

**ATTACHMENT 10
HEP Evaluation Related to Shutdown Cooling Isolation**

**1RHOPRPRVSDP-H--, OPERATOR FAILS TO ISOLATE PRVs - EDG 1B
OUTAGE SDP**

Plant	Data File	File Size	File Date	Record Date
Clinton				

HEP Summary		
	Failure Probability	Total HEP
Diagnosis	2.02E-03	
Action	2.00E-02	2.20E-02

RAW	FV	Risk Significant
0.00E+00	0.00E+00	N/A

Plant	
Initiating Event	
Basic Event Context	

Timing Analysis	
Time available for cognition and recovery	180 Minutes
Time available for recovery	180 Minutes
SPAR-H Available time (cognitive)	180 Minutes
SPAR-H Available time (execution) ratio	2.2 Minutes
EPRI Minimum level of dependence for recovery	ZD

Notes

Time Available: 6 hours (GOTHIC plots are based on 6 hour response, but actual time available, also per GOTHIC, is closer to 9 before PRVs may be challenged).

Tdelay - 1/2 hour for going through procedures (if Tdelay is increased, Tsw should also be increased)

Texe - 2.5 hours - need RP brief (1/2 hour) plus transit time (1/2 hour) (steam tunnel, security checkpoint, not hot during shutdown, need clothing, flashlight, etc.), plus closing valve. Texe remains the same regardless of Tdelay. Texe x 2 = 5 hours; Tsw = 6 or more hours. Thus, Tsw > 2x Texe (and is greater than 30 minutes) Select "Extra" time in Cognitive for conservatism.

PART I. DIAGNOSIS		
PSFs	PSF Levels	Multiplier for Diagnosis
Available Time (recommended choice based on timing information in bold)	Inadequate Time	P(failure) = 1.0
	Barely adequate time (~2/3 x nominal)	10
	Nominal time	1
	Extra time (between 1 and 2 x nominal and > than 30 min)	X 0.1
	Expansive time (> 2 x nominal and > 30 min)	0.01
	Insufficient information	1

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Stress	Extreme		5
<i>Assume NRC's Choice Letter level</i>	High	X	2
	Nominal		1
	Insufficient information		1
Complexity	Highly complex		5
	Moderately complex		2
<i>Portable light, otherwise straightforward</i>	Nominal	X	1
	Obvious diagnosis		0.1
	Insufficient information		1
Experience/Training	Low		10
<i>Operators have performed before</i>	Nominal	X	1
	High		0.5
	Insufficient information		1
Procedures	Not available		50
	Incomplete		20
	Available, but poor		5
<i>Exist</i>	Nominal	X	1
	Diagnostic/symptom oriented		0.5
	Insufficient information		1
Ergonomics/HMI	Missing/Misleading		50
	Poor		10
<i>Nominal for diagnosis</i>	Nominal	X	1
	Good		0.5
	Insufficient information		1
Fitness for Duty	Unfit		P(failure) = 1.0
	Degraded Fitness		5
	Nominal	X	1
	Insufficient information		1
Work Processes	Poor		2
	Nominal	X	1
	Good		0.8
	Insufficient information		1
Diagnosis HEP	2.02E-03		

PART II. ACTION			
PSFs	PSF Levels		Multiplier for Diagnosis
Available Time (recommended choice based on timing information in bold)	Inadequate Time		P(failure) = 1.0
	Time available is about the time		10
<i>Margin exists</i>	Nominal time	X	1
	Time available >= 5x the time		0.1
	Time available is >= 50x the time		0.01
	Insufficient Information		1
Stress/Stressors	Extreme		5
<i>Assume NRC's Choice Letter level</i>	High	X	2
	Nominal		1
	Insufficient Information		1

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Complexity	Highly complex		5
	Moderately complex		2
<i>Does not change just because there is SBO</i>	Nominal	X	1
	Insufficient Information		1
Experience/Training	Low		3
<i>Operators have performed before</i>	Nominal	X	1
	High		0.5
	Insufficient Information		1
Procedures	Not available		50
	Incomplete		20
	Available, but poor		5
<i>Exist</i>	Nominal	X	1
	Insufficient Information		1
Ergonomics/HMI	Missing/Misleading		50
<i>Assume poor due to entering steam tunnel</i>	Poor	X	10
	Nominal		1
	Good		0.5
	Insufficient Information		1
Fitness for Duty	Unfit		P(failure) = 1.0
	Degraded Fitness		5
	Nominal	X	1
	Insufficient Information		1
Work Processes	Poor		5
	Nominal	X	1
	Good		0.5
	Insufficient Information		1
Action.Probability	2.00E-02		

PART III. DEPENDENCY	
Crew	N/A
Time	N/A
Location	N/A
Cues	N/A
Dependency Level	Zero
Diagnosis	2.02E-03
Total	2.20E-02

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Crew	Time	Location	Caes	Level of Dependency	
same	close in time	same	no additional	Complete	
			additional	Complete	
		different	no additional	High	
			additional	High	
	not close	same	no additional	High	
			additional	Moderate	
		different	no additional	Moderate	
			additional	Low	
	different	close in time	same	no additional	Moderate
				additional	Moderate
		different	same	no additional	Moderate
				additional	Moderate
not close	same	no additional	Low		
		additional	Low		
different	not close	different	no additional	Low	
			additional	Low	
zero				<u>Zero</u>	