

Deana Burn

From: Stephen Richardson <Steve@cowmanstoddart.com.au>
Sent: Friday, 24 March 2017 12:05 PM
To: Deana Burn
Cc: Brian.hanley@manildra.com.au; John Studdert; Dean Shewring
Subject: RE: MOD 12 Shoalhaven Starches - Questions for PHA

Dear Deana,

I refer to your email dated 16th March 2017 in relation to the above matter. I have received the following responses from Pinnacle Risk Management (in red) to the questions raised for the Department's consideration:

In the unlikely event of loss of containment, the existing safeguards is LEL and plant can be tripped and isolated remotely. Please clarify the following:

- Is there any safety instrumented system will be installed at the columns? Hence any abnormally at the columns will trip the plant automatically.

The plant is designed for inherent safety and shutdown. Should the pressurised column catastrophically fail then there will be no overheads stream from the column. The overheads stream provides the heat duty to the reboiler on the first distillation column in the plant (which operates at a partial vacuum). Once the reboiler on the first column is lost then no fractionation of the feed stream can take place and hence the plant can no longer produce concentrated ethanol, i.e. the hazard associated with catastrophic failure of the pressurised column. The cause and effect matrix is still being defined but the plant can be isolated by at least an operator shutting the emergency isolation valve on the feed to the plant, i.e. stopping the flow of dilute ethanol.

- Besides the control room, is there other location that the plant can be controlled and isolated remotely?

Yes, there will be (at least) remote shutdown at the MCC and via a duplicate shutdown facility at the boiler house.

Regards

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From: Deana.Burn@planning.nsw.gov.au [mailto:Deana.Burn@planning.nsw.gov.au]
Sent: Thursday, 16 March 2017 3:56 PM
To: Brian.hanley@manildra.com.au; John Studdert <John.Studdert@manildra.com.au>; Stephen Richardson <Steve@cowmanstoddart.com.au>
Subject: FW: MOD 12 Shoalhaven Starches - Questions for PHA

Hi All

Please see Doris's further questions on the PHA for MOD 12, not sure if I already sent these on?

Regards
Deana.

Hi Deana,

I have reviewed the responses to questions prepared by Dean Shewring. The Department generally agrees with the responses except on the response for the adopted failure frequency. Could you please send the additional questions to Starches?

It is noted that the proposed failure frequency as reported in Table 8 of the PHA are referenced to ICI, which is data from over 20 years. The Department has reviewed some relatively recent failure rates published by HSE, OGP and Purple Book as tabled below.

	Pressure Vessel	Pipework (Guillotine) pipe size between 75mm to 150mm	Year
HSE	2E-06 to 6E-06	5E-07	2006
OGP	2.45E-05	6E-07	2010
Purple Book	5E-06	3E-07	2005
ICI	1E-06	1E-07	

It appears that the relatively recent failure frequencies are higher than those reported in ICI. Taking values from purple book as average failure frequencies, the flash fire/explosion likelihood is calculated to 1.54E-06. If based on ICI figures, it would calculate as 4.2e-07 (Please note that there is a typo on the piping failure rate (it should read as 0.1×10^{-6}) in the formula on page 26 the PHA). With consideration of the weather condition which all the reported flash fire distances (table 7 of PHA) extend beyond the site boundary, it appears that the risk criteria compliance is at the border line.

In the unlikely event of loss of containment, the existing safeguards is LEL and plant can be tripped and isolated remotely. Please clarify the following:

- Is there any safety instrumented system will be installed at the columns? Hence any abnormally at the columns will trip the plant automatically.
- Besides the control room, is there other location that the plant can be controlled and isolated remotely?

Regards,
Doris

From: Stephen Richardson [<mailto:Steve@cowmanstoddart.com.au>]

Sent: Friday, 24 February 2017 9:04 AM

To: Deana Burn <Deana.Burn@planning.nsw.gov.au>; Doris Yau <doris.yau@planning.nsw.gov.au>

Cc: Brian.hanley@manildra.com.au; 'John Studdert' <John.Studdert@manildra.com.au>; Dean Shewring <deanshewring@optusnet.com.au>

Subject: FW: MOD 12 Shoalhaven Starches - Questions for PHA

Dear Deana and Doris,

I refer to Deana's email dated 21st February 2017 attached to which was a number of questions raised by Doris in relation to the PHA for the above Modification.

