Vepco

VIRGINIA ELECTRIC AND POWER COMPANY, RICHMOND, VIRGINIA 23261

January 15, 1979

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. O. D. Parr, Chief
Light Water Reactors Branch No. 3
Division of Project Management
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Serial No. 547/091978
LQA/RMN:bep/mc

Docket Nos. 50-404
50-405

Dear Mr. Denton:

We have received and reviewed the request for additional information from Mr. Parr dated September 19, 1978. Our responses are attached.

Very truly yours,

WCSpencer
for

Sam C. Brown, Jr.
Senior Vice President-
Power Station Engineering
and Construction

Attachment

790118 0157

PROPOSED POSTULATED PIPE BREAK CRITERIA AND ANALYSIS
NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.1 Auxiliary Systems Branch

(a) Provide layout drawings of the safety-related areas outside containment showing the high and moderate energy piping systems and their relation to the safety-related equipment. Indicate the method of protection provided against a high energy piping system failure for each system listed.

(b) Provide a table which includes the method of protection for moderate energy piping systems. Provide results of analyses of the effects on the safety-related systems for all high and moderate energy piping system failure in accordance with our Branch Technical Position APCSB 3-1.

(c) Identify areas of system piping where no breaks are postulated, "break exclusion" regions (including lengths of pipe such as those located in the main steam and feedwater lines).

RESPONSE

(a) The analysis for the high energy and moderate energy systems has not been completed to date. The layout drawings and methods of protection for all safety related areas will be provided in the FSAR. However, to demonstrate the method of protection against high energy pipe rupture, engineering sketches EMD-7 and EMD-8 showing the layout of main steam and feedwater piping, outside containment, are provided.

A detailed description of the main steam and feedwater pipe routing from the containment penetrations to the north wall of the main steam valve house (MSVH), a pipe break exclusion area, is given in the response to 010.1(c). Unless otherwise noted the following description is valid for both Units 3 and 4.

Main Steam Lines Routing

The main steam lines leave the MSVH through the close gap restraints in the valve house north wall and continue north above the service building roof, where they turn east and enter the main steam manifold assembly (shown in engineering sketches EMD-7 and 8). The main steam lines are seismically qualified up to and including the seismic interface anchor at the main steam manifold assembly.

The main steam lines leave the main steam manifold assembly and continue east. For Unit 3, at approximately col line 18, and for Unit 4, at approximately col line 29, they turn north and head toward the turbine building. The main steam lines drop in Unit 3 at the C_x line and in Unit 4 at the C line approximately 10 ft and enter the turbine building terminating at the turbine as indicated in engineering sketches EMD-7 and 8 for Units 3 and 4, respectively. In addition, there are two 12-in and one 8-in main steam lines which head north and drop north of the C line and enter the turbine building.

For Unit 4, the main steam lines are routed over the control room area, as indicated on engineering sketch EMD-8.

Pipe breaks are postulated in accordance with the pipe rupture criteria submitted July 20, 1976, Serial no. 978. For the piping runs between the MSVH and the manifold assembly pipe breaks were chosen in accordance with Section 2.2.1.3a, with the terminal end pipe breaks located just outside the north wall of the MSVH and at the piping connections to the manifold assembly. Since the stress levels are below 0.8 $(1.2\ S_h + S_A)$, only circumferential pipe breaks were postulated.- In the piping run between the main steam manifold assembly and the turbine connections, terminal end pipe breaks were postulated at the manifold and turbine connections. Only circumferential pipe breaks are postulated, because the stress levels are below 0.8 (S_A), in accordance with Section 2.2.1.3b.

Pipe rupture restraints were added to protect safety-related targets. Because of the separation, pipe whip was not addressed in the turbine building except as noted below, for the main steam lines in Unit 4. Postulated pipe breaks in the portion of the main steam line that runs north in the turbine building, may cause a pipe whip that may impact the walkway in the control room area. The adverse effects of this impact is prevented by the concrete walls as shown in Section 2-2 on engineering sketch EMD-8.

Feedwater Lines Routing

The 18-in feedwater lines leave the MSVH through close gap restraints in the valve house north wall and continue north turning east at the C_E line where they connect to a 24-in line, which runs north toward the turbine building. This connection occurs at col line 19 for Unit 3 and col line 29 for Unit 4 as shown in Section 1-1 on engineering sketches EMD-7 and 8, for the respective units. There is a seismic interface anchor located on the 24-in feedwater line. The 18-in feedwater lines are seismically analyzed up to this anchor. In addition, there is a 12-in feedwater line that leaves the MSVH and heads north over the service building and drops north of the C_x line and enters the turbine building, as indicated on engineering sketches EMD-7 and 8.

Pipe breaks are chosen in accordance with paragraph 2.2.1.3a of the pipe rupture criteria. The stress levels are below 0.8 $(1.2\ S_h + S_A)$, hence only circumferential pipe breaks are postulated. Pipe rupture restraints are located as shown on the sketches to prevent impact to safety-related targets.

For Unit 4, the 18-in feedwater lines travel over the control room, as shown on engineering sketch EMD-8. Postulated pipe breaks in the 24-in line, located in the turbine building, may cause the pipe to impact the walkway in the control room area. The adverse effects of this pipe break will be prevented by the walls shown in Section 1-1 on engineering sketch EMD-8. Protection will be provided for postulated pipe breaks in the 12-in feedwater line, when the analysis is complete.

(b) The moderate energy piping systems will be analyzed as indicated in Section 2.2.2 of the Pipe Rupture Criteria submitted in 1976. Protection against postulated through-wall leakage cracks is provided by designing structures and equipment, required for safe shutdown of the plant, for the environmental effects (e.g., pressure, temperature, humidity, and flooding) of the cracks.

Results of the ânalyses of the effects on the safety-related systems for all high and moderate energy piping system failure will be provided in the FSAR.

(c) The main steam lines from the containment penetration to the north wall of the MSVH, at El 310 ft-9 11/16 in, are within the break exclusion area, hence no mechanistic pipe breaks are postulated in the MSVH. Since this area has been designated a break exclusion area, it will meet all break exclusion area requirements.

Close gap restraints are located in the north wall of the MSVH to maintain stress levels below $1.8S_h$ in the MSVH for postulated pipe breaks outside the MSVH. Engineering sketch EMD-5 shows the details of the MSVH (pipe break exclusion area), showing the 32.25-in main steam lines and associated branch connections up to the isolation valves (which are seismically qualified). The layout of the break exclusion zones of those branch lines, beyond the isolation valves, will be shown in the FSAR. Only the west two lines are shown in the sketch. The east lines are mirror images.

The 18-in feedwater lines from the containment penetration at El 287 ft to the north wall of the MSVH at El 306 ft, shown in engineering sketch EMD-6, are also within the break exclusion region. Along with these lines are the 6-in bypass lines and the 12-in feedwater line which penetrate the north wall of the MSVH. In addition, 6-in feedwater branch connections are shown up to their isolation valves. The layout of the break exclusion zones of these 6-in lines will be shown in the FSAR. Pipe whip restraints are located on the feedwater lines inside the MSVH, for pipe breaks outside the MSVH. The close gap restraints are located in the north wall of the MSVH. These restraints are required to keep stress below $1.8S_h$, between the containment penetration and the isolation valve, after pipe rupture.

Nonmechanistic pipe cracks (equivalent to the flow area of a single-ended pipe rupture) are addressed in the response to Question 010.2.

REQUEST FOR ADDITIONAL INFORMATION -
"PIPE BREAK EVALUATION REPORT," DATED DEC. 5, 1973
NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.2 Auxiliary Systems Branch

We require that compartments that contain safety-related equipment and are labeled "break exclusion" regions for the main steam lines and feedwater lines, be designed to consider the environmental effects (pressure, temperature, humidity) and potential flooding consequences from an assumed crack, equivalent to the flow area of a single ended pipe rupture in these lines. We require that essential equipment located within the compartment, including the main steam isolation and feedwater valves and their operators be capable of operating in the environment resulting from the above crack. We also will require that if this assumed crack could cause the structural failure of this compartment, then the failure should not jeopardize the safe shutdown of the plant. In addition, we require that the remaining portion of the pipe in the tunnel between the "break exclusion" compartment and the turbine building meet the guidelines of Branch Technical Position APCSB 3-1.

We require that you submit a subcompartment pressure analysis to confirm that the design of the pipe tunnel conforms to our position as outlined above.

We request that you evaluate the design against this staff position, and advise us as to the outcome of your review, including any design changes which may be required. The evaluation should include a verification that the methods used to calculate the pressure build-up in the subcompartments outside of the containment for postulated breaks are the same as those used for subcompartments inside the containment. Also, the allowance for structural design margins (pressure) should be the same. If different methods are used, justify that your method provides adequate design margins and identify the margins that are available. When you submit the results of your evaluation, identify the computer codes used, the assumptions used for mass and energy release rates, and sufficient design data so that we may perform independent calculations.

The peak pressures and temperatures resulting from the postulated break of a high energy pipe located in compartments or buildings is dependent on the mass and energy flows during the time of the break. You have not provided the information necessary to determine what terminates the blowdown or to determine the length of time blowdown exists. For each pipe break or leakage crack analyzed, provide the total blowdown time and the mechanism used to terminate or limit the blowdown time of flow so that the environmental effects will not affect safe shutdown of the facility.

RESPONSE

Compartments that contain safety-related equipment and are break exclusion areas will be designed for the environmental effects (Pressure, temperature, humidity) and potential flooding consequences from an assumed crack, equivalent to the flow area of a single-ended pipe rupture of the high energy piping systems in the area.

Essential equipment located within the compartment will be qualified to be capable of operating in the environment resulting from the postulated crack.

The assumed nonmechanistic crack will not cause the structural failure of the main steam and feedwater valve house.

There is no pipe tunnel between the break exclusion area in the main steam valve house and the turbine building.

A subcompartment analysis will be submitted in the FSAR with sufficient data to allow the NRC to perform an independent analysis.

REQUEST FOR ADDITIONAL INFORMATION
"PIPE BREAK EVALUATION REPORT," DATED DECEMBER 5, 1973
NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.3 Auxiliary Systems Branch

According to Section 2.6, pipe whip and jet impingement resulting from high energy line failures may cause damage to the cable trays. This is unacceptable. It is our position that safety-related cable trays required for safe shutdown be protected from the effects of pipe whip and jet impingement.

RESPONSE

The safety-related cable trays required for safe shutdown will be protected from the effects of pipe whip and jet impingement.

REQUEST FOR ADDITIONAL INFORMATION - "PIPE BREAK EVALUATION REPORT," DATED DECEMBER 5, 1973 NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.4 Auxiliary Systems Branch

In Section 3.3 and 6.0, you indicate that you will provide process leakage detection instrumentation in various areas of the plant to provide indication of piping failures. Verify that this instrumentation is seismic Category I.

RESPONSE

A study of the environmental and mechanical effects of high energy pipe breaks on safety-related equipment and systems, required to safely shut down the plant, is being undertaken. As a result of this study, changes in plant design may be required to mitigate the effects of a high energy pipe break.

The Seismic Category I instrumentation that now exists in the Seismic Category I fluid systems may provide some inferential indication of a pipe crack or break.

The plant will be designed to mitigate the effects of a pipe break. Therefore, every effort will be made to limit the reliance on leakage detection instrumentation. If the study concludes that some leakage detection instrumentation is necessary, system requirements will dictate instrument classification.

REQUEST FOR ADDITIONAL INFORMATION
"PIPE BREAK EVALUATION REPORT," DATED DECEMBER 5, 1973
NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.5 Auxiliary Systems Branch

According to Section 4.1, a high energy line break may cause the loss of a redundant train of safety-related equipment (e.g., Service Water System) listed in Table 4.1-2.2. You have indicated that this equipment is not required for protective action following the high energy line break and hence protection is not required. Our evaluation shows that the service water system is required for safe shutdown. It is our position that a high energy line break not result in the loss of a redundant train in systems required to place the plant in a safe cold shutdown condition or to mitigate the consequences of an accident. Verify that you meet this position.

RESPONSE

A high energy line break will not result in the loss of a redundant train, in systems required to place the plant in a safe shutdown condition, or to mitigate the consequences of an accident.

REQUEST FOR ADDITIONAL INFORMATION
"PIPE BREAK EVALUATION REPORT," DATED DECEMBER 5, 1973
NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.6 Auxiliary Systems Branch

As stated in Section 5.3.3, high energy line breaks in the reactor makeup system can cause the loss of function of safety-related valves located in the containment penetration area. This is not acceptable. It is our position that these valves be protected to prevent their loss of function if they are required to safely shut down the plant.

RESPONSE

All safety-related valv s required for safe shutdown of the plant will be protected to prevent their loss of function.

REQUEST FOR ADDITIONAL INFORMATION - PIPE BREAK EVALUATION REPORT; DATED DECEMBER 5, 1973 NORTH ANNA, UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 010.7 Auxiliary Systems Branch

According to Sections 5.3.9.4 and 5.3.9.5, steam tight doors will be added to prevent hazardous post-accident environmental conditions in the turbine room from being introduced in the control room and diesel generator rooms. Verify that administrative controls will be implemented to assure that the steam tight doors will always be closed during normal plant operation. Further, we require that alarms be provided on these doors. These alarms should enunciate in the control room when the doors are opened during normal plant operation.

RESPONSE

The design will include the two sets of doors to provide environmental, security, and missile protection. These doors will prevent hazardous post-accident environmental conditions in the turbine room from being introduced in the control room. Administrative controls will be implemented to assure that the steamtight doors will be closed during normal plant operation. Alarms will be provided for the doors and will annunciate in the control room if the doors are opened during normal plant operation. However, plant shutdown will not be required when the doors are opened.

Since the submittal of the Pipe Break Evaluation Report in 1973, the diesel generator building has been relocated. The main steam lines do not run in the vicinity of the diesel generator building. Therefore, there will not be any steamtight doors associated with the diesel generator rooms.

REQUEST FOR ADDITIONAL INFORMATION -
PROPOSED POSTULATED PIPE BREAK CRITERIA AND ANALYSIS
NORTH ANNA UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 110.1 Mechanical Engineering Branch

Section 2.2.1.2 discusses piping between Isolation Valves and Containment. The paragraph 2.2.1(e) should read as follows: "Inservice examination will be performed in accordance with the requirements specified in ASME Code, Section XI. In addition, 100 percent volumetric examination of all circumferential and longitudinal welds in these piping systems is required during each inspection interval.

RESPONSE

All welds in piping between isolation valves and the containment will be subjected to 100 percent volumetric examination during each inspection interval. In the main steam valve house the break exclusion area extends to the valve house wall for the main steam and feedwater lines. These and other high energy lines in the valve house for which break exclusion criteria are applied will also have all welds 100 percent volumetrically inspected during each inspection interval. These lines will be identified in the FSAR.

PROPOSED POSTULATED PIPE BREAK CRITERIA AND ANALYSIS
NORTH ANNA UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 110.2 Mechanical Engineering Branch

Section 2.2.1.3(b) discusses pipe break criteria for nonnuclear class piping. Provide a commitment to use to sum of equations (12) and (13) of the ANSI B31.1, Power Piping Code multiplied by 0.8 to determine intermediate break location in lieu of 0.8 S_A.

RESPONSE

In accordance with PSAR commitments, North Anna Units 3 and 4 are using the ANSI B31.1 Power Piping Code, 1967 Edition, including Addenda a, b, c, and d (up to Summer 1972 addenda) in the analysis of nonnuclear piping. This version of the code has no equations stated. However, the intents of equations (12) and (13), which first appeared in the summer 1973 addenda, are indicated in paragraphs 102.3.3(a) and 102.3.2(c) of the 1967 Code.

For nonnuclear piping, no seismic analysis is required. Therefore, in equations (12) and (13) of ANSI B31.1 Summer 1973, seismic loads are not included. However, in some cases nonnuclear piping is seismically supported. These cases arise when (a) the nonnuclear piping is in the same structural stress analysis model with ASME Section III, Class 2 or 3 piping, or (b) it is determined that the failure of the piping during earthquake could damage systems, structures or components required for safe shutdown.

