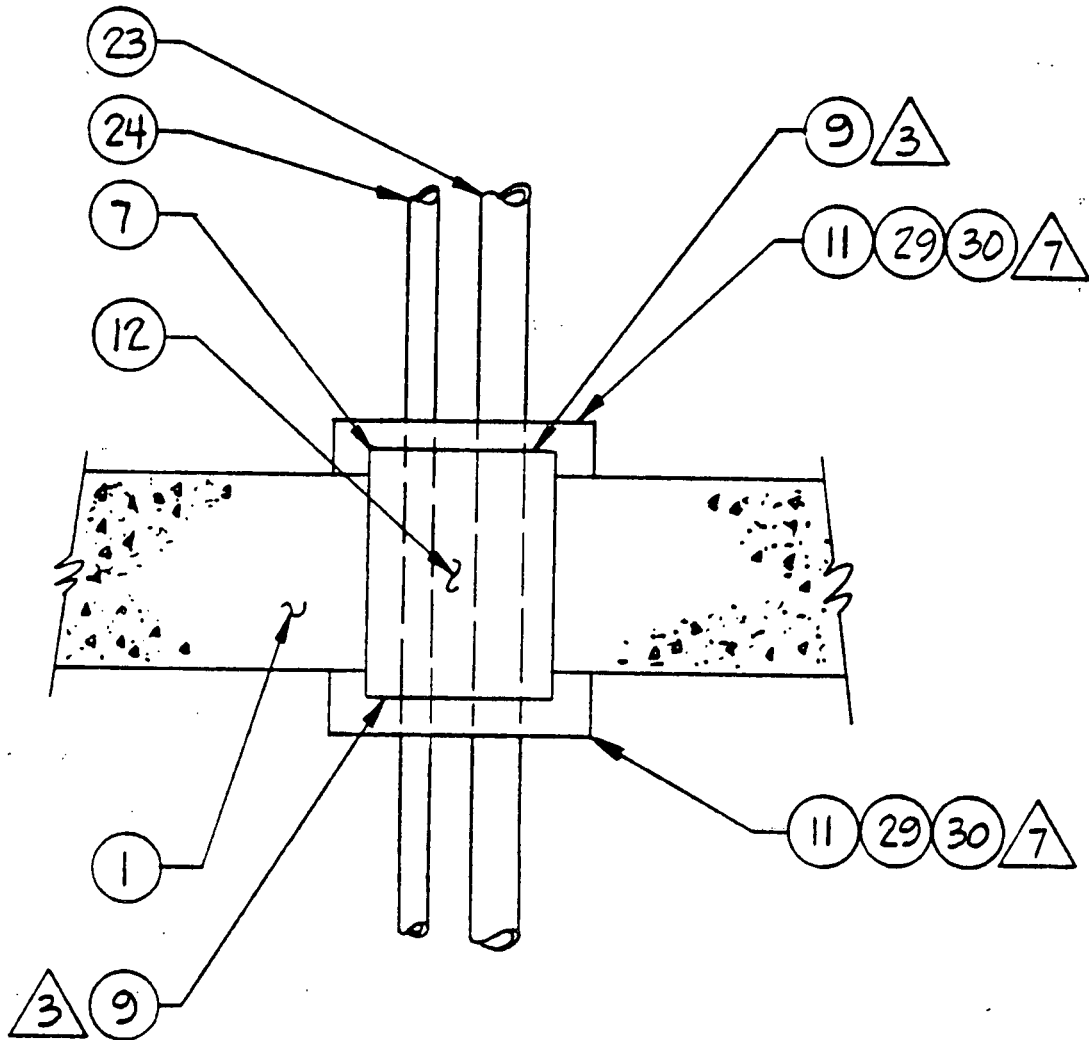
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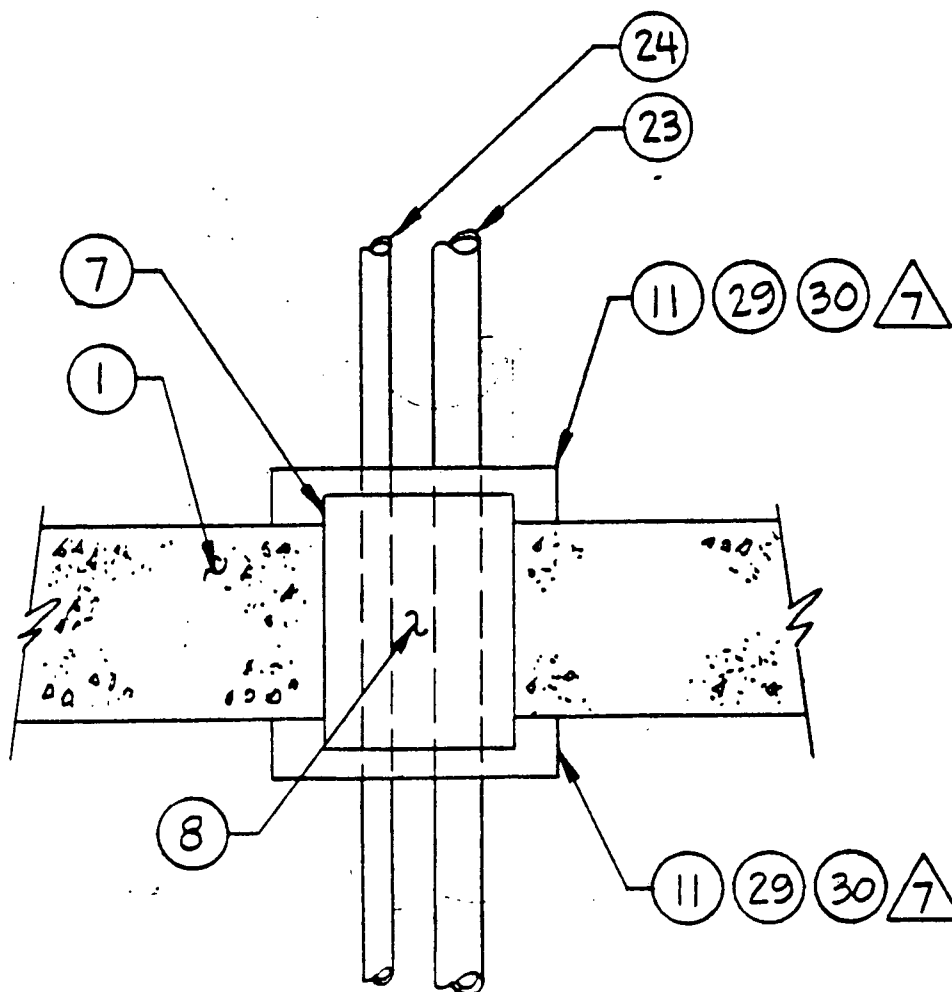
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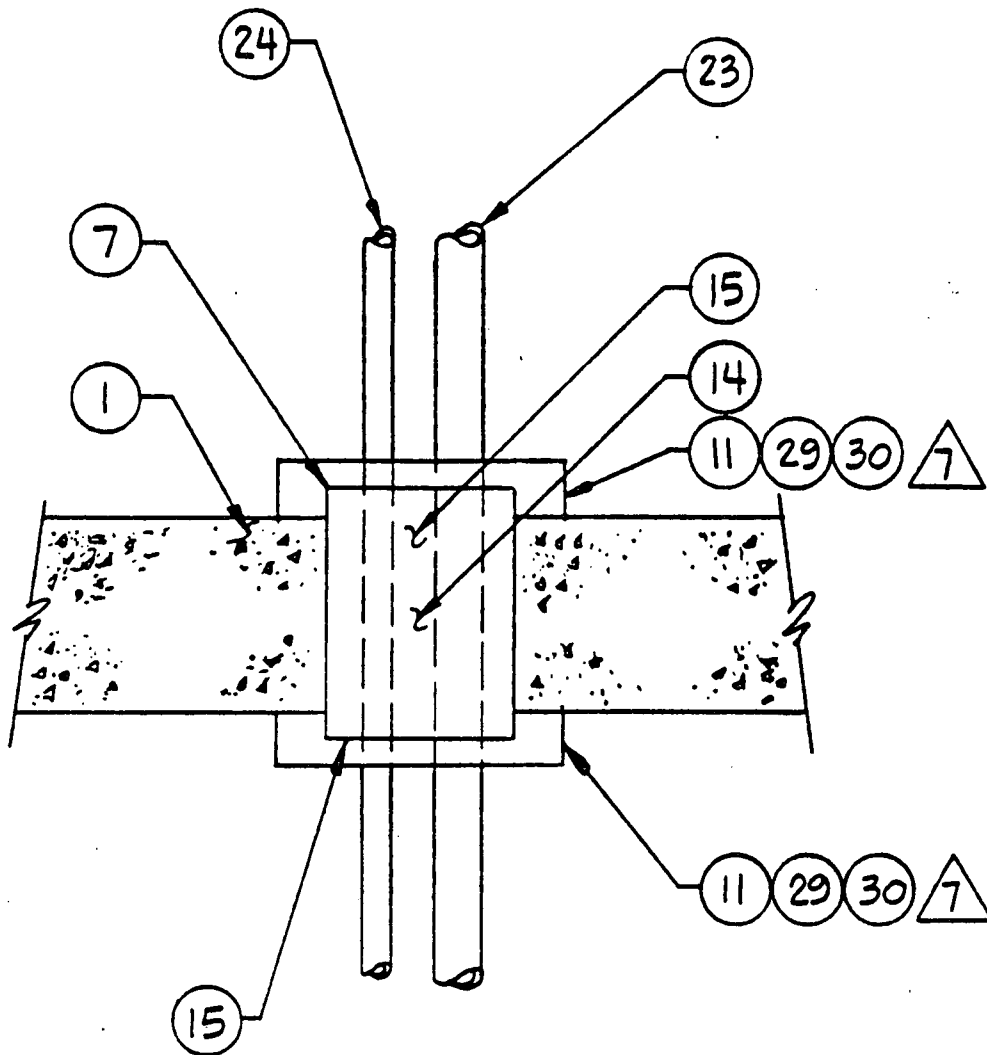
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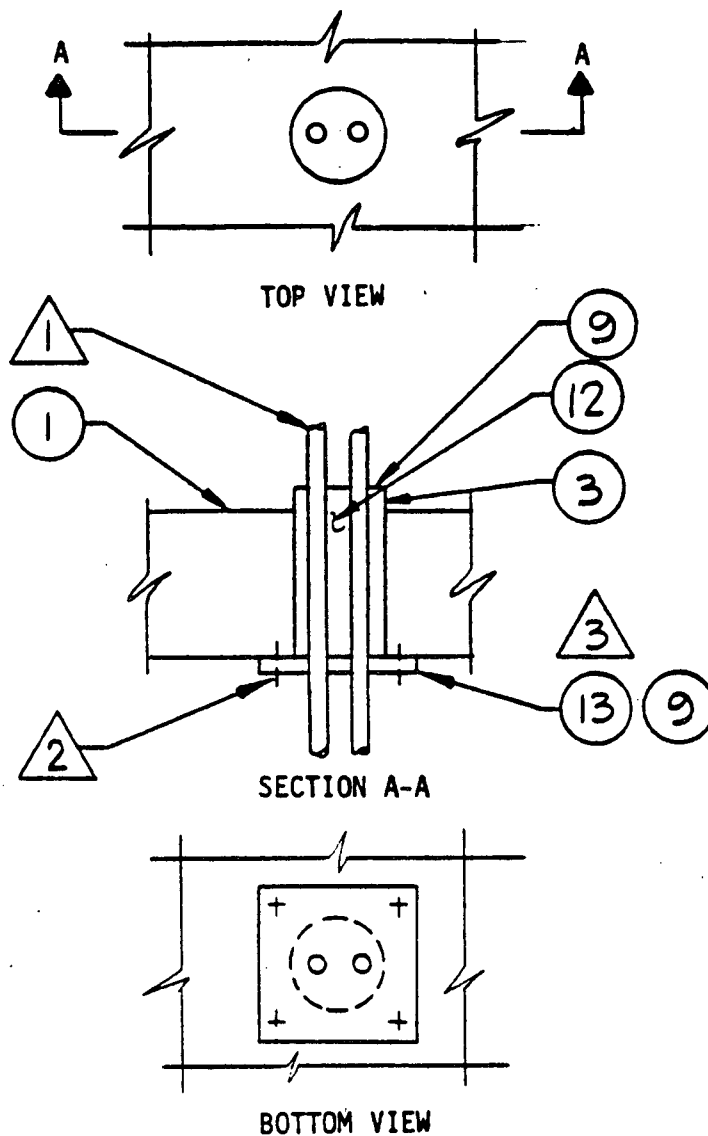