Please find attached a submission prepared by Dean Shewring of Pinnacle Risk Management addressing the matters raised by Doris.

I trust that this submission will satisfy the Department in this regard.

If you require any further clarification or information in relation to this matter please do not hesitate to contact me.

Regards

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From: Brian Hanley [<mailto:brian.hanley@manildra.com.au>]
Sent: Tuesday, 21 February 2017 9:51 AM
To: Stephen Richardson <Steve@cowmanstoddart.com.au>; deanshewring@optusnet.com.au
Subject: Fwd: MOD 12 Shoalhaven Starches - Questions for PHA

Sent from my iPhone

Begin forwarded message:

From: "Deana.Burn@planning.nsw.gov.au" <Deana.Burn@planning.nsw.gov.au>
Date: 21 February 2017 at 8:52:49 am AEDT
To: John Studdert <John.Studdert@manildra.com.au>, Brian Hanley <brian.hanley@manildra.com.au>
Subject: FW: MOD 12 Shoalhaven Starches - Questions for PHA

Hi Brian, John

Please find comments/questions below from Doris on the PHA for MOD 12. If you/your consultant have specific questions, please contact Doris directly.

Regards
Deana.

From: Doris Yau
Sent: Monday, 20 February 2017 1:04 PM
To: Deana Burn <Deana.Burn@planning.nsw.gov.au>
Subject: MOD 12 Shoalhaven Starches - Questions for PHA

Deana,

I am sorry for the late response for MOD 12. Below is a list of question I have for the PHA.

1. The PHA assumes SEP of 50kW/m² for large pool fires (pool diameter >25 m) and 60 kW/m² for smaller fires. Taking into account that the ethanol fires are luminous, the SEPs used in the analysis appears to be optimistic. Please provide the basis for the assumed SEPs.
2. An ethanol burndown rate of 1mm/min is used in the analysis and it is referenced to Lees and the Yellow book. However, this value was not found in any of these references. Please clarify if the quoted burning rate is based on further calculation provided in the references, such as based on the mass burning rate? Please provide further details.
3. A release rate of 1kg/s ethanol is estimated for a 50 mm hole leak and provided in Table 6 and Section 5.3.1 of the PHA. Please provide the parameters used for the estimation of the rate and details on the methodology used for the calculation. Please provide the maximum inventory of ethanol that can be released if the hole is located at the top of the column?
4. The jet flame The jet flame will extend 8 metre from the release source. If any equipment/building is located within this distance, the jet fire impingement may result in a failure. Was this domino effect considered in the analysis and how? Please provide details on the preventive and mitigation measures proposed to be implemented to minimise the risk from domino effect within the facility.
5. A flash fire (50mm hole leak) may reach 18m from the release source, hence there is potential to damage the surrounding equipment if an ignition source is present. Was this considered in the PHA and how?
6. Section 5.4 of the PHA identifies that a potential pool fire in the distillery may impact on the control room. A number of preventive control measures, aiming to reduce the likelihood of this event, are identified and listed in the HazID. However, only a limited number of mitigation measures are identified the PHA: emergency egress and???. While these measures may be sufficient to protect the people working in the control room, what measures will be in place if the control room is not accessible due to the fire. It is also noted that not only the control room, but the equipment in the vicinity may also suffer high heat stress and result in structural failure. Has this event been considered and what are the proposed safety measures?
7. The failure frequencies presented in Table 8 of the PHA appear to be optimistic. For example, the frequency suggested in TNO purple book is with 1 order of magnitude higher than the frequencies used in the PHA. Using the TNO frequency, the overall frequency for the flash fire/explosion event would be around 3.5E-06. Please provide a justification on the used data or otherwise ensure that the analysis err on conservative side by using conservative failure frequencies
8. The PHA concludes that an explosion is not a credible scenario and the overpressure effect is not estimated. However, the area in the vicinity of the control room is quite congested and therefore an explosion cannot be ruled out in the event of release. The PHA should be updated to consider the explosion events in the analysis.
9. A bund fire frequency of 1E-5 per year is assumed (Section 5.4) and it is based on LASTFIRE and IChemE publications. Does the chosen bund fire frequency accounts for the higher flammability of ethanol ? It is noted that LASTFIRE quotes a range from 2E-5 to 26E-5 based on statistical analysis, while IChemE states 1.2E-