

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

REGULATORY DOCKET FILE COPY

August 21, 1979

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Serial No. 687  
PSE&C/CMRjr:mac:wang

Docket No. 50-280

License No. DPR-32

Dear Mr. Denton:

ANALYSIS COMPLETION OF DESIGNATED SUPPORTS  
OUTSIDE CONTAINMENT  
SURRY POWER STATION UNIT 1

The Nuclear Regulatory Commission staff has identified certain supports outside the containment for which analysis must be complete prior to consideration of interim start up of Surry Unit 1. These supports associated with the low head safety injection system, high head safety injection system, auxiliary feedwater system, and containment and recirculation spray system are identified in Table 4-1B of our August 1, 1979 submittal (Vepco Serial No. 453A). The purpose of this letter is to inform you that pipe support analysis associated with these systems has been completed. On this basis, we request immediate consideration of our previous requests for interim operation.

To recap the total pipe support results to date, there are 1030 supports (492 inside containment, 538 outside containment) on lines originally analyzed by SHOCK 2. All 492 pipe supports within the reactor containment have been reanalyzed, and 51 hardware modifications have been identified. All 112 supports for the four systems identified above which are outside the reactor containment have been analyzed and 10 modifications have been identified. These modifications are included in the attached revised Table 4-2.

For clarification, we are submitting revised Tables 3-3, 4-1A, 4-1B, and 4-2 originally submitted with our report of August 1, 1979 to reflect completion of the above reanalysis. These tables are completely updated to show results of all analysis work to date.

Modifications associated with the following will be accomplished prior to startup:

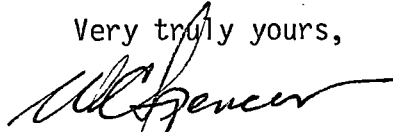
1. All modifications shown on Table 3-4, Hardware Modification Summary Due to Nozzle and Penetration Overloading, as submitted with our August 1, 1979 report.

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2. All modifications shown on revised Table 3-3, attached, Pipe Stress Hardware Modification Summary.
3. All modifications shown on revised Table 4-1A, attached, Pipe Support Status Summary Inside Containment - SHOCK 2.
4. All modifications shown on revised Table 4-1B, attached, Pipe Support Status Summary Outside Containment - SHOCK 2.

We appreciate your prompt response to our request for interim operation. If you should have any questions, please contact us immediately.

Very truly yours,



W. C. Spencer  
Vice President - Power Station  
Engineering and Construction Services

Attachments: 4 Tables

TABLE 3-3  
PIPE STRESS HARDWARE MODIFICATION SUMMARY

<u>Problem No.</u>	<u>MKS No.</u>	<u>System</u>	<u>Overstressed Condition</u>	<u>Attributable To:</u>	<u>Resolution</u>
334B	102G1,G2	FW	Thermal overstress	As-Built	Delete U-Bolt**
508	117A1	RHR	DBEI overstressed RHR pump Discharge elbows and overloaded nozzles.	Seismic Reanalysis	Six supports added to alleviate overstress condition.
540	117B1	RHR	1. Thermal overstress due to support which was not included in original analysis. 2. Overstress in 2" line which was not included in original analysis.	As-Built	1. Delete NS & RH's. 2. Add Anchor to 2" line.
548A	123B1	C&RS	DBEI overstress condition	As-Built	Addition of a horizontal snubber.
562	123E2	C&RS	DBEI overstress	As-Built	Addition of EW. Replace RH with SH. Replace SH with VC.
727	127C1	LHSI	DBEI overstress	Seismic Reanalysis	Addition of an LSS.
735	127G1	HHSI	DBEI overstress	As-Built	Addition of two guides.
743	127F1	LHSI	DBEI overstress	As-Built	Shim existing constraint to VC/LC.
744/754	123J1	C&RS	DBEI overstress	As-Built	Modification and replacement of constraints to reflect original analysis.
745	123K1	C&RS	DBEI overstress	As-Built	Modification and replacement of constraints to reflect original analysis.
746	131A1 B2 C3	HP Steam	DBEI overstress	As-Built	Modification and addition of constraints to reflect original original analysis.