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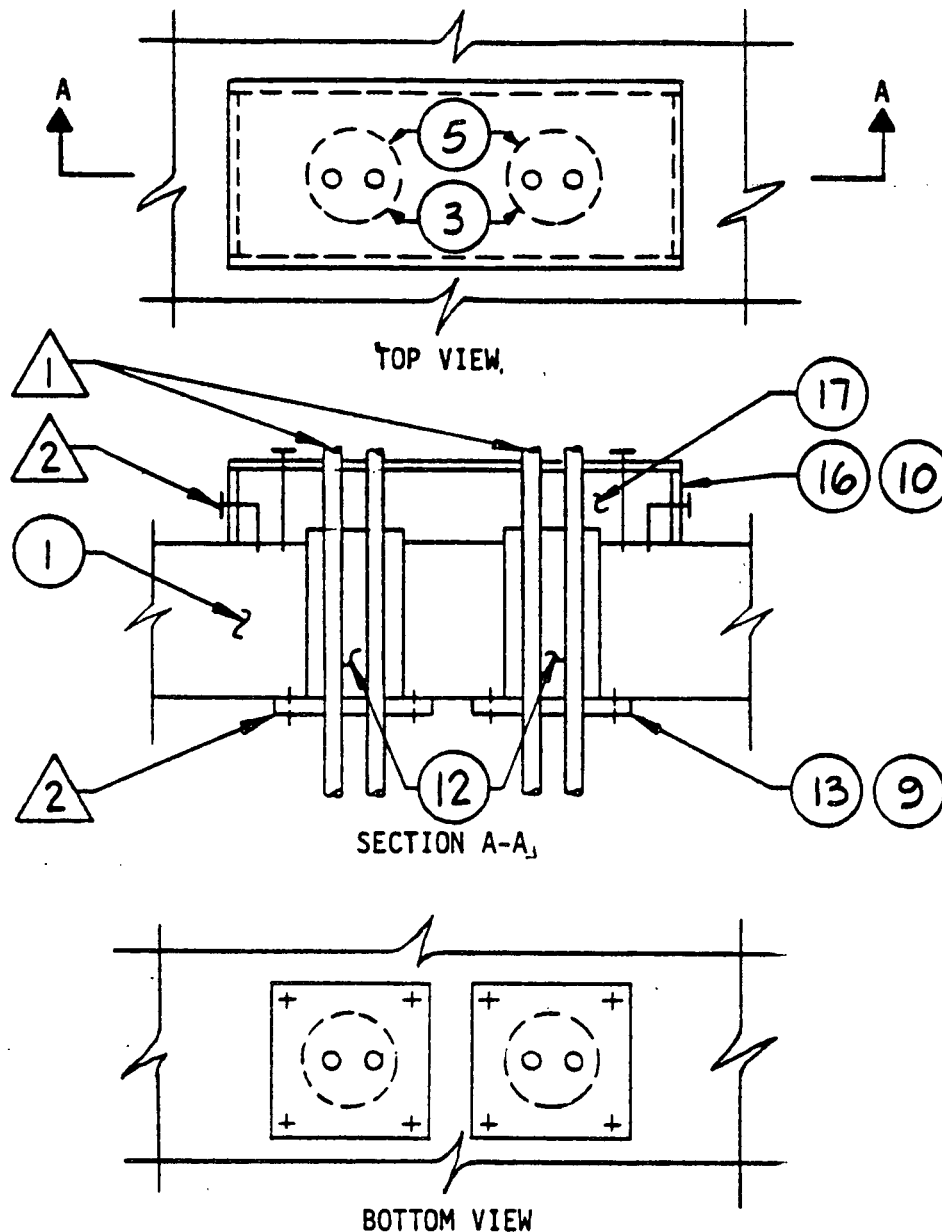
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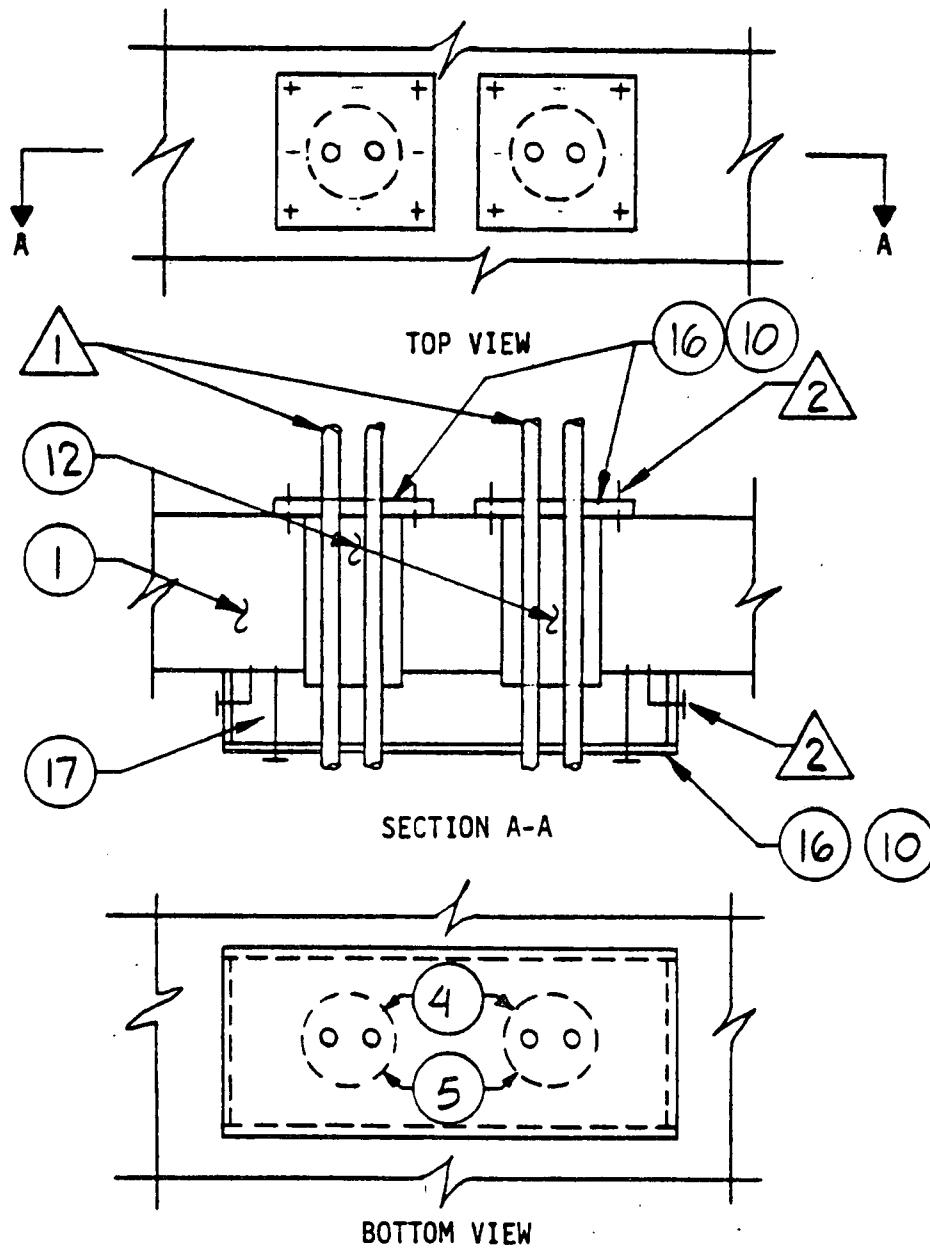
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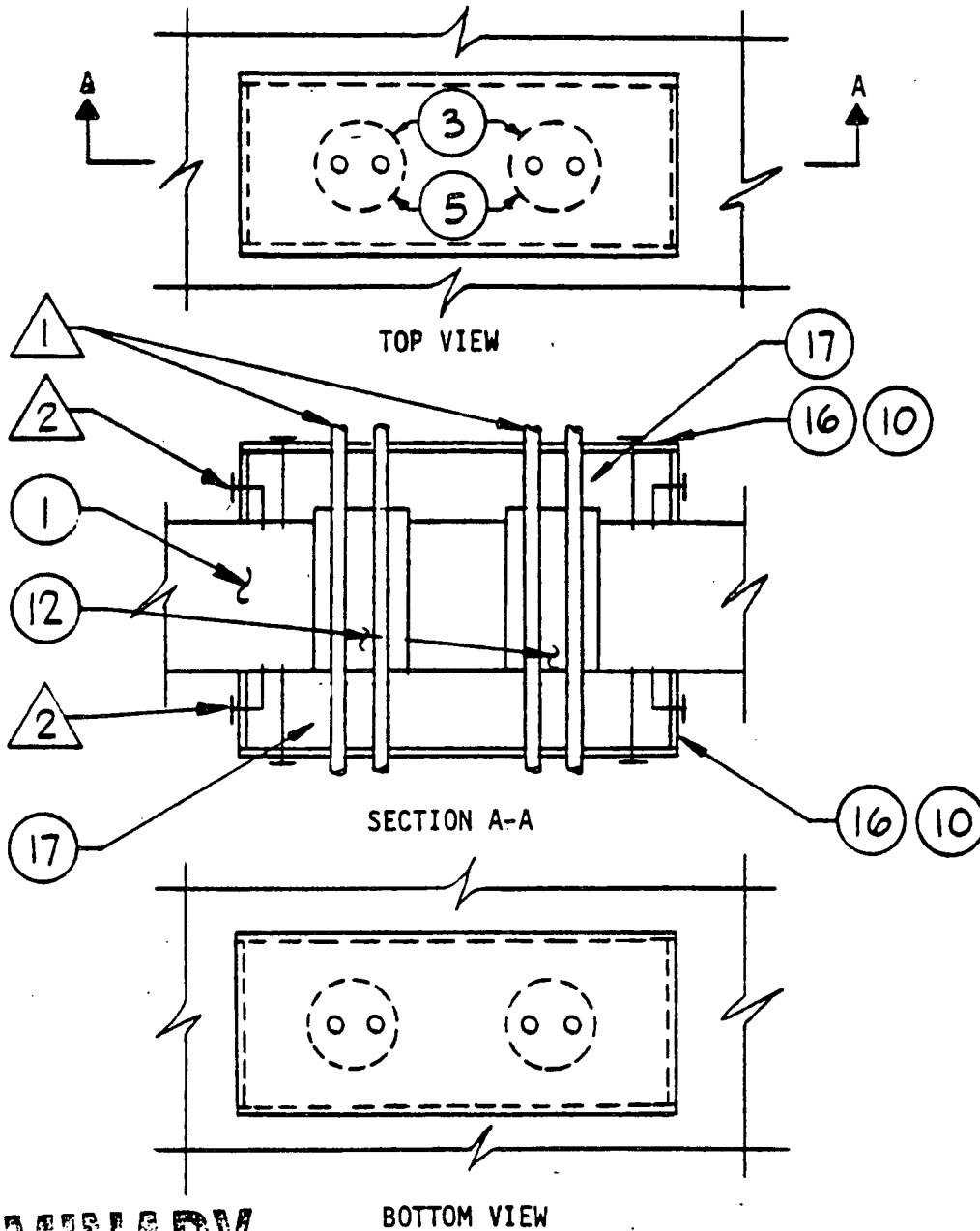
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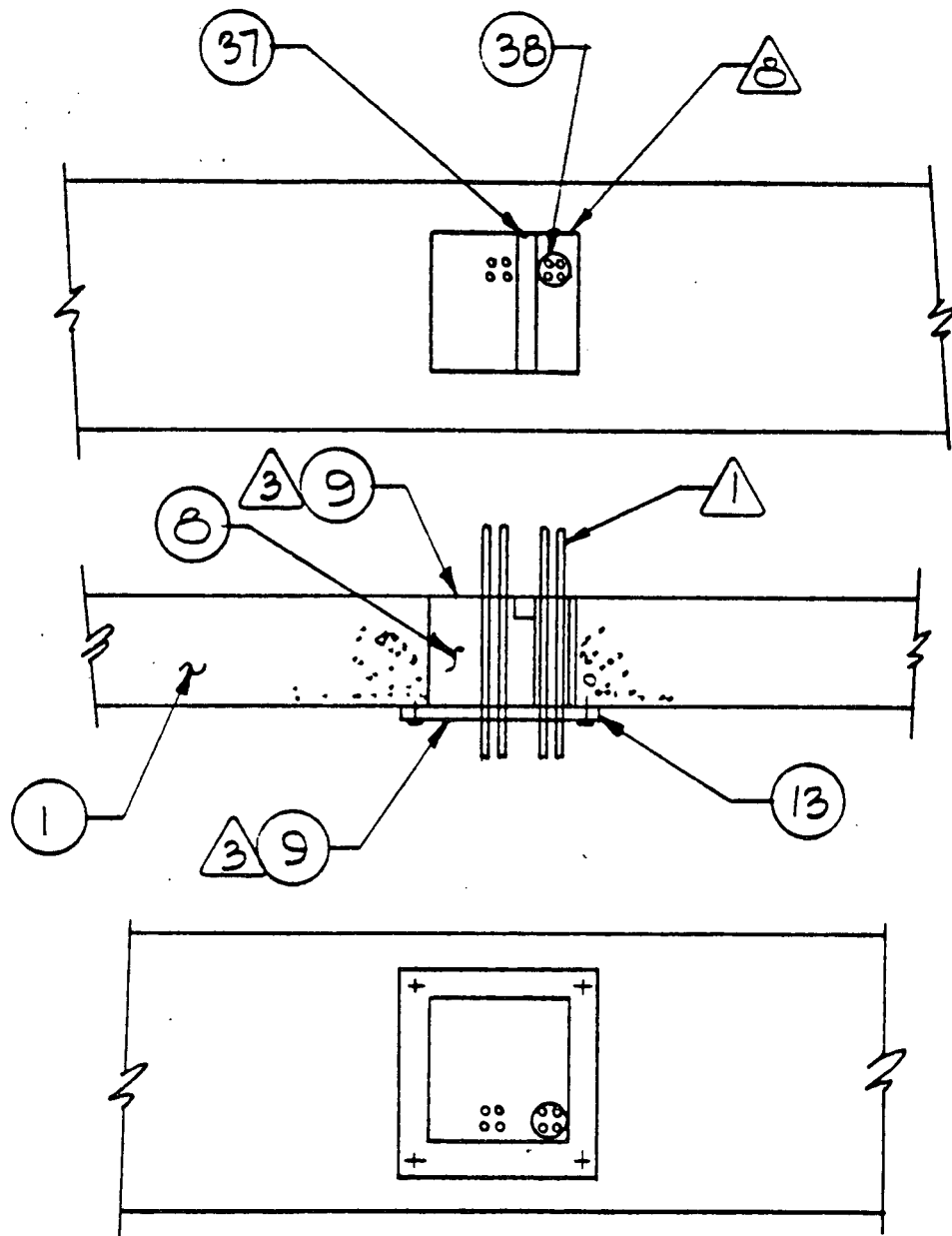
