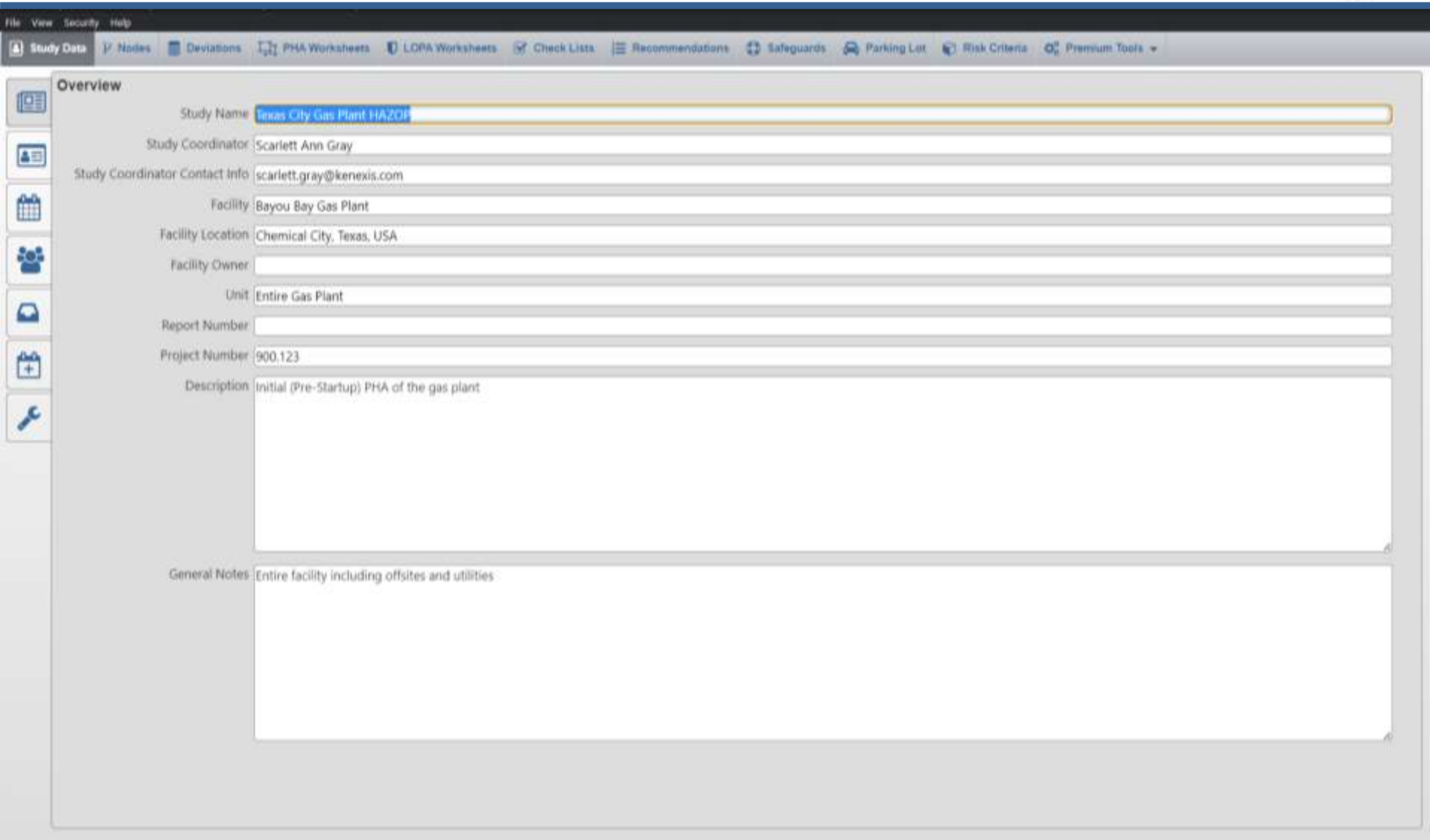
Texas City Gas Plant HAZOP Report

Overview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Study Data
Nodes
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PHA Worksheets
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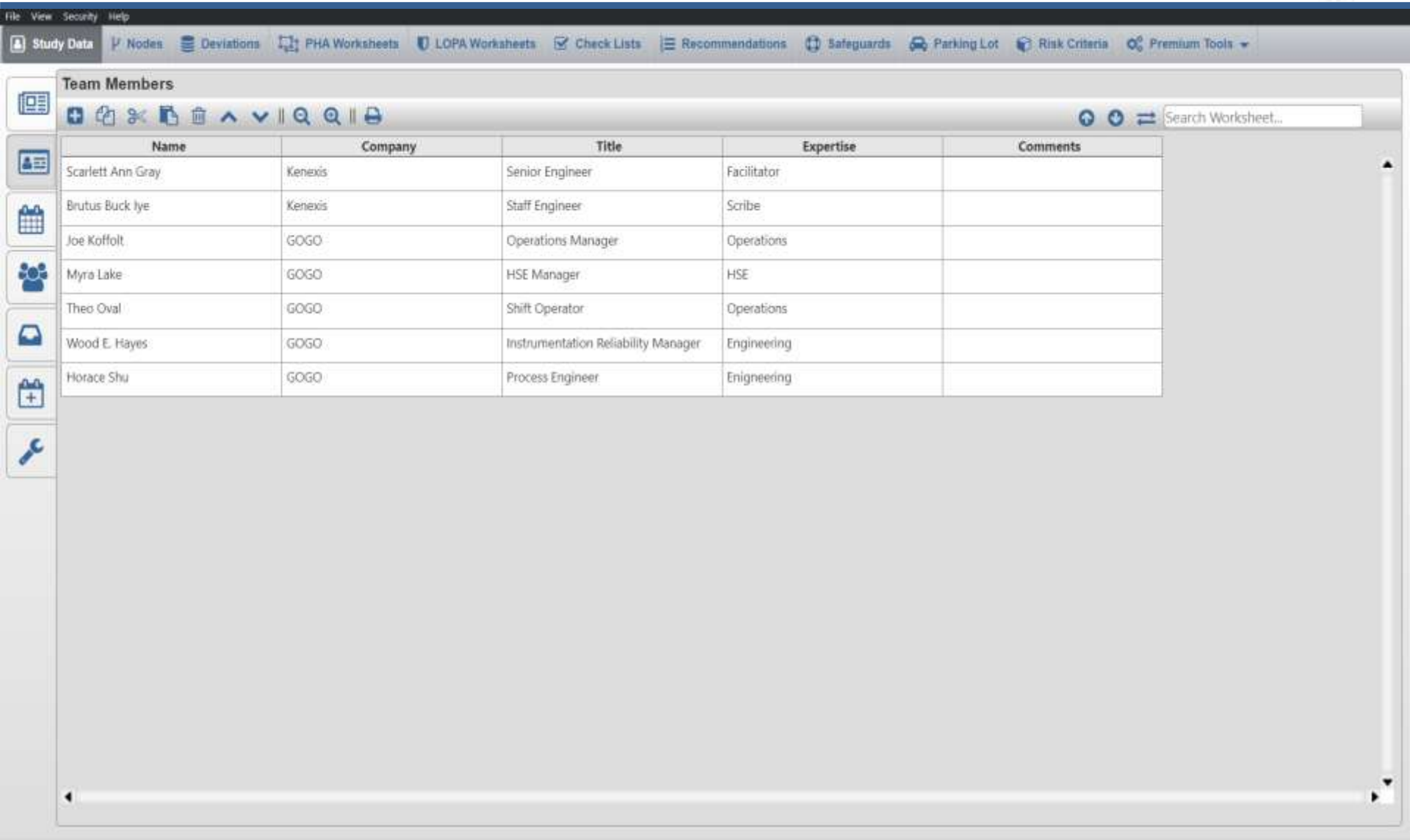
Premium Tools
Overview
Study Name
Texas City Gas Plant HAZOP
Study Coordinator
Scarlett Ann Gray
Study Coordinator Contact Info
scarlett.gray@kenexis.com
Facility
Bayou Bay Gas Plant
Facility Location
Chemical City, Texas, USA
Facility Owner
Unit
Entire Gas Plant
Report Number
Project Number
900.123
Description
Initial (Pre-Startup) PHA of the gas plant
General Notes
Entire facility including offsites and utilities

