GE Nuclear Energy

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

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Docket STN 52-004

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington DC 20555

Attention: Richard W. Borchardt, Director
Standardization Project Directorate

Subject: NRC Requests for Additional Information (RAIs) on the Simplified Boiling Water Reactor (SBWR) Design

References: Transmittal of Requests for Additional Information (RAIs) Regarding the SBWR Design, Letter from M. Malloy to P. W. Marriott dated January 4, 1994

The Reference letter requested additional information regarding the SBWR design for use by Pudue University to develop an SBWR prototype. In fulfillment of this request, GE is submitting Attachment 1 to this letter which contains responses to these RAIs.

Sincerely,

J. E. Leatherman

J. E. Leatherman
SBWR Certification Manager
MC-781, (408)925-2023

Attachment 1, "Responses to NRC RAIs"

cc: M. Malloy, Project Manager (NRC) (w/2 copies of Attachment 1)
F. W. Hasselberg, Project Manager (NRC) (w/1 copy of Attachment 1)

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RAI Purdue #1

Question:

In SSAR page 6.2-23 reference is made to Figure 21.6.2.2. which is to provide additional information on the design of the PCCS condenser. This drawing has not been provided to Purdue so we would like to request a copy of this figure

GE Response:

The SSAR reference to Figure 21.6.2-2 on page 6.2-23 was made in error. For further information regarding the PCCS condenser, please refer to the data provided to Purdue during the meeting held at Purdue on October 1, 1993 and the documentation of this meeting provided by GE letter MFN No. 170-93, SBWR Test Program, P.W. Marriott to J.N. Wilson, dated October 20, 1993.

RAI Purdue #2

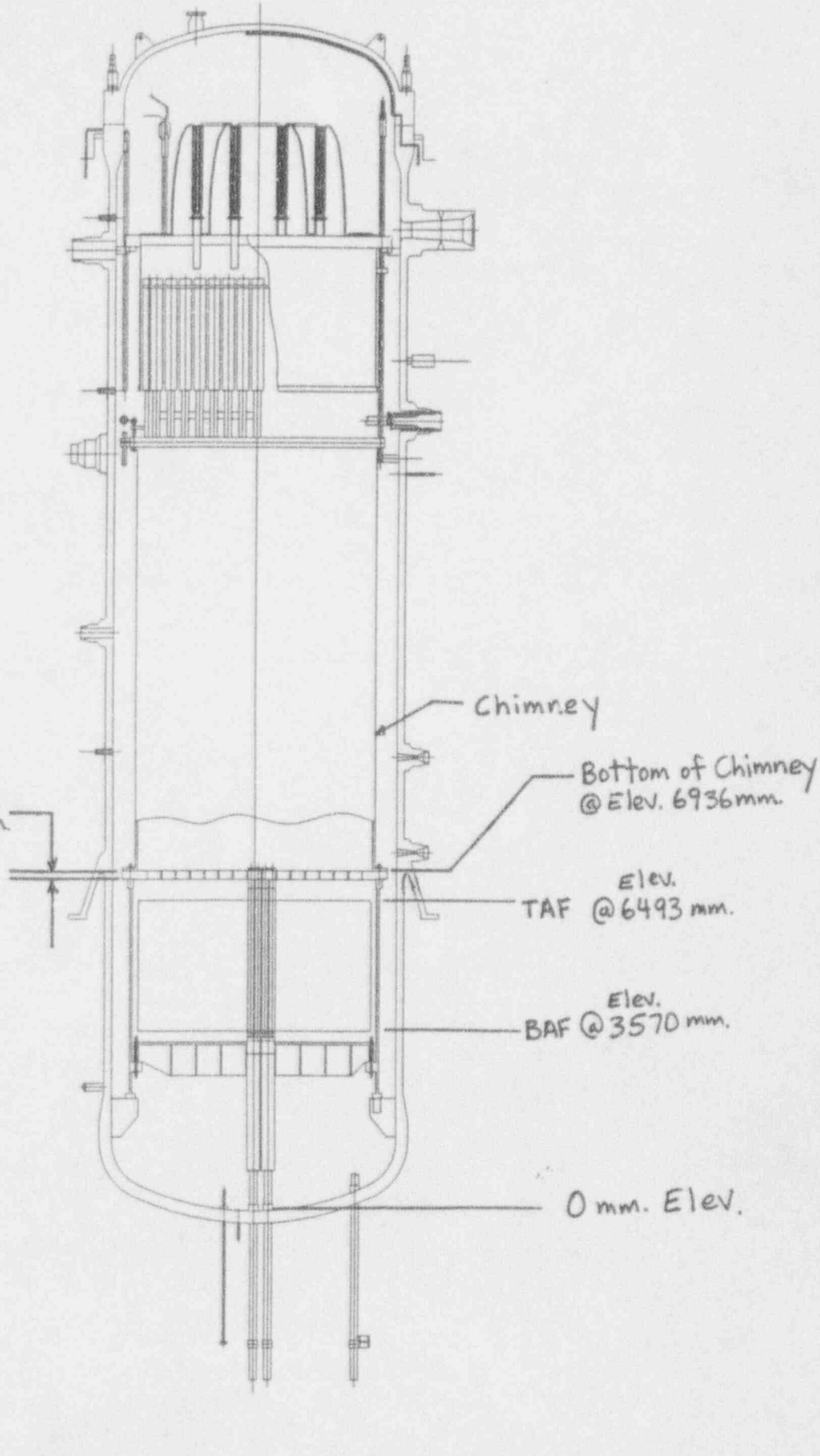
Question:

Please provide information on the gap size between the top of the core and bottom of the chimney sections.

GE Response:

The chimney and partitions are supported by the top guide. The gap between the top of the active fuel (TAF) and the bottom of the chimney sections is 443 mm. The gap between the TAF and the bottom of the Top Guide is 265 mm. (See the attached sketch, which shows the Chimney/Top Guide details.)

CHIMNEY/TOP GUIDE DETAILS



RAI Purdue #3

Question:

Please provide detailed information such as design and location on the deflector plates on the DPV lines. Figure 21.1.2-2 SH 6 shows that the two DPV lines on the MSL do not have deflector plates.

GE Response:

The detailed specification and design of the jet deflectors to be attached at the outlets of the DPVs are designated as "SBWR commercialization activities" as opposed to "SBWR design certification activities". Accordingly, GE-NE is not scheduling this work on the critical path steps leading to USNRC certification for the SBWR. The SSAR arrangement drawing, Figure 21.1.2-2, SH 6, has the objective to show that nominal space at the outboard exit from each of the DPVs--whether mounted on main steamlines or mounted off stublines connected to the RPV--does exist, and is reserved (by the showing of representative equipment at these exits) to reflect the needs for assembly, repair, jet dissipation, and the like.

The showing of a curved exhaust deflector in Figure 21.1.1 for the two DPVs attached to the main steamlines indicates a proposed design approached that would direct the DPV exhaust onto the reactor shield wall which would, in turn, serve to dissipate the jet. The reactor shield wall is amply strong to withstand this jet load and no vulnerable equipment is located nearby. This approach seems the most expedient, possibly, for these two DPVs as they are located relatively close to the reactor shield wall. For the other four DPVs located at the end of the stublines, a different solution is being anticipated wherein the jet is simultaneously turned and dissipated, much like the thrust-reversers used on aircraft jet engines.

RAI Purdue #4

Question:

Please provide detailed information on the SRV spargers such as nozzle diameter number of nozzles etc... Also provide information on the spargers located on the non-condensable vent lines

GE Response:

SRV Quencher details are provided in the attached draft SBWR Quencher drawing.

The present reference design for the PCCS vent is an open-ended pipe terminating beneath the suppression pool surface at a distance of 0.85 m above the top tangent of the uppermost horizontal vent. The pipe-end sparger shown in the August, 1992 SSAR (Figure 21.6.2-1) has been removed, and the ventpipe termination (for each of the three PCCS condensers) has been relocated to a position adjacent to the drywell vent wall. These changes represent design upgrades under which the SBWR PCCS system design is further simplified--through not requiring the sparger at all; plus, at its new position adjacent to the vent wall and away from the containment wall, the dynamic loads produced on vent wall, containment wall, and on in-pool submerged piping and structures all become negligible with respect to the dynamic loads produced on these components by the underwater vent system during LOCA blowdowns and for which these components are conservatively designed. It is worth noting that this configuration (with no sparger) is consistent with the way the containment pressure/temperature LOCA calculations are being made for the SSAR.