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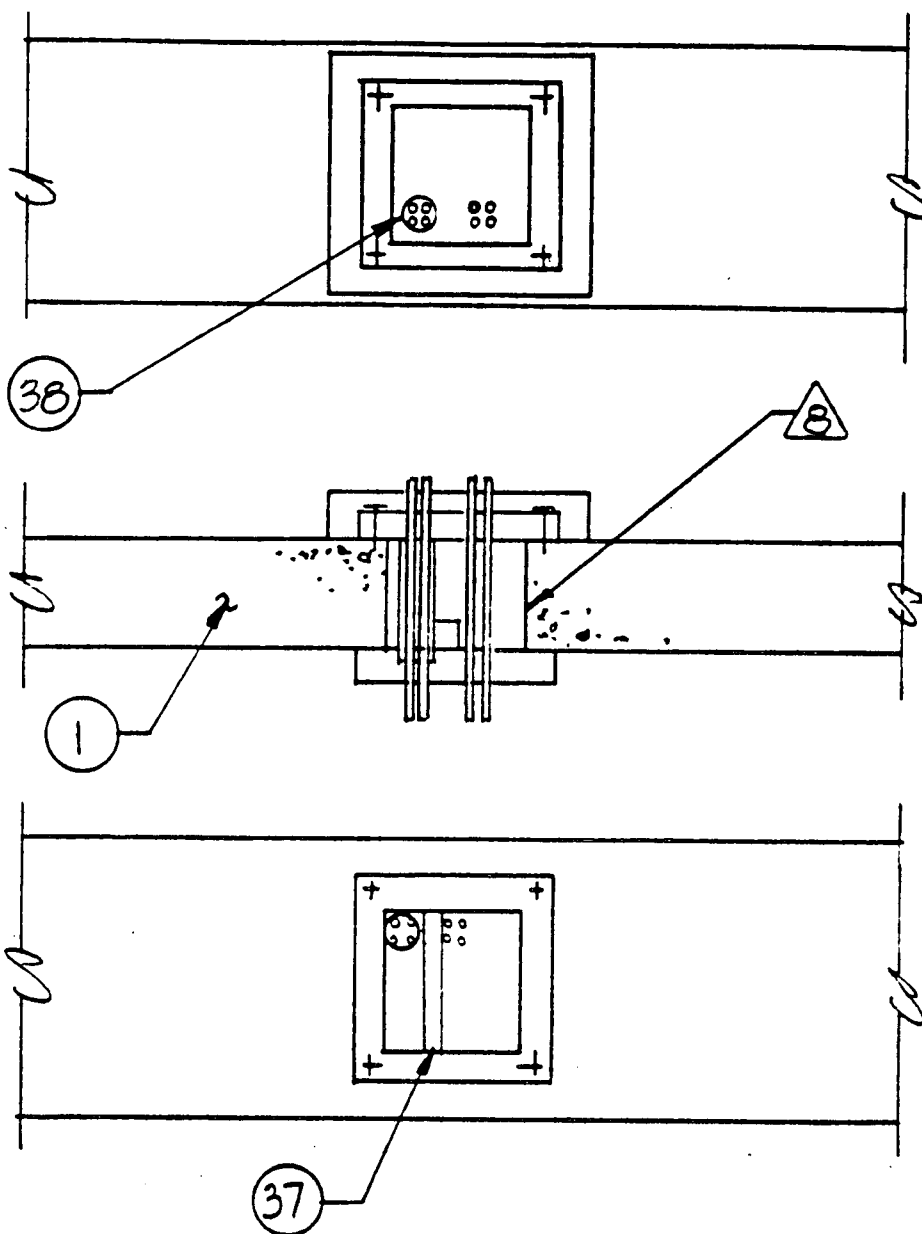
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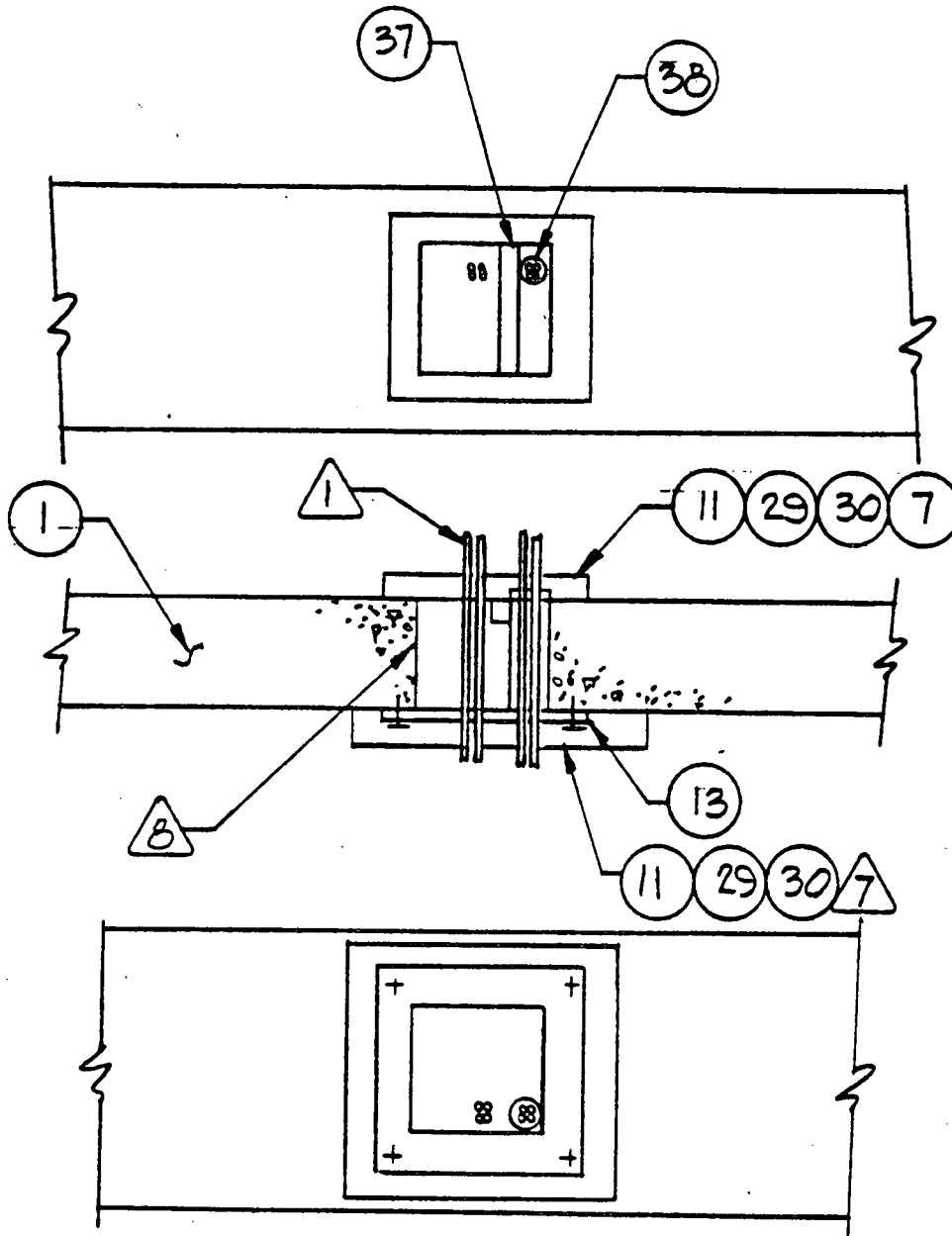
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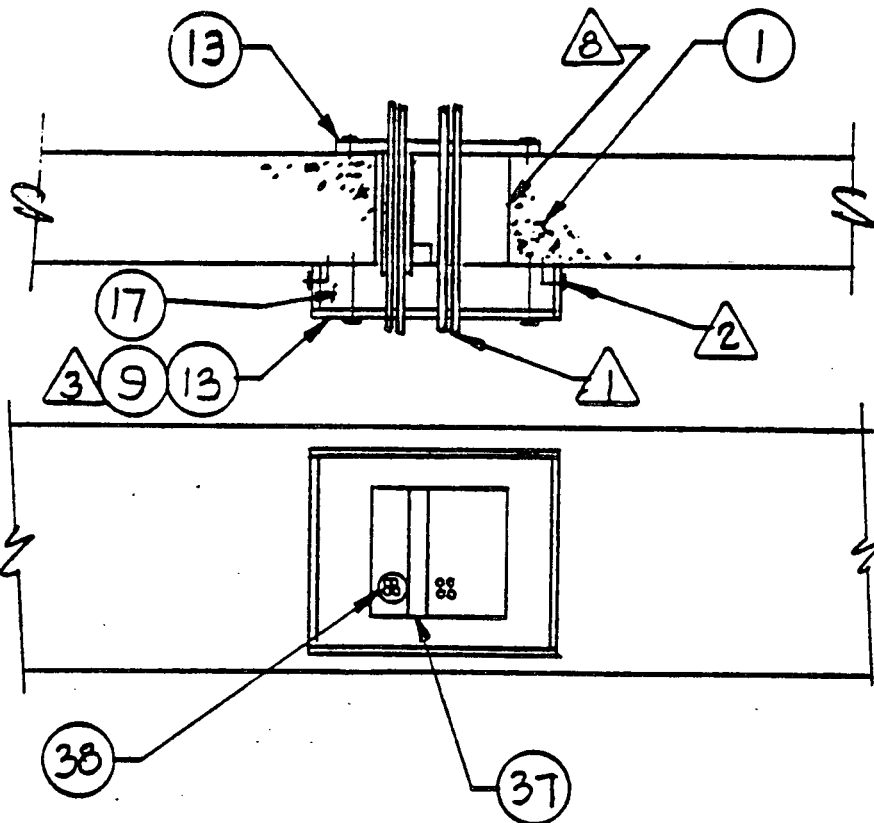
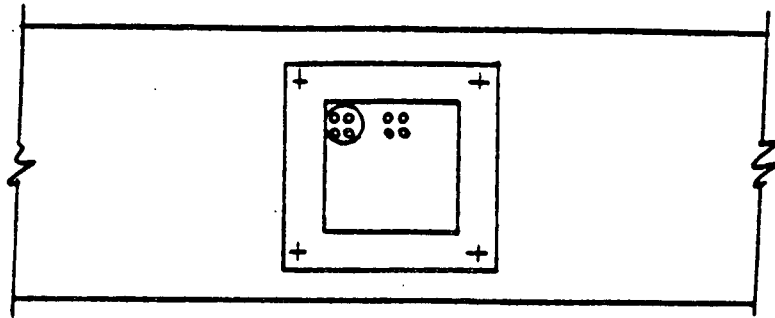
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**PRELIMINARY**