TABLE 3-3 (Cont)

<u>Problem No.</u>	<u>MKS No.</u>	<u>System</u>	<u>Overstressed Condition</u>	<u>Attributable To:</u>	<u>Resolution</u>
488/480	122A1,C1	CCW	DBEI overstress	As-built *	Add two guides to Problem 480 and two lateral restraints to Problem 488.
507/481	112B1,F1	CCW	DBEI overstress	As-built *	Add two guides to Problem 481.
509A/D	112G	CCW	DBEI overstress	As-built	Added one vertical restraint.
517	112M	CCW	DBEI overstress	As-built Seismic Reanalysis	Eight restraint changes are required.***
526C	112L	CCW	DBEI overstress	Seismic Reanalysis	Added a lateral restraint and modify an SH to a rigid vertical constraint.
527A/C	112T	CCW	DBEI overstress	As-built	Delete anchor A36 and shim exchanger supports.
605A	112AA	CCW	DBEI overstress	As-built	Add four lateral restraints.
766	112AR	CCW	DBEI overstress and thermal overstress	As-built	Add horizontal guides and delete an axial restraint.
2527/2529	112	CCW	DBEI overstress	As-built	Delete Anchor and Shim exchanger supports.***

NOTE:

\* The use of ARS curves causes higher acceleration levels than the procedure for below-grade structures formerly used as described in the Seismic Design Review revised September 15, 1971.

\*\* Due to Branch-Line Analysis

\*\*\* Revised since August 1, 1979 Submittal

SURRY POWER STATION UNIT 1

TABLE 4-1A

PIPE SUPPORT STATUS SUMMARY  
INSIDE CONTAINMENT - SHOCK 2

<u>System and Prob. No</u>	<u>Total No. of Supports</u>	<u>No. Acceptable (Evaluation Complete)</u>	<u>No. Under Evaluation</u>	<u>Modifica- tions or Additions Required</u>	<u>Comments</u>
<u>Low Head Safety Injection</u>					
555	14	14	-	4	
706A	10	10	-	-	
707A	9	9	-	-	
708	22	22		3	
1555	9	9	-	-	
<u>Containment &amp; Recircu- lation Spray</u>					
525A/1525A	35	35	-	5	
544	12	12	-	2	
544A	6	6	-	-	
544B	6	6	-	1	
546/560	18	18	-	6	
546/5600	11	11	-	2	
546/5620	11	11	-	1	
547	13	13	-	-	
548A	2	2	-	-	
548B	22	22	-	4	
548C	25	25	-	2	
562	19	19	-	5	

SURRY POWER STATION UNIT 1

TABLE 4-1A (cont'd.)

PIPE SUPPORT STATUS SUMMARY  
INSIDE CONTAINMENT - SHOCK 2

<u>System and Prob. No</u>	<u>Total No. of Supports</u>	<u>No. Acceptable (Evaluation Complete)</u>	<u>No. Under Evaluation</u>	<u>Modifica- tions or Additions Required</u>	<u>Comments</u>
<u>Main Steam</u>					
322A	5	5	-	-	
323A	17	17	-	-	
334A	3	3	-	-	
<u>Feedwater</u>					
322B	8	8	-	-	
323B	14	14	-	-	
334B	8	8	-	- 1	
<u>Auxiliary Feedwater</u>					
417	26	26	-	-	
<u>Pressurizer Spray and Relief</u>					
630	27	27	-	-	
636	33	33	-	1	
<u>Residual Heat Removal</u>					
508	50	50	-	3	
540	10	10	-	-	
<u>Service Water</u>					
465	8	8	-	1	

Revised  
August 21, 1979

SURRY POWER STATION UNIT 1

TABLE 4-1A (cont'd)

PIPE SUPPORT STATUS SUMMARY  
INSIDE CONTAINMENT - SHOCK 2

<u>System and Prob. No</u>	<u>Total No. of Supports</u>	<u>No. Acceptable (Evaluation Complete)</u>	<u>No. Under Evaluation</u>	<u>Modifica- tions or Additions Required</u>	<u>Comments</u>
<u>Component Cooling</u>					
603A	7	7	-	3	
603B	5	5	-	2	
605A	17	17	-	3	
605B	10	10	-	2	

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SURRY POWER STATION UNIT 1

TABLE 4-1B

PIPE SUPPORT STATUS SUMMARY  
OUTSIDE CONTAINMENT - SHOCK 2

<u>System and Prob. No</u>	<u>Total No. of Supports</u>	<u>No. Acceptable (Evaluation No. Under Complete</u>	<u>Evaluation</u>	<u>Modifica- tions or Additions Required</u>	<u>Comments</u>
<u>Low Head Safety Injection</u>					
727	21	21	-	-	
731A	4	4	-	3	
731B	4	4	-	2	
743	5	5	-	-	
<u>High Head Safety Injection</u>					
735	43	43	-	3	
<u>Containment &amp; Recircu- lation Spray</u>					
744/754	10	10	-	-	
745	8	8	-	1	
751	2	2	-	-	
<u>Main Steam</u>					
346	54	33	21	-	
<u>Auxiliary Feedwater</u>					
607	15	15	-	1	

