



**INDIANA AND MICHIGAN POWER
D. C. COOK NUCLEAR PLANT
UPDATED FINAL SAFETY ANALYSIS REPORT**

Revised: 26.0
Table: 4.1-10
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Design Thermal and Loading Cycles

Item	Transient	Cycles ¹
Level A Limits (Normal)		
1	Heatup at 100 °F/hr.	200
2	Cooldown at 100°F/hr. (Pressurizer @ 200 °F/hr.)	200
3	Unit Loading at 5% of full power/min.	18,300/11,680 ^{2 3}
4	Unit Unloading at 5% of full power/min.	18,300/11,680 ^{2 3}
5	Step Load Increase of 10% of full power	2,000 ⁴
6	Step Load Decrease of 10% of full power	2,000 ⁴
7	Large Step Decrease in load (with steam dump)	200

¹ For Unit 1 Model 51R replacement steam generator manway and handhole stud preloads, the design considers 100 cycles each of tensioning and detensioning or torquing and detorquing, as appropriate.

² Unit 1 rerating to 3600 MWt.

³ The Unit 1 Model 51R replacement steam generators have been structurally designed for the lower cycle limit for both 3264 MWt and the 3600 MWt power uprate condition. The RCS average temperature and steam temperature will deviate ± 3 °F in one minute. The corresponding RCS pressure variation will be ± 100 psi.

⁴ WCAP-17588-P, D. C. Cook Unit 1 Lower Radial Support Clevis Insert Acceptable Minimum Bolting Pattern Analysis, used 200 Step Load Increase of 10% of full power and 200 Step Load Decrease of 10% of full power transients to qualify the minimum bolting pattern. A new procedural limit was set to account for the lower number of transients allowed for the Unit 1 Clevis Insert Bolts. WCAP-17588-P does not impact any other analyses performed using the transients described in Table 4.1-10.



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Item	Transient	Cycles ¹
8	Hot Standby Operation	18,300 ⁵
9	Turbine Roll Test	10
10	Steady State Fluctuations	Infinite ⁶
Level B Limits (Upset)		
11	Loss of Load (without immediate turbine or Reactor trip)	80
12	Loss of Power (blackout with natural circulation in Reactor Coolant System)	40
13	Loss of Flow (partial loss of flow one pump only)	80
14	Reactor Trip From Full Power	400
15	a) Operational Basis Earthquake (20 events of 20 cycles each event), except Reactor Vessel	400
	b) Operational Basis Earthquake, Reactor Vessel only (10 events of 20 cycles each event)	200
Level C Limits (Emergency)		

⁵ Applies to steam generator only. Reflects cyclic limit for the feed ring of a rapid injection of cold feedwater.

⁶ Reactor coolant system average temperature is assumed to increase and decrease a max. of 6°F in one minute. The corresponding reactor coolant pressure variation is less than 100 psi.



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Item	Transient	Cycles ¹
	None	
Level D Limits (Faulted)		
16	Reactor Coolant Pipe Break (LOCA)	1
17	SSE	1
18	Steam Pipe Break	1
Test Conditions		
19	Primary Side Hydrostatic Tests Before Initial Startup @ 3107 psig	5 ⁷
20	Primary Side ASME Section XI/Field Tests	10 ⁸
21	Secondary Side Hydrostatic Test Before Initial Startup at 1356 psig	5 / 20 ^{8,9}
22	Primary to Secondary Leak Test	50 / 90 ⁸
23	Secondary to Primary Leak Test	120 ⁸

⁷ Unit 1 Model 51R replacement steam generator shop hydro was 3106 psig.

⁸ Unit 1 Model 51R replacement steam generator.

⁹ Unit 1 Model 51R replacement steam generator not subjected to secondary side shop hydro. Leakage test performed after installation in accordance with Code Case N-416-1.