

Hazop study Number: DHDS-2 Node : DHDS-2 H2S and H2 Cold separator to Recycle Gas Compressor.

P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

Description of design intention: DHDS-2: To Recycle un-reacted H2S and Maintain System Pr.

Existing controls:

Units:

Control Range:

HAZOP GUIDE WORD	LIKELY DEVIATION	LIKELY CAUSES	LIKELY CONSEQUENCES	PRESENT CONTROLS & THEIR LIMITATIONS	RECOMMENDATION FOR BETTER HAZARD CONTROL
(1) NO (NOT OR NONE)	No/less pressure	Mug Compr fails	System Pr. Diminished-> Reaction affected	Stand by Mug manually started within 10 to 15 mins. Else shut down.Pressure AL, ALL Exist	None.
RISK LEVEL:	Risk level: NO DAMAGE and NO CHANCE		Category	Operability.	SIL/LOP: N.A.
Action by:	None.				

Hazop study Number: DHDS-1 Node : DHDS-1: Sauer Diesel AVU-1 or OMS Tank to Catalytic Reactor

P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

Description of design intention: DHDS-1: Remove sulphur

Existing controls:

Units:

Control Range:

HAZOP GUIDE WORD	LIKELY DEVIATION	LIKELY CAUSES	LIKELY CONSEQUENCES	PRESENT CONTROLS & THEIR LIMITATIONS	RECOMMENDATION FOR BETTER HAZARD CONTROL
(1) NO (NOT OR NONE)	No/ less feed	Feed pump trip, Fail Open CV-FC-105 Fails or Stuck Mid way.No or less Fuel gas	Interlock with Furnace to Trip.	AL, ALL at 52 m3 Hr.By pass operated till FC Replaced.FSSS Exists	Provide flow Transmitter and Indicator.
RISK LEVEL:	Risk level: MEDIUM DAMAGE and LOW CHANCE		Category	None.	SIL/LOP: 1
Action by:	None.				

(2) MORE OF	More feed	FC fails	Pump Rpm Rises-> Pump trip-> Plant stops.	AH, AHH existBypass operated till FC replaced	None.
RISK LEVEL:	Risk level: NO DAMAGE and NO CHANCE		Category	Operability.	SIL/LOP: N.A.
Action by:	None.				

(5) PART OF	N.A.	N.A.	N.A.	None.	None.
RISK LEVEL:	Risk level: HIGH DAMAGE and MEDIUM HIGH CHANCE		Category	Operability.	SIL/LOP: 3
Action by:	None.				

Hazop study Number: DHDS-3 Node : DHDS-3: Treated Diesel to Stripper

P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

Description of design intention: DHDS-3: To recover dissolved H2S.

Existing controls:

Units:

Control Range:

HAZOP GUIDE WORD	LIKELY DEVIATION	LIKELY CAUSES	LIKELY CONSEQUENCES	PRESENT CONTROLS & THEIR LIMITATIONS	RECOMMENDATION FOR BETTER HAZARD CONTROL
(1) NO (NOT OR NONE)	No/Less Steam	Steam Fails FC-503 Fails/Stuck Mid way	Fail Open Stripper stops By interlock Manually Stripper to be stopped Reduce through put to stop increase in level of VV103	None. By pass provided	None.
RISK LEVEL: Risk level: MEDIUM DAMAGE and LOW CHANCE Category: None. SIL/LOP: 1					
Action by:					
(2) MORE OF	Steam controller stuck open	More Steam	Stripper to Temp Rise-> Diesel gets evaporated reducing Diesel Yield.	Steam is by FC-701 with Bypass	NA
RISK LEVEL: Risk level: LOW DAMAGE and LOW CHANCE Category: None. SIL/LOP: 1					
Action by: None.					

Hazop study Number: DHDS-4 Node : DEHDS-4: H2S Hazard

P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

Description of design intention: DHDS-4: Detection and Protection of Employees

Existing controls:

Units:

Control Range:

HAZOP GUIDE WORD	LIKELY DEVIATION	LIKELY CAUSES	LIKELY CONSEQUENCES	PRESENT CONTROLS & THEIR LIMITATIONS	RECOMMENDATION FOR BETTER HAZARD CONTROL
(2) MORE OF	Diffusion from flanges	Normally Diffusion from flanges	Detectors cannot detect as H2S diffused gets diluted below detection level of Detectors	Detectors in Field at different locations and shift wise hand held detectors use d to detect leaks..Normally Average H2S level in the Field remains Below detection limit 10 ppm alarm.	1. To detect even minutest Traces of H2S diffusions from Flanges it is Recommended to Use Lead Chromate fine Powder dispersed in Epoxy Resin and Copper or MS-Wire dipped and dried and this wire wound round Each Flange carrying H2S and Tied up. Even minutest undetectable amount of H2S diffusion turns Yellow Lead Chromate in to Black Lead Sulphide. Then you can remove the Lead chromate Lead Chromate wire Get the flange Sealed. 2. Also use a Lead Acetate Paper strip pinned on to all employees working in H2S area. There will be

some brownish colour developed and Lab. Should calibrate the Colour to assess the amount of H2S Exposure.
 3. Rotate Persons every 3-Years or earlier as feasible.

RISK LEVEL: Risk level: LOW DAMAGE and MEDIUM CHANCE

Category None.

SIL/LOP: 1

Action by: None.

HAZOP team: Name, Designation, Department	SIL	Generalized View
1. Dr. Ram S Hamsagar, Chairperson	4	Potential for fatalities in the community
2. Sunil Hamsagar Software operation and simulation	3	Potential for multiple fatalities
3. Panel Operators	2	Potential for major serious injuries or one fatality
	1	Potential for minor injuries

Hazop study Number: DHDS-1 Node : DHDS-1: Sauer Diesel AVU-1 or OMS Tank to Catalytic Reactor

P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

Description of design intention: DHDS-1: Remove sulphur

Existing controls:

Units:

Control Range:

HAZOP GUIDE WORD	LIKELY DEVIATION	LIKELY CAUSES	LIKELY CONSEQUENCES	PRESENT CONTROLS & THEIR LIMITATIONS	RECOMMENDATION FOR BETTER HAZARD CONTROL
(1) NO (NOT OR NONE)	No/ less feed	Feed pump trip, Fail Open CV-FC-105 Fails or Stuck Mid way.No or less Fuel gas	Interlock with Furnace to Trip.	AL, ALL at 52 m3 Hr.By pass operated till FC Replaced.FSSS Exists	Provide flow Transmitter and Indicator.

RISK LEVEL: Risk level: MEDIUM DAMAGE and LOW CHANCE Category None. SIL/LOP: 1

Action by: None.

Hazop study Number: DHDS-4 Node : DEHDS-4: H2S Hazard

P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

Description of design intention: DHDS-4: Detection and Protection of Employees

Existing controls:

Units:

Control Range:

HAZOP GUIDE WORD	LIKELY DEVIATION	LIKELY CAUSES	LIKELY CONSEQUENCES	PRESENT CONTROLS & THEIR LIMITATIONS	RECOMMENDATION FOR BETTER HAZARD CONTROL
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some brownish colour developed and Lab. Should calibrate the Colour to assess the amount of H2S Exposure.
 3. Rotate Persons every 3-Years or earlier as feasible.

RISK LEVEL: Category SIL/LOP:
 Action by:

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1. Dr. Ram S Hamsagar, Chairperson	4	Potential for fatalities in the community
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3. Panel Operators	2	Potential for major serious injuries or one fatality
	1	Potential for minor injuries

Risk Levels for HAZOP	Count	Risk Levels for HAZOP	SIL/LOP:
Risk level: HIGH DAMAGE and MEDIUM HIGH CHANCE	1	Very Highly Critical	3
Risk level: LOW DAMAGE and LOW CHANCE	1	Medium Low Critical	1
Risk level: LOW DAMAGE and MEDIUM CHANCE	1	Medium Critical	1
Risk level: MEDIUM DAMAGE and LOW CHANCE	2	Medium Critical	1
Risk level: NO DAMAGE and NO CHANCE	2	Safe	N.A.

HAZOP team: Name, Designation, Department	SIL	Generalized View
1. Dr. Ram S Hamsagar, Chairperson	4	Potential for fatalities in the community
2. Sunil Hamsagar Software operation and simulation	3	Potential for multiple fatalities
3. Panel Operators	2	Potential for major serious injuries or one fatality
	1	Potential for minor injuries

Hazop study Number: DHDS-1 Node : DHDS-1: Sauer Diesel AVU-1 or OMS Tank to Catalytic Reactor
P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

RECOMMENDATION FOR BETTER HAZARD CONTROL

Provide flow Transmitter and Indicator. Action Date 12/01/2015 Action Taken YES
Action By: None.