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SURRY POWER STATION UNIT 1

TABLE 4-1B (cont'd)

PIPE SUPPORT STATUS SUMMARY  
OUTSIDE CONTAINMENT - SHOCK 2

<u>System and Prob. No</u>	<u>Total No. of Supports</u>	<u>No. Acceptable (Evaluation Complete)</u>	<u>No. Under Evaluation</u>	<u>Modifications or Additions Required</u>	<u>Comments</u>
<u>Component Cooling</u>					
488/480	33	-	33	-	
507/481	27	-	27	-	
509A/D	32	-	32	-	
509B	9	-	9	-	
509C	13	-	13	-	
512	9	-	9	-	
517	38	-	38	-	
526C	17	-	17	-	
527A/C	18	-	18	-	
612	20	-	20	-	
614	19	-	19	-	
766	18	-	18	-	
1512	8	-	8	-	
2526	20	-	20	-	
2527/2529	23	-	23	-	
<u>Containment Vacuum</u>					
CV1	3	3	-	1*	
<u>3" HP Steam</u>					
746	19	19	-	-	

SURRY POWER STATION UNIT 1

TABLE 4-1B (cont'd)

PIPE SUPPORT STATUS SUMMARY  
OUTSIDE CONTAINMENT - SHOCK 2

<u>System and Prob. No</u>	<u>Total No. of Supports</u>	<u>No. Acceptable (Evaluation Complete)</u>	<u>No. Under Evaluation</u>	<u>Modifica- tions or Additions Required</u>	<u>Comments</u>
<u>Fire Pro- tection</u>					
CF1	14	-	14	-	
CF2	14	-	14	-	
<u>Diesel Muffler</u>					
1040	18	3	15	3*	

Notes:

The number in the "Modifications" or "Additions" Column are already included in the status shown in the "Acceptable (Complete)" column.

The number in the "Total Supports" column equals the number in the "Acceptable" plus the number in the "Under Evaluation" column.

\*These modifications are not included in Table 4-2 as they do not belong to systems LHSI, AFW, CRS and HHSI (outside the containment). These modifications have been identified to field and will be completed before start up.

TABLE 4-2

## PIPE SUPPORT HARDWARE MODIFICATION SUMMARY

<u>Problem No.</u>	<u>Support No.</u>	<u>Description of Modification or Overstressed Condition</u>	<u>Modified Since August 1, 1979 Submittal</u>	<u>Attributable To:</u>	<u>Resolution</u>
<u>INSIDE REACTOR CONTAINMENT UNLESS NOTED</u>					
334B	PT 90	Snubber modification	Yes. Note 1	Support Function	Add horizontal shock suppressor.
465	H-21	Support member overstressed	No	As-built	Removed Support H-21.
508	H-42A	Snubbers over allowable	No	Seismic Reanalysis	Add horizontal snubber.
508	PT 26	Snubbers over allowable	No	Seismic Reanalysis	Add horizontal and vertical snubbers.
508	H-20	Weld over allowable	No	As-built	Modify support.
525A	H14	Prevents growth in one direction	No	As-built	Modify support.
525A	PT 65	Add shock suppressor due to H-1 overstressed	Yes. Note 2	Seismic Reanalysis	Add horizontal shock suppressor.
525A	H70	Support overstressed	Yes. Note 3	As-built	Modify support.
544	H34A	Overstressed with new loads	No	As-built	Redesigned and modified to VC-LC.
544	H37A	Overstressed with new loads	No	As-built	Redesigned and modified to VC-LC.
544B	H46	Weld over stress allowable	No	As-built	Support modified.
548B	H87	No lateral restraint capability	No	As-built	Redesigned and modified support to receive lateral load.
548B	H72A H72B	6-way restraint not properly functioning	No	As-built	Redesigned (modified to 3-way restraint).
548B	H72B	6-way restraint not properly functioning	Yes. Note 4	As-built	Redesigned (modified to 3-way restraint). Ganged with H72A
548B	H84	No lateral movement due to thermal and seismic	No	As-built	Restore to original configuration.
548B	H18A H18B	U-bolts overstressed	No	As-built	Redesigned and modified support by adding bracing member.