Team Member Data



Name	Company	Title	Expertise	Comments
Scarlett Ann Gray	Kenexis	Senior Engineer	Facilitator	
Brutus Buck Iye	Kenexis	Staff Engineer	Scribe	
Joe Koffolt	GOGO	Operations Manager	Operations	
Myra Lake	GOGO	HSE Manager	HSE	
Theo Oval	GOGO	Shift Operator	Operations	
Wood E. Hayes	GOGO	Instrumentation Reliability Manager	Engineering	
Horace Shu	GOGO	Process Engineer	Enigneering	

Navigation Toolbar

- The navigation toolbar serves as the primary means for navigating the Open PHA study editor interface and appears on all pages in the editor. This section details the available buttons on the toolbar:

Nodes

- Processes must be divided into sections for detailed review. In HAZOP studies, nodes are used.
- Example- It may be defined as pipe sections and vessels in which process chemicals are, or may be, present. (In Chemical Industry)

Nodes

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Nodes

Search Worksheet...

Description	Intention	Design Conditions	Operating Conditions	Color	Session	Drawing
1 (HP Gas) Production Header through High Pressure Separator (V-101) to Gas Export Pipeline	Entry of high pressure gases into the process from the wellheads and production manifold, and transfer of low pressure gas for delivery to the sales gas export pipeline.	MAWP = 1200 psig @ 300 F	700 psig @ 70 F (From production header) 350 psig @ 40 F (From HP separator)			D-254-002 Sh. 2 of 6 D-254-002 Sh. 5 of 6
2 (Liquid Stream) High Pressure Separator (V-101) to Low Pressure Separator (V-102)	Low pressure separator receives knockout liquid hydrocarbons from the high pressure separator.	MAWP = 75 psig @ 300 F	50 psig @ 38 F			D-254-002 Sh. 2 of 6 D-254-002 Sh. 3 of 6
3 (Gas Stream) Low Pressure Separator (V-102), Gas Compressor (C-104), and Compressor Discharge Cooler (H-105) (includes gas spillback to Low Pressure Separator)	Transfer of low pressure gas for compression and delivery of compressed gas to the sales gas export pipeline. Compressor discharge gas is cooled by H105 before delivery to the export pipeline or spillback to M102.	MAWP = 75 psig @ 300 F (LP Separator) 50 psig @ 70 F (Compressor Suction) 350 psig @ 300 F (Compressor Discharge)	50 psig @ 70F (LP Separator) 50 psig @ 70 F (Compressor Suction) 350 psig @ 300 F (Compressor Discharge)			D-254-002 Sh. 3 of 6 D-254-002 Sh. 5 of 6
4 (Liquid Stream) Low Pressure Separator (V-102) through Export Pump (P-103) to Export Liquid Pipeline (includes liquid spillback to Low Pressure Separator from Export Pump)	Delivery of high pressure liquid to export liquid pipeline.	MAWP = 75 psig @ 300 F (LP Separator) 2150 psig @ 300 F (Pump Discharge)	50 psig @ 50 F (LP Separator) 2150 psig @ 55 F (Pump Discharge)			D-254-002 Sh. 3 of 6 D-254-002 Sh. 4 of 6
5 Global Considerations						

Deviations

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Deviations

1. (HP Gas) Production Header through High Pressure Separator (V-101) to Gas Export Pipeline

Search Worksheet...

Deviation	Guide Word	Parameter	Design Intent	Comments
1.1 High Pressure	High	Pressure		
1.2 Low Pressure	Low	Pressure		
1.3 High Temperature	High	Temperature		
1.4 Low Temperature	Low	Temperature		
1.5 High Level	High	Level		
1.6 Low Level	Low	Level		
1.7 High Flow	High	Flow		
1.8 Low Flow	Low	Flow		
1.9 Reverse Flow	Reverse	Flow		
1.10 Misdirected Flow	Misdirected	Flow		
1.11 Other Than Flow	Other Than	Flow		
1.12 Composition	Abnormal	Concentration/Composition		

PHA Worksheet

- The table is a staple of the Open PHA interface and is used extensively creating, editing and maintaining the study's worksheets.

