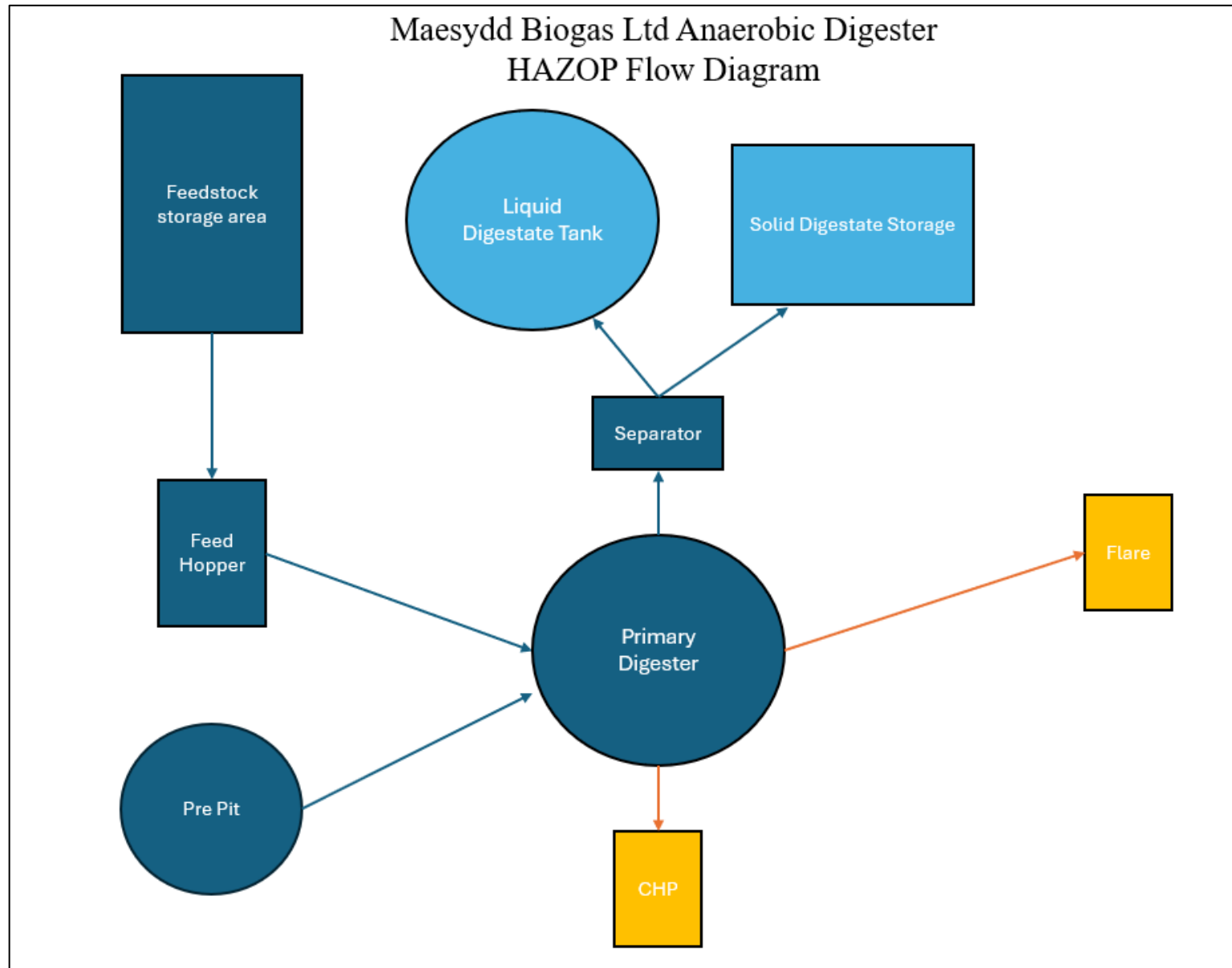




Alligator/Mix box

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	No Feed into Mix Box	Electric Motor Failure	No Feed into Digester	Low Level Alarm	Scheduled Inspections and Maintenance
		Mechanical Failure			
LESS	Low Feed into Mix box	Electric Motor Failure	Less Feed into Digesters	Low Level Alarm	Scheduled Inspections and Maintenance
		Mechanical Failure		Alarm on Time Switch	
More	High Feed into Mix box	Weigher Failure	More Feed into Digester	High Level Alarm	Scheduled Inspections and Maintenance
		Electrical			

Mix box Feed Pump

GUIDE WORD		DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS
ACTION REQUIRED NO Alarm	No Flow into Mix Box	Valve Failure	No Flow into Digester	Low Level	Scheduled Inspections and Maintenance
		Pipe Blocked			
LESS Alarm	Low Flow into Mix box	Valve Part Failure	Less flow into Digester	Low Level	Scheduled Inspections and Maintenance
MORE Alarm	High flow into Mix box	Valve Failure	More flow into Digester	High Level	Scheduled Inspections and Maintenance

Mix box Discharge Pump

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	No Flow into Digester	Electric Motor Failure	No Flow into Digester	Alarm	Scheduled Inspections and Maintenance
		Mechanical Failure			
LESS	Low flow into Digester	Pipe Restriction	Longer time to Feed Digesters	Time Out Alarm	Scheduled Inspections and Maintenance
		Feed Conveyer Restriction			
MORE	High Flow into Digester	Alligator Failure (Feed box)	No Dry Feed into Digester only mixing liquid being fed into Digester	Alarm	Scheduled Inspections and Maintenance