TABLE 4-2 (Cont)

<u>Problem No.</u>	<u>Support No.</u>	<u>Description of Modification or Overstressed Condition</u>	<u>Modified Since August 1, 1979 Submittal</u>	<u>Attributable To:</u>	<u>Resolution</u>
<u>INSIDE REACTOR CONTAINMENT UNLESS NOTED</u>					
548C	H17A H17B H17C	Lugs overstressed on gang hanger - anchor	No	As-built	Redesigned and modified by removing attachments to relieve pipe overstress conditions.
548C	H75	U-bolt subjected to lateral loads over allowable loads	No	As-built	Replace U-bolt with framed member.
555	H10	Integral attachment overstressed	No	Seismic Reanalysis	Add lateral shock suppressor.
555	H28	Horizontal and vertical structural member restraining pipe movement	No	Thermal movement	Restore to original intent.
555	H29	Vertical member restraining pipe motion	No	Thermal movement	Restore to original intent.
555	H30	Vertical member restraining pipe motion	No	Thermal movement	Restore to original intent.
546/560	H39A H39B	Integral attachment overstressed for support H39A	No	As-built	Replace anchor by a 3-way restraint.
546/560	PT-185	Added due to H39A	No	As-built	Add vertical shock suppressor to reduce loads.
546/560	PT-208	Added due to H39A	No	As-built	Add lateral constraint.
546/560	PT-130	Added due to H39A	No	As-built	Add lateral constraint and vertical constraint.
546/560	PT-216	Added due to H39A	No	As-built	Add lateral constraint.
546/560	PT-310	Added due to H39A	No	As-built	Add lateral constraint.
546/560	H50	Integral attachment overstressed for support H50	Yes. Note 2	As-built	Add North South East West restraint.
562	H26	Modified due to H39B. Integral attachment overstressed for H39B.	No	As-built	Modify support by adding U-bolt.
562	H29A	Modified due to H39B. Inte-	No	As-built	Modify 2-way support to

TABLE 4-2 (Cont)

<u>Problem No.</u>	<u>Support No.</u>	<u>Description of Modification or Overstressed Condition</u>	<u>Modified Since August 1, 1979 Submittal</u>	<u>Attributable To:</u>	<u>Resolution</u>
<u>INSIDE REACTOR CONTAINMENT UNLESS NOTED</u>					
	H29B	gral attachment overstressed for H39B.			3-way support.
562	PT-265	Added due to H39B. Integral attachment overstressed for H39B.	No	As-built	Add lateral constraint. Reduce loads at anchor point.
562	PT-340	Modified due to H39B. Integral attachment overstressed for H39B.	No	As-built	Modify vertical constraint.
562	H-39B	Integral attachment overstressed	Yes. Note 4	As-built	Replace anchor by a 3-way restraint. Ganged with H39A.
562	PT-183	Added due to H39B. To reduce load on hanger H39B.	No	As-built	Add 2-way support.
546/5600	H15B	U-bolt modified to reduce loads on H17B	No	Seismic Reanalysis	Redesigned and modified ganghanger from 1-way (LC).
546/5600	PT-155	Added to reduce anchor loads	No	Seismic Reanalysis	Add LC-VC to reduce loads at anchor.
546/5620	H-15A	U-bolt modified to reduce loads on H17A	Yes. Note 2	Seismic Reanalysis	Redesigned and modified ganghanger from 1-way (LC) to 2-way (LC-VC).
546/5620	PT-230	Added to reduce anchor loads	No	Seismic Reanalysis	Add LC-VC to reduce loads.
636	H36	Plate overstressed	No	As-built	Modify anchor by adding gusset.
708	PT-1	Lateral load on U-bolt overstressed	No	As-built	Add lateral restraint.
708	H127	Member overstressed	No	As-built	Modify support to vertical and lateral constraint.
708	PT-380	Lateral restraint overstressed	No	As-built	Modify support to vertical and lateral constraint.

