BFN-16

MATRIX 1

BWR OPERATING STATES

CONDITIONS	STATES A	B	C	D	E	F
Reactor vessel head off	X	X				
Reactor vessel head on			X	X	X	X
Shutdown	X		X		X	
Not shutdown		X		X		X
Pressure <825 psig(2)	X(1)	X(1)	X	X		
Pressure >825 psig					X	X

Definition

Shutdown: k_{eff} sufficiently less than 1.0 that the full withdrawal of any one control rod could not produce criticality under the most restrictive potential conditions of temperature, pressure, core age, and fission product concentrations.

NOTES:

(1) Because the reactor vessel head is off in States A and B, pressure is atmospheric pressure.

(2) At less than 825 psig, the main steam line isolation valves are interlocked closed when the mode switch is in RUN.

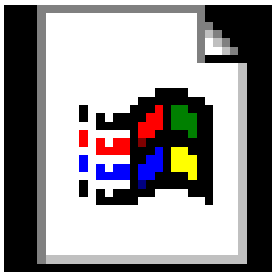
MATRIX 2 Sheet 1

TYPES OF OPERATIONS AND EVENTS APPLICABLE IN EACH BWR OPERATING STATE

TYPES OF OPERATION AND EVENTS	BWR OPERATING STATE A	B	C	D	E	F
PLANNED OPERATION						
1. Refueling Outage	X	X				
2. Achieving Criticality	X	X	X	X	X	X
3. Heatup				X		X
4. Power Operation						X
5. Achieving Shutdown		X		X		X
6. Cooldown	X		X		X	
7. (Open)						
8. (Open)						
9. (Open)						
10. (Open)						
11. (Open)						
ABNORMAL OPERATIONAL TRANSIENTS						
Nuclear System Pressure Increase						
12. Generator trip				X		X
13. Turbine trip (with bypass)				X		X
14. Isolation of all main steam lines			X	X	X	X
15. Isolation of one main steam line			X	X	X	X
16 Loss of vacuum (turbine trip without bypass)			X	X	X	X
Moderator Temperature Decrease						
17. (Open)						
18. Loss of feedwater heating						X
19. Shutdown cooling (RHRS) malfunction (temperature decrease)	X	X	X	X		
20. Inadvertent Pump Start (temperature decrease)	X	X	X	X	X	X
Reactivity Insertion						
21. Control rod withdrawal error	X	X	X	X	X	X
22. Fuel assembly insertion	X					
23. Control rod removal	X					
24. (Open)						
Loss of Coolant Inventory						
25. Pressure regulator failure			X	X	X	X
26. Inadvertent opening of a relief or safety valve	X	X	X	X	X	X

MATRIX 2 (Continued) Sheet 2

TYPES OF OPERATION AND EVENTS	BWR OPERATING STATE A	B	C	D	E	F
27. Loss of feedwater flow			X	X	X	X
28. Total loss of off-site power	X	X	X	X	X	X
Core Coolant Flow Decrease						
29. Recirculation flow control failure decreasing flow			X	X	X	X
30. Trip of one recirculation pump			X	X	X	X
31. Trip of two recirculation pumps			X	X	X	X
32. Recirculation pump seizure			X	X	X	X
Core Coolant Flow Increase						
33. Recirculation flow control failure increasing flow			X	X	X	X
34. Startup of idle recirculation pump	X	X	X	X	X	X
Core Coolant Temperature Increase						
35. Loss of shutdown cooling	X	X	X	X		
Excess of Coolant Inventory						
36. Feedwater Controller failure-maximum demand			X	X	X	X
ACCIDENTS						
37. (Open)						
38. Control rod drop accident			X	X	X	X
39. Pipe breaks inside primary containment			X	X	X	X
40. Fuel-handling accident	X	X	X	X	X	X
41. Pipe breaks outside primary containment			X	X	X	X
42. (Open)						
43. (Open)						
SPECIAL EVENT						
44. Loss of habitability of the control room	X	X	X	X	X	X
SPECIAL EVENT						
45. Ability to shut down reactor without control rods		X		X		X
46. (Open)						
47. (Open)						



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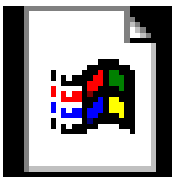

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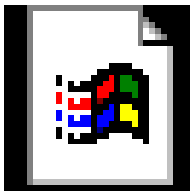

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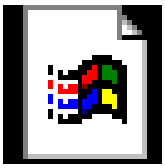

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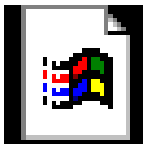

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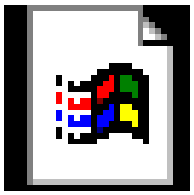

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