- All tables are provided with a consistent set of controls to allow you to interface with the data in various ways. This section provides a summary of the controls which are typical for tables in Open PHA.

PHA Worksheet

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PHA Worksheets

1. (HP Gas) Production Header through High Pressure Separator (V-101) to Gas Export Pipeline

Search Worksheet...

Deviation	Consequence	Causes: Cause	Safeguards: Safeguard	Type	Tag	IPL	Consequences: S	L	RR	LOPA Required
1.1 High Pressure	1.1.1 Potential overpressure of V-101. Potential loss of mechanical integrity. Potential rupture of High Pressure Separator resulting in large release of hydrocarbons and potential fire or explosion.	1.1.1.1 Production header pressure operates above 1200 psig.	1 Relief valve PSV-101 opens to flare			No	4	3	4	Yes
			2 PT-101D high pressure shutdown closes HP separator inlet valve SDV-101.			No				
			3 Control valve PV-101B will open to flare.			No				
		1.1.1.2 External fire in the vicinity of HP Separator V-101.	1 Relief valve PSV-101 opens to flare			No				
			2 PT-101D high pressure shutdown closes HP separator inlet valve SDV-101.			No				
			4 Fire detection system allowing time for personnel evacuation			No				
			5 Control valve PV-101B will open to flare. No credit taken for this IPL due to inadequate sizing.			No				
1.2 Low Pressure	1.2.1 Potential breach of high pressure pipeline with subsequent pressure reduction to HP Separator M-101. Potential hydrocarbon release to environmental and subsequent impacts. Potential fire/explosion.	1.2.1.1 Production header pipeline leak or rupture (due to vehicle impact) upstream of SDV-101.	6 PT-101D low pressure shutdown mitigates hazard by closing SDV-101.			No	4	0	0	
			7 Automated low pressure shutdown upstream of the production header.			No				
1.3 High Temperature	1.3.1 No credible causes	1.3.1.1								
1.4 Low Temperature	1.4.1 No credible causes - Auto-refrigeration of gas flashing	1.4.1.1								

LOPA Worksheets

- When opening the PHA Worksheets tab, the workspace will open a blank worksheet prepopulated with deviations from the Deviations Table.
- If the Deviations table was not completed prior to starting on the PHA Worksheet, simply enter the deviations into the Deviation column and this will populate the Deviations column in the Deviations table.