RAI Purdue #5

Question:

In Figure 21.6.3-2 note 6 of the SSAR it is mentioned that GDCS pools A and B are connected to the PCCS pools A and B respectively, however there is no mention of GDCS pool C. Please clarify.

GE Response:

The Passive Containment Cooling System (PCCS) heat exchangers are connected to GDCS pools A and C (270° & 90°). Note 6 on SSAR Figure 21.6.3-2 is in error and will be corrected. GDCS pool B (180°) is not connected to any PCCS.

In the earlier design, there were only two PCC heat exchangers and they were located in cells over GDCS pools A and C. When the third PCC condenser was added, it had to be placed in one of the open cells that was not already occupied by one of the original two PCC condensers or the three Isolation Condensers (ICs). The most practical location was to use a cell located over the GDCS A pool. Therefore, there are two PCC condensers connected to pool A and one connected to pool C with no PCCS connection to pool B. The GDCS pools are interconnected so that any addition to one of the pools would be distributed over all three of the GDCS pools. There is no functional requirement to assign each PCC condenser to a different GDCS pool.

RAI Purdue #6

Question:

Detailed information on the opening area at RPV skirt connecting the upper and lower drywell is needed.

GE Response:

The RPV skirt type support design is in the process of being changed to a sliding type support design. This change is being made in order to minimize the adverse effects of high neutron fluence at the RPV skirt. Upon GE Technical Integration group approval of this design change, the RPV detail drawings will be revised to show the sliding type support details. Preliminary detailed information on the sliding support configuration and the insulation arrangement at the RPV support are provided in the attached Figures 1 through 4.

The opening area at the RPV support connecting the upper and lower drywell is shown in Figure 2. In addition, there are 14 vents built into the RPV support structure which connect the upper and lower drywell regions. The attached Figures 5 and 12 from GE document No. 25A5044, provide the vent details.