Hazop study Number: DHDS-4 Node : DEHDS-4: H2S Hazard
P and I Dwg. No. : Dwg_asjhbj1256445-fdr6

RECOMMENDATION FOR BETTER HAZARD CONTROL

1. To detect even minutest Traces of H2S diffusions from Flanges it is Recommended to Use Lead Chromate fine Powder dispersed in Epoxy Resin and Copper or MS-Wire dipped and dried and this wire wound round Each Flange carrying H2S and Tied up. Even minutest undetectable amount of H2S diffusion turns Yellow Lead Chromate in to Black Lead Sulphide. Then you can remove the Lead chromate Lead Chromate wire Get the flange Sealed.
2. Also use a Lead Acetate Paper strip pinned on to all employees working in H2S area. There will be some brownish colour developed and Lab. Should calibrate the Colour to assess the amount of H2S Exposure.
3. Rotate Persons every 3-Years or earlier as feasible.

Action Date Action Taken NO
Action By: None.

HAZOP team: Name, Designation, Department

1. Dr. Ram S Hamsagar, Chairperson
2. Sunil Hamsagar Software operation and simulation
3. Panel Operators

Hazop study Number: DHDS-4

Node : DEHDS-4: H2S Hazard

P and I Dwg. No. : Dwg_asjhb1256445-fdr6

RECOMMENDATION FOR BETTER HAZARD CONTROL

1. To detect even minutest Traces of H2S diffusions from Flanges it is Recommended to Use Lead Chromate fine Powder dispersed in Epoxy Resin and Copper or MS-Wire dipped and dried and this wire wound round Each Flange carrying H2S and Tied up. Even minutest undetectable amount of H2S diffusion turns Yellow Lead Chromate in to Black Lead Sulphide. Then you can remove the Lead chromate Lead Chromate wire Get the flange Sealed.
2. Also use a Lead Acetate Paper strip pinned on to all employees working in H2S area. There will be some brownish colour developed and Lab. Should calibrate the Colour to assess the amount of H2S Exposure.
3. Rotate Persons every 3-Years or earlier as feasible.

Hazop study Number: DHDS-1

Node : DHDS-1: Sauer Diesel AVU-1 or OMS Tank to Catalytic Reactor

P and I Dwg. No. : Dwg_asjhb1256445-fdr6

RECOMMENDATION FOR BETTER HAZARD CONTROL

Provide flow Transmitter and Indicator.

HAZOP team: Name, Designation, Department

1. Dr. Ram S Hamsagar, Chairperson
2. Sunil Hamsagar Software operation and simulation
3. Panel Operators

HAMS-GPS : RBI (Risk Based Investigation) Matrix

For ABC Co.

[Licensed to : HAMSAGARS]

Chance levels ----->					Total	%
	0	0	0	0	0	0.00
	0	0	0	0	1	14.29
	0	1	0	0	1	14.29
	0	1	2	0	3	42.86
	2	0	0	0	2	28.57
Total	2	2	2	0	1	7
%	28.57	28.57	28.57	0.00	14.29	100

Risk Levels	Total	%
HIGH	1	14.29
MEDIUM HIGH	0	0.00
MEDIUM	2	28.57
Low	2	28.57
SAFE	2	28.57
Total	7	100

Applications of RBI-Risk Matrix: Following are the applications of an RBI-Risk matrix

1. As an indicator of the risk level of the installation,
2. To establish risk mitigation measures and evaluate their effects
3. To compare units and processes on the basis of risk,
4. To develop trends of risk development of a unit over time and during its life cycle.

Number of Risk (Damage-Consequence) level areas.

Number of Risk (Damage-Consequence) level areas

Nodes	HIGH	MEDIUM HIGH	MEDIUM	LOW	SAFE
DHDS-1: Sauer Diesel AVU-1 or OMS Tank to Catalytic	1	0	1	0	1
DHDS-2 H2S and H2 Cold separator to Recycle Gas	0	0	0	0	1
DHDS-3: Treated Diesel to Stripper	0	0	1	1	0
DEHDS-4: H2S Hazard	0	0	0	1	0
TOTAL	1	0	2	2	2

Applications of RBI-Risk Matrix: Following are the applications of an RBI-Risk matrix

1. As an indicator of the risk level of the installation.
2. To establish risk mitigation measures and evaluate their effects.
3. To compare units and processes on the basis of risk
4. To develop trends of risk development of a unit over time and during its life cycle.

SAFE	2	x 100 /	7	=	28.57 %
LOW	2	x 100 /	7	=	28.57 %
MEDIUM	2	x 100 /	7	=	28.57 %
MEDIUM HIGH	0	x 100 /	7	=	0.00 %
HIGH	1	x 100 /	7	=	14.29 %