DC - RECATLOWT, COC Idaho National Engineering & Environmental Laboratory

SPAR HRA	Worksheet	DRAFT	1/12/99
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Plant: Initiat	ting Event: Sequence	Number:	Basic Event Code: <u>HEP-RECG-FW-WI</u>
Basic Event Context	:		
Basic Event Descript	tion:		· · ·
Does this task contain a	significant amount of diagnosis	activity? YES X	(start with Part I, p. 1) NO (skip Part I, p. 1; start with Part II, p
			SIS
A. Evaluate PSFs for th	e 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
vailable Time	Inadequate time	P(failure) = 1.0	Extra time is available due to leakage and boil off ratio.
	Barely adequate time <20 min	10	
	Nominal time ≈_30 min	1	·····
	Extra time >60 min	0.1 X	
	Expansive time >24 hrs	0.01	
tress	Extreme	5	Operator has had alarms, recognizes there is problem.
	High Nominal	2 X 1	·····
Complexity	Highly complex	5	····
	Moderately complex	2	
	Nominal Obvious diagnosis	1 X 0.1	
xperience/Training	Low	10	Assumes a highly trained staff.
suberreiter training	Nominal	1	
	High	0.5 X	****
rocedures	Not available	50	Assumes procedures that are inadequate.
	Available, but poor	5	••••
	Nominal	1	
	Diagnostic/symptom oriented	0.5 X	
Ergonomics	Missing/Misleading	50	Assumes alarms for temperature and level.
	Poor	10	·····
	Nominal	1	
	Good	0.5 X	
itness for Duty	Unfit	P(failure) = 1.0	
	Degraded Fitness	5	
	Nominal	1 X	
Work Processes	Poor	2	Assumes a crew and procedures that interact well in a good facility.
	Nominal	1 X	

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B. Calculate the Diagnosis Failure Probability

(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-2	x <u>.1</u>	x <u>2</u>	x <u>1</u>	x <u>.5</u>	x <u>.5</u>	x <u>1</u>	x <u>1</u>	x <u>.8</u>	= <u>2E-4</u> Diagnosis
									Failure Probability

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SPAR HRA	Worksheet	DRAFT	1/12/99
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SPAR HRA Human Error Worksheet (Page 2 of 3) Best Case						
Plant: Initiat	ting Event: Sequer	nce Number:	Basic Event Code: <u>HEP-RECG-FW-WI</u>			
Basic Event Context	:					
Basic Event Descript	tion:					
A. Evaluate PSFs for th	e action portion of the task.	Part II. AC	TION			
rors	FOI LEVEIS	Action	specific reasons in this column			
Available Time	Inadequate time	P(failure) = 1.0				
	Time available ≈ time required	10				
	Nominal time Time available>50 x time required	0.01	••			
Stress	Extreme High Nominal	5 2 1				
Complexity	Highly complex Moderately complex Nominal	5 2 1				
Experience/Training	Low Nominal High	3 1 0.5	······································			
Procedures	Not available Available, but poor Nominal	50 5 1				
Ergonomics	Missing/Misleading Poor Nominal	50 10 1				
Fitness for Duty	Good Unfit	0.5 P(failure) = 1.0				
	Degraded Fitness Nominal	5	••••••••••••••••••••••••••••••••••••••			
Work Processes	Poor Nominal Good	5 1 0.5	····			

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/ Procedures Ergonomics Fitness Work Training for Duty Processes

Action: 10E-3	x	x	х	x	x	x	x	х	=
									Action Failure Probability

SPAR HRA Human Error Worksheet (Page 3 of 3) Best Case							
Plant: Initiating Event: Sequence Number: Basic Event Code: <u>HEP- RECG-FW-WI_</u>							
PART III. CALCULA	PART III. CALCULATE THE TASK FAILURE PROBABILITY WITHOUT FORMAL DEPENDENCE $(P_{W/OD})$						
Calculate the Task Failure Pr p.1) and the Action Failure P	obability Witl robability (fro	hout Formal Dependence (P _{w/od}) by a om Part II, p. 2).	adding the Diagnosis Failure Probabi	lity (from Part I,			
			If all PSFs are nomina	l, then			
Diagnosis Failure Probability	: _		Diagnosis Failure Probability:	10E-2			
Action Failure Probability:	+_		Action Failure Probability:	<u>+10E-3</u>			
Task Failure Without Formal Dependence (P _{w/od})	=		P _(w/od)	= 1.1x10E-2			

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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:

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		D	ependency (Condition Ta	able
Crew (same or	Time (close in	Location	Cues (additional or	Dependency	Number of Human Action Failures Rule
different)	time or not close in time	different)	not additional)		- Not Applicable. Why?
Same	Close	Same	-	complete	If this error is the 3rd error in the sequence , then the dependency is at least moderate .
					If this error is the 4th error in the sequence, then the dependency is at least high.
					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 $(1+19 \text{ x P}_{w/od})/20$

For Zero Dependence the probability of failure is $P_{w \mbox{\scriptsize red}}$

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

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