NUMBER SBWR RPV SLIDING SUPPORT DATE

SUBJECT DETAILS (Figures 1→4) BY SHEET OF

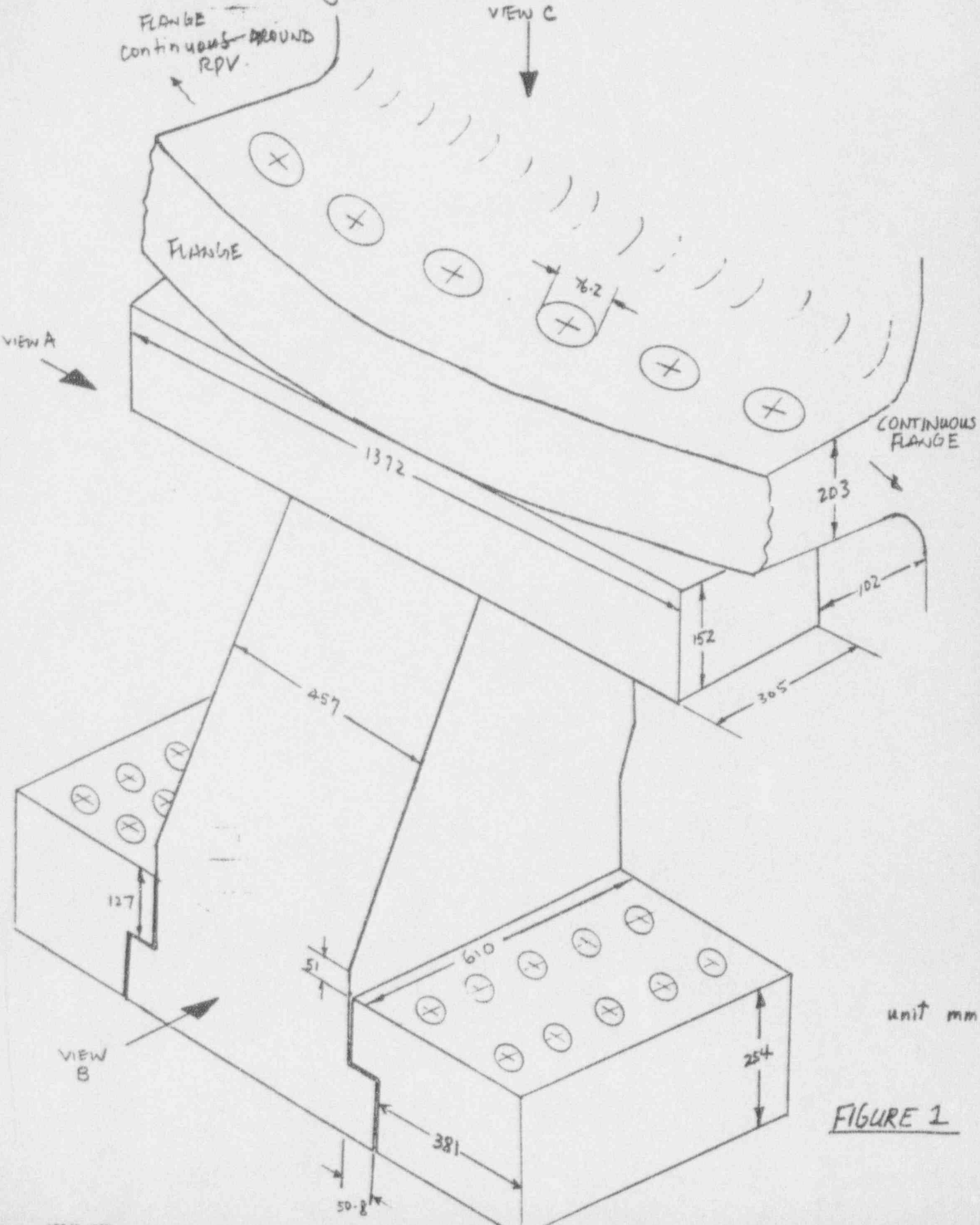