TABLE 4-2 (Cont)

<u>Problem No.</u>	<u>Support No.</u>	<u>Description of Modification or Overstressed Condition</u>	<u>Modified Since August 1, 1979 Submittal</u>	<u>Attributable To:</u>	<u>Resolution</u>
<u>INSIDE REACTOR CONTAINMENT UNLESS NOTED</u>					
1525A	PT-1000	Integral attachment (H-2) overstressed	Yes. Note 2	Seismic Reanalysis	Modify anchor to VC to reduce anchor load.
1525A	PT-5000	Delete due to H-2	No	Seismic Reanalysis	Delete axial support and 1-way LC to reduce anchor load.
1525A	PT-8000	U-bolt and frame overstressed	No	Seismic Reanalysis	Modify frame.
1525A	PT-134	Added due to H10A	Yes. Note 2	Seismic Reanalysis	Add LC to reduce anchor loads.
1525A	PT-232	Added due to H2	Yes. Note 2	Seismic Reanalysis	Add LC to reduce loads.
1525A	PT-314	Added due to H10A	Yes. Note 2	Seismic Reanalysis	Add LC to reduce anchor loads.
1525A	PT-2510	Add due to H2	Yes. Note 2	Seismic Reanalysis	Add LC to reduce loads.
1525A	PT-5802	Hanger overstressed	Yes. Note 1&3	Seismic Reanalysis	Modify support.
603A	3,	Pipe straps overstressed	No	As-built	Add gussets to all and increase weld size.
603A	4	Pipe straps overstressed	Yes. Note 2	As-Built	Add gussets to all and increase weld size.
603A	7	Pipe straps overstressed	No	As-built	Add gussets to all and increase weld size.
603A	5	Vertical restraint only required, but support had zero lateral clearance.	No	As-built	Modify support to provide lateral clearance.
603B	13	Uplift restraint is required, but support had negative vertical restraint only.	No	As-built	Modify support to provide uplift restraint.

TABLE 4-2 (Cont)

<u>Problem No.</u>	<u>Support No.</u>	<u>Description of Modification or Overstressed Condition</u>	<u>Modified Since August 1, 1979 Submittal</u>	<u>Attributable To:</u>	<u>Resolution</u>
<u>INSIDE REACTOR CONTAINMENT UNLESS NOTED</u>					
603B	10	Vertical support only required, but support is a vertical restraint and lateral restraint.	No	As-built	Remove top and side members of support.
605B	4	Support members overstressed	No	As-built	Replace two W4x13 members with TS4x4x1/2.
605B	6	Pipe strap weld stress over allowable	Yes. Note 2	As-built	Add two gussets to reduce load at connection.
603A	H-2	Lateral clearance insufficient	Yes. Note 2	Thermal movement	Modify restraint.
605B	H-2	Lateral clearance insufficient	No	Thermal movement	Modify restraint.
605A	PT-13	Need vertical restraint	No	As-built	Modify vertical support.
605A	PT-23	Need vertical and lateral restraint	Yes. Note 5	As-built	Modify vertical support.
605A	PT-28	Need vertical and lateral restraint	Yes Note 5	As-built	Modify vertical support.
605A	PT-4295	Additional support	Yes. Note 5	As-built	Add new support.
605A	PT-4300	Additional support	Yes. Note 5	As-built	Add new support.
605A	2020	Delete lateral restraint	No. Note 7	As-Built	Modify support.
605A	2005	Delete lateral restraint	No. Note 7	As-Built	Modify support.
607	PT 77	U-Bolt overstressed	No. Note 6	As-Built	Delete U-Bolt
731A	SI-C-90	Support member overstressed	No. Note 6	Support Function	Add structural brace.
731A	PT 46	Integral attachment overstressed	No. Note 6	Support Function	Add N-S restraint. Gang Hanger Problem #731B Point #44.

TABLE 4-2 (Cont)

<u>Problem No.</u>	<u>Support No.</u>	<u>Description of Modification or Overstressed Condition</u>	<u>Modified Since August 1, 1979 Submittal</u>	<u>Attributable To:</u>	<u>Resolution</u>
<u>INSIDE REACTOR CONTAINMENT UNLESS NOTED</u>					
731B	SI-C-91	Support member overstressed	No. Note 6	Support Function	Add structural brace.
745	PT 45	Support overstressed	No. Note 6	As-Built	Modify support.
731A	PT 38	Support overstressed	No. Note 6	Support Function	Modify support.
731B	PT 36	Support overstressed	No. Note 6	Support Function	Modify support.
735	PT 20	Support overstressed	No. Note 6	As-Built	Modify support.
735	PT 35	Support overstressed	No. Note 6	As-Built	Modify support.
735	PT 50	Support overstressed	No. Note 6	As-Built	Modify support.

NOTES:

1. Revised Point No.
2. Deleted due to more detailed analysis.
3. Modified due to more detailed analysis.
4. Deleted since this support is ganged with other support and they shall be considered as one support.
5. Deleted since this change is due to stress.
6. Modification outside containment. Added to Table 4-2 as required by the SER.
7. Modification added - Non-Functional Structure to be removed.