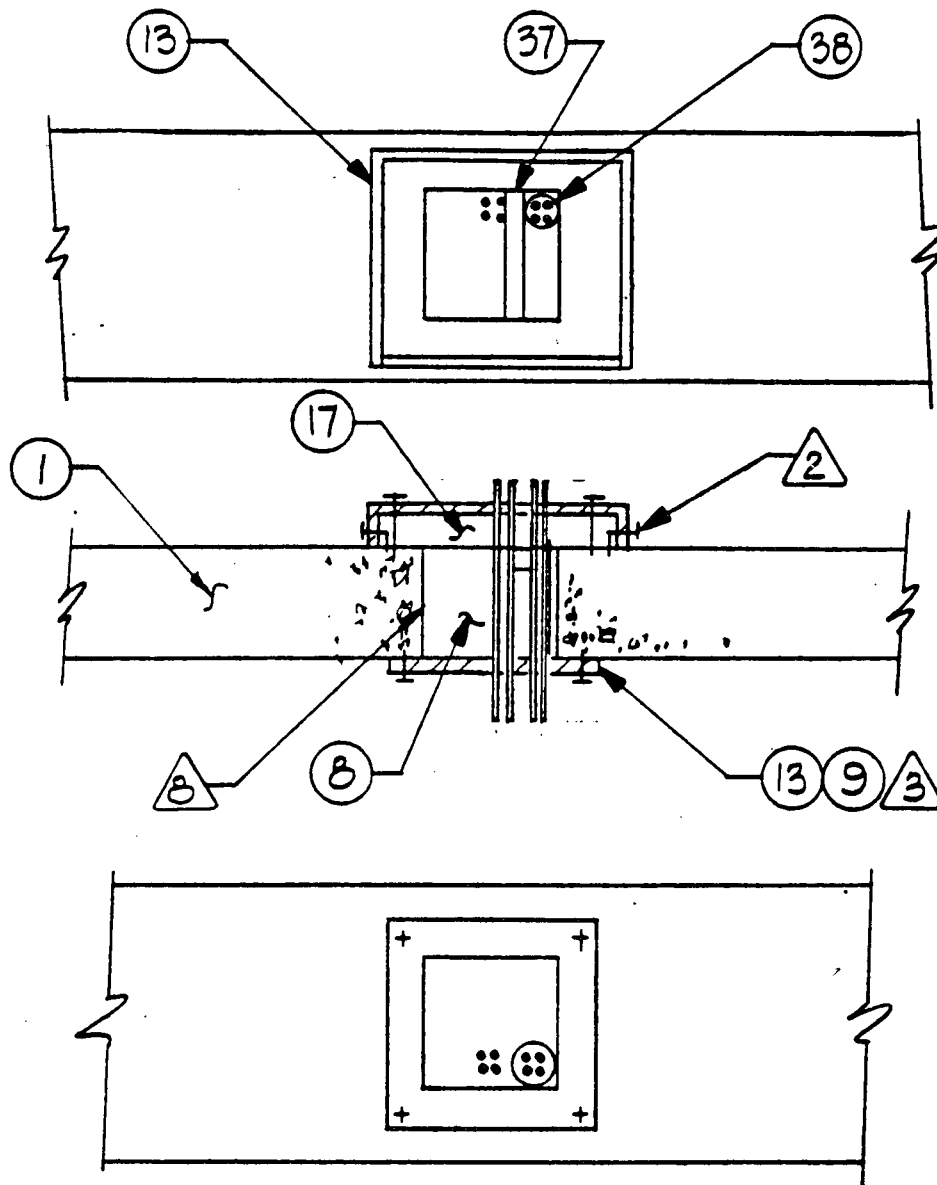


1	11-15-79	ISSUED FOR REVIEW & COMMENT	D.C.					
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA	
REVISIONS								
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR <b>QUADREX CORPORATION</b>			CHARGE NO.			
PASSED					NOR-0176/0179			
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO.		SHEET	REV
SCALE NONE					1000787		OF	1



PRELIMINARY

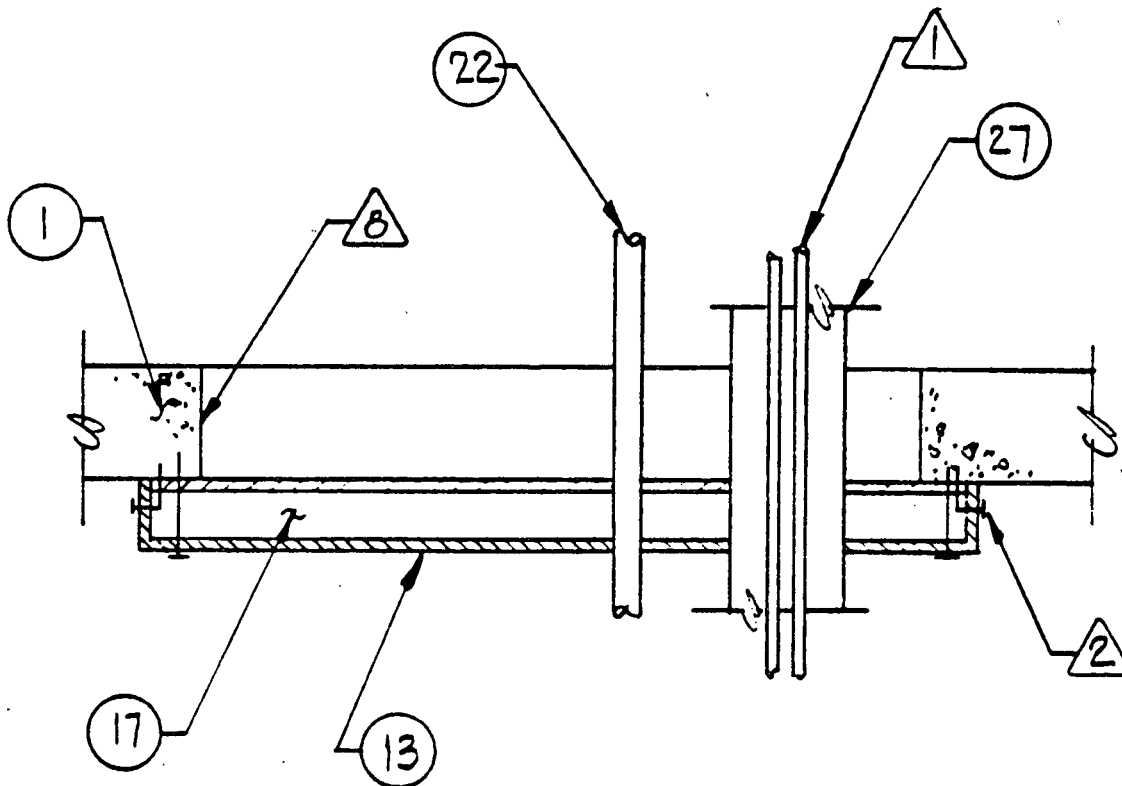
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
1	11/15/79	ISSUED FOR REVIEW & COMMENT	D.C.	AD		AD	
REVISIONS							
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR		CHARGE NO.			
PASSED				NOR-0176/0179			
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST		DWG NO.	SHEET	REV	
SCALE				1000787	OF	1	
NONE							