FIGURE 1

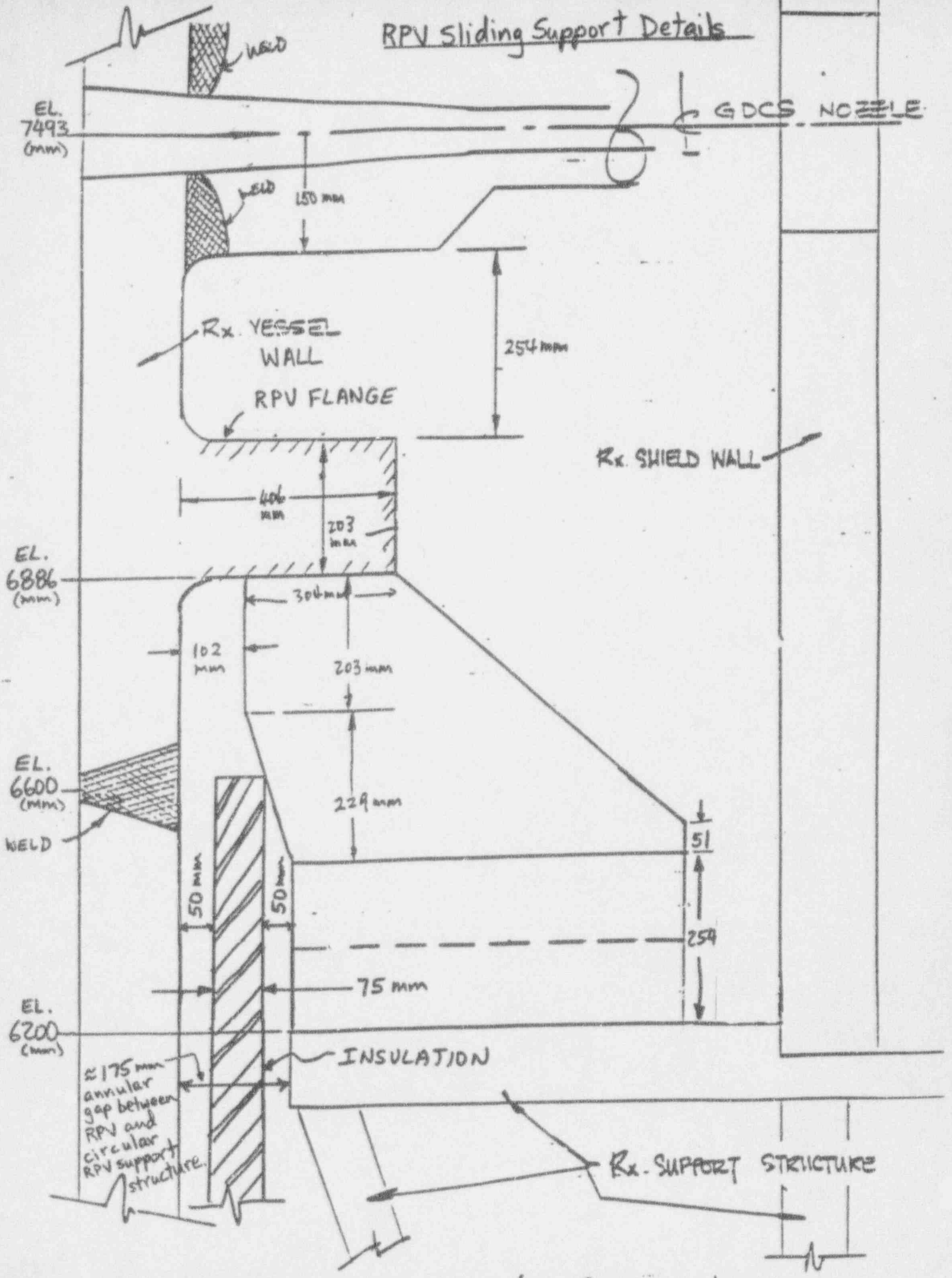


FIGURE 2: VIEW A (WITH GDCS NOZZLE)

