

LineVu Uses and Benefits

Problem	Process	Location	Comment	Improves process safety	Improves profit	Reduces use of chemicals	Reduces downtime	Reduces risk to asset integrity	Challenge process limits to be challenged	Evidence for pipeline entry agreements
UPSTREAM										
1	Hydrates	N/A	Well head	Allows correct dosing of MEG or Methanol	✓	✓		✓	✓	
2	Hydrate and HC Liquids	Desulphurisation	Amine contactor inlet	HC liquids contaminate the Amine and cause foaming	✓	✓	✓	✓	✓	✓
3	Foaming and blockages on bubble trays	Desulphurisation	Between bubble trays in amine contactor	Early detection of foaming and blockages	✓	✓	✓	✓	✓	✓
4	Amine Carry-over and foaming	Desulphurisation	Amine contactor outlet	Allows quick diagnosis of process problem so that operators can take action	✓	✓	✓	✓	✓	✓
5	Amine and HC liquid carry-over and foaming	Dehumidification	Glycol contactor inlet	Allows quick diagnosis of process problem so that operators can take action	✓	✓	✓	✓	✓	✓
6	Foaming and blockages on bubble trays	Dehumidification	Between bubble trays in glycol contactor	Early detection of foaming and blockages	✓	✓	✓	✓	✓	✓
7	Glycol carry-over and foam	Dehumidification	Glycol contactor outlet	Allows quick diagnosis of process problem so that operators can take action	✓	✓	✓	✓	✓	✓
8	Liquid Carry-over causes bed to “concrete” and fail	Removal of Mercury	Mercury absorber bed inlet	Alarms upon liquid event to protect the asset and reduce downtime	✓	✓	✓	✓	✓	
9	Glycol carry-over freezes in DP unit	Removal of NGL	Dew pointing equipment inlet	Alarms upon liquid event to protect the asset and reduce downtime	✓	✓	✓	✓	✓	
10	Fouling and scaling build up	Cooling or heating of gas	Heat exchangers	Allows optimisation of scale inhibitor and de-scaling operations	✓	✓	✓	✓	✓	
11	Investigate process limits	Various	De-bottlenecking projects	Allows safe observation of processes to allow increase in production		✓	✓		✓	
12	Numbers from liquid measurement system are not always believable	Liquid Level alarm	Vessels containing combustible liquids	Provides operators extra confidence by being able to see inside vessel	✓				✓	
13	When extra wells come on stream. Only CFD models are used to determine if the current assets will cope with higher flows	In-situ flow tests	Gas/liquid separator outlet	In-situ flow tests can be performed to establish maximum flow and alternative options		✓			✓	
14	Dew point detection	Various	Various	Alarms when gas hits either the water or HC dew point and shows operators how much free liquid is present	✓	✓		✓	✓	✓
15	Ensures gas meets pipeline entry requirements for entrained liquids	N/A	Export Line	Provides proof to customer that gas is clean - Allows operators to take rapid action when a liquid event occurs	✓				✓	✓

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MIDSTREAM																												
16	Gas containing liquids breaks tariff agreements and safety standards	Purchase/Sale of gas	Custody transfer points	Buyers have indisputable evidence on which to base a compensation claim or renegotiate price		✓	✓																					
17	Orifice plate flow meter over-read if gas is wet	Flow Measurement	Custody transfer points	Buyer can correct flow rates for wet gas when system is in alarm			✓																					
18	System needs to be de-pressurized to remove orifice plate for audit	Audit orifice plate dimensions in-situ	Custody transfer points	A LineVu system can permanently monitor orifice shape and dimensions in-situ		✓	✓																					
19	Liquids at inlet, or in the gas seal, will cause major damage to compressor	Increases line pressure for better gas flows	Compressor station inlet	Allows rapid action to prevent damage to compressors		✓	✓																					
20	Dew point detection	Various	Various	Alarms when gas hits either the water or HC dew point and shows operators how much free liquid is present		✓	✓																					
DOWNSTREAM																												
21	Gas is bought on a "dry gas" basis. Problems can occur for the buyer of the gas is wet	Purchase of gas	Custody transfer points	Buyers have indisputable evidence on which to base a compensation claim or renegotiate price		✓	✓																					
22	Wet gas can cause major damage to turbine blades	Purchase of gas	Gas turbine entry	Buyers can take immediate action to avoid damage and claim compensation or renegotiate price		✓	✓																					
23	Many catalysts suffer major damage by liquids or the combination of liquids and acid gases	A variety of catalysts are used in refineries and petro. chem plants	Entry to catalyst bed	Alerts operators to take rapid action to avoid damage		✓	✓	✓	✓	✓																		
24	Mol. Sieve suffers major damage when liquids are present at the entry point	Gas drying to below 1 ppm water vapour	Entry to Molecular sieve beds in LNG plants	Alerts operators to take rapid action to avoid damage		✓	✓	✓	✓	✓																		
25	When liquid water is present in superheated steam, large amounts of carbon are produced and cause blockages	Ethylene cracker	Steam inlet to cracker	Alerts operators to take rapid action to avoid damage		✓	✓																					
26	Foaming and blockages can reduce efficiency	Distillation	Between bubble trays	Alerts operators to take rapid action to avoid damage		✓	✓	✓	✓	✓																		
27	Popcorn butadiene causes damage to plant and loss of containment	Production of Butadiene	Various	Alerts operators to take rapid action to avoid damage		✓	✓																					
28	Benzene and other liquids can cause blockages	LNG Production	Liquefaction inlet	Alerts operators to take rapid action to avoid damage		✓	✓																					
29	Numbers from liquid measurement system are not always believable	Liquid Level alarm	Vessels containing combustible liquids	Provides operators extra confidence by being able to see inside vessel		✓	✓																					
30	Fouling and scaling build up	Cooling or heating of gas	Heat exchangers	Allows optimisation of scale inhibitor and de-scaling operations		✓	✓	✓	✓	✓																		
31	Investigate process limits	Various	De-bottlenecking projects	Allows safe observation of processes to allow safe increase in production			✓	✓																				
32	Dew point detection	Various	Various	Alarms when gas hits either the water or HC dew point and shows operators how much free liquid is present		✓	✓																					