Intermediate breaks in nonnuclear piping will be based on the sum of the stresses as calculated by equations (12) and (13) of ANSI B31.1 Summer 1973 addenda, and compared with 0.8 (S_A+kS_h). As mentioned earlier, seismic loads are not included in equations (12) and (13) except for seismically supported nonnuclear piping.

REQUEST FOR ADDITIONAL INFORMATION
PROPOSED POSTULATED PIPE BREAK CRITERIA AND ANALYSIS
NORTH ANNA UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 110.3 Mechanical Engineering Branch

The postulated pipe break exclusion criteria for the piping in the containment penetration areas applicable to:

(a) Main Steam System

(b) Feedwater System

(c) Makeup and Purification System

are described in the letter No. 262 October 1, 1976.

Provide a commitment to perform an integral system analysis which includes the main system and their attached branch pipings to demonstrate that the main system and their branch pipings meet the break exclusion criteria.

RESPONSE

The integral system analysis which includes the main systems and their attached branch piping will be performed to demonstrate that the main systems and their branch piping meet the break exclusion criteria.

PROPOSED POSTULATED PIPE BREAK CRITERIA AND ANALYSIS
NORTH ANNA UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 110.4 Mechanical Engineering Branch

Demonstrate that the postulated pipe break outside the break exclusion area of the above discussed systems would not develop a plastic hinge in the break exclusion area of these systems.

RESPONSE

This requirement will be complied with, and the results will be submitted in the FSAR.

PROPOSED POSTULATED PIPE BREAK CRITERIA AND ANALYSIS NORTH ANNA UNITS 3 AND 4, DOCKET NOS. 50-404/405

COMMENT 110.5 Mechanical Engineering Branch

Section 2.2.2(d) discusses moderate energy nonnuclear class piping systems crack postulation criteria. Provide a commitment to use the sum of equations (12) and (13) of the ANSI B31.1, Power Piping Code multiplied by 0.4 to exempt moderate energy nonnuclear piping from crack postulation in lieu of 0.4 S_A.

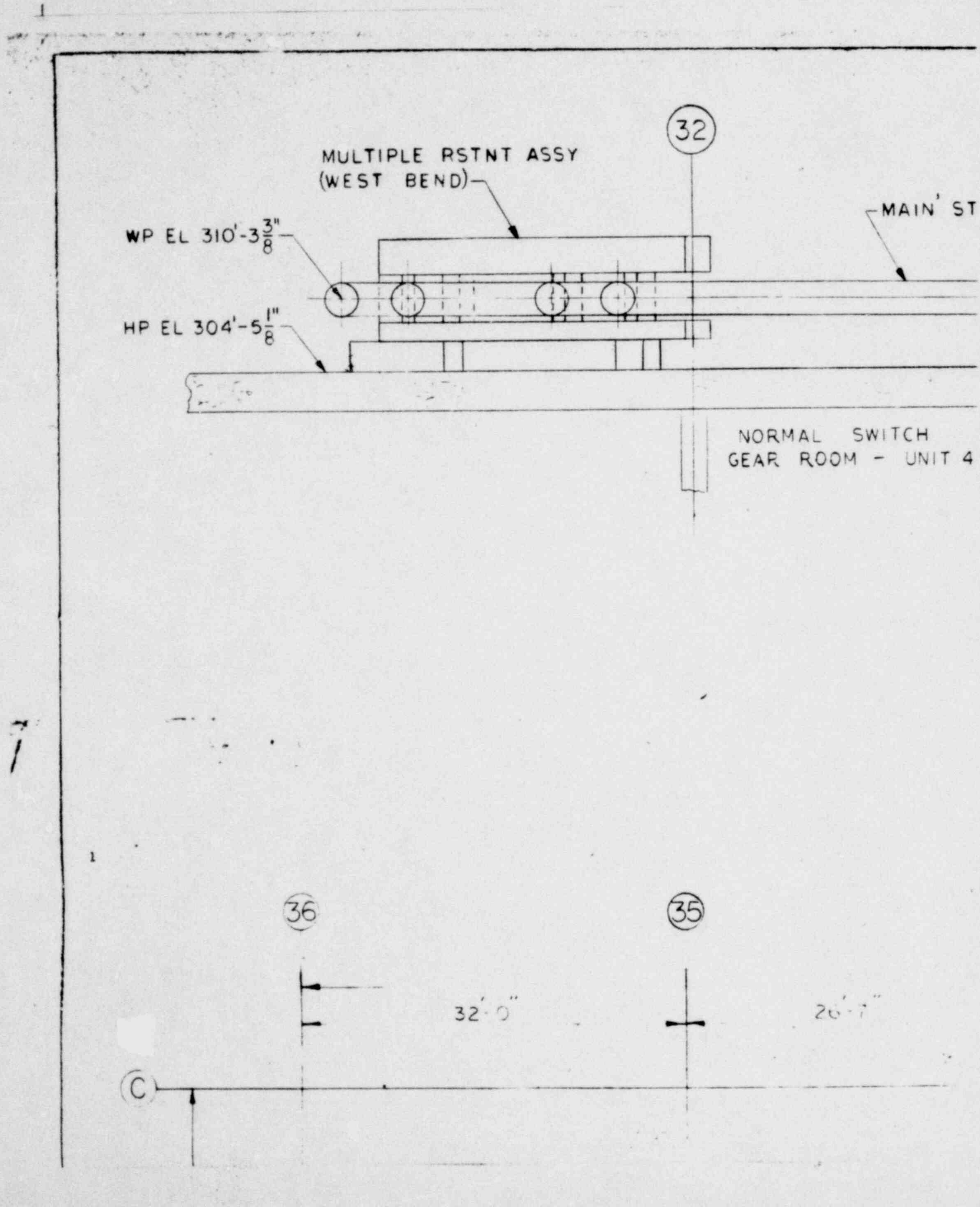
RESPONSE

In accordance with PSAR commitments, North Anna Units 3 and 4 are using the ANSI B31.1 Power Piping Code, 1967 Edition, including Addenda a, b, c, and d (up to Summer 1972 addenda) in the analysis of nonnuclear piping. This version of the code has no equations stated; however, the intents of equations (12) and (13), which first appeared in the Summer 1973 addenda, are indicated in paragraphs 102.3.3(a) and 102.3.2(c) of the 1967 Code.

For nonnuclear piping, no seismic analysis is required. Therefore, in equations (12) and (13) of ANSI B31.1 Summer 1973, seismic loads are not included. However, in some cases nonnuclear piping is seismically supported. These cases arise when (a) the nonnuclear piping is in the same structural stress analysis model with ASME Section III, Class 2 or 3 piping, or (b) it is determined that the failure of the piping during earthquake could damage systems, structures, or components required for safe shutdown.

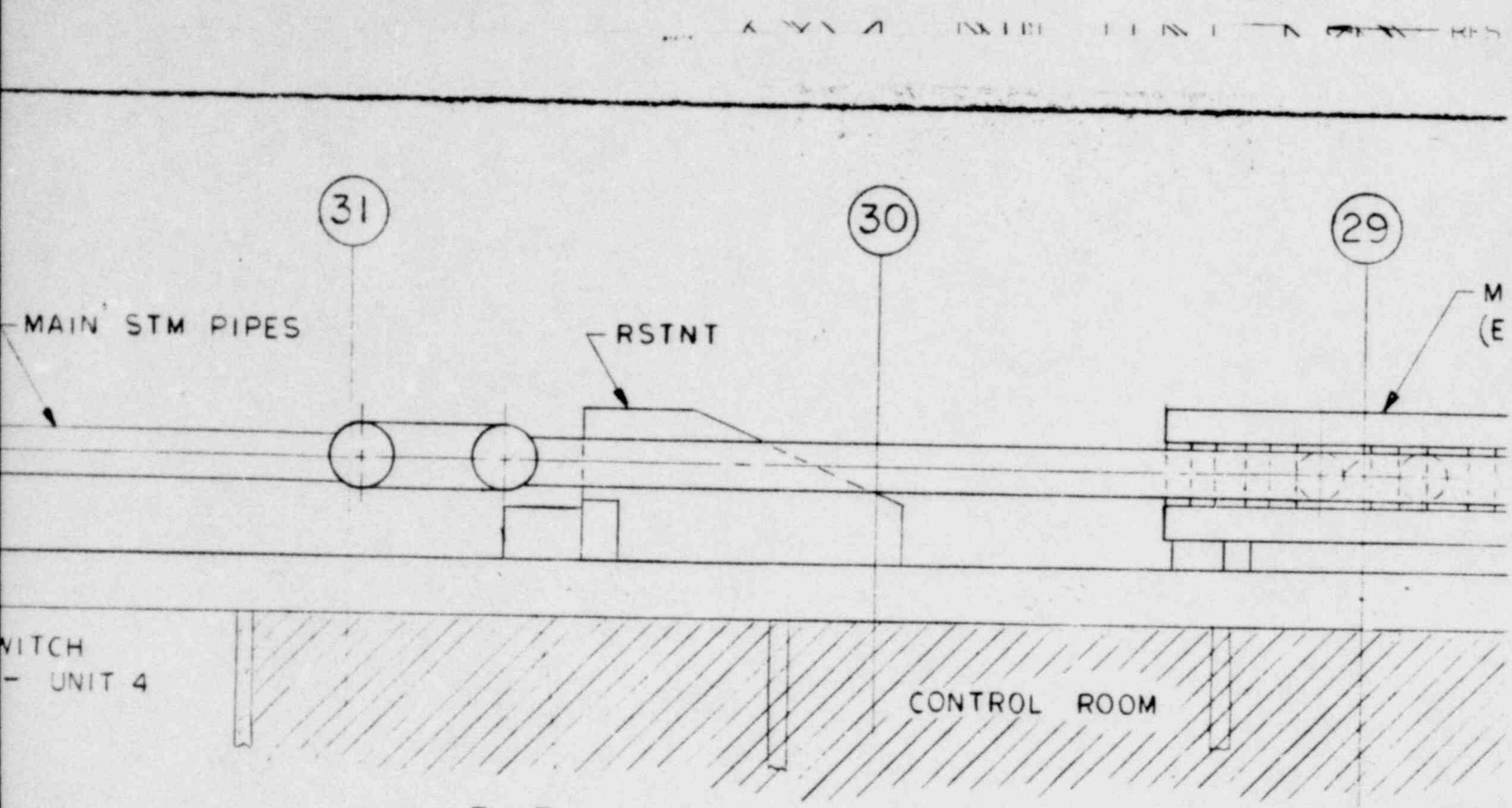
Intermediate cracks in nonnuclear piping will be based on the sum of the stresses as calculated by equations (12) and (13) of ANSI B31.1 Summer 1973 addenda, and compared with 0.4 (S_A+kS_h). As mentioned earlier, seismic loads are not included in equations (12) and 13) except for seismically supported nonnuclear piping.

A-1/4



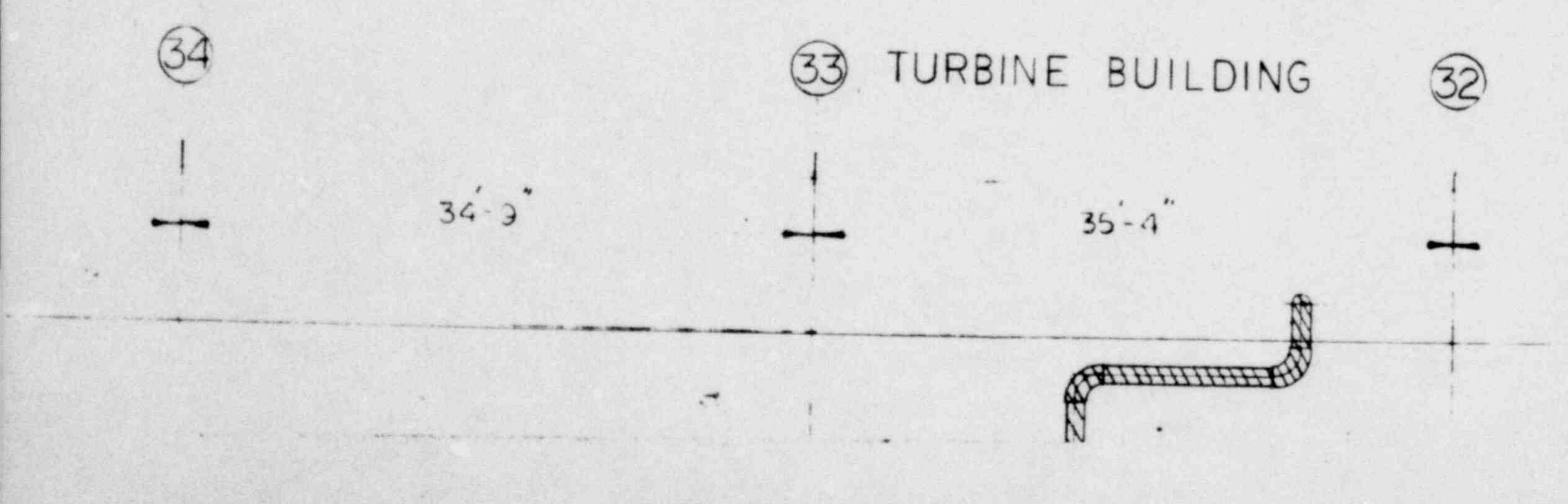
32
MULTIPLE RSTNT ASSY
(WEST BEND)
MAIN' ST
WP EL 310'-3 3/8"
HP EL 304'-5 1/8"
NORMAL SWITCH
GEAR ROOM - UNIT 4
7
36
35
32'-0"
26'-7"
C

A-2/4



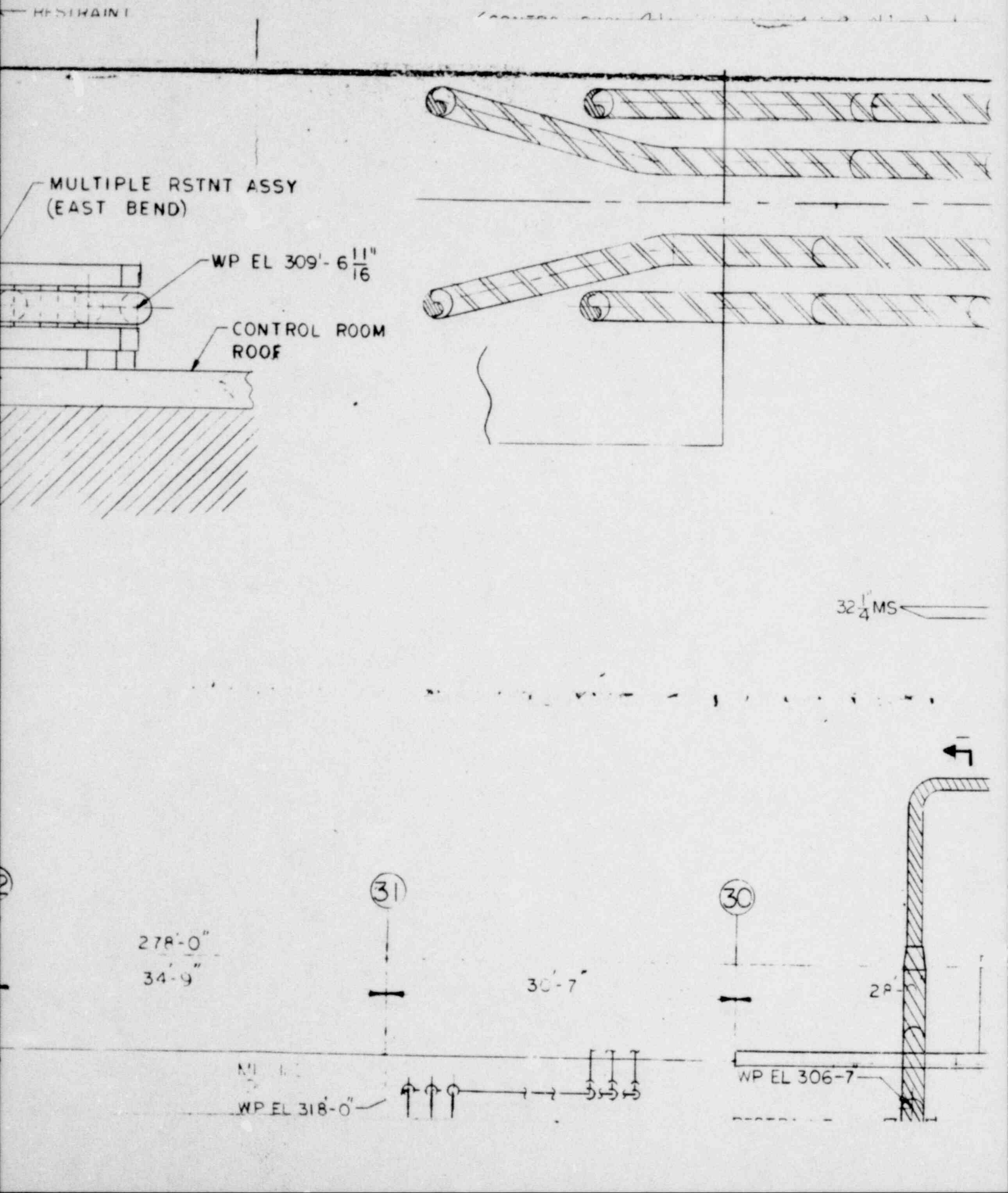
31
30
29
MAIN STM PIPES
RSTNT
M
(E
VITCH
- UNIT 4
CONTROL ROOM