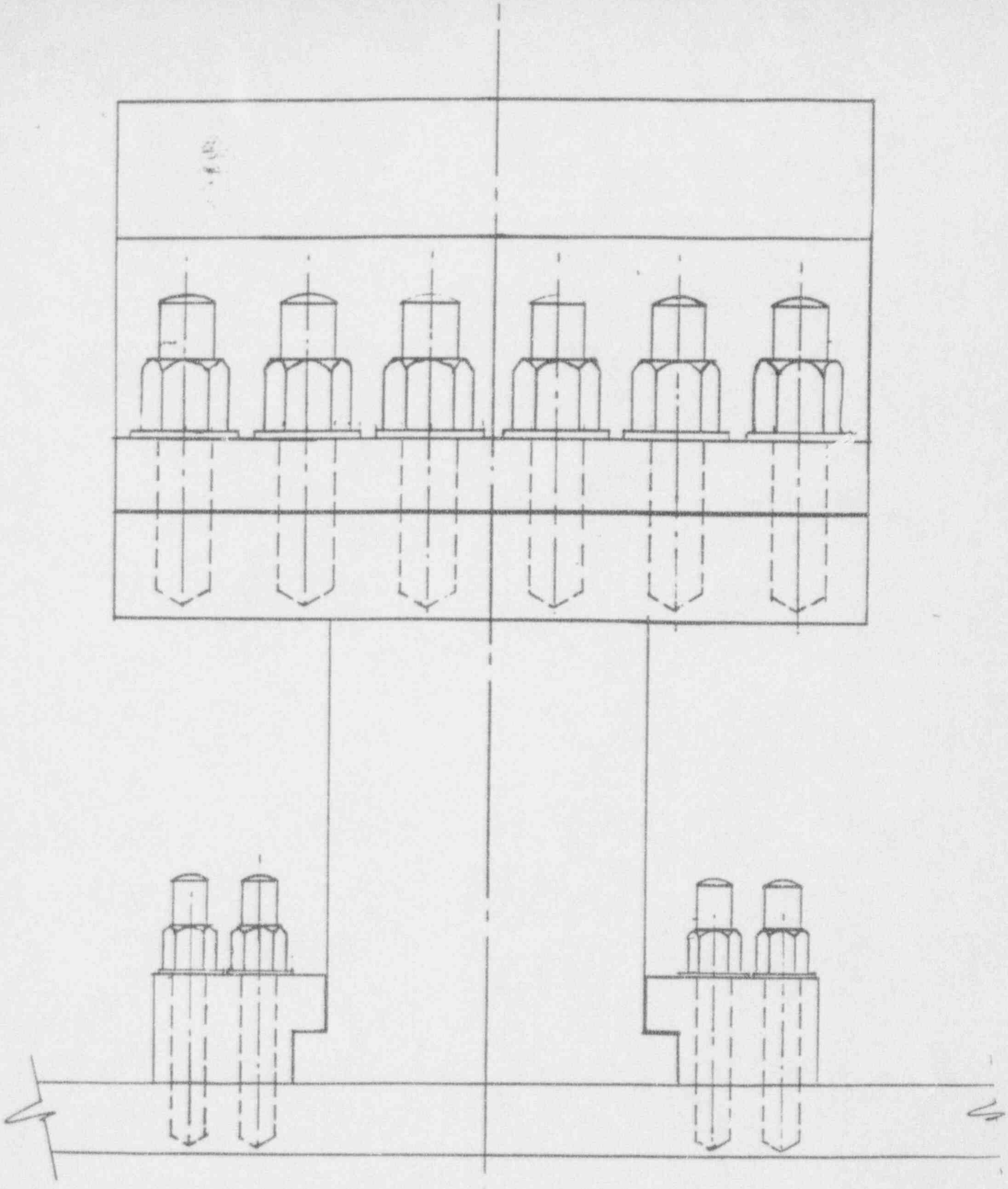
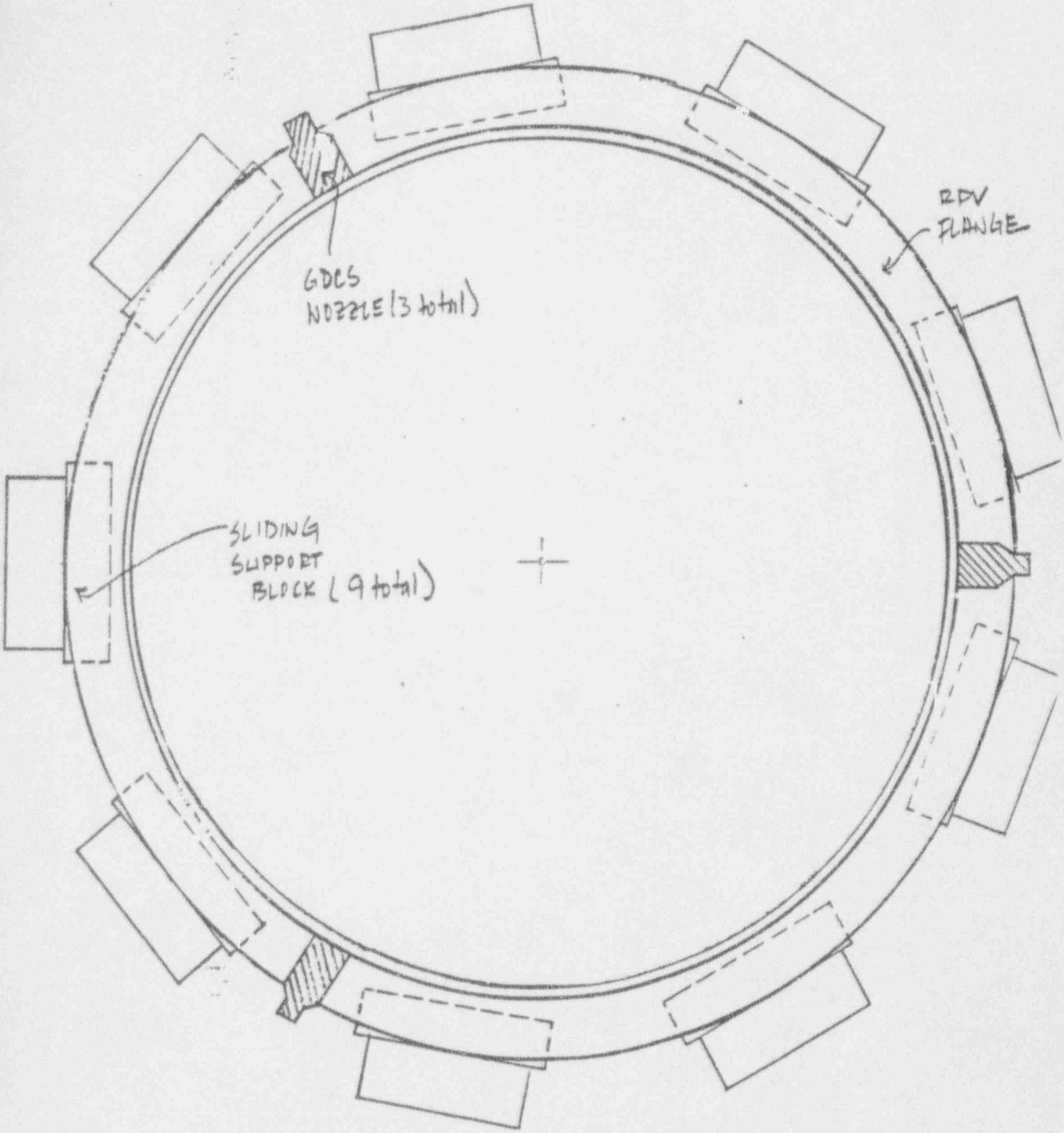