Prepit Pump

GUIDE WORD		DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS
ACTION REQUIRED					
NO Alarm	No Flow into Digester	Mechanical/Electric Failure	No Flow into Digester	No Flow	Scheduled Inspections and Maintenance
		Blocked Pipe			
LESS rate	Low flow	Pipe Restrictions	No Flow into Digester	No Flow Alarm	Scheduled Inspections and Maintenance
MORE	High Flow	Regulator Meter/ Valve Failure	High Flow <u>Into</u> Digester	High Level Alarm	Scheduled Inspections and Maintenance

Separator

GUIDE WORD		DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS
ACTION REQUIRED NO Separator	No Flow into	Electrical/Mechanical Failure	No Flow Mechanical Damage	Alarm	Scheduled Inspections and Maintenance
		Blocked Pipe			
LESS Separator	Less Feed to	Pipe Restriction	Less Flow	Time Alarm	Scheduled Inspections and Maintenance
MORE Separator	High Flow to	Separator Restriction Plate Failure	No Separation	Leakage Prob Alarm	Scheduled Inspections and Maintenance

Separator

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	No Flow into Separator	Electrical/Mechanical Failure	No Flow Mechanical Damage	Alarm	Scheduled Inspections and Maintenance
		Blocked Pipe			
LESS	Less Feed to Separator	Pipe Restriction	Less Flow	Time Alarm	Scheduled Inspections and Maintenance
MORE	High Flow to Separator	Separator Restriction Plate Failure	No Separation	Leakage Prob Alarm	Scheduled Inspections and Maintenance

Separator Feed Pump

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	No Flow into Separator	Pipe Blockage	No Flow to Separator	High Level Alarm No Flow Alarm	Scheduled Inspections and Maintenance
		Electrical Failure			
		Mechanical Failure			
LESS	Low Flow	Pipe Restrictions Screen Restrictions	Low flow through separator	Time Alarm	Scheduled Inspections and Maintenance
More	High Flow	Discharge Pump Failure	High Flow through Separator. Risk of Leakage	Leakage Prob Alarm	Scheduled Inspections and Maintenance
		Separator Screen Failure			

Separator Discharge Pump

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	NO Flow	Electrical/Mechanical Failure	No Flow to Lagoon	Alarm	Scheduled Inspections and Maintenance
		Float Switch Failure			
LESS	Low Flow	Pipe Restriction	Less flow to Lagoon	Timed Alarm	Scheduled Inspections and Maintenance
		Worn Pump			
HIGH	High Flow	Flow Meter Failure	Risk of Leakage	Leakage Prob Alarm	Scheduled Inspections and Maintenance
		Pipe Failure			

Substrate Pump

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
LOW	NO Flow	Electrical Motor Failure	No Substrate transfers	High Level Alarm Flow Meter Alarm	Scheduled Inspections and Maintenance
		Mechanical Failure			
		Pipe Blockage			
LESS	Low Flow	Pipe Restriction	Low flow substrate Transfers	High Level Alarm	Scheduled Inspections and Maintenance
		Pump Worn			
HIGH	High Flow	Pipe Failure	High substrate Flow	High Level Alarm Leakage Prob Alarm	Scheduled Inspections and Maintenance
		Flow Rate Failure			

Digesters + Prepit Mixers

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	No Digestate Movement	Electric Failure	Digestate Separation	Alarm	Scheduled Inspections and Maintenance
		Mechanical Failure			
LOW	Partial Digestate Movement	Mechanical Failure	Digestate Separation	Visual	Scheduled Inspections and Maintenance
		Propeller Restriction			
HIGH	Vigorous Digestate Movement	Mixer in Wrong Positon	Digestate Frothing	High Level Alarm Visual	Scheduled Inspections and Maintenance

Flare

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
NO	No Ignition	Gas Valve Shut	No gas to Ignite Flame Pressure Increase in storage tanks	Alarm	Scheduled Inspections and Maintenance
		Electrical Failure			
LOW	Poor Flame	Gas Pipe Restriction	Pressure Increase	Alarm + Visual	Scheduled Inspections and Maintenance
HIGH	Vigorous Flame	Regulator Valve Failure	Under Pressure Risk	Alarm+Visual	Scheduled Inspections and Maintenance
		Weather conditions			

Digester Tanks

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
MORE DIGESTATE	High Level of Digestate	Valve Failure	Tank over Full	High Level Alarm	Scheduled Inspections and Maintenance
		Substrate Pump Failure			
MORE DIGESTATE	High Level of Digestate	Discharge Pump Failure	Digestate Transfer Necessary	High Level Alarm	Scheduled Inspections and Maintenance
		Valve Failure			
LOW DIGESTATE	Low Level of Digestate	No Feed into Digester	Feed Pipe/Pump Failure	Visual Site Gauge	Scheduled Inspections and Maintenance EMERGENCY PLAN
		Tank Failure	Lagoon Leakage	Leakage Chamber/ Visual Checks	
LOW DIGESTATE	Low Level of Digestate	Valve Failure	Digestate Level reduced causing less gas production	Alarm Mechanical Failure	Scheduled Inspections and Maintenance
		Substrate Pump Failure			

MORE GAS	High level of Gas	CHP Failure	Excess gas vented or Flared off	Venting Valves or Flare	Scheduled Inspections and Maintenance
		Excess Feed			
LOW GAS	Low Level of Gas	No Feed	Roof Possibly deflated	Alarm	Scheduled Inspections and Maintenance
		Gas Leak			

Overpressure/Under pressure Safety

GUIDE WORD	DEVATION	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION REQUIRED
LESS	Low Gas Pressure	Roof Collapse	Gas leak Roof Failure No Gas Production	Low Pressure Alarm Under pressure Relief Valve	Scheduled Inspections and Maintenance
MORE	High Gas Pressure	CHP Failure Gas Pipe Restriction Valve Failure	Possible roof damage	High Level Alarm Overpressure Relief Valve Flare	Scheduled Inspections and Maintenance