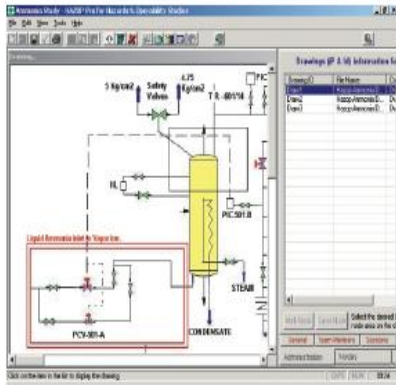


HAZOP Pro Version 2.0

HAZOP-Pro is based on guidelines published by Centre for Chemical Plant Safety (CCPS) of AIChE and section II and III of RP750 recommended practices of American Petroleum Institute. Hazop Pro enhances the Quality of Hazop sessions yet accelerates the Hazop process and greatly reduces the possibility of missing identification of a potential hazard by the Hazop team.

Hazop Pro comes with a unique feature which prompts the Hazop team to discuss causes and deviations applicable to a node but not considered yet in a study.

Hazop Pro comes with FET Base – a database of Toxic, flammable and explosive properties of over 2400 commonly used chemicals. It is the only software which stores drawings along with the study and can be given to client as part of the study having nodes marked on them and includes exhaustive libraries for node types, parameters, guide words, causes, consequences and recommendations etc.



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Worksheet information form

Node: 1. Liquid Ammonia inlet to Vaporizer.

Deviation: 1. No Flow

Causes	Consequences	SI	LI	RR	CAT	Safeguards
PV-501 closed when complete ammonia vapour supply is met from ammonia plant, e.g., partial load of A.S. plant.	1.1. Normal control. No hazard.			1		1.1.1 No safeguards are required.
PV-501-C3 closed on malfunction or isolation valve closed.	2.1. Possibility of pressure fluctuation in ammonia vapour header. 2.2. Supply of ammonia vapour to individual plants affected.					2.1.1 Pressure indication in control room. 2.2.1 Local pressure gauge for vaporizer.
No supply of liquid ammonia from ammonia plant.	3.1. Reduced load of AS plants depending on direct supply from ammonia plant. 3.2. Control valve PV-501 remains full open and excessive liquid ammonia may enter vaporizer when ammonia supply resumes.	3	3	9		3.1.1 Ammonia vapour header pressure control room by PIC-501. 3.2.1 Indication for PV-501 open output of PIC-501.

Administration Nodes Deviations Worksheet Recommendations

For Help: Press F1

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Drawing...

Recommendations information form (view only)

Node No.	Devia No.	Recommendations	S1	L1	RR	CAT	Priority	Responsibil	Status	% Comp	Est. Start Date	Est. End Date	Act. Start Date
1	1	1.1.1 No recommendation required.	2	2	4		4						
1	1	2.1.1 Tagging of isolation valves for their position.	2	3	6		3	Robert Patrick	None	60	02/16/2002	02/23/2002	02/16/2002
1	1	2.2.1 Regular check / maintenance of instruments and control valves.	4	2	8		2	Peter Dsouza	No Resolution.	100	02/17/2002	02/20/2002	02/17/2002
1	1	3.1.1 When liquid ammonia supply from ammonia plant is stopped, close PV-501 on manual. Take it on auto after stabilizing supply of liquid ammonia.	3	1	3		1	John Massey	None.	100	02/20/2002	02/27/2002	02/20/2002
1	2	2.1.1 Regular check / maintenance of instruments and control valves.				R1	1	Sam Dsilva	None	100	02/11/2002	02/12/2002	02/11/2002
1	2	2.2.1 Tagging of isolation valves for their position.				R3	2	Peter Dsouza	None	100	02/04/2002	02/12/2002	02/04/2002
1	3	1.1.1 Consider closing of PV-501 by solenoid with manual push button from control room.				R1	1	John Massey					
2	1	1.1.1 Isolation valve in line from vaporizer to header to be car seal open.				R1	1	Peter Dsouza	Complete	100			
2	1	1.2.1 Provide level switch at bottom of vaporizer covering the section below steam coil, (presently redundant HL can be used for this purpose).				R2	2	Mary Fernandes	Incomplete	100			
4	1	1.1.1 Recommendations1 for Cause1, Node4 and Dev1 In case of interruption in user plants close PV-501 on manual and then close steam valve. To resume, first open steam valve slowly before opening PV-501.											

Administration Nodes Deviations Worksheet Recommendations

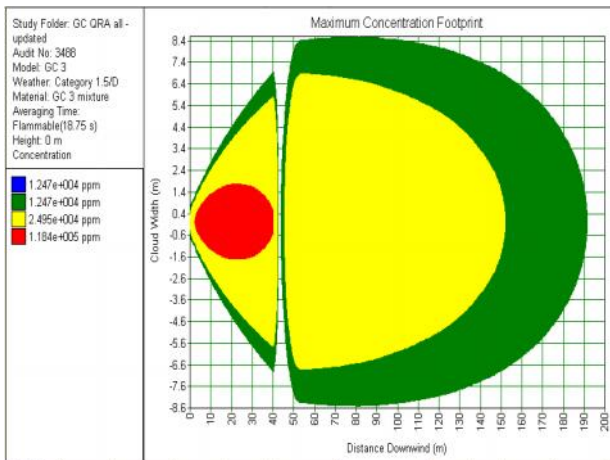
PHAST 6.51 & SAFETI Micro V 6.51

DNV Software's SAFETI 6.51 program is a user-friendly, industry standard method for carrying out Quantitative Risk Assessments (QRA) of onshore process, chemical and petrochemical facilities and is the latest version in DNV's SAFETI software pack.

SAFETI (Software for the Assessment of Flammable, Explosive and Toxic Impact) is by far the most comprehensive quantitative tool available for assessing process plant risks. It is designed to perform all the analytical, data processing and results presentation elements of a QRA within a structured framework.

The software is used to assess the effects of flammable and toxic releases, estimating the distance chemicals may travel given local weather conditions and the number of people who may be injured by these events. Specific modules of SAFETI have been included to ensure compliance with the Dutch Yellow Book and UK HSE regulations.

SAFETI contains models tailored for hazard analysis of onshore industrial installations. These include: Discharge and dispersion models, including DNV's proprietary Unified Dispersion Model (UDM), Flammable models, including resulting radiation effects, for jet fires, pool fires and BLEVEs, TNO Explosion model to calculate overpressure and impulse effects and models for the toxic hazards of a release including indoor toxic dose calculations



Contours for individual and societal risk can be plotted on the layout drawings of the site.



The F-N curve is also plotted considering the population details given