LOPA Worksheets

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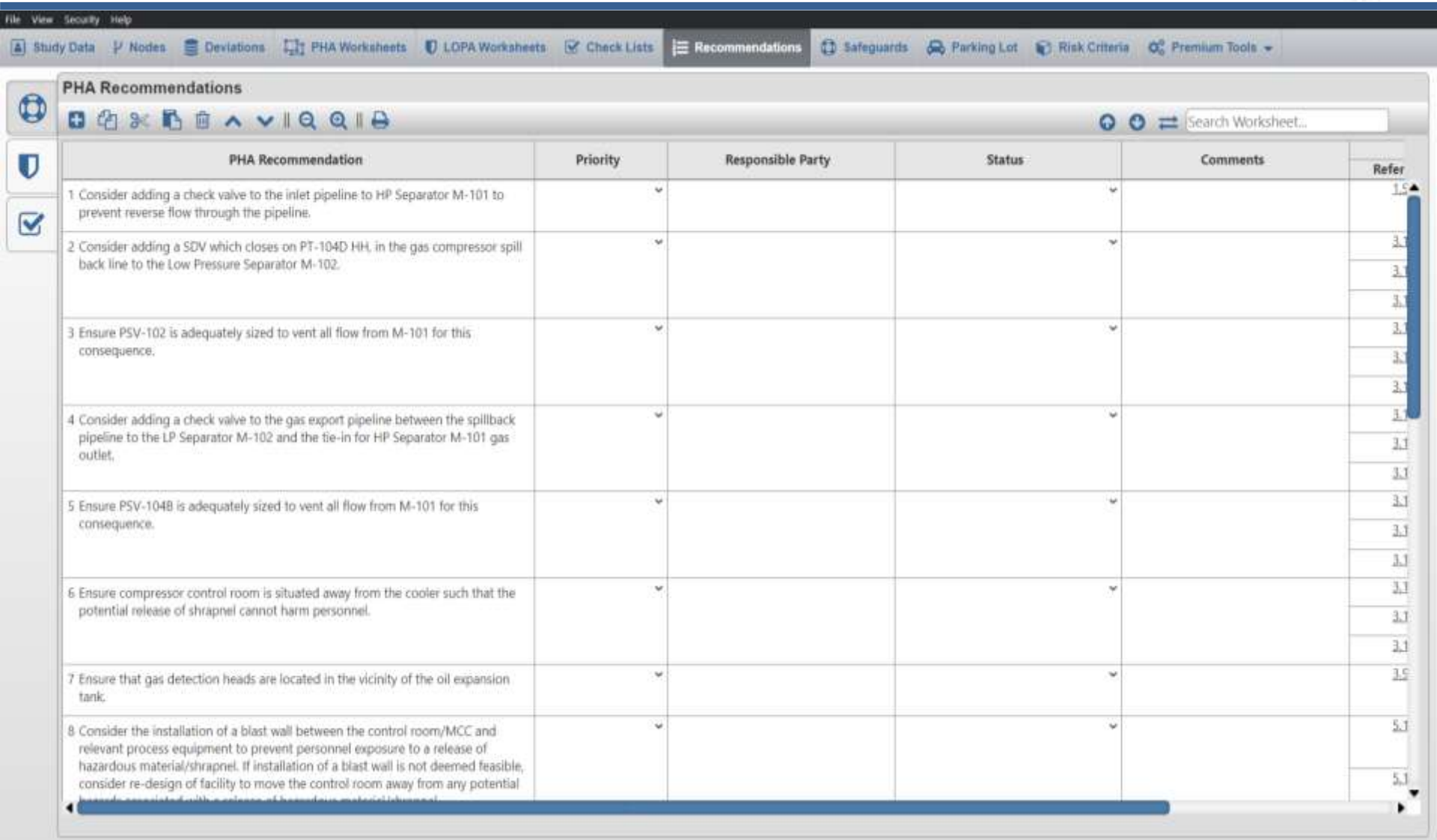
LOPA Worksheets

1. (HP Gas) Production Header through High Pressure Separator (V-101) to Gas Export Pipeline

Search Worksheet...