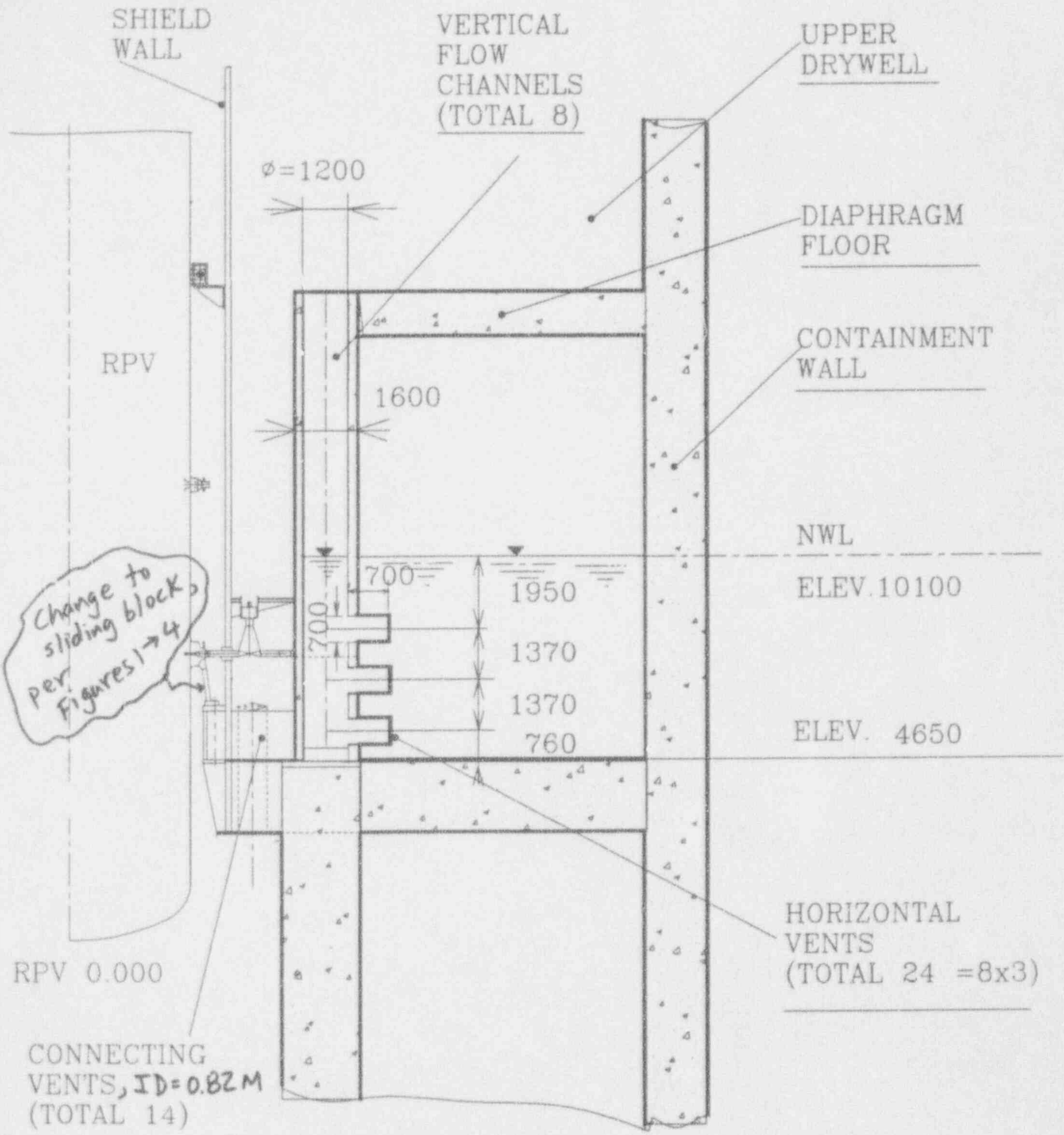
FIGURE 3: VIEW B

RPV Sliding Support Details



RPV Sliding Support Details

FIGURE 4: VIEW C



Note: Dimensions are in millimeters. Elevations relative to RPV invert EL. 0.000