# PRELIMINARY

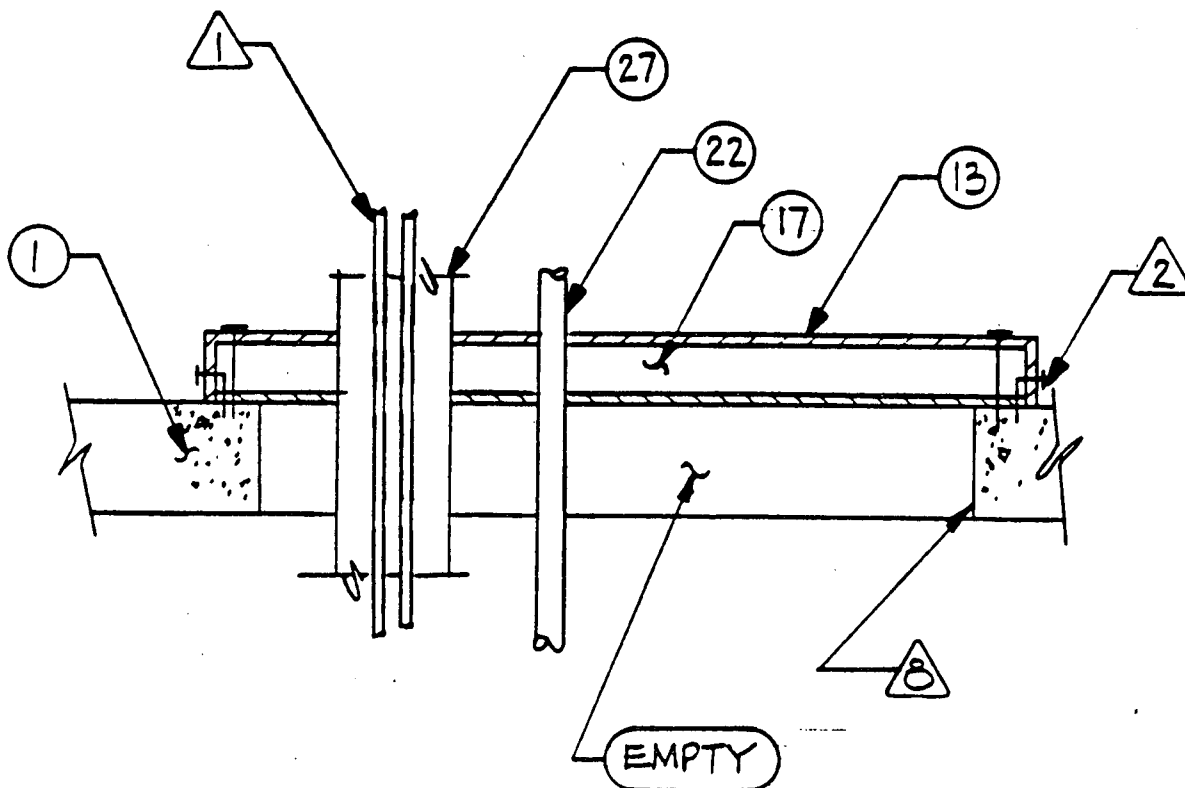
1	11-15-79	ISSUED FOR REVIEW & COMMENT	D.C.	<del>20</del>	<del>20</del>		
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR			CHARGE NO.		
PASSED					NOR-0176/0179		
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO.	SHEET	REV
SCALE NONE					1000787	OF	1

P28



**PRELIMINARY**

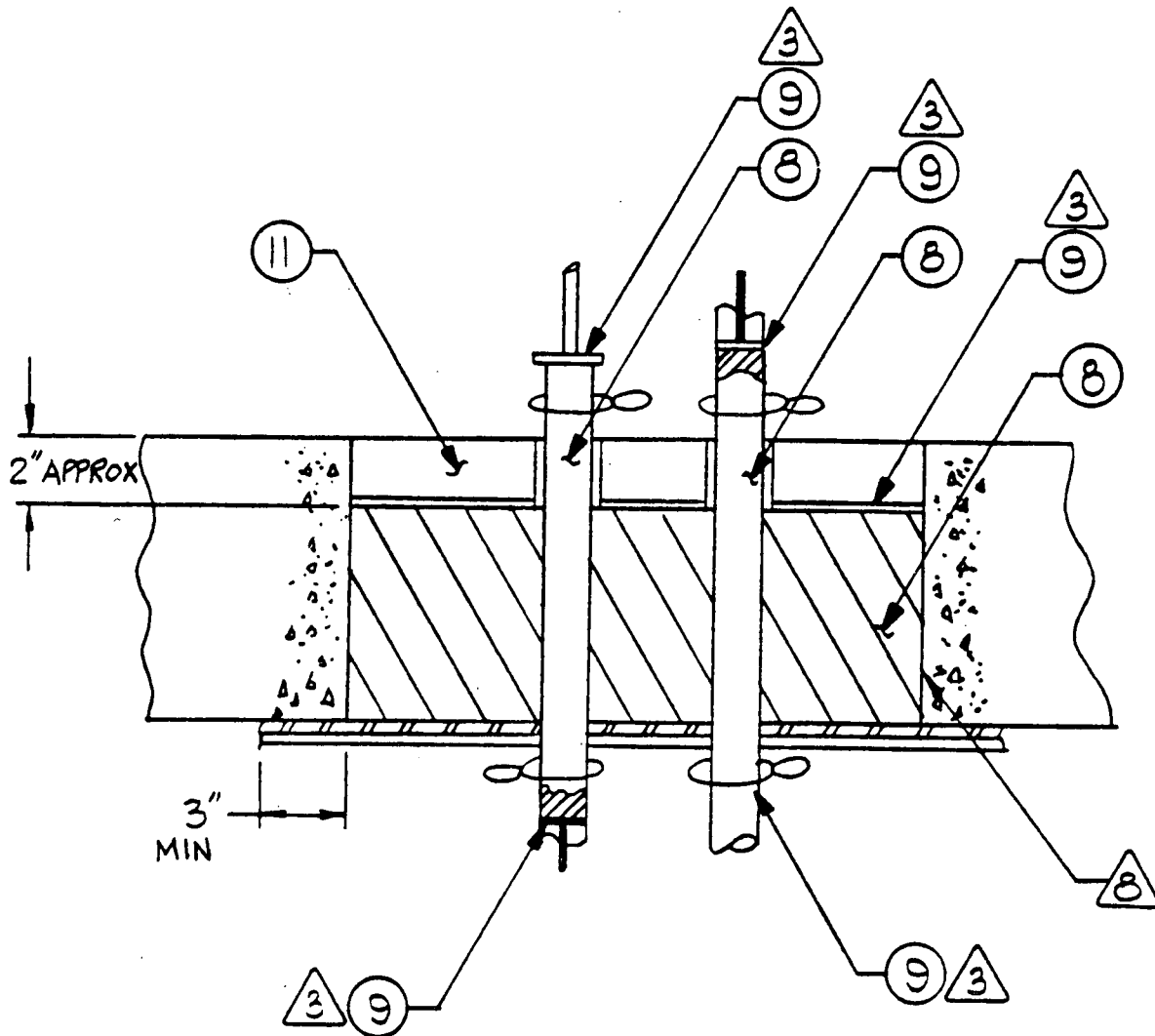
1	11/15/79	ISSUED FOR REVIEW & COMMENT	DC.					
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA	
REVISIONS								
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR			CHARGE NO.			
PASSED					NOR-0176/0179			
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO.		SHEET	REV
SCALE					OF		1	
NONE								



# PRELIMINARY

1	11-15-79	ISSUED FOR REVIEW & COMMENT	DC.	<i>[Signature]</i>		<i>[Signature]</i>	
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR <b>QADOREX CORPORATION</b>			CHARGE NO.		
PASSED					NOR-0176/0179		
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO.	SHEET	REV
SCALE					1000787	OF	1
NONE							

