

bestps2 r/p2.doc

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## SPAR HRA Human Error Worksheet (Page 1 of 3) Best Case

Plant: \_\_\_\_\_ Initiating Event: \_\_\_\_\_ Sequence Number: \_\_\_\_\_ Basic Event Code: HEP-SFP-STRLP2

Basic Event Context: \_\_\_\_\_

Basic Event Description: \_\_\_\_\_

Does this task contain a significant amount of diagnosis activity? YES (start with Part I, p. 1) NO X (skip Part I, p. 1; start with Part II, p. 2) Why? \_\_\_\_\_

## Part I. DIAGNOSIS

A. Evaluate PSFs for the diagnosis portion of the task.

PSFs	PSF Levels	Multiplier for Diagnosis	If non-nominal PSF levels are selected, please note specific reasons in this column
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Available Time	Inadequate time	P(failure) = 1.0	
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Barely adequate time <20 min	10	
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Nominal time $\approx$ 30 min	1	
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Extra time >60 min	0.1	
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Expansive time >24 hrs	0.01	
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Stress	Extreme	5
	High	2
	Nominal	1

Complexity	Highly complex	5
	Moderately complex	2
	Nominal	1
	Obvious diagnosis	0.1

Experience/Training	Low	10
	Nominal	1
	High	0.5

Procedures	Not available	50
	Available, but poor	5
	Nominal	1
	Diagnostic/symptom oriented	0.5

Ergonomics	Missing/Misleading	50
	Poor	10
	Nominal	1
	Good	0.5

Fitness for Duty	Unfit	P(failure) = 1.0
	Degraded Fitness	5
	Nominal	1

Work Processes	Poor	2
	Nominal	1
	Good	0.8

B. Calculate the Diagnosis Failure Probability

H/20

(1) If all PSF ratings are nominal, then the Diagnosis Failure Probability = 10E-2

(2) Otherwise,	Time	Stress	Complexity	Experience/ Training	Procedures	Ergonomics	Fitness for Duty	Work Processes	=	
Diagnosis: 10E-2x	x	x	x	x	x	x	x	x		
										Diagnosis Failure Probability

**SPAR HRA Human Error Worksheet (Page 2 of 3) Best Case**Plant: \_\_\_\_\_ Initiating Event: \_\_\_\_\_ Sequence Number: \_\_\_\_\_ Basic Event Code: HEP-SFP-STRLP2

Basic Event Context: \_\_\_\_\_

Basic Event Description: \_\_\_\_\_

**Part II. ACTION**

A. Evaluate PSFs for the action portion of the task.

PSFs	PSF Levels	Multiplier for Action	If non-nominal PSF levels are selected, please note specific reasons in this column
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Available Time	Inadequate time	P(failure) = 1.0	<b>Expansive time due to boil off and leakage ratios.</b>
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Time available $\approx$ time required	10		
Nominal time	1		
Time available $> 50 \times$ time required	0.01	X	

Stress	Extreme	5	X	<b>Stress extreme due to severe weather.</b>
	High	2		
	Nominal	1		

Complexity	Highly complex	5		<b>Complexity increased due to severe weather.</b>
	Moderately complex	2	X	
	Nominal	1		

Experience/Training	Low	3	
	Nominal	1	X
	High	0.5	

Procedures	Not available	50	
	Available, but poor	5	
	Nominal	1	X

Ergonomics	Missing/Misleading	50		<b>Human machine interface degraded due to severe weather, cold, wet, slippery.</b>
	Poor	10	X	
	Nominal	1		
	Good	0.5		

Fitness for Duty	Unfit	P(failure) = 1.0	
	Degraded Fitness	5	
	Nominal	1	X

Work Processes	Poor	5		<b>Crew and procedures that interact well in a good facility.</b>
	Nominal	1		
	Good	0.5	X	

B. Calculate the Action Failure Probability

(1) If all PSF ratings are nominal, then the Action Failure Probability =  $10E-3$

(2) Otherwise,	Time	Stress	Complexity	Experience/ Training	Procedures	Ergonomics	Fitness for Duty	Work Processes	
Action: 10E-3	<u>x.01</u>	<u>x5</u>	<u>x2</u>	<u>x1</u>	<u>x1</u>	<u>x10</u>	<u>x1</u>	<u>x.5</u>	= <u>5E-4</u> Action Failure Probability

### SPAR HRA Human Error Worksheet (Page 3 of 3) Best Case

Plant: \_\_\_\_\_ Initiating Event: \_\_\_\_\_ Sequence Number: \_\_\_\_\_ Basic Event Code: HEP-STP-STRLP2

#### PART III. CALCULATE THE TASK FAILURE PROBABILITY WITHOUT FORMAL DEPENDENCE ( $P_{w/od}$ )

Calculate the Task Failure Probability Without Formal Dependence ( $P_{w/od}$ ) by adding the Diagnosis Failure Probability (from Part I, p.1) and the Action Failure Probability (from Part II, p. 2).

If all PSFs are nominal, then

Diagnosis Failure Probability: \_\_\_\_\_ - \_\_\_\_\_

Diagnosis Failure Probability: 10E-2

Action Failure Probability: + \_\_\_\_\_

Action Failure Probability: +10E-3

Task Failure Without  
Formal Dependence ( $P_{w/od}$ ) = \_\_\_\_\_

$P_{w/od} = 1.1 \times 10E-2$

#### Part IV. DEPENDENCY

For all tasks, except the first task in the sequence, use the table and formulae below to calculate the Task Failure Probability With Formal Dependence ( $P_{wd}$ ).

If there is a reason why failure on previous tasks should not be considered, explain here: \_\_\_\_\_

**Dependency Condition Table**

Crew (same or different)	Time (close in time or not close in time)	Location (same or different)	Cues (additional or not additional)	Dependency	Number of Human Action Failures Rule - Not Applicable. Why? _____
Same	Close	Same	-	complete	If this error is the <b>3rd error in the sequence</b> , then the dependency is at least <b>moderate</b> .  If this error is the <b>4th error in the sequence</b> , then the dependency is at least <b>high</b> .  This rule may be ignored only if there is compelling evidence for less dependence with the previous tasks. Explain above.
		Different	-	high	
	Not Close	Same	No Additional	high	
			Additional	moderate	
		Different	No Additional	moderate	
			Additional	low	
Different	Close	-	-	moderate	
	Not Close	-	-	low	

Using  $P_{w/od}$  = Probability of Task Failure Without Formal Dependence (calculated in Part III, p. 3):

For Complete Dependence the probability of failure is 1.

For High Dependence the probability of failure is  $(1 + P_{w/od})/2$

For Moderate Dependence the probability of failure is  $(1 + 6 \times P_{w/od})/7$

For Low Dependence the probability of failure is  $(1 + 19 \times P_{w/od})/20$

For Zero Dependence the probability of failure is  $P_{w/od}$

Calculate  $P_{w/d}$  using the appropriate values:

$(1 + ( \quad * \quad ))/ \quad = \quad \text{Task Failure Probability With Formal Dependence } (P_{wd})$