

Annexure C – HAZOP Worksheets

Node: 1. Non phenolic sour water flash drum system

Drawings / References:

Deviation	Cause	Consequence	Safeguards	Recommendations	Resp
1. No/Less Flow of non phenolic sour water from the refinery	1. Less production of sour water in the refinery	1.1. Possible loss of feed to the non phenolic sour water storage tank since the level in the sour water partition of the sour water flash drum is controlled by the flow to the non phenolic sour water storage tank. However, this may lead to possible blocked out conditions for the non phenolic sour water flash drum pump	1.1.1. FI-0101 is available		
			1.1.2. The non phenolic sour water flash drum pump is provided with dual mechanical seals		
			1.1.3. Газодетекторы предусматриваются в соответствии с принципами проекта		
			1.1.4. Spare pump is available		
	2. Train 1 is isolated by closing the B/L valve	2.1. Possible blocked out condition on the inlet line to Train 1 flash drum which may lead to overpressurization with sour water flowing from high pressure units	2.1.1. PSV-0001-1/2 is available on the inlet line to take care of overpressurization		
2. No Flow of fuel gas to the non phenolic sour water flash drum	1. Malfunction and closure of PV-0101A	1.1. Possible decrease of pressure in the drum, however, no vacuum formation is expected as the level is maintained H ₂ S may flash inside the drum and the drum is floating with SRU. Hence, no consequences			
3. No Flow of flash gas from the non phenolic sour water flash drum to SRU	1. Malfunction and closure of PV-0101B	1.1. Possible overpressurization of the drum as the flashed H ₂ S is not released from the drum	1.1.1. PSV-0101-1/2 is available on the drum to release the pressure in the worst case		
4. No Flow of slop oil from the drum to tank 311_1/1	1. Choking of the strainer available at the slop oil pump section	1.1. Possible cavitation of the slop oil pump in the worst case	1.1.1. PDI-0105 is available locally. Regular maintenance procedure is followed		
	2. Non-starting of slop oil pump when required due	2.1. In the worst case, slop oil skimmer inside the drum may overflow and contaminate the sour water flowing to the storage tank	2.1.1. LI-0102 is available to give high alarm 2.1.2. LI-0101 is available to give high alarm, Однако это часть неисправного контура.	1. As per client requirement, review the taping for LT-0101 and LT-0102 from the same standpipe from the point view of Kazakhstan standards	Contractor

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	malfunction of DCS interlock		2.1.3. Floating oil skimmer is available in the non phenolic sour water storage tank	that require separate level connections for interlock and level indication.	
5. No Flow of the sour water to non phenolic sour water storage tank	1. Choking of the strainer available at the non phenolic sour water storage tank	1.1. Possible cavitation of the non phenolic sour water storage tank pump in the worst case	1.1.1. PDI-0110 is available locally. Regular maintenance procedure is followed		
			1.1.2. Spare pump is available		