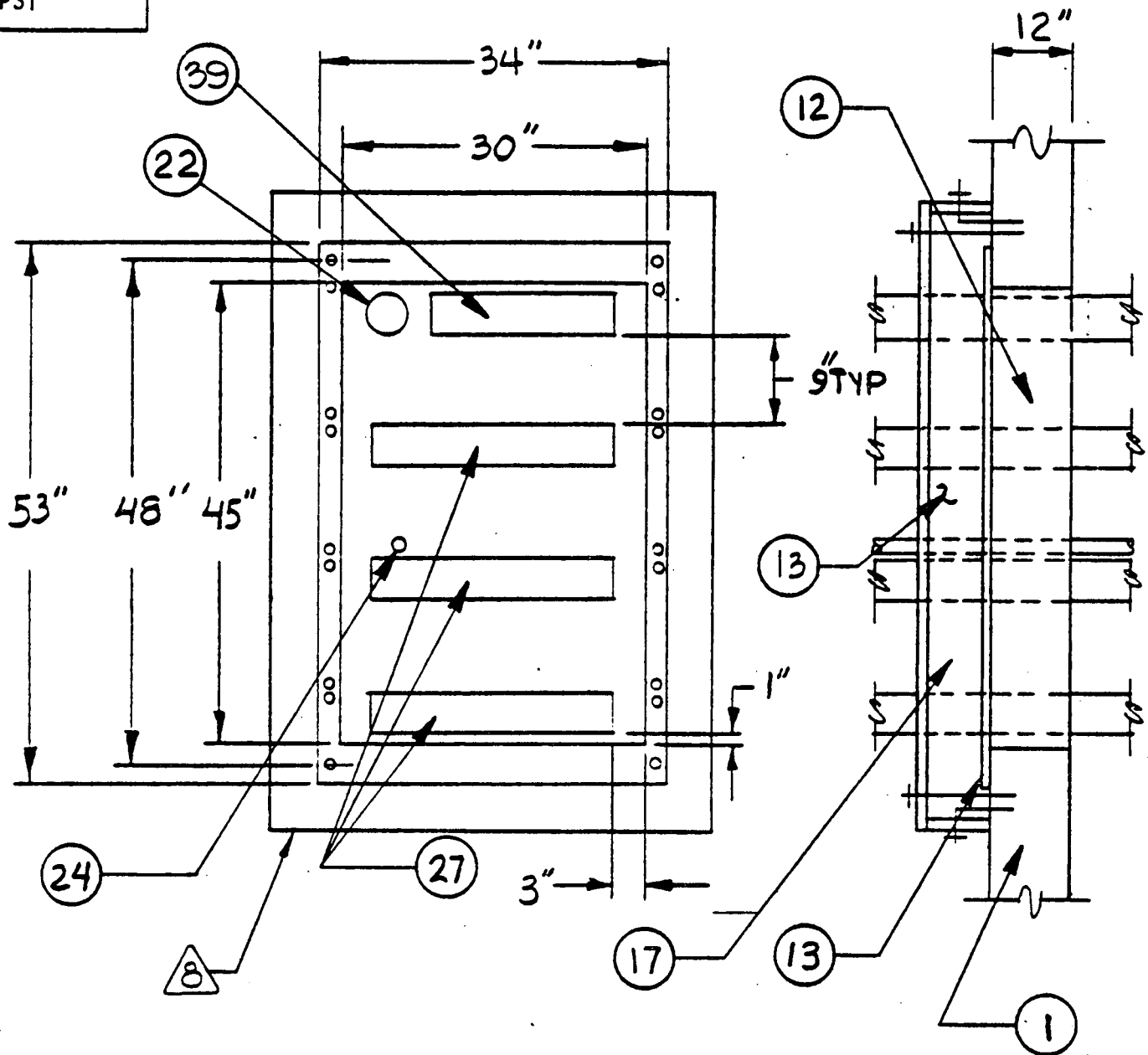
P 30



**PRELIMINARY**

1	11/15/79	ISSUED FOR REVIEW & COMMENT	D.C.	<i>RD</i>	<i>RD</i>		
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA QUADREX CORPORATION			CHARGE NO.		
PASSED					NOR-0176/0179		
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO.	SHEET	REV
SCALE					1000787	OF	1
NONE							

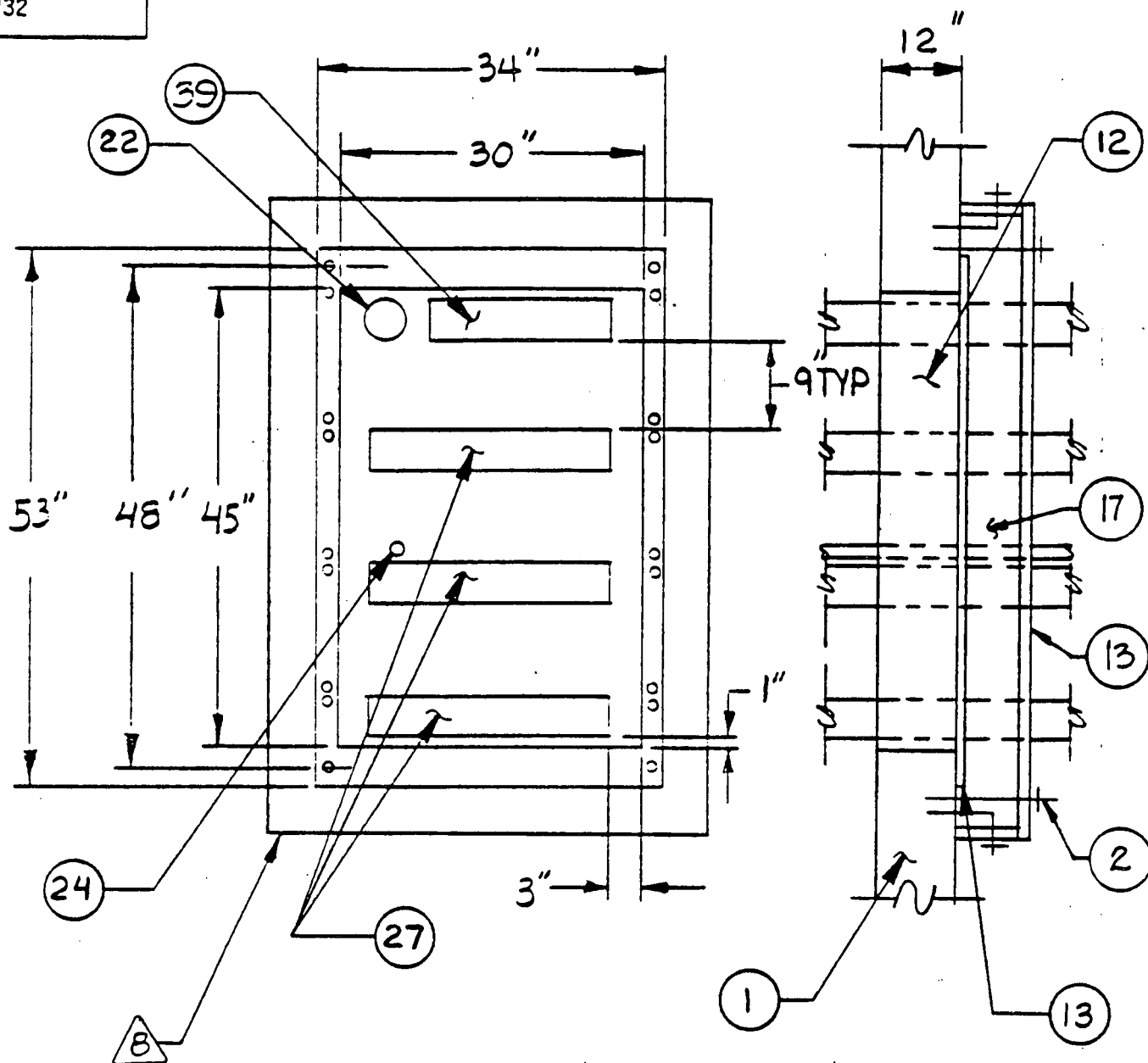
P31



# PRELIMINARY

1	11-1579	ISSUED FOR REVIEW & COMMENT	D.C.	<i>HD</i>	<i>BD</i>	
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV
REVISIONS						
TEST DATA		Nuclear Services Corporation		CHARGE NO.		
PASSED		CAMPBELL, CALIFORNIA		NOR-0176/0179		
FAILED		FOR		DWG NO.		
SCALE		NORTHERN STATES POWER		SHEET		
NONE		PENETRATION SEAL TEST		REV		
				1000787		
				OF		

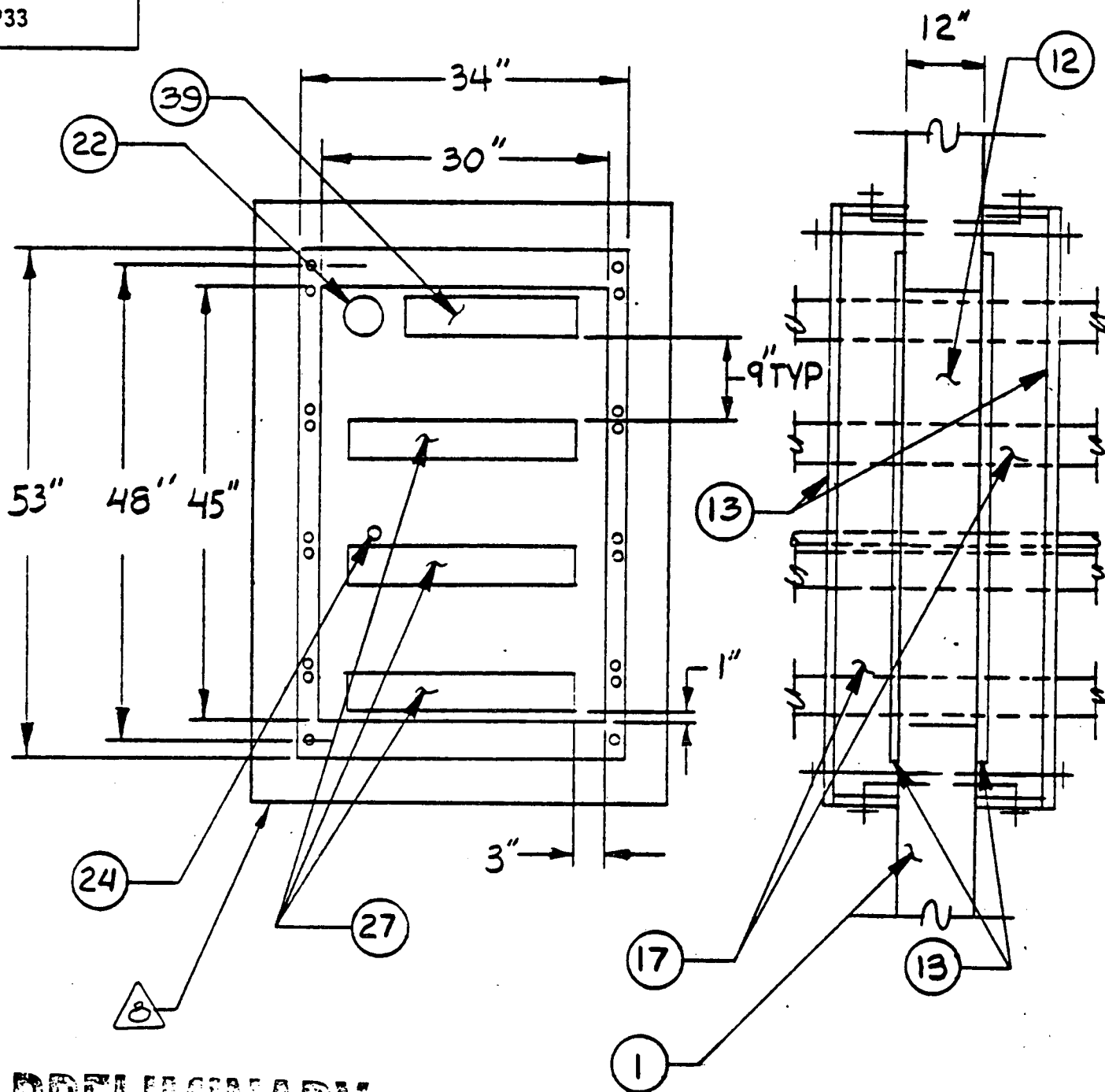
P32



**PRELIMINARY**

1	11-15-79	ISSUED FOR REVIEW & COMMENT	D.C.	ED	AD	
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV
REVISIONS						
TEST DATA		Nuclear Services Corporation		CHARGE NO.		
PASSED		CAMPBELL, CALIFORNIA		NOR-0176/0179		
FAILED		FOR		DWG NO.		
SCALE		NORTHERN STATES POWER		SHEET		
NONE		PENETRATION SEAL TEST		REV		
				1000787		
				OF		
				E		

P33



# PRELIMINARY

1	11/15/79	ISSUED FOR REVIEW & COMMENT	D.C.	<i>RL</i>	<i>RL</i>		
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR		CHARGE NO.			
PASSED				NOR-0176/0179			
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST		DWG NO.	SHEET	REV	
SCALE				1000787	OF	1	
NONE							

7



3

4



6

7

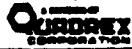
**PRELIMINARY**

36

8.