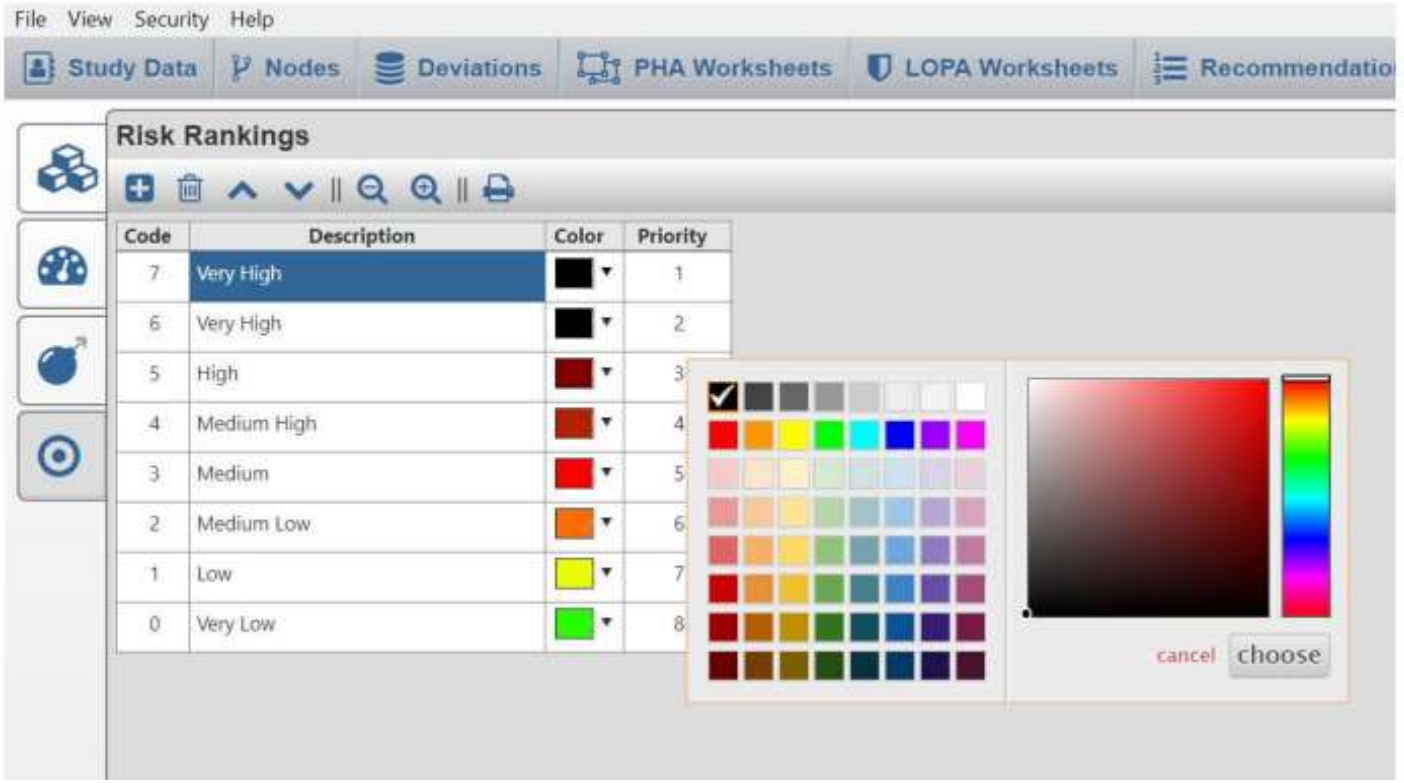
Deviation	Consequence	S	CM-S		TMEL Safety	Consequences				
			Description	Prob.		Cause	Frequency	Enabling Events		Causes
								Description	Prob.	IPL
1.1 High Pressure	1.1.1 Potential overpressure of V-101. Potential loss of mechanical integrity. Potential rupture of High Pressure Separator resulting in large release of hydrocarbons and potential fire or explosion.	4			1E-4	1.1.1.1 Production header pressure operates above 1200 psig.	0.1	None	1	92 Relief Valve on High Pressure Separator
										93 High Pressure Separator (V-101) High-High Pressure Closes Inlet Valve
						1.1.1.2 External fire in the vicinity of HP Separator V-101.				

Recommendations



Risk Rankings Page

- The Risk Rankings Page houses the risk ranking table. This table allows the user to identify, describe and rank risk. Below is an example of the Risk Rankings Page from a study that uses the explicit LOPA method.



Safegaurds

- Safeguards help to protect a process when the system deviates from the safe operating conditions. Safeguards are often utilized in a Process Hazard Analysis (PHAs) or a Hazard and Operability (HAZOP) study as a way to reduce the severity or probability of a scenario that was identified by the risk assessment