FIGURE 5. HORIZONTAL VENT SYSTEM CONFIGURATION

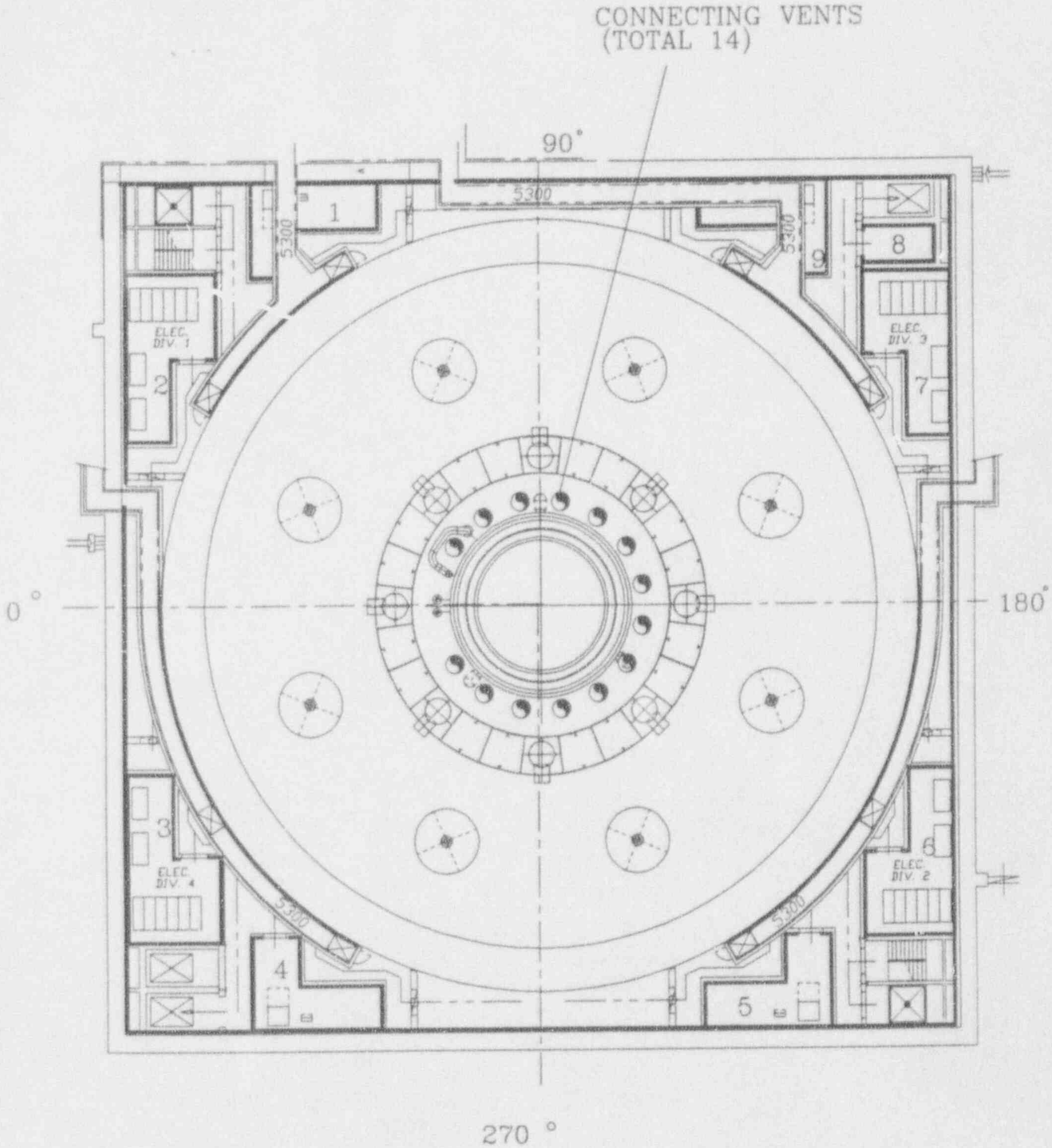


FIGURE 12. SAFETY ENVELOPE FLOOR ELEVATION 3050

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