PENETRATIONS P7, P8, P9, P27 AND P34 ARE 14" X 42".  
 PENETRATIONS P22, P23, P24, P25, P26 AND P30 ARE 14" X 14".  
 PENETRATIONS P28 AND P29 ARE 36" X 48".  
 PENETRATIONS P31, P32 AND P33 ARE 30" X 45".

**PRELIMINARY**

1	11-15-79	ISSUED FOR REVIEW & COMMENT	DC.	<i>[Signature]</i>		<i>[Signature]</i>			
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA		
REVISIONS									
		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA					CHARGE NO. NOR-0176/0179		
		FOR NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO. 1000787		SHEET OF		REV 1-
SCALE		NONE							

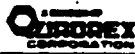
- ① SLAB, POURED CONCRETE, 12 INCHES THICK
- ② SLAB, POURED CONCRETE, 12 INCHES THICK WITH A PORTION 24 INCHES THICK
- ③ SLEEVE, 6" DIAMETER, 13" LONG, FLUSH WITH BOTTOM OF SLAB.
- ④ SLEEVE, 6" DIAMETER, 13" LONG, FLUSH WITH TOP OF SLAB.
- ⑤ 2 SLEEVES, 6" DIAMETER ON 12" CENTERS
- ⑥ SLEEVE, 10" DIAMETER, FLUSH WITH SLAB AT EACH END.
- ⑦ SLEEVE, 8" DIAMETER, 18 1/2" LONG, EXTENDING 2" FROM ONE SIDE OF SLAB, AND 4 1/2" FROM THE OTHER SIDE.
- ⑧ THERMAL INSULATING WOOL (TIW) TYPE I OWENS-CORNING FIBERGLASS CORPORATION FIBERGLASS TOWER, TOLEDO, OHIO 43659 (419)248-8000
- ⑨ FLAMEMASTIC 71A  
THE FLAMEMASTER CORPORATION  
11120 SHERMAN WAY, SUN VALLEY, CA. 91352 (213)982-1650
- ⑩ FLAMEMASTIC 77
- ⑪ PYROCRETE 241  
CARBOLINE COMPANY, FIREPROOFING PRODUCTS DIVISION  
350 HANLEY INDUSTRIAL COURT, ST. LOUIS, MO. (314)644-1000  
REPRESENTED BY:  
BOB CORDTZ CO.  
262 W. ANGELA AVE.  
PLEASANTON, CA. 94566 (415) 846-3013

**PRELIMINARY**

1	11/579	ISSUED FOR REVIEW & COMMENTS	D.C.				
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
		<b>Nuclear Services Corporation</b> <small>CAMPBELL, CALIFORNIA</small>		<b>CHARGE NO.</b> NOR-0176/179			
		FOR NORTHERN STATES POWER PENETRATION SEAL TEST		<b>DWG NO.</b> 1000787		<b>SHEET</b> OF	<b>REV</b> 1
SCALE		NONE					

- 12 INSTA-FOAM  
INSTA-FOAM PRODUCTS, INC.  
2050 NORTH BROADWAY, JOLIET, ILL. 60435 (815)726-6241
- 13 1/2" MARINITE XL BOARD  
JOHNS-MANVILLE REFRACTORY PRODUCTS  
DRAWER 17L, DENVER, COLO. 80217 (303)979-1000
- 14 KAOWOOL, BULK FIBER  
THE CARBORUNDUM COMPANY, INSULATION DIVISION  
P. O. BOX 808, NIAGARA FALLS, N.Y. 14302 (716)278-6221
- 15 KAOWOOL, DURABLANKET
- 16 1" CARBORUNDUM FIBERFRAX HOTBOARD
- 17 ICMS PRODUCT 60, 5" DEEP, MINIMUM, FROM TOP AND SIDE OF SLEEVE  
INSULATION CONSULTANTS & MANAGEMENT SERVICES, INC.  
P. O. BOX 1, BARODA, MICHIGAN 49101 (616)422-2112
- 18 ASBESTOS PIPE INSULATION 5" O.D., FOR 3" PIPE, 3' LONG EXTENDING  
1' EACH SIDE OF SLAB.
- 19 ALUMINUM SHEET OVER PIPE INSULATION PABCO SUREFIT METAL JACKETING SYSTEM  
LOUISIANA-PACIFIC CORP., PALESTINE, TEXAS 75801
- 20 PIPE 3", STEEL, 5' LONG, EXTENDING 2' EACH SIDE OF SLAB, CAPPED AT EACH END.

# PRELIMINARY

1	11/15/79	ISSUED FOR REVIEW & COMMENT	D.C.	<i>PD</i>	<i>PD</i>		
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
		<b>Nuclear Services Corporation</b> <small>CAMPBELL, CALIFORNIA</small>		 <b>QUIPREX CORPORATION</b>		CHARGE NO.	
		FOR				NOR-0176/0179	
		NORTHERN STATES POWER PENETRATION SEAL TEST		DWG NO.	SHEET	REV	
SCALE NONE				1000787	OF	1	

- (21) PIPE 5", 316 STAINLESS STEEL, 4' LONG, EXTENDING 1' BELOW SLAB, CAPPED AT EACH END.
- (22) CONDUIT 4", 4' LONG, EXTENDING 1' BELOW SLAB, CAPPED AT EACH END.
- (23) CONDUIT 2", 4' LONG, EXTENDING 1' BELOW SLAB, CAPPED AT EACH END.
- (24) CONDUIT 1", 4' LONG, EXTENDING 1' BELOW SLAB, CAPPED AT EACH END.
- (25) PRIMER SS 4044 & RTV 511  
GENERAL ELECTRIC COMPANY  
1 RIVER ROAD, SCHENECTADY, N.Y. 12345 (518)385-2211
- (26) SOLID SHEET METAL FULL WIDTH OF TRAY (16 GA MINIMUM)
- (27) LADDER BACK TRAY, ALUMINUM, 24" WIDE, 4" HIGH
- (28) PYROPRIME 772  
CARBOLINE COMPANY
- (29) 3.4 POUND PER SQUARE YARD METAL LATH
- (30) SELF-STICK INSUL-ANCHORS  
H.A. JONES CO. INC, DAYTON, OHIO  
OR  
SELF-STICK STICK-UPS  
MIRACLE ADHESIVES CORP. BELLMORE, LONG ISLAND, NEW YORK  
OR EQUIV. TO FASTEN TO THE  
WALL, AND USE TIE WIRE TO FASTEN THE METAL  
LATH AROUND THE SLEEVES.

**PRELIMINARY**

1	11/5/79	ISSUED FOR REVIEW & COMMENT	D.C.	DD	DD	DD	DD
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS							
		<b>Nuclear Services Corporation</b> <small>CAMPBELL, CALIFORNIA</small>		CHARGE NO. NOR-0176/0179			
		FOR NORTHERN STATES POWER PENETRATION SEAL TEST		DWG NO. 1000787	SHEET OF	REV 1	
SCALE NONE							

31 SLEEVE, 8" DIAMETER, 34" LONG, EXTENDING  
2" FROM ONE SIDE OF THE SLAB AND 20" FROM THE OTHER SIDE.

32 CHICO A  
  
CROUSE-HINDS COMPANY  
CONSTRUCTION MATERIALS PRODUCTS DIVISION  
ROOM 625  
155 BOVET ROAD  
SAN MATEO, CALIF. 94402 (415) 574-3737

33 CHICO X  
  
CROUSE-HINDS COMPANY

34 INTUMASTIC 285  
CARBOLINE COMPANY

35 SILICATE GEL  
SOUTHWEST RESEARCH INSTITUTE  
6220 CULEBRA ROAD  
SAN ANTONIO, TEXAS 78284 (512) 684-5111

36 SILICATE FOAM  
SOUTHWEST RESEARCH INSTITUTE

**PRELIMINARY**

1	11.15.79	ISSUED FOR REVIEW & COMMENT	D.C.	<del>ED</del>		<del>ED</del>	
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPVD	QA
REVISIONS							
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA			CHARGE NO. NOR-0176/0179		
PASSED		FOR NORTHERN STATES POWER PENETRATION SEAL TEST			DWG NO.		SHEET
FAILED					1000787		OF
SCALE		NONE			REV 1		

- 37. 2" CHANNEL
- 38. 3" PIPE, 12" LONG
- 39. LADDER BACK TRAY, ALUMINUM 18" WIDE, 4" HIGH

**PRELIMINARY**

1	11-5-79	ISSUED FOR REVIEW & COMMENT	D.C.	<i>RD</i>			<i>RD</i>	
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPVD	QA	
REVISIONS								
		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA		CHARGE NO. NOR-0176/0179				
		FOR NORTHERN STATES POWER PENETRATION SEAL TEST		DWG NO. 1000787		SHEET OF		REV 1
SCALE		NONE						

