
 EUROPEAN SPALLATION SOURCE	GENERAL REPORT		Document ID ESS-0062443		
	Project/Area/Building Gallery Buildings G02		Responsible Discipline and Company PS01 Sweco Industry AB		
	CF Description Process risk analysis G02		Work Package Leader Kennet Lindström		
			Date 2016-07-01		
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Gallery Buildings G02
Process risk analysis G02
For Construction

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DOCUMENT REVISION HISTORY

Revision	Reason for revision	Date
1	Issued for Construction	2016-07-01

List of Authors	List of Reviewers	List of Approvers
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Appendix 1 ESS ACC PID 2016-05-13 with positions from risk analysis

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1. GENERAL

1.1 Risk analysis method


As method for the risk analysis was "What-if" chosen. The choice of method was made together with Per Eriksson at Eriksson risk consulting AB. The process was analysed by P&ID, following the process flow. See the protocols below.


1.2 Risk analysis sessions

One risk analysis session in 2016-05-13 to cover function changes in the systems since last analyses was held in 2015-01-12 and 2015-02-12.

Participants in the sessions as below:


Name (abr.)	Company	Discipline/Function	2016-05-13	
Per Eriksson (PE)	Eriksson Risk consulting	Analysis leader	X	
Fredrik Lauritzson (FL)	SWECO	Secretary/Process	X	
Kennet Lindsröm (KL)	SWECO	Work pack leader	X	
Bengt Svanlind (BS)	ÅF	System owner	X	
Jarmo Niemi (JN)	SWECO	El/Instr./Aut	X	

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	Miso Filipovic (FM)	SWECO	Process	X	
	Thomas Hjern (TH)	ÅF	System owner	X	


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2. ANALYSIS PROTOCOLS


Item	Tag no	What if?	Causes	Consequence	Taken Action	Recommended Action	Resp.	Action Date
<i>PID: PS0152F—8-G-----001</i>								
1	HV566	Open when it is supposed to be closed.	Manual failure.	Low pressure to consumers. The system is not dimensioned for full redundancy.	PT-016, PT-017	-		
<i>PID: PS0155---8-G-----002</i>								
2	HV037 HV038	Open when it is supposed to be closed.	Manual failure.	Low flow to consumers. The system is not dimensioned for full redundancy.	Consumer s can handle total cooling cut-off.	-		
<i>PID: PS0155---8-G-----003</i>								


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Item	Tag no	What if?	Causes	Consequence	Taken Action	Recommended Action	Resp.	Action Date
3	HV099 HV100	Open when it is supposed to be closed.	Manual failure.	Low flow to consumers. The system is not dimensioned for full redundancy.	Consumers can handle total cooling cut-off.	-		
<i>PID: PS0155---8-G-----004</i>								
4	HV181 HV183	Open when supposed to be closed.	Manual failure	Too high pressure to consumers.	-	Suggestion interlocking system HV238 HV239 HV178 HV179 closed before opening HV230 HV231 HV181 HV183	ESS	
<i>PID: PS0155---8-G-----005</i>								


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5	HV410 HV411	Open when it is supposed to be closed.	Manual failure.	Loss of media to floor.	Caps on HV410 and HV411	-		
6	HV412	Closed when supposed to be open.	Manual failure.	Bad water quality if no circulation.	-	Change dimension to DN25	MF	2016-07-01
7	HV417 HV418	Open when it is supposed to be closed.	Manual failure.	Loss of media to floor.	Caps on HV417 and HV418	-		
8	HV419	Closed when supposed to be open.	Manual failure.	Bad water quality if no circulation.	-	Change dimension to DN25	MF	2016-07-01
PID: PS0155---8-G-----006								

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9	HV041 HV042	Open when it is supposed to be closed.	Manual failure.	Low flow to consumers. The system is not dimensioned for full redundancy.	Consumer s can handle total cooling cut-off.	-		
<i>PID: PS0155---8-G-----007</i>								
10	HV230 HV231	Open when supposed to be closed.	Manual failure	Too high pressure to consumers.	-	Suggestion interlocking system HV238 HV239 HV178 HV179 closed before opening HV230 HV231 HV181 HV183	ESS	
<i>PID: PS0155---8-G-----008</i>								


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11	HV270 HV271	Open when it is supposed to be closed.	Manual failure.	Low flow to consumers. The system is not dimensioned for full redundancy.	Consumer s can handle total cooling cut-off.	-		
<i>PID: PS0155---8-G-----010</i>								
12	HV458 HV459 HV460	Closed when it is supposed to be open	Manual failure.	No cooling in HVAC F03.	-	-		
13	CV002 TT005 TC005	CV002 Open more than intended.	Failure in control loop.	If CV002 Fully open, minor disturbances in CWL to Klystron gallery consumers. Minor problems in HVAC	-	-		

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14	CV002 TT005 TC005	CV002 Open less than intended.	Failure in control loop.	Less cooling in HVAC F03.	-	-		
15	HE003	Leakage in HE003		Leakage of water from HVAC system to main cooling system.	-	Move CV002 to after HE003. Maximum 4 barg operating pressure in HVAC system.	MF BS	2016-07-01
16	HV461 HV462	Closed when it is supposed to be open	Manual failure.	No cooling in HVAC F03.	-	-		
<i>PID: PS0155---8-G-----009</i>								
17	HV675 HV674	Closed when it is supposed to be open	Manual failure	Process disturbances.	-	-		

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Item	Tag no	What if?	Causes	Consequence	Taken Action	Recommended Action	Resp.	Action Date
18	HV676	Open when it is supposed to be closed.	Manual failure	High pressure to consumers.	RV002	Minimize size of HV676	FL	2016-07-01
						Dimension RV002 for fully open HV676 and CV012	FL	2016-07-01
19	CV012 PC013	Open more than intended	Failure in control loop.	High pressure to consumers.	RV002	Dimension RV002 for fully open HV676 and CV012	FL	2016-07-01
20	CV012 TC012	Too high temperature to consumers.	Failure in control loop.	Damage of consumers.	Consumer s can handle temperature failure in cooling water.	Consider CV012 Fail Last (FL)	FL	2016-07-01
21	FT005	Fail function		Only indication	-	-		



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22	RV002	Failure to open.		High pressure.	Schedule d test of RV002 included in maintenance program.	Dimension for flow with fully open CV012 and HV676. Or 10% back flow NRV028.	FL	2016-07-01
23	DPC005 PT015 PT013	Measure too low DP		Too high flow and DP. Risk for cavitation.	-	Move PT014 to suction side	MF	2016-07-01
24	DPC005 PT015 PT013	Measure too high DP		Higher delta T and lower flow to consumers.	-	-		
25	HV343 HV347	Closed when it is supposed to be open.		Cavitation	Instructio n	GS needed on these valves?	FL	2016-07-01

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26	PU004A/B	Overspeed Frequency converter				Check earlier risk analysis	FL	2016-07-01
27	HV346 HV350					GS needed on these valves?	FL	2016-07-01
28	NRV022	Failure		None	-	-		
29	NRV028	Failure		Backflow maximum 10 barg to consumers	RV002	Check dimensioning	FL	2016-07-01
30	HV432 HV433	Open when it is supposed to be closed.	Manual failure.	Loss of media to floor.	Caps on HV432 and HV433	-		
31	HV431	Closed when supposed to be open.	Manual failure.	Bad water quality if no circulation.	-	Change dimension to DN25	MF	2016-07-01