ENCLOSURE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2
DBA MOVEMENTS OF SCV
NCR CEB 79-19
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Piping which penetrates the steel containment (SCV) with rigid penetrations or is rigidly attached to SCV was analyzed and designed without adequate consideration for design basis accident (DBA) movements of SCV. Specifically, earlier analysis and design of piping systems penetrating the steel vessel incorrectly accounted for the following:

(1) Most piping systems which penetrate the steel vessel are supported by rigid pipe supports, springs, and/or by mechanical seismic supports (snubbers). However, the containment and piping response to earthquake motion is rapid enough to cause the snubbers to lock up thereby preventing movement of the pipes. In the original analysis of the piping, it was assumed that the snubbers would not lock up during the accident condition.

(2) The displacement of the vessel wall and attached piping (at the point of attachment) was incorrectly assumed to be only outward for the analysis and design of certain piping systems where movement of the vessel wall was considered. However, inward movement of the containment vessel must also be considered where vessel wall movement is important.

(3) In the original analysis of Sequoyah and Watts Bar piping systems, TVA's analysis approach was to conservatively analyze for containment vibratory motion during a DBA inside containment using static displacements. This analysis was consistent with the analysis approach and philosophy which was used at that time for free standing steel containment buildings and was judged to be adequate to encompass inertial effects. It has recently been determined that acceleration effects due to the rapid vibratory movement of the containment vessel may not be adequately considered by the static analysis.

The attached table lists the piping systems by penetrations which are to be reanalyzed to correct this nonconformance. All piping systems listed must be reanalyzed to account for the inertial effects. This reanalysis will envelope any corrective action for the displacement problem. Piping which must be reanalyzed for snubber lockup are identified in the table.

Safety Implications Statement

Had this condition gone uncorrected, certain piping systems would have been overstressed during a DBA and could, as a consequence, result in a breach in containment integrity. This could have adversely affected the safe operation of the plant.

Corrective Action

TVA has generated time history and response spectra data at each containment nozzle location for each of the six primary system DBA's. Using this information, all piping systems having rigid penetrations through the SCV are being reanalyzed giving full consideration for the DBA event. Also, the new DBA movements are being examined with respect to bellows type penetrations by both TVA and the bellows penetration vendor. No problems are anticipated with these penetrations.

The analysis effort is in the final documentation stage for unit 1. Analysis is still in progress for unit 2. Where necessary, supports for piping systems are being relocated or redesigned. All analysis, design, and construction will be completed by November 23, 1979, for unit 1 and before fuel loading for unit 2.

SEQUOYAH NUCLEAR PLANT

Piping Penetrations Affected by NCR CEB 79-19

Penetration Number	System*	Pipe Size	Service	Affected by Snubber Lockup	Sys Reqd for Safe Shutdown
16	CVCS (Supply)	3	Normal charging to Regen Hx	X	
29	CCS (Disch)	6	R.C. Pump Oil Cooler		
35	CCS (Disch)	6	Excess Letdown Hx	X	X**
39A	WDS	1	N2 to Accumulators	X	
39B	WDS	.75	N2 to Pressure Relief Tank	X	
40A	AFW (Supply)	4	Auxiliary Feedwater	X	X
40B	AFW (Supply)	4	Auxiliary Feedwater	X	X
40D	CSAS (Supply)	3	Air supply for H2 Purge	X	
41	WDS	3	Floor Sump Pump Discharge	X	
42	PWS	3	Pressurizer Relief Tank Makeup	X	
43A	CVCS (Supply)	2	Sealwater Injection - RC Pump		
43B	CVCS (Supply)	2	Sealwater Injection - RC Pump		
43C	CVCS (Supply)	2	Sealwater Injection - RC Pump		
43D	CVCS (Supply)	2	Sealwater Injection - RC Pump		
44	CVCS (Disch)	4	Sealwater Return - RC Pump		
48A	Containment Spray	12	Spray Header	X	X
48B	Containment Spray	12	Spray Header	X	X
49A	RHR Spray	8	Spray Header	X	X
49B	RHR Spray	8	Spray Header	X	X
50A	CCS (Disch)	3	RC Pump Thermal Barrier		
50B	CCS (Supply)	3	RC Pump Thermal Barrier		
51	FPS	4	Service to Standpipe Sys inside Cranewll		
52	CCS (Supply)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
53	CCS (Supply)	6	Excess Letdown Hx	X	X**
56	ERCW (Supply)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
57	ERCW (Disch)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
58	ERCW (Supply)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
59	ERCW (Disch)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
60	ERCW (Supply)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
61	ERCW (Disch)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
62	ERCW (Supply)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
63	ERCW (Disch)	6	RCP, CRDM, Lower Cont Vent Cooler	X	
64	ACS	2	Instrument Room Vent Cooler	X	
65	ACS	2	Instrument Room Vent Cooler	X	

SEQUOYAH NUCLEAR PLANT

Piping Penetrations Affected by NCR CEB 79-19

Penetration Number	System*	Pipe Size	Service	Affected by Snubber Lockup	Sys Reqd for Safe Shutdown
66	ACS	2	Instrument Room Vent Cooler	X	
67	ACS	2	Instrument Room Vent Cooler	X	
68	ERCW (Supply)	2	Upper Containment Vent Cooler	X	
69	ERCW (Supply)	2	Upper Containment Vent Cooler	X	
70	ERCW (Disch)	2	Upper Containment Vent Cooler	X	
71	ERCW (Disch)	2	Upper Containment Vent Cooler	X	
72	ERCW (Disch)	2	Upper Containment Vent Cooler	X	
73	ERCW (Disch)	2	Upper Containment Vent Cooler	X	
74	ERCW (Supply)	2	Upper Containment Vent Cooler	X	
75	ERCW (Supply)	2	Upper Containment Vent Cooler	X	
76	CSAS	2	Service Air		
77	DWS	2	Demineralized Water	X	
78	FPS	4	Service to RCP Spray Coverage		
82	Fuel Pool Cooling	6	From Refueling Cavity	X	
83	Fuel Pool Cooling	4	To Refuleing Cavity	X	
110	UHI (Supply)	2	UHI Valve Test Line		
114	ICS	2	Glycol Floor Cooling	X	
115	ICS	2	Glycol Floor Cooling	X	

*For description of acronyms, see next page.

**The CCS piping between the excess letdown heat exchanger and the steel containment vessel is TVA Class B and is required to function as a containment boundry (i.e., a closed system). It is for this reason that it is indicated as required for safe shutdown. The function of supplying and discharging CCS water to and from the heat exchanger is not required for safe shutdown.

SEQUOYAH NUCLEAR PLANT

Piping Penetrations Affected by NCR CEB 79-19

Acronyms	System
CVCS	Chemical Volume and Control System
CCS	Component Cooling System
WDS	Waste Disposal System
AFW	Auxiliary Feedwater System
PWS	Primary Water System
ICS	Ice Condenser System
FPS	Fire Protection System
ERCW	Essential Raw Cooling System
DWS	Demineralized Water System
UHI	Upper Head Injection System
ACS	Air-Conditioning/Chilled Water System