QUADREX SLAB #1

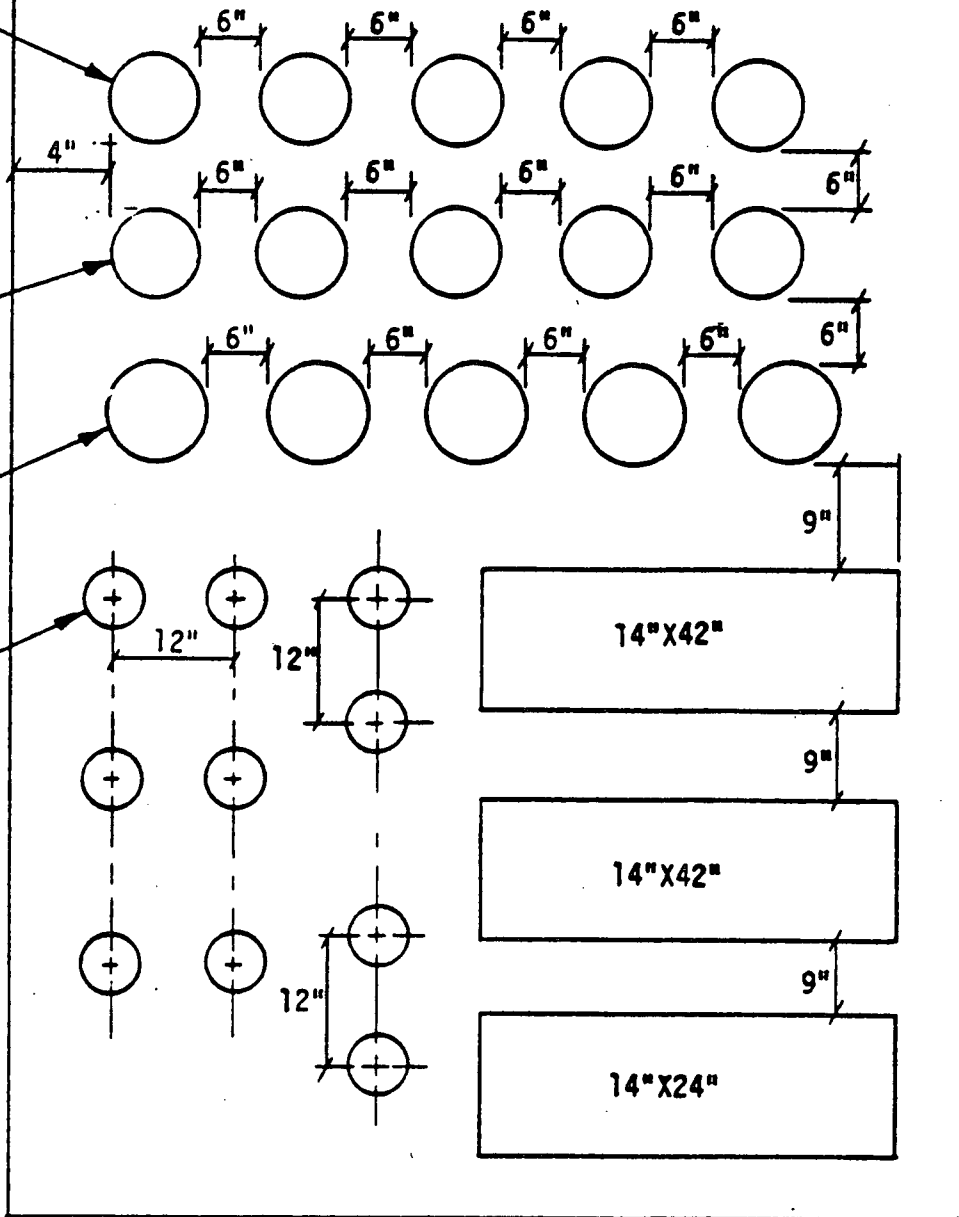
8" DIA  
TYP  
5 PLACES

8" DIA  
TYP  
5 PLACES

10" DIA  
TYP  
5 PLACES

6" DIA  
TYP  
10 PLACES

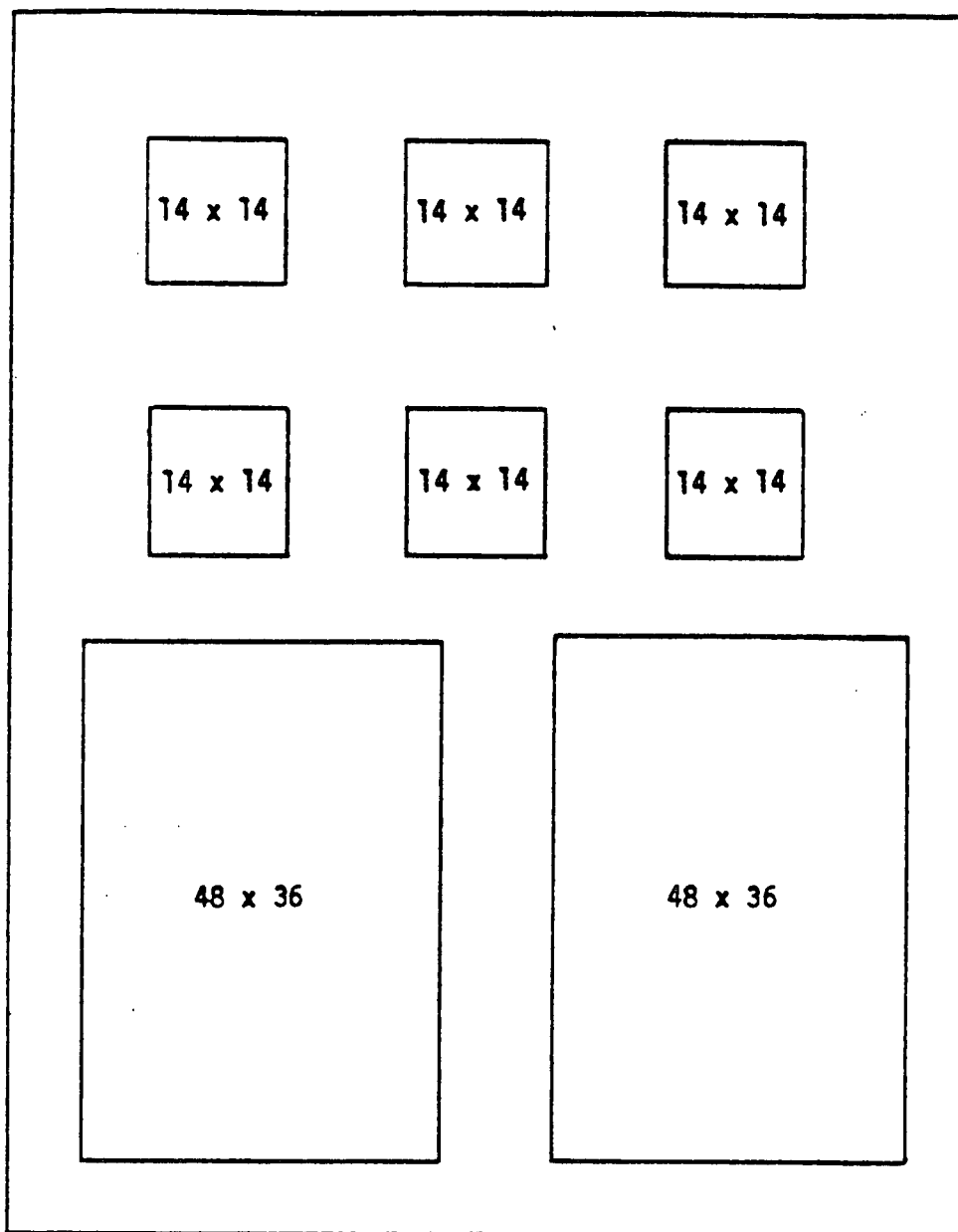
PRELIMINARY



1	11/5/79	ISSUED FOR REVIEW & COMMENT	D.C.				
REV	DATE	DESCRIPTION	DRAWN	DESIGN	CHECK	APPVD	QA
REVISIONS							
TEST DATA PASSED		Nuclear Services Corporation CAMPBELL, CALIFORNIA			CHARGE NO. NOR-0176/0179		
FAILED		FOR			DWG NO.		
SCALE NONE		NORTHERN STATES POWER PENETRATION SEAL TEST			SHEET OF		
					REV 1-		
					1000787		

QUADREX SLAB #2

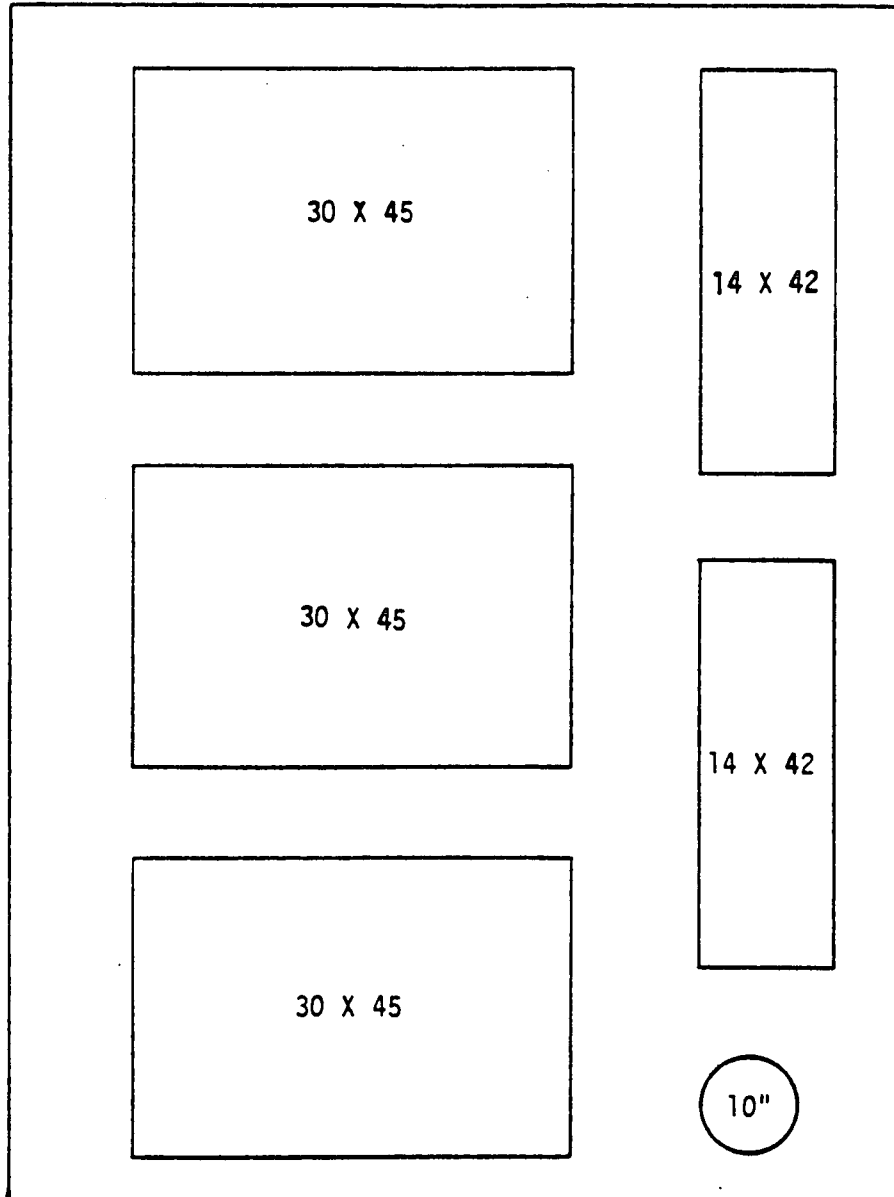
PRELIMINARY



1	11-15-79	ISSUED FOR REVIEW & COMMENTS				D.C.	<del>ED</del>	<del>ED</del>	
REV	DATE	DESCRIPTION				DRAWN	DESIGN	CHECK	APPROV
REVISIONS									
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR				CHARGE NO.			
PASSED						NOR-0176/0179			
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST				DWG NO.	SHEET	REV	
SCALE						1000787	OF	1	
NONE									

QUADREX SLAB#3

PRELIMINARY



1	11-15-79	ISSUED FOR REVIEW & COMMENT			D.C.	<i>BD</i>		<i>BD</i>	
REV	DATE	DESCRIPTION			DRAWN	DESIGN	CHECK	APPROV	QA
REVISIONS									
TEST DATA		<b>Nuclear Services Corporation</b> CAMPBELL, CALIFORNIA FOR				CHARGE NO.			
PASSED						NOR-0176/0179			
FAILED		NORTHERN STATES POWER PENETRATION SEAL TEST				DWG NO.	SHEET	REV	
SCALE NONE						1000787	OF	5	