Safegaurds

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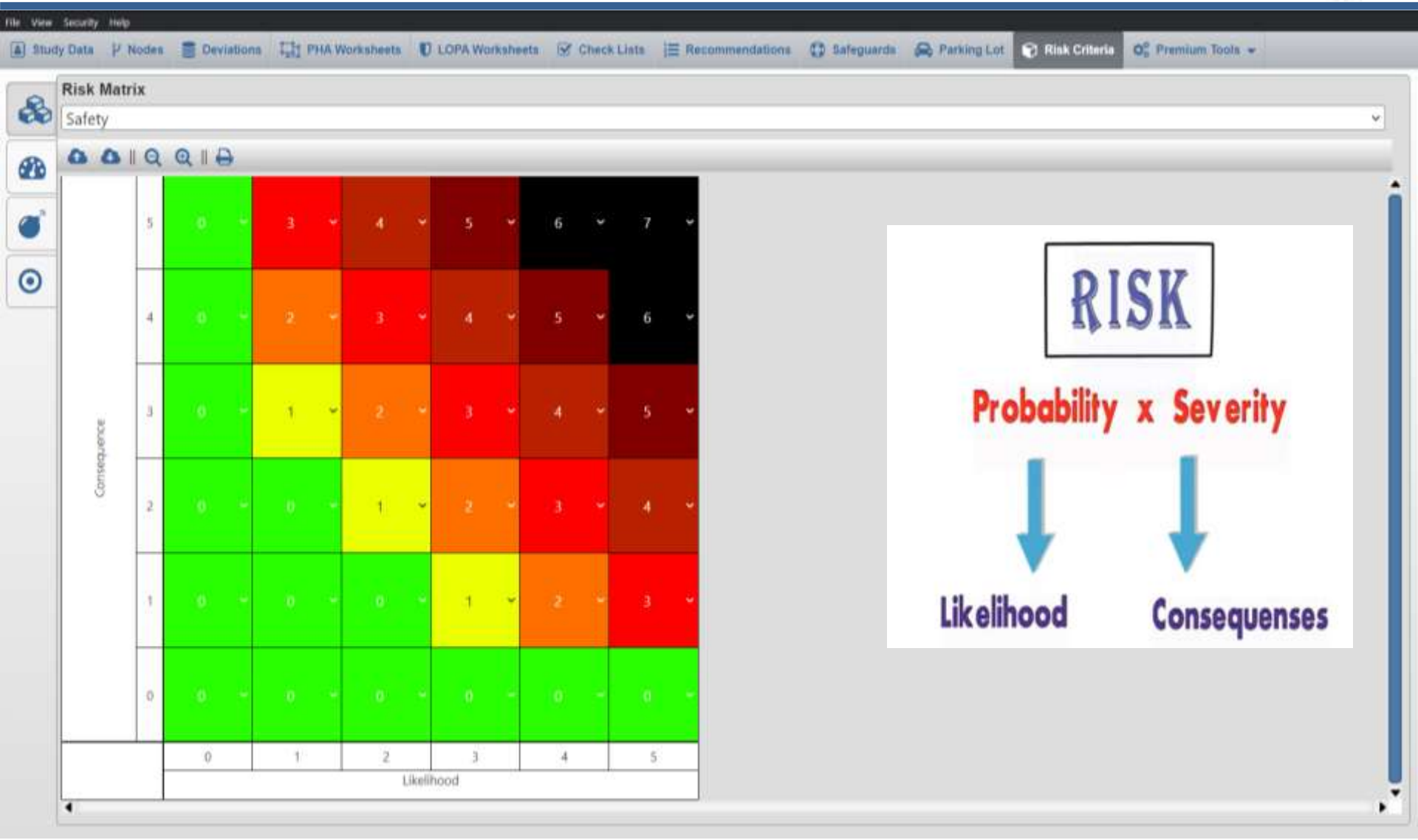
Safeguards

Search Worksheet...

Safeguard	Type	Safeguard	IPL	Tag	PFD	Reference
1 Relief valve PSV-101 opens to flare		Yes	No			1.1.1.1 1.1.1.2
2 PT-101D high pressure shutdown closes HP separator inlet valve SDV-101.		Yes	No			1.1.1.1 1.1.1.2
3 Control valve PV-101B will open to flare.		Yes	No			1.1.1.1
4 Fire detection system allowing time for personnel evacuation		Yes	No			1.1.1.2 2.1.1.1
5 Control valve PV-101B will open to flare. No credit taken for this IPL due to inadequate sizing.		Yes	No			1.1.1.2
6 PT-101D low pressure shutdown mitigates hazard by closing SDV-101.		Yes	No			1.2.1.1
7 Automated low pressure shutdown upstream of the production header.		Yes	No			1.2.1.1
8 High level shutdown LT-101B closes inlet valve SDV-101		Yes	No			1.5.1.1 1.5.1.2 1.5.1.3
9 Operator response to high level alarm LT-101A - not independent from control loop failure		Yes	No			1.5.1.1 1.5.1.2 1.5.1.3
10 Relief valve PSV-102, which is sized for gas blow-by		Yes	No			1.6.1.1 1.6.1.2

Risk Matrix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Risk Matrix
Safety
Consequence
Likelihood
RISK
Probability x Severity
Likelihood
Consequenses

Thanks