3 - 3

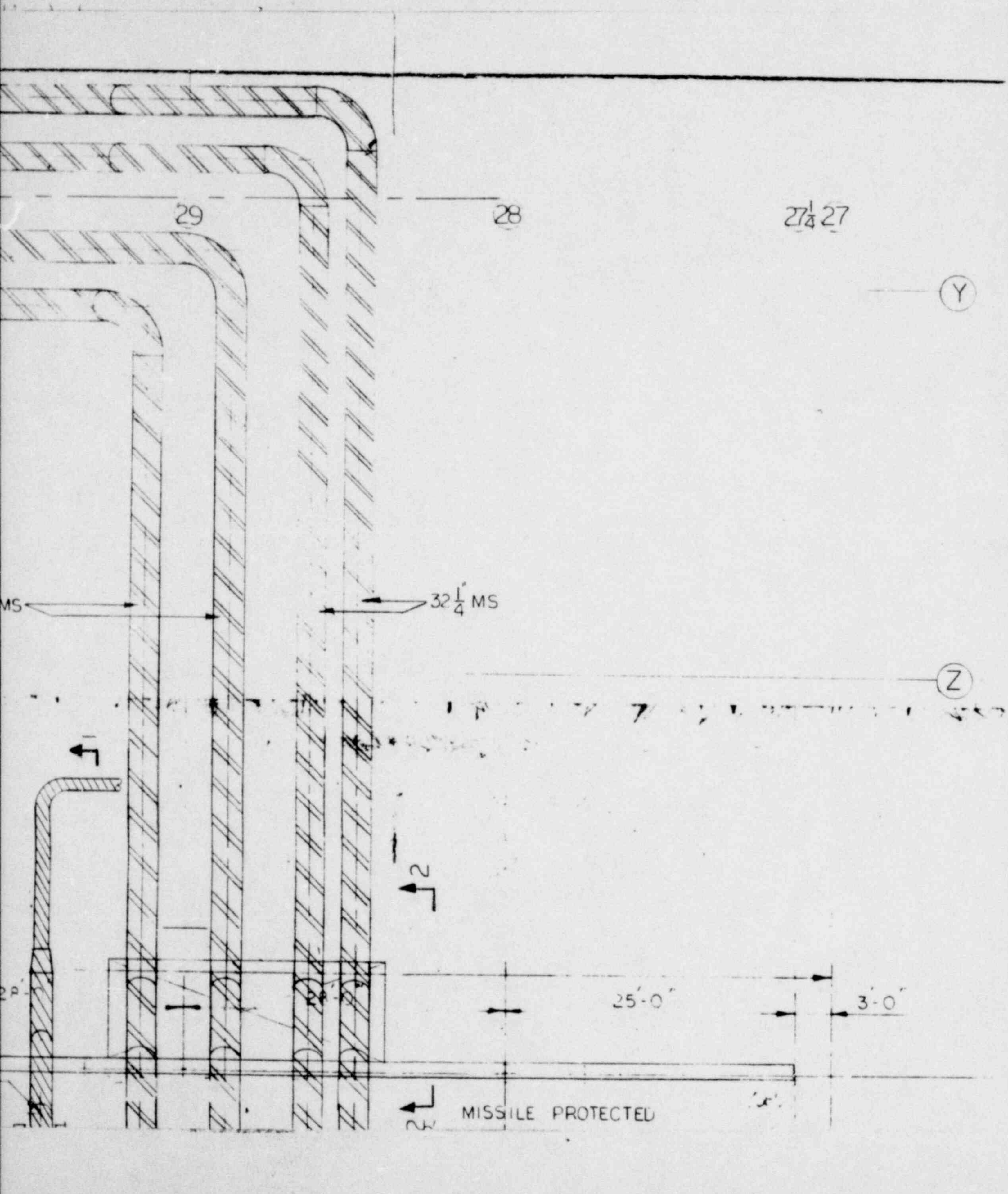


34
33
TURBINE BUILDING
32
34'-9"
35'-4"

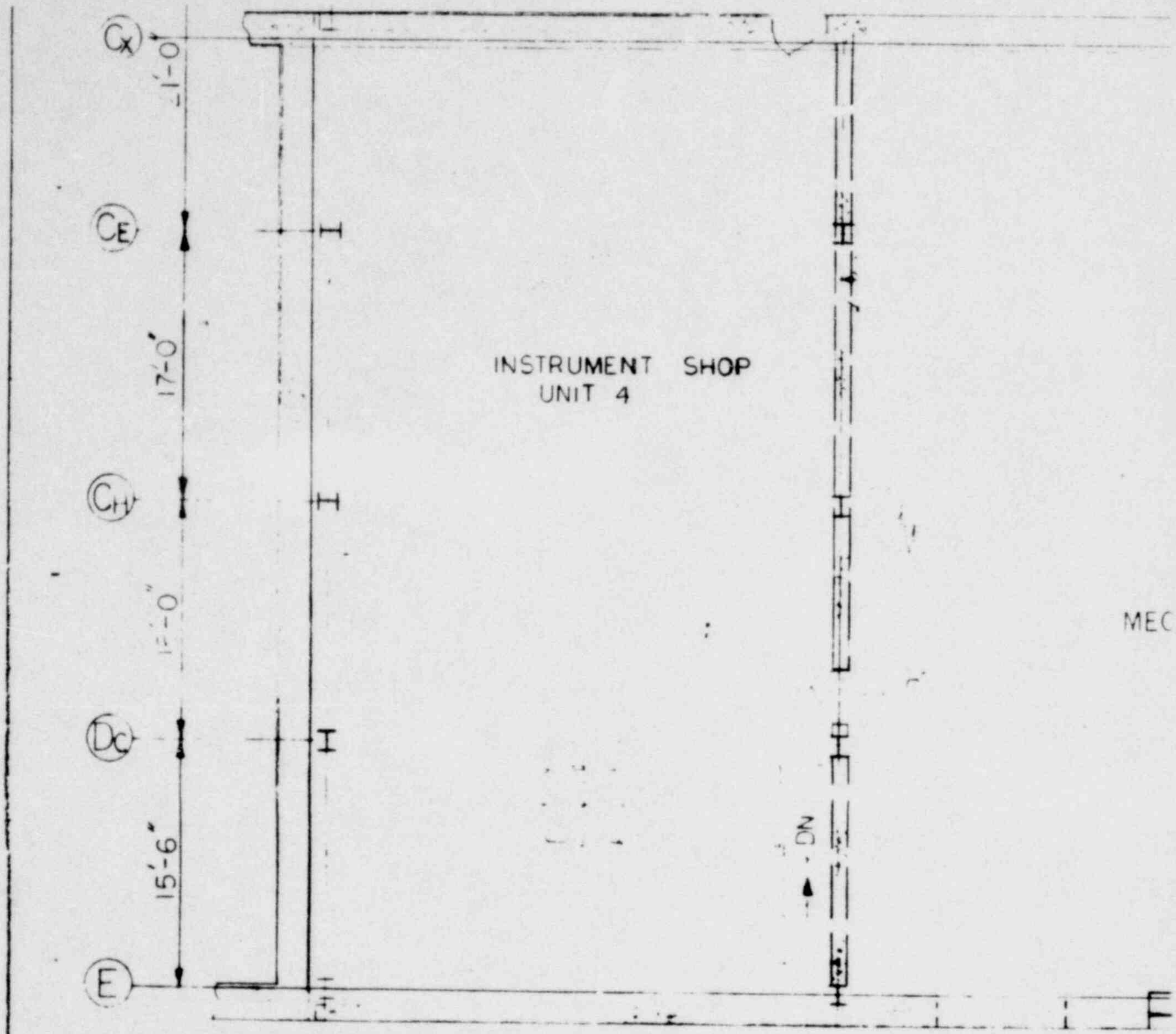
A-3/4


RESTRAINT
MULTIPLE RSTNT ASSY
(EAST BEND)
WP EL 309'-6 11/16"
CONTROL ROOM
ROOF
32 1/4" MS
31
30
278'-0"
34'-9"
30'-7"
28'
WP EL 318'-0"
WP EL 306-7

A-4/4



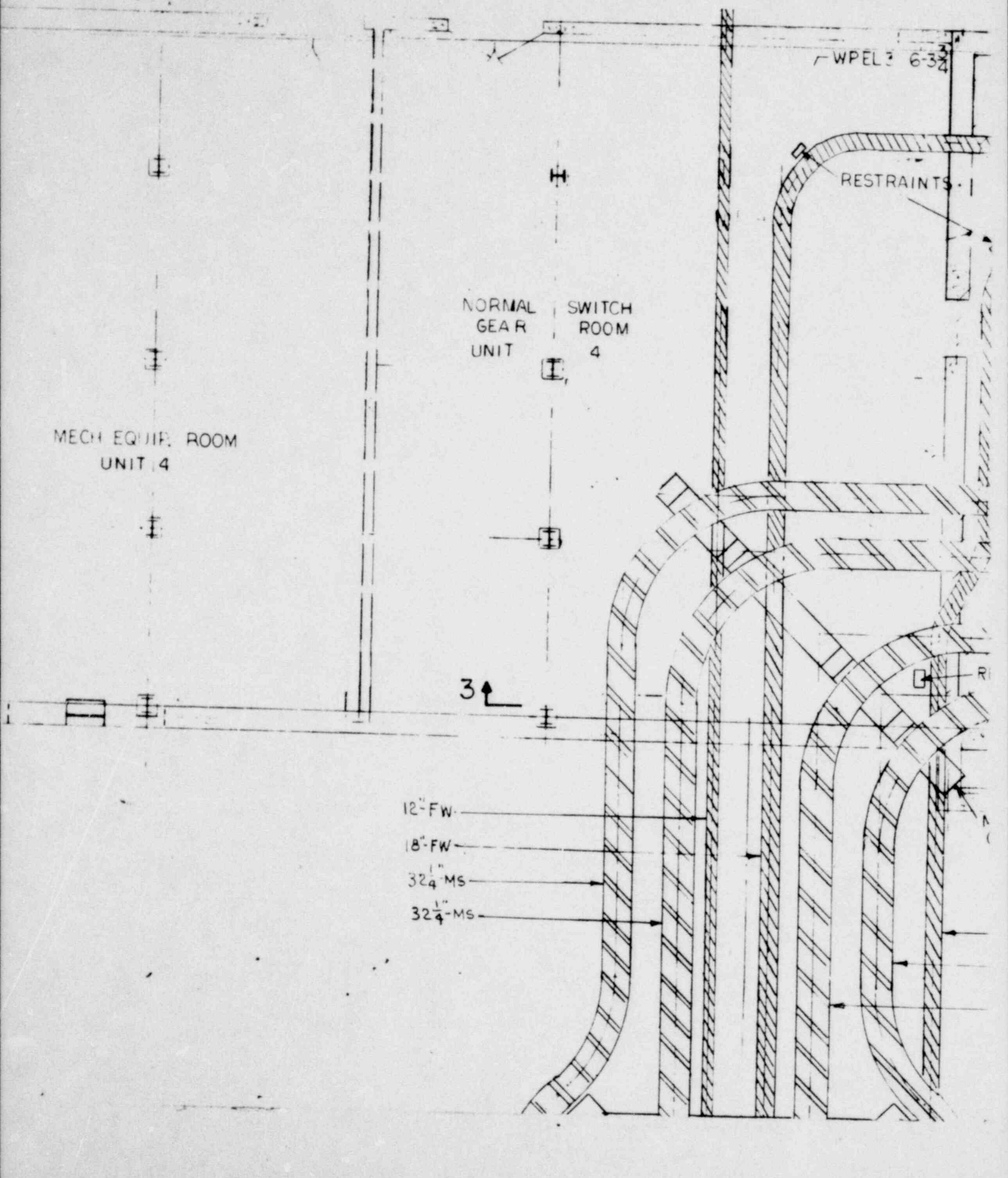
B-1/4



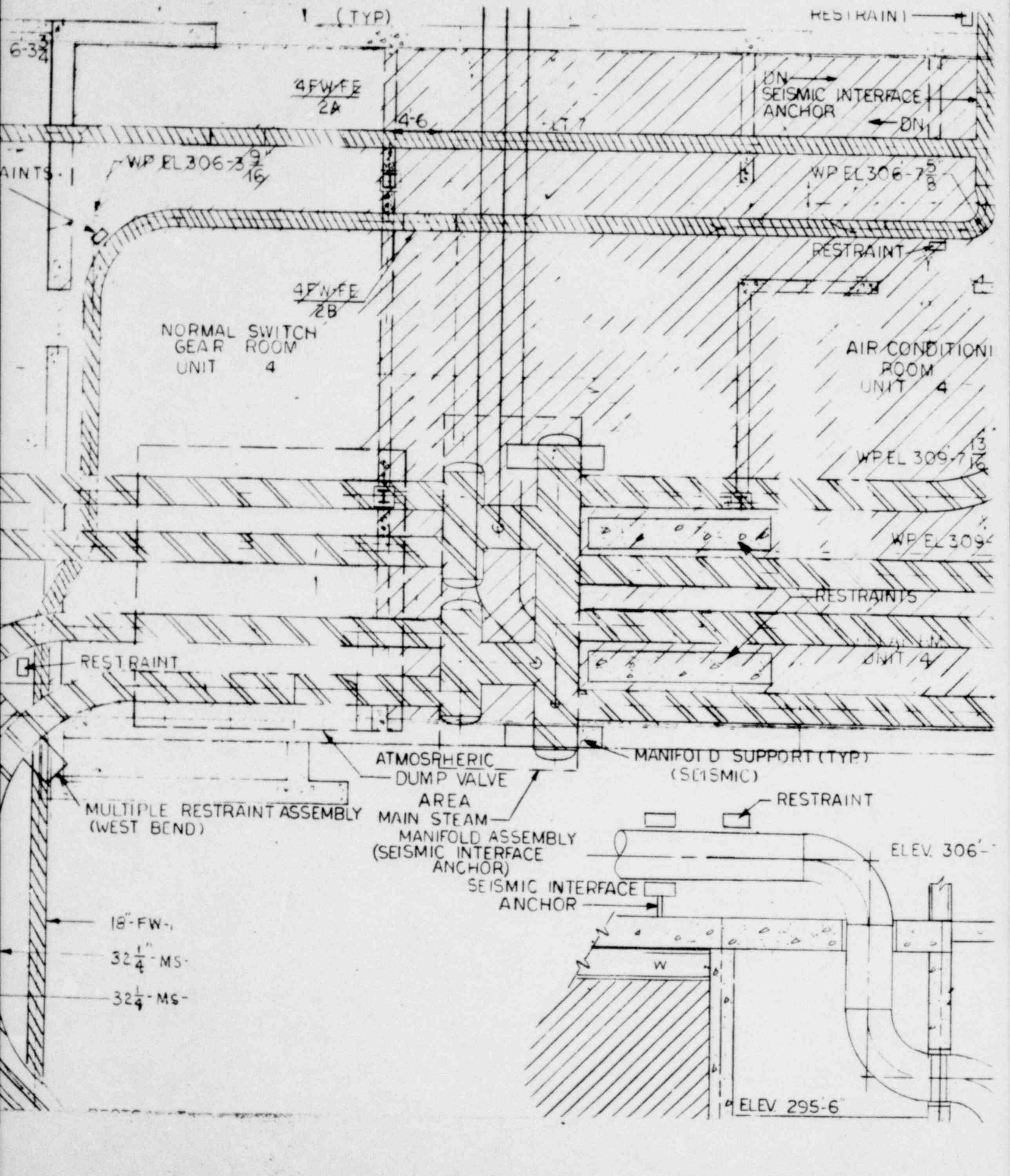
NOTES:

1. INDICATES MAIN STEAM LINE

B-2/4

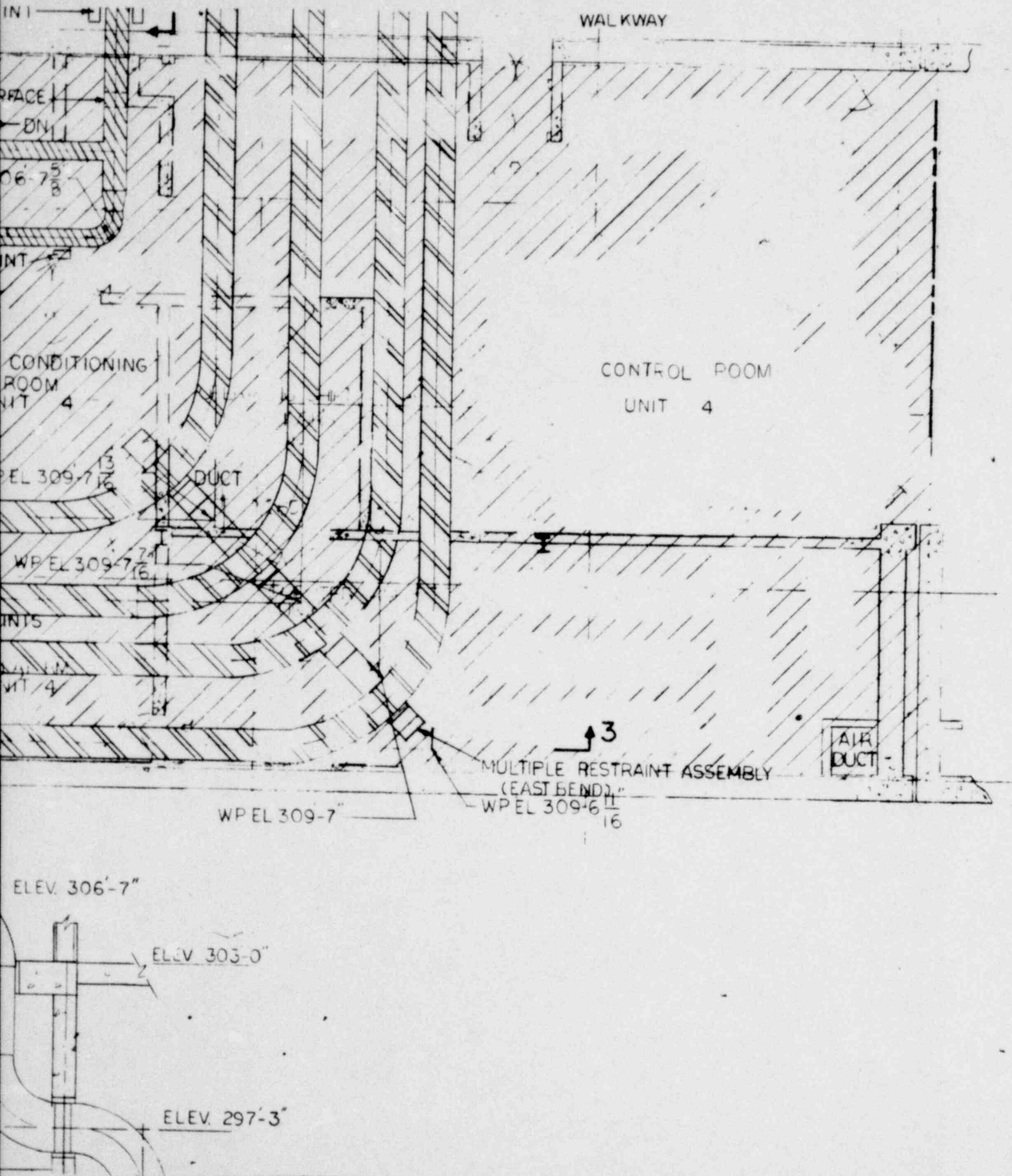

WPEL 3 6-3 3/4
RESTRAINTS
NORMAL SWITCH
GEAR ROOM
UNIT 4
MECH EQUIP. ROOM
UNIT 4
3
12"-FW
18"-FW
32 1/4"-MS
32 1/4"-MS

B-3/4



(TYP)
RESTRAINT
6-3 3/4
4FW-FE 2A
4-6
DN
SEISMIC INTERFACE ANCHOR
DN
AINTS
WP EL306-3 9/16
WP EL306-7 5/8
RESTRAINT
4FW-FE 2B
NORMAL SWITCH GEAR ROOM UNIT 4
AIR CONDITIONI ROOM UNIT 4
WP EL 309-7 13/16
WP EL 309
RESTRAINTS
UNIT 4
RESTRAINT
ATMOSPHERIC DUMP VALVE AREA
MANIFOLD SUPPORT (TYP) (SEISMIC)
MULTIPLE RESTRAINT ASSEMBLY (WEST BEND)
MAIN STEAM MANIFOLD ASSEMBLY (SEISMIC INTERFACE ANCHOR)
RESTRAINT
ELEV. 306-
SEISMIC INTERFACE ANCHOR
18"-FW-
32 1/4"-MS-
32 1/4-MS-
W
ELEV 295-6"

B-4/4


WALKWAY
RFACE
DN
06-7 5/8
INT
CONDITIONING
ROOM
NIT 4
EL 309-7 13/16
DUCT
WP EL 309-7 7/16
INTS
NIT 4
CONTROL ROOM
UNIT 4
3
AIR DUCT
MULTIPLE RESTRAINT ASSEMBLY
(EAST BEND)
WP EL 309-6 11/16
WP EL 309-7"
ELEV. 306'-7"
ELEV 303-0"
ELEV. 297'-3"

C-1/4

2. INDICATES FEEDWATER LINE

3. INDICATES AREA WHICH CONTAINS SAFETY RELATED EQU

4. FROM LINES C TO E IS THE SERVICE BUILDING

5. FROM THE C LINE NORTH IS THE TURBINE BUILDING

6. INTERIOR WALLS NOT DRAWN TO SCALE

7. SERVICE BUILDING IS A CATAGORY I STRUCTURE

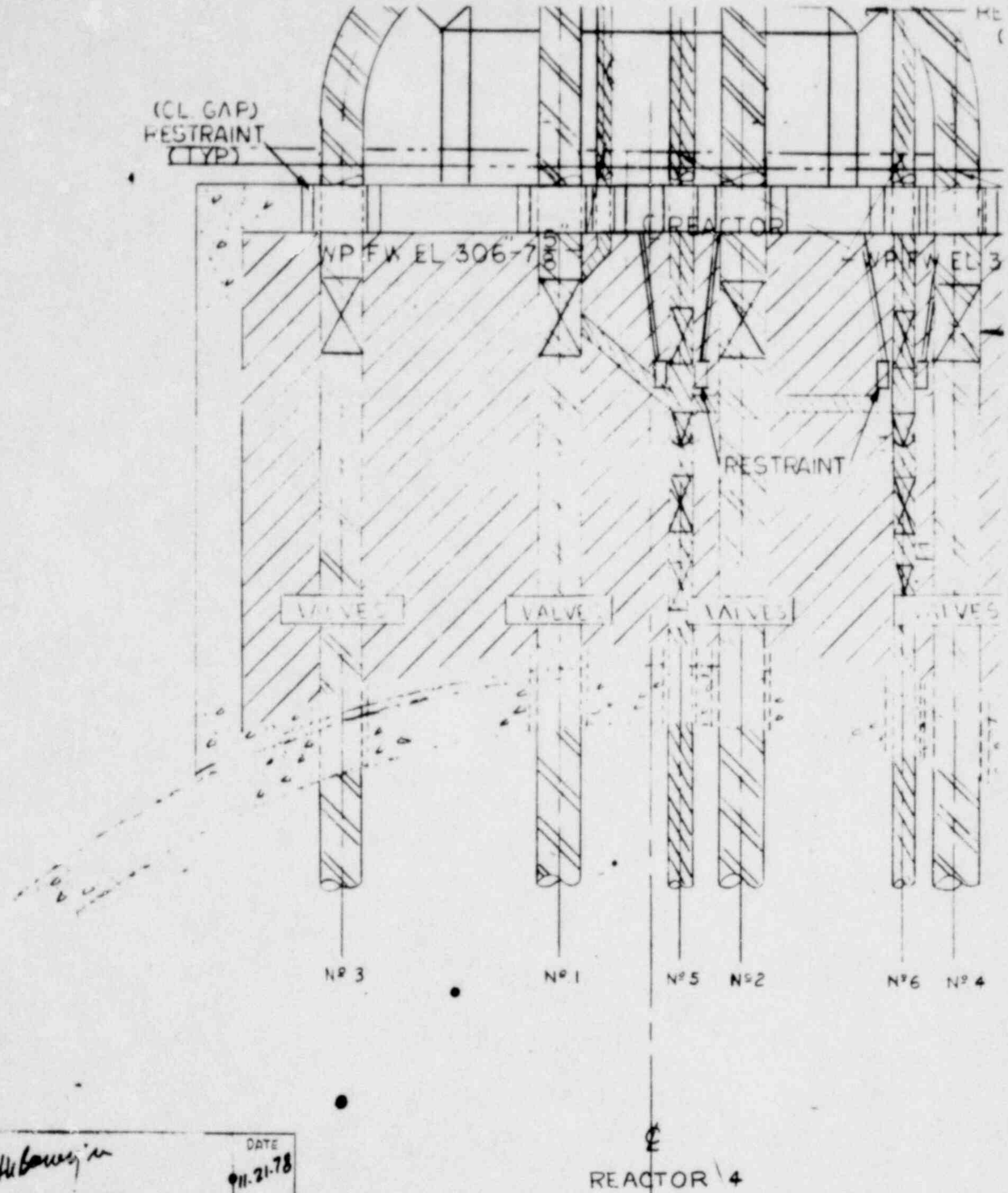
MAIN STEAM & FEEDWATER O/C
CONT. PENETRATION TO TURBINE (UNIT 4)

SKETCH NO. EMD-8

ORIGINATOR	Roger W Ward	DATE 11-21-78	REVIEWER	RE Rowe	DATE 21 NOV 78	APP

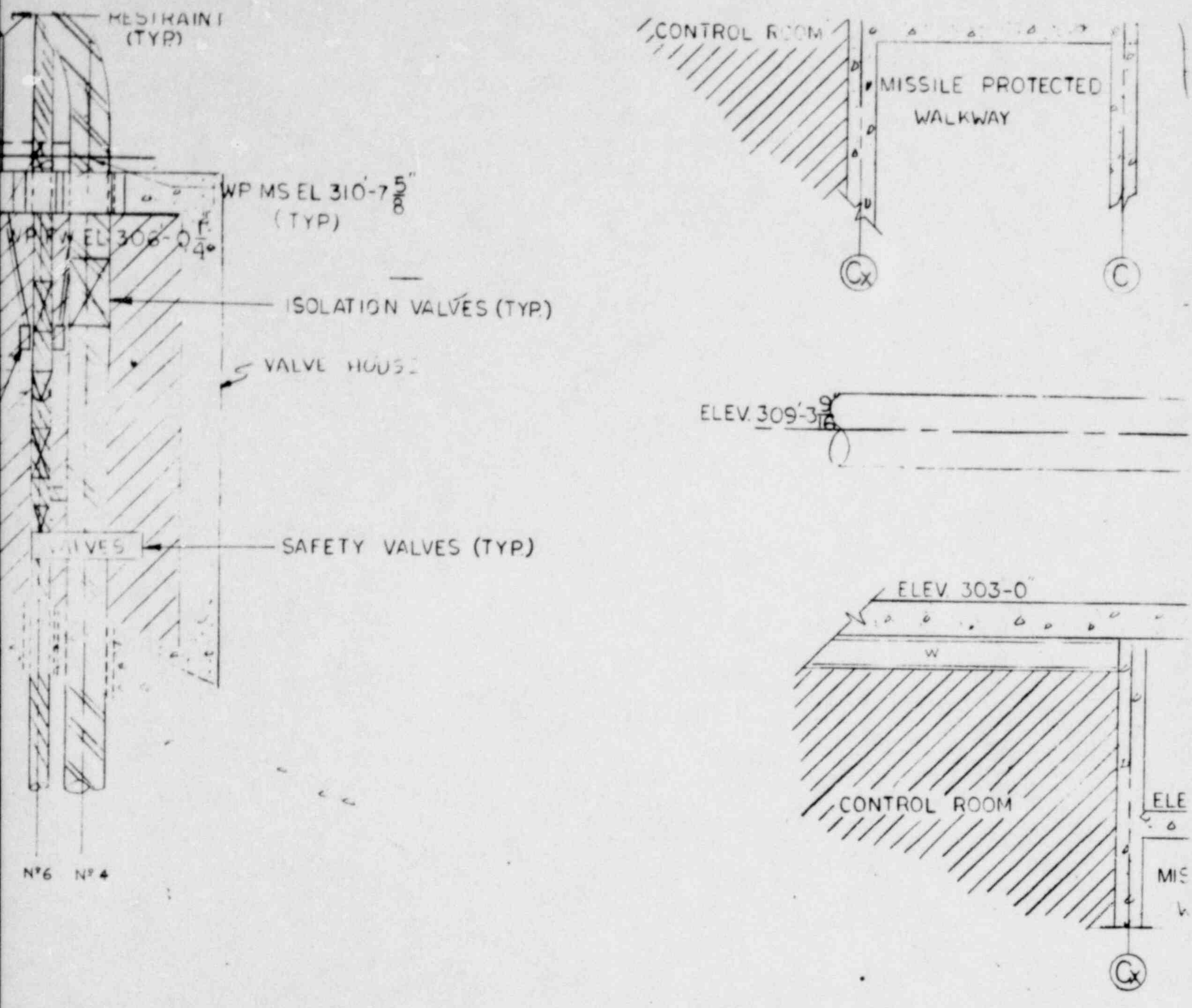
C-2/4

RELATED EQUIPMENT

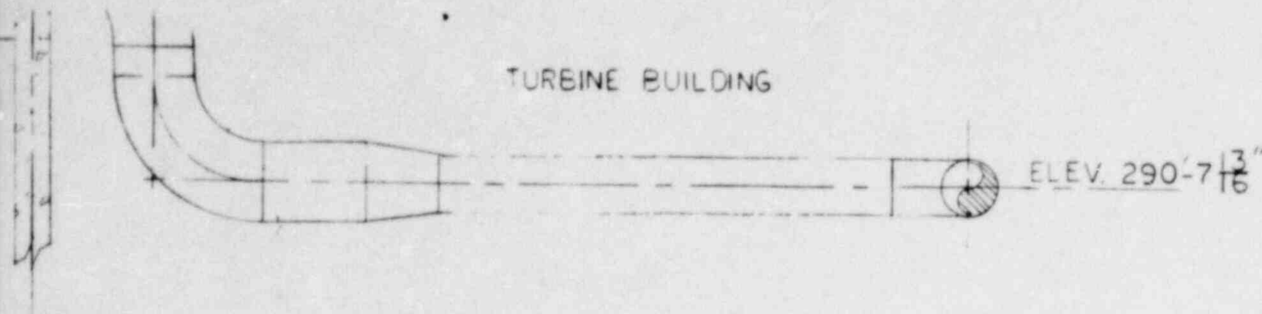


DATE	APPROVED BY		DATE
11-20-78			11-21-78

C-3/4

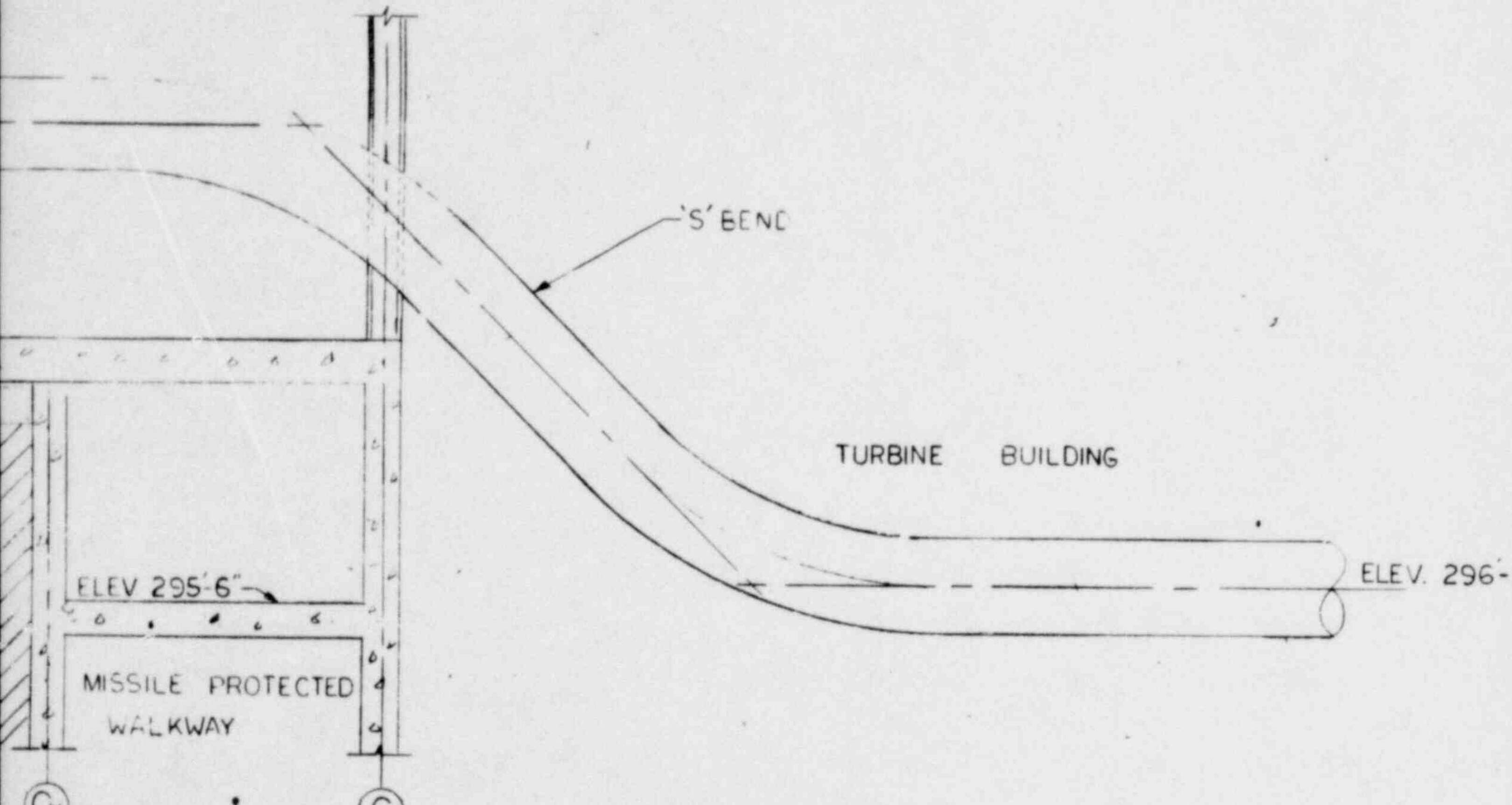

(TYP.)
WP MS EL 310'-7 5/8"
(TYP)
ISOLATION VALVES (TYP.)
SAFETY VALVES (TYP.)
N°6
N°4
CONTROL ROOM
MISSILE PROTECTED
WALKWAY
Cx
C
ELEV. 309'-3 9/16"
ELEV. 303-0"
W
CONTROL ROOM
Cx

C-4/4



TURBINE BUILDING
ELEV. 290'-7 3/16"
C

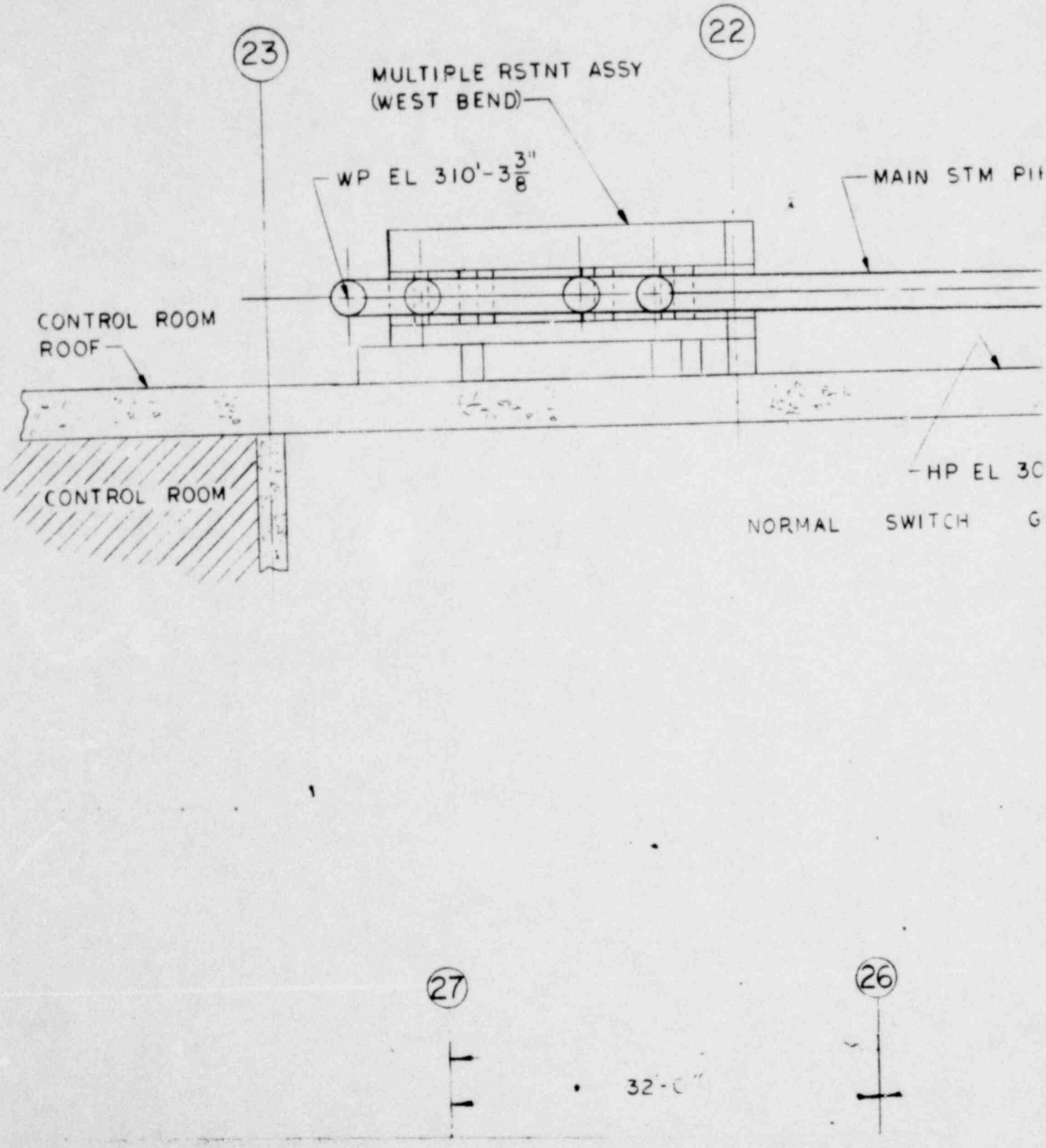
1-1



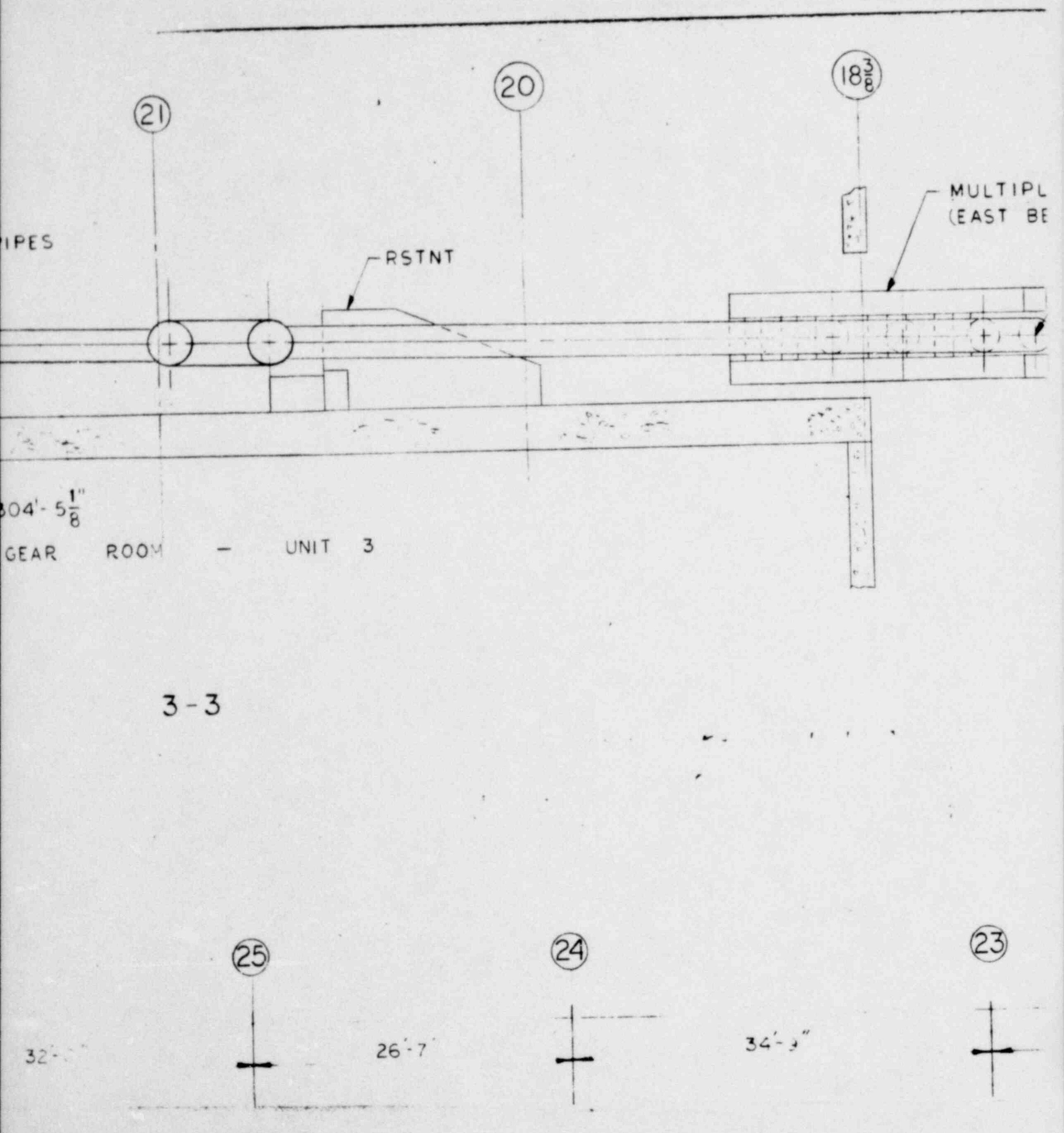
'S' BEND
TURBINE BUILDING
ELEV. 296'-
ELEV 295'-6"
MISSILE PROTECTED
WALKWAY
C
C

2-2

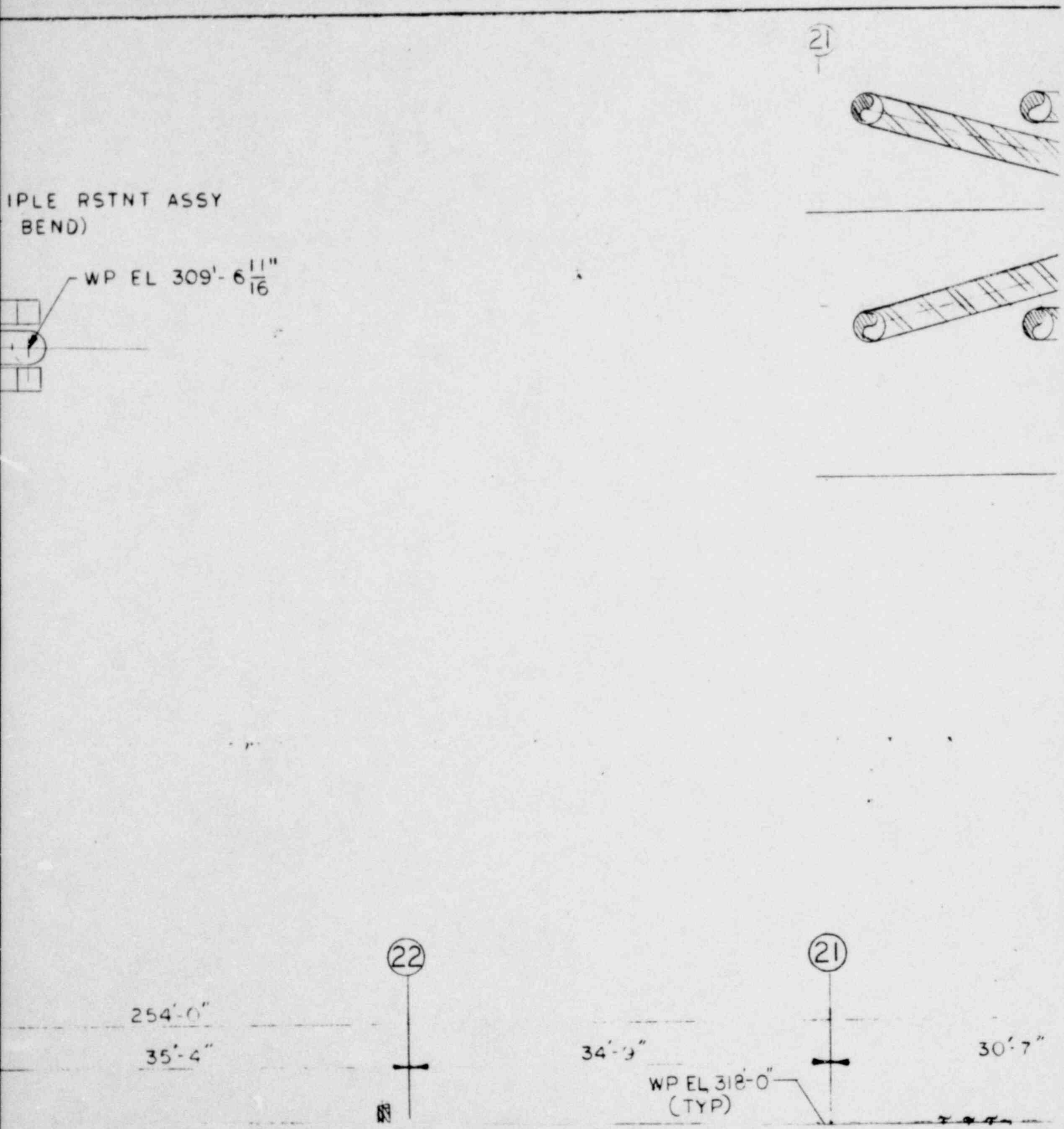
D-1/4


23
22
MULTIPLE RSTNT ASSY
(WEST BEND)
WP EL 310'-3 3/8"
MAIN STM PI
CONTROL ROOM
ROOF
HP EL 30
CONTROL ROOM
NORMAL SWITCH G
27
26
32'-0"

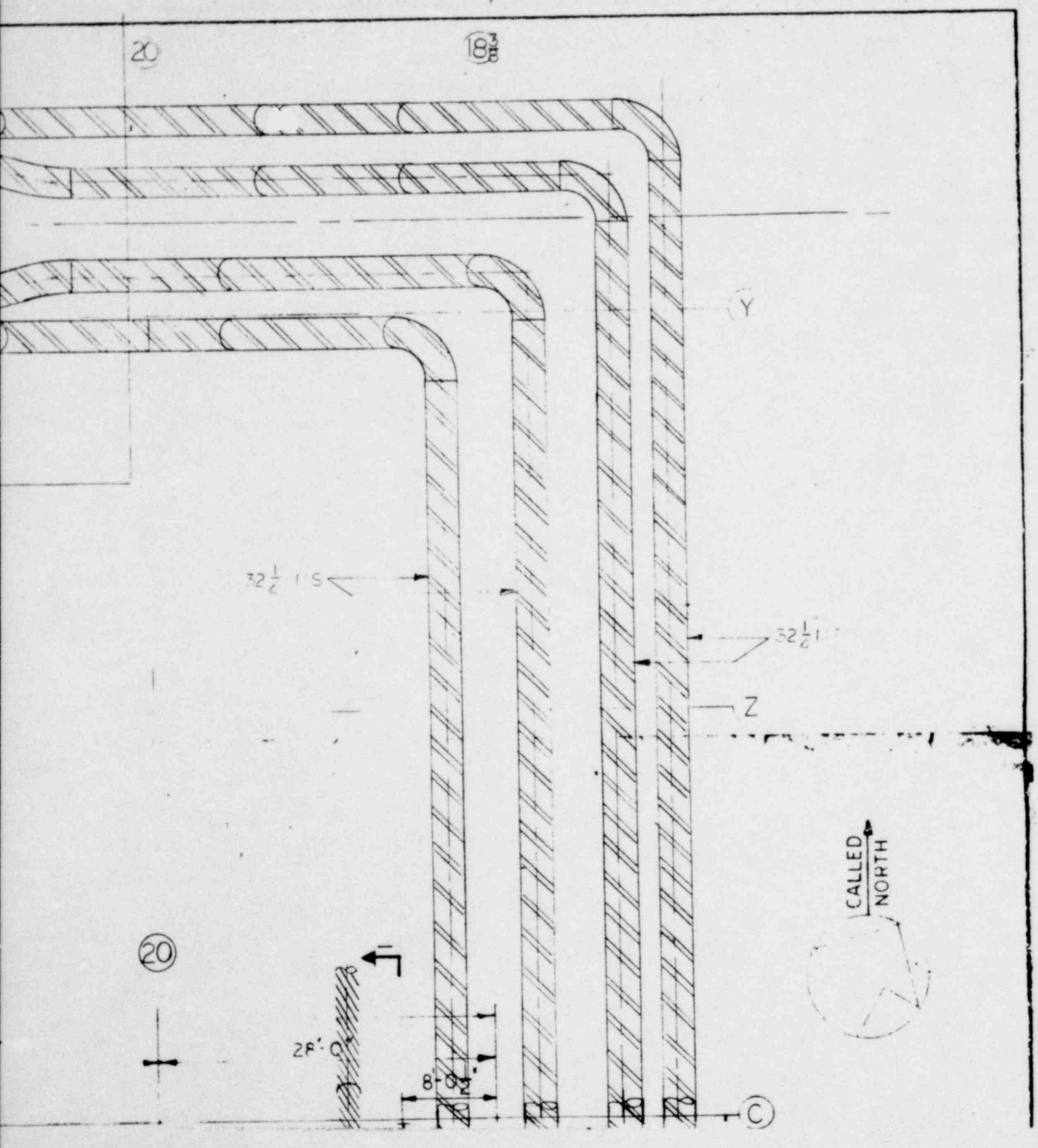
D-2/4


21
20
$18\frac{3}{8}$
MULTIPL
(EAST BE
IPES
RSTNT
$304'-5\frac{1}{8}''$
GEAR ROOM — UNIT 3
3-3
25
24
23
26'-7

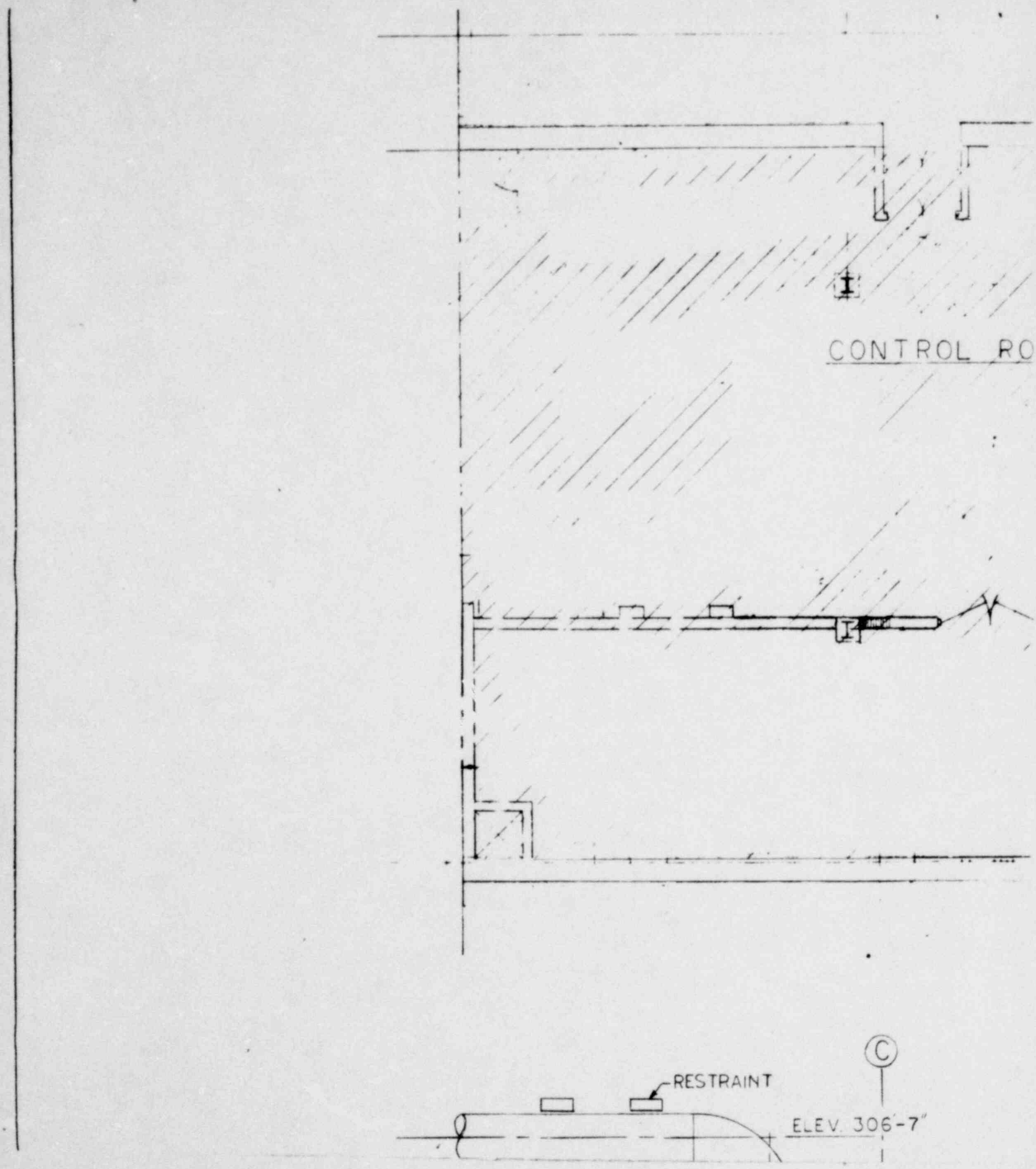
D-3/4


21
IPLE RSTNT ASSY
BEND)
WP EL 309'-6 11/16"
22
21
254'-0"
35'-4"
34'-9"
30'-7"
WP EL 318'-0"
(TYP)

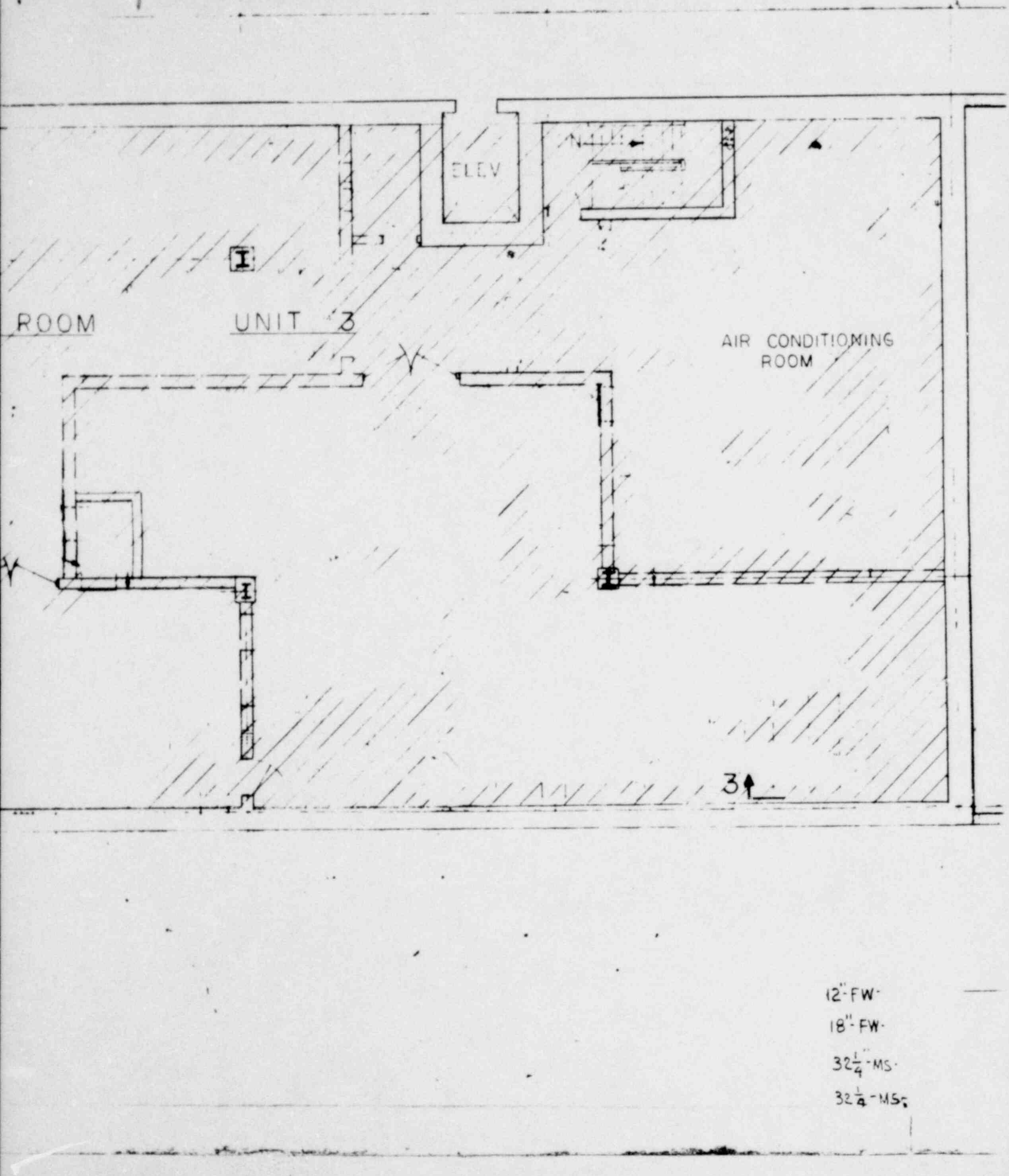
D-4/4



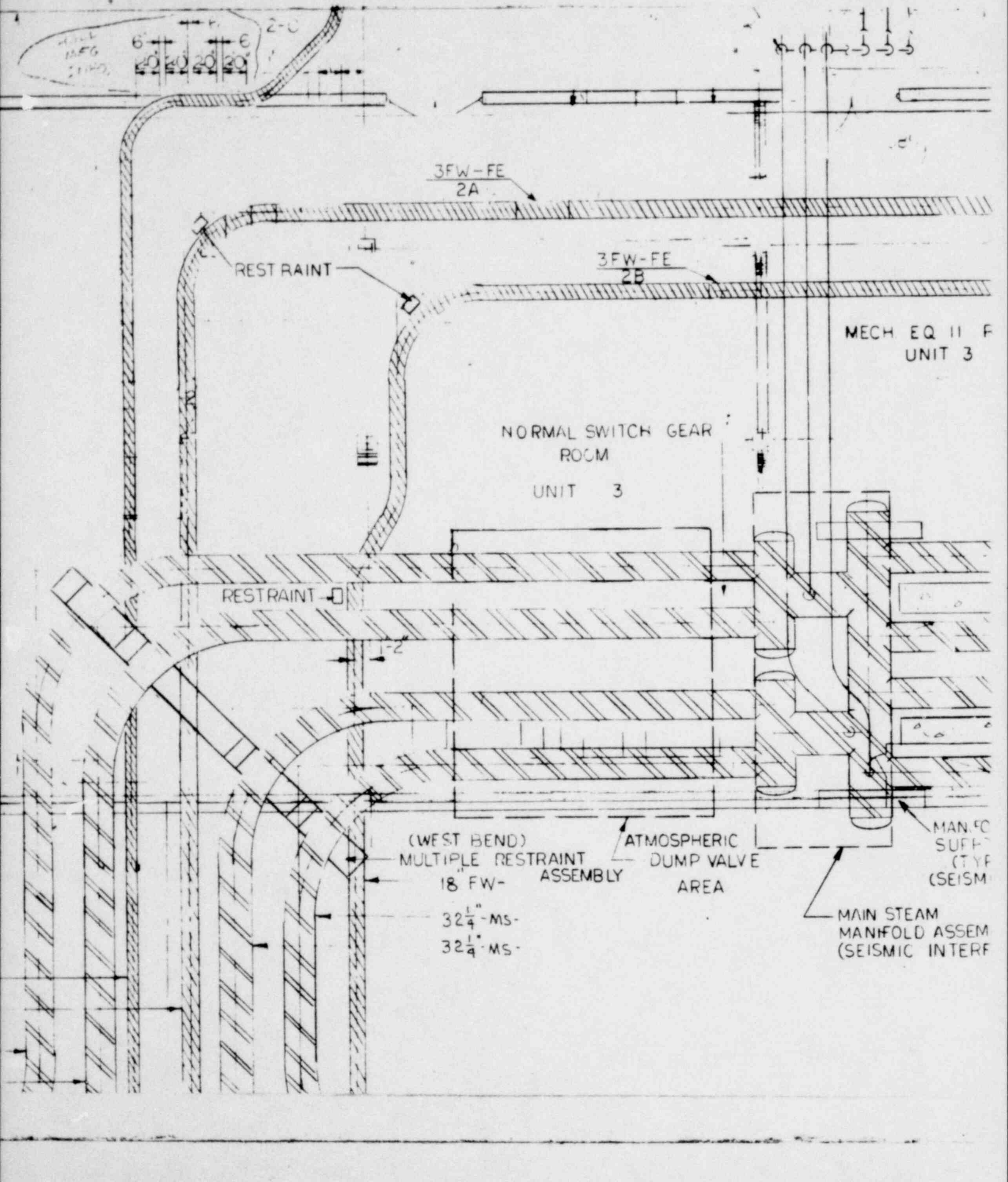
E-1/4



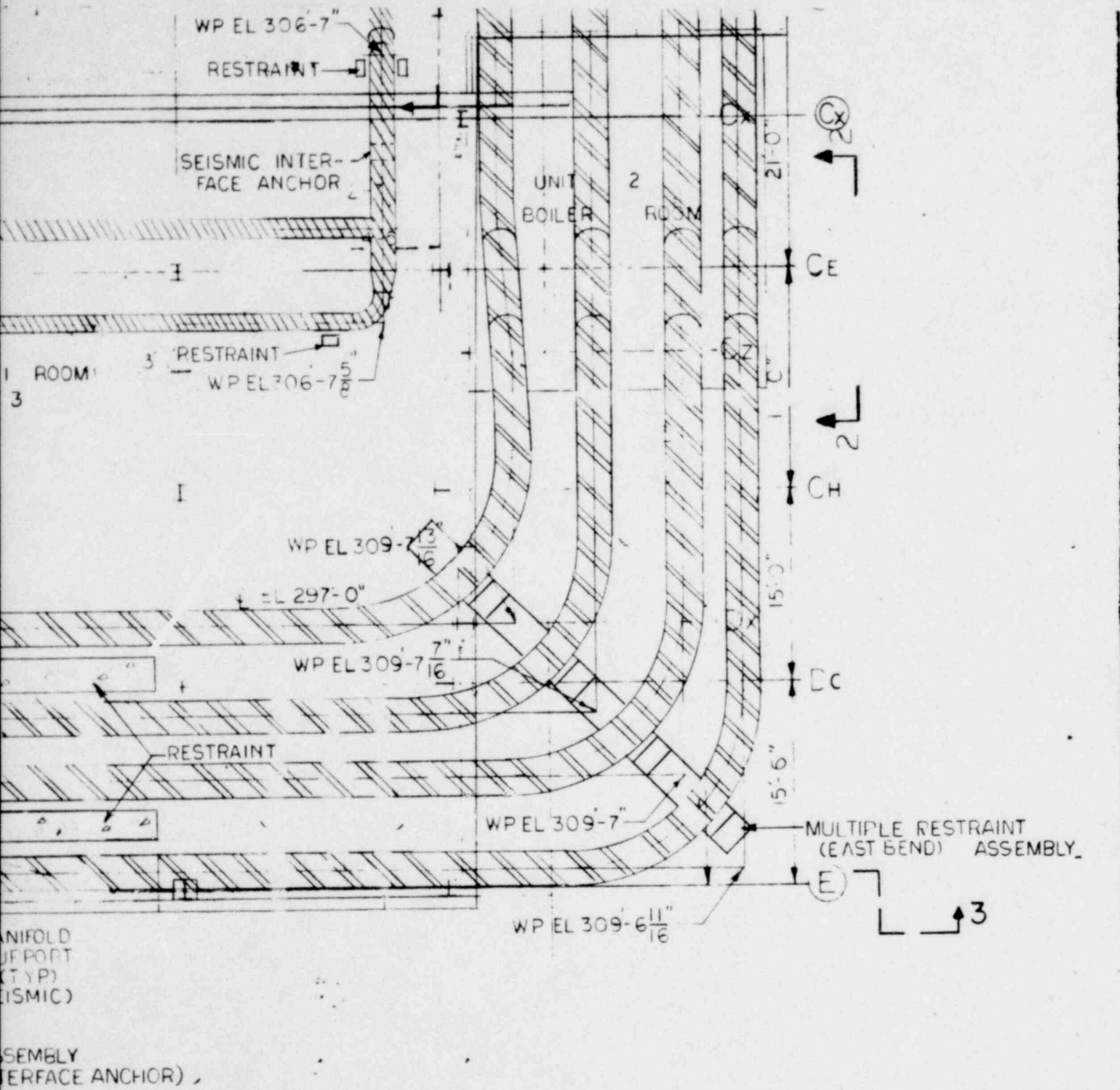
E-2/4


ELEV
ROOM
UNIT 3
AIR CONDITIONING ROOM
3
12" FW
18" FW
$32\frac{1}{4}$" MS
$32\frac{1}{4}$ MS

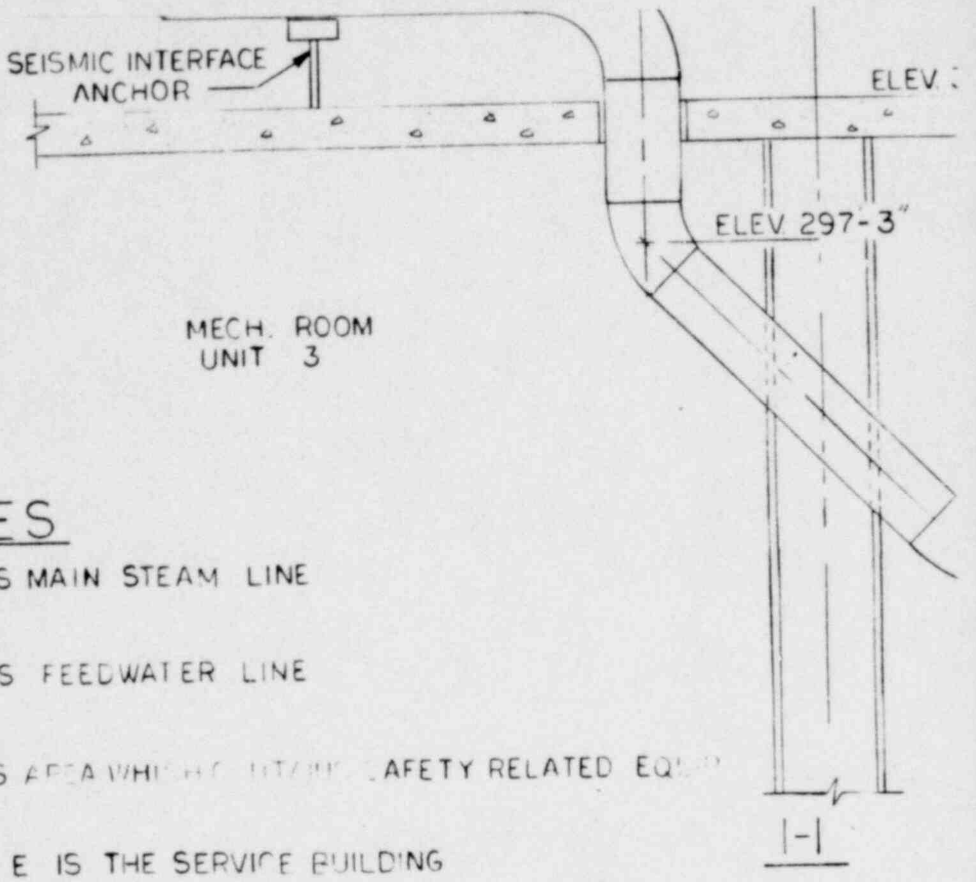
E-3/4


3FW-FE
2A
3FW-FE
2B
RESTRAINT
MECH EQ II F
UNIT 3
NORMAL SWITCH GEAR
ROOM
UNIT 3
RESTRAINT
(WEST BEND)
MULTIPLE RESTRAINT
ASSEMBLY
18" FW-
$32\frac{1}{4}$"-MS-
$32\frac{1}{4}$"-MS-
ATMOSPHERIC
DUMP VALVE
AREA
MAIN STEAM
MANIFOLD ASSEM
(SEISMIC INTERF

E-4/4


WP EL 306-7"
RESTRAINT
SEISMIC INTER-
FACE ANCHOR
UNIT 2
BOILER ROOM
RESTRAINT
WP EL 306-7 5/8
ROOM
3
WP EL 309-7 13/16"
EL 297-0"
WP EL 309-7 7/16"
RESTRAINT
WP EL 309-7"
MULTIPLE RESTRAINT
(EAST BEND) ASSEMBLY
WP EL 309-6 11/16"
Cx
CE
CH
DC
E
21'-0"
15'-0"
15'-6"
2
3
ANIFOLD
UPPORT
(TYP)
ISMIC)
SEMBLY
ERFACE ANCHOR)

F-1/4



NOTES

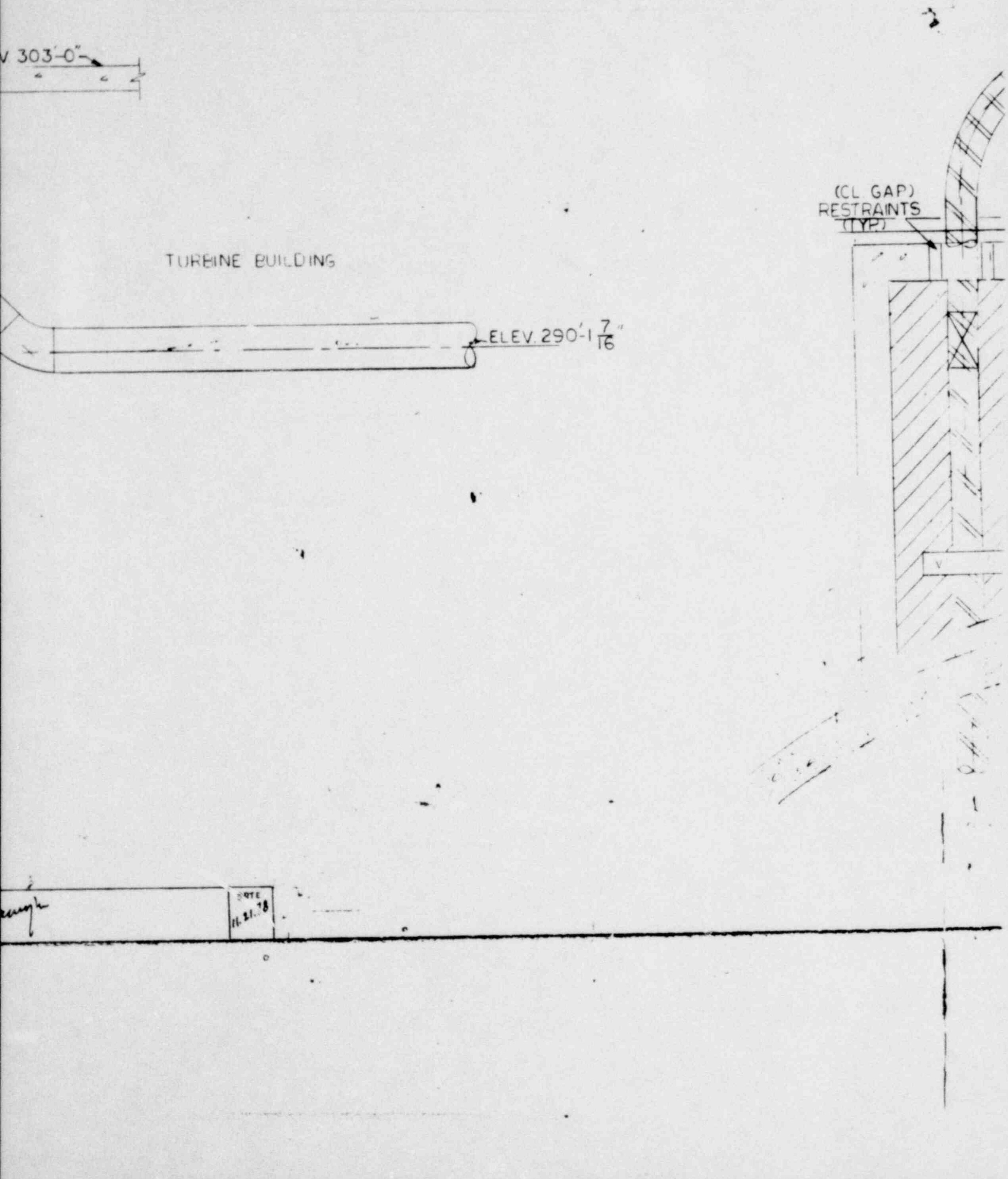
1. INDICATES MAIN STEAM LINE
2. INDICATES FEEDWATER LINE
3. INDICATES AREA WHICH CONTAINS SAFETY RELATED EQUIP
4. FROM LINES C TO E IS THE SERVICE BUILDING
5. FROM THE C LINE NORTH IS THE TURBINE BUILDING
6. INTERIOR WALLS NOT DRAWN TO SCALE
7. SERVICE BUILDING IS A CATAGORY I STRUCTURE

MAIN STEAM & FEEDWATER O/C: CONT. PENETRATION TO TURBINE (UNIT 3)

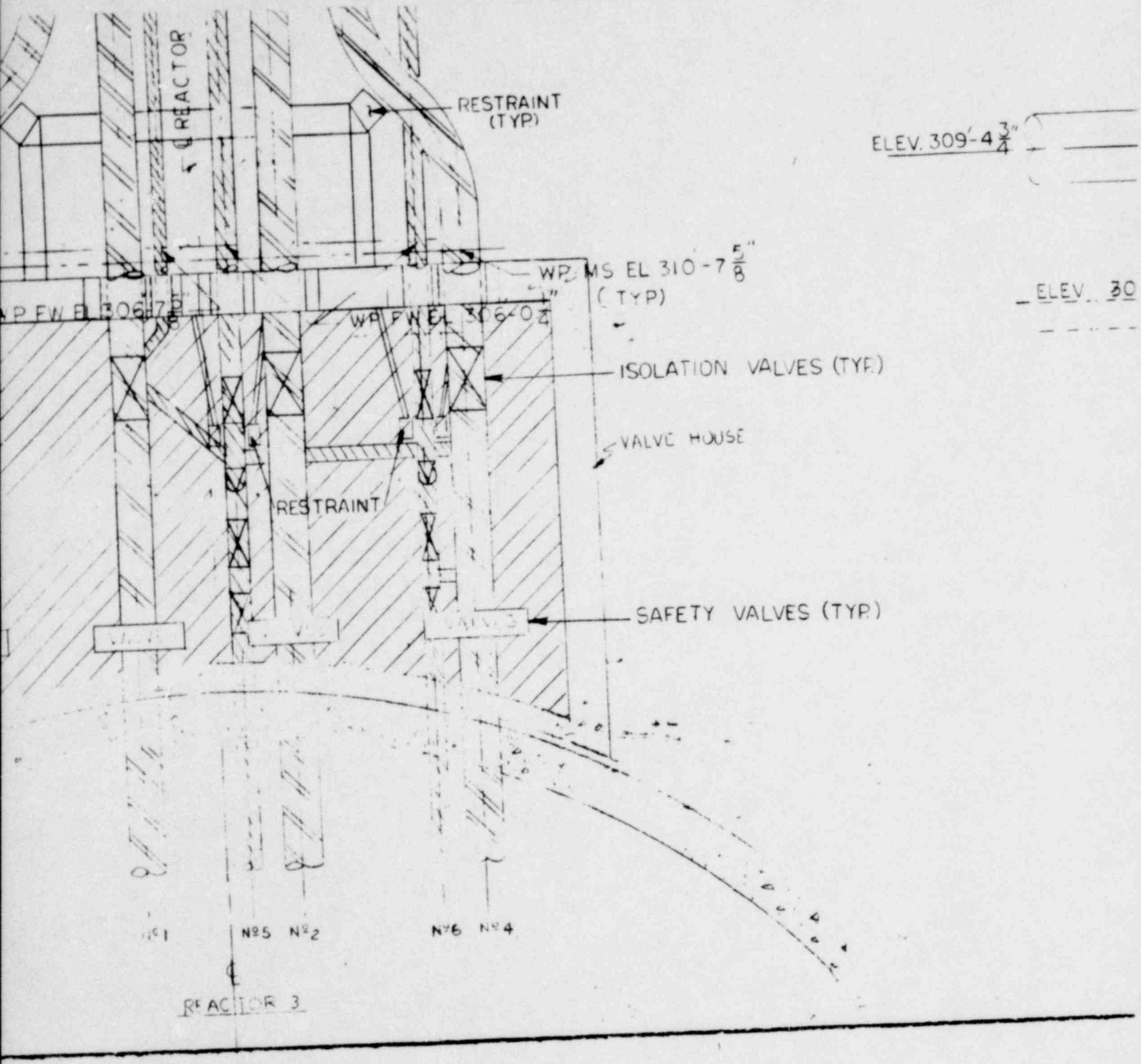
SKETCH NO. EMD-7

ORIGINATOR	Roger W. Hurd	DATE 11-21-78	REVIEWER	[signature] R.E. Kaus	DATE 21 NOV 78	APPROVED	[signature]

F-2/4

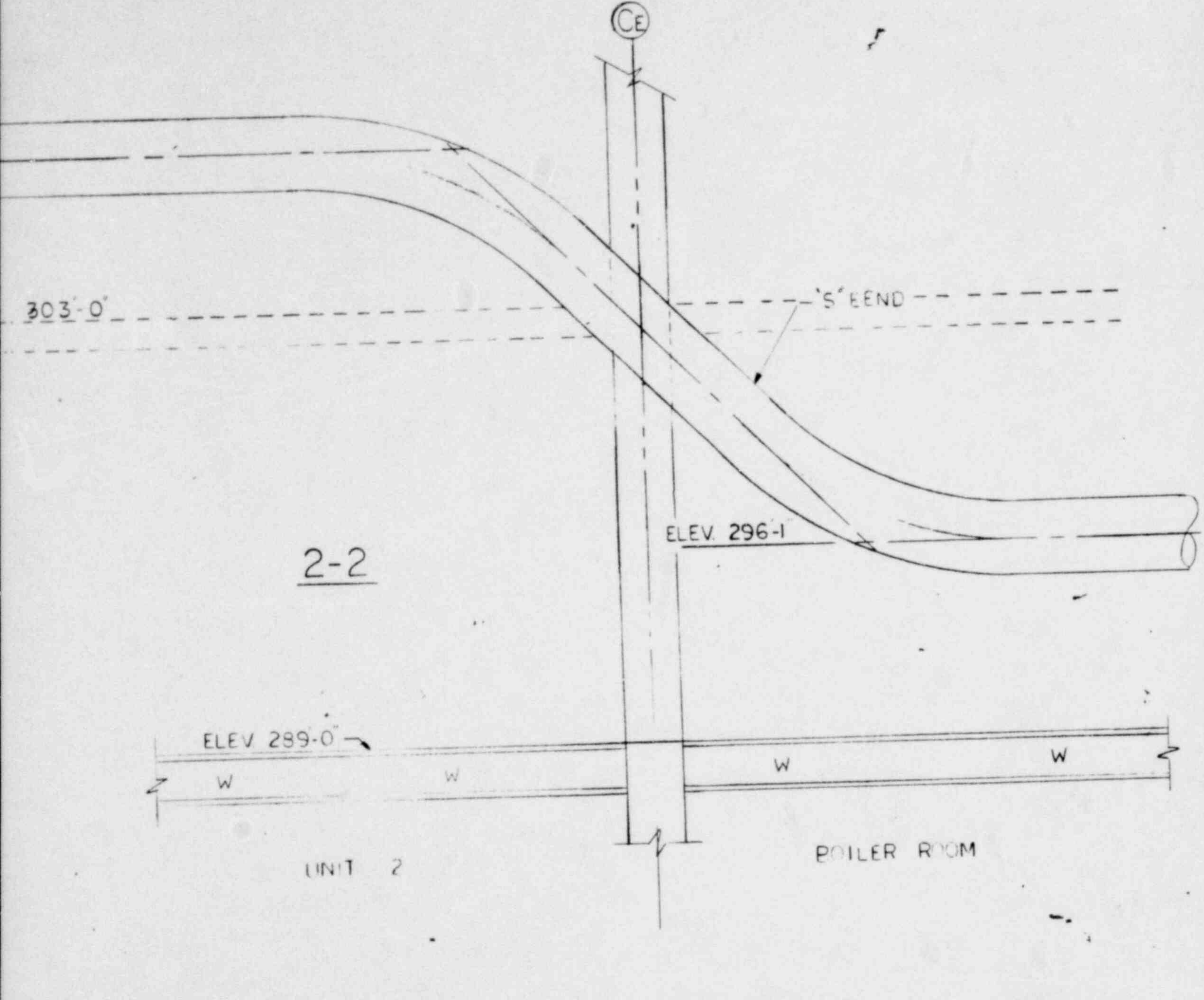

V 303'-0"
TURBINE BUILDING
ELEV. 290'-1 7/16"
(CL. GAP)
RESTRAINTS
(TYP.)
DATE
11.21.78

F-3/4

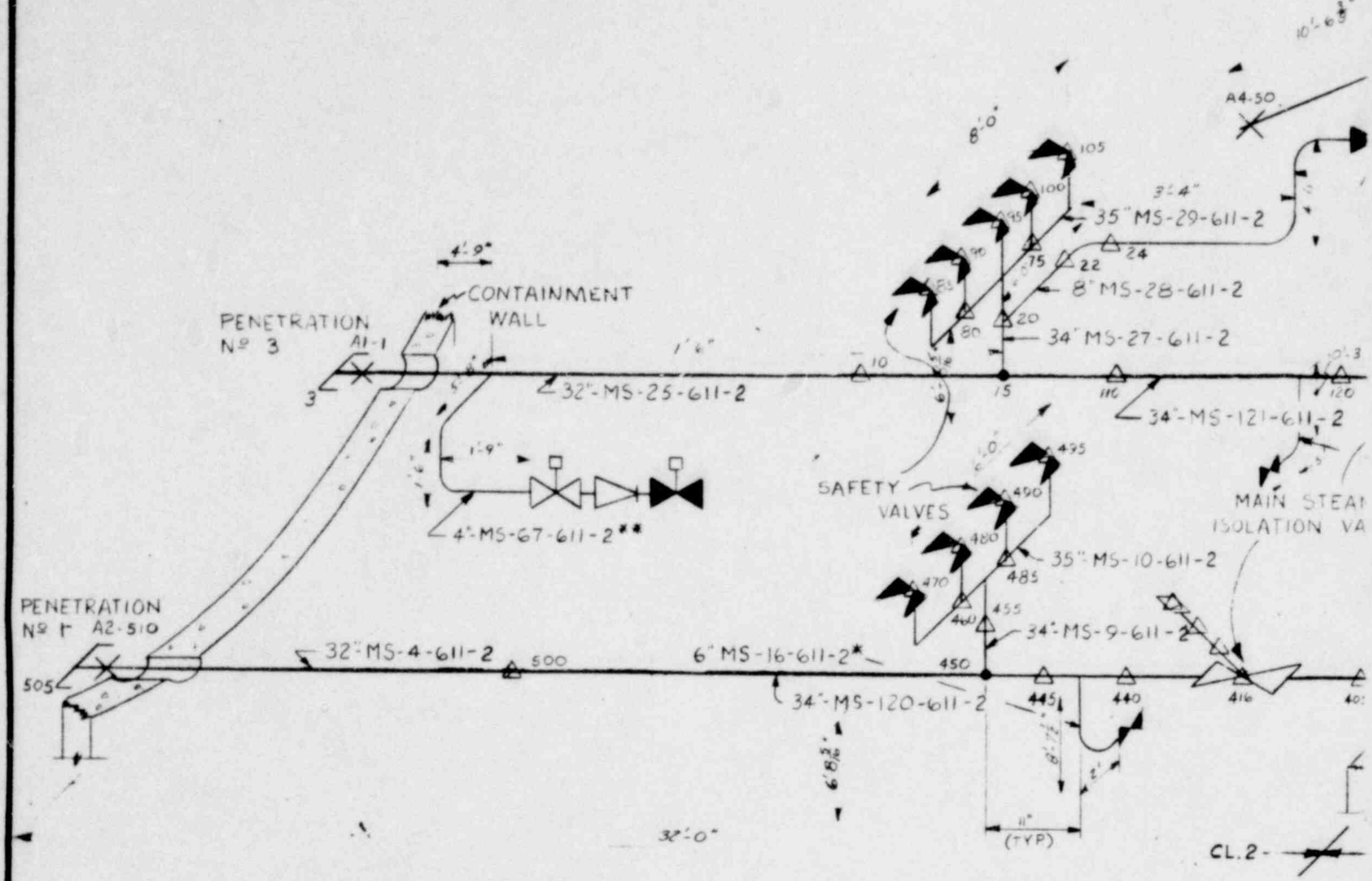


REACTOR
RESTRAINT (TYP)
ELEV. 309'-4 3/4"
WP. MS EL 310-7 5/8" (TYP)
ELEV. 30
WP FW EL 306-0 1/4"
ISOLATION VALVES (TYP)
VALVE HOUSE
RESTRAINT
SAFETY VALVES (TYP)
Nº5
Nº2
Nº6
Nº4
REACTOR 3

F-4/4



G-1/2



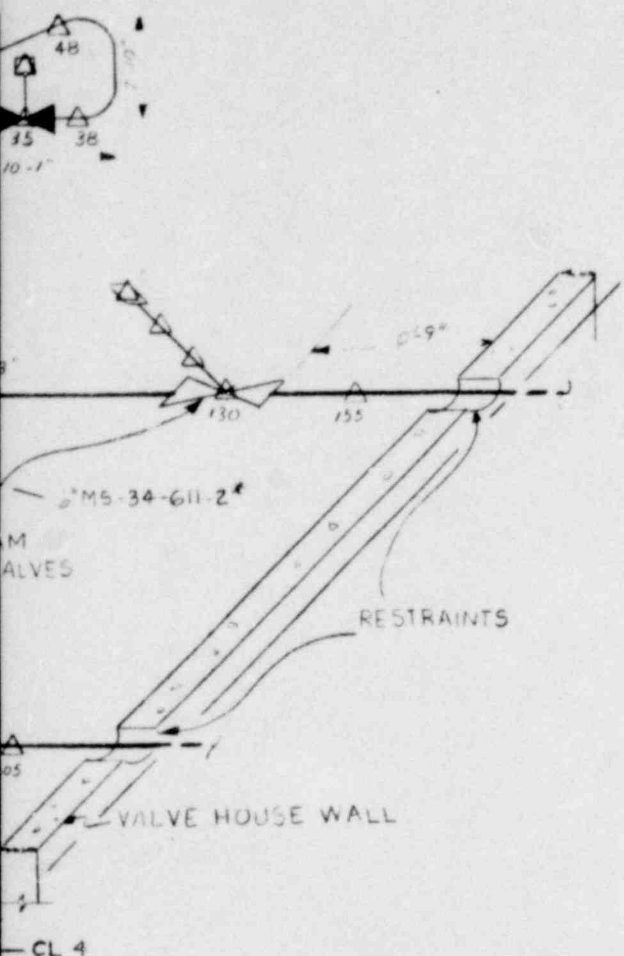
NOTES

* - TO STEAM GENERATOR CIRC. PUMPS

** - TO AUX. FEEDPUMPS TURBINE DRIVER

ORIGINATOR Roger D. Hurd

G-2/2

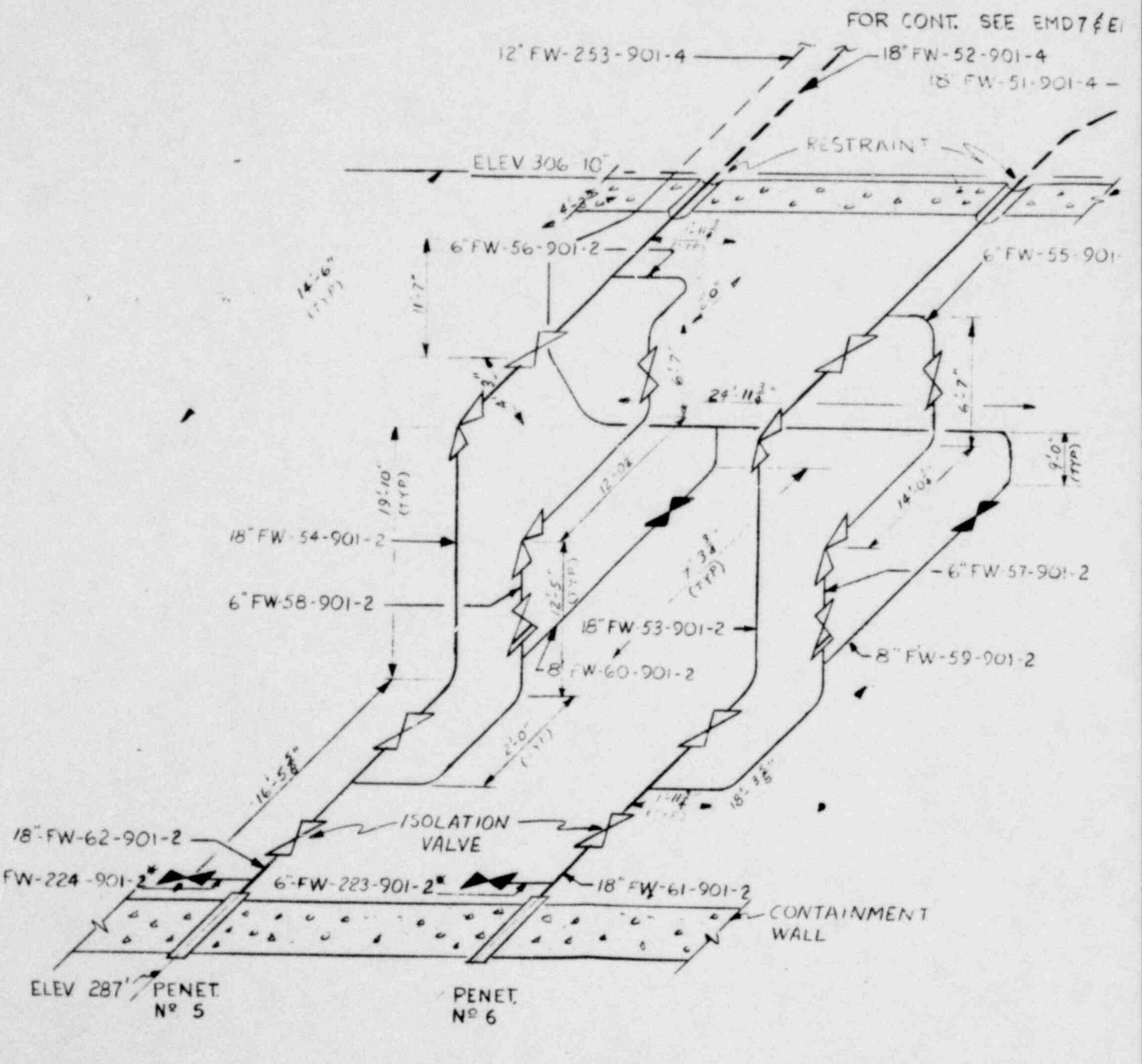


FOR CONT. SEE EMD-7&8

MAIN STEAM ROUTING BREAK EXCLUSION AREA
UNIT 3
SKETCH NO. EMD-5

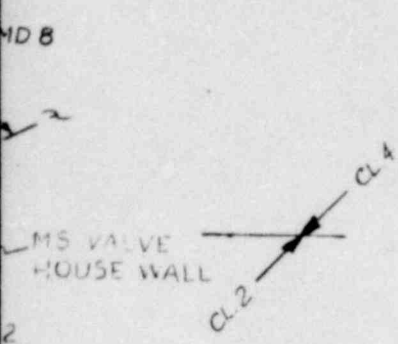
DATE 11-21-78	REVEIWER	[signatures]	DATE	APPROVED BY	[signature]	DATE 11.21.78

H-1/2



ORIGINATOR	Roger B. Ward

H-2/2



NOTES:
* - FROM HEAT UP CIRC. PUMPS.

FEEDWATER: BREAK EXCLUSION AREA (UNIT 3)
SKETCH NO. EMC-6

DATE			DATE			DATE
11-21-78	REVIEWER	R.E. [signature] [signature]	11-21-78	APPROVED BY	[signature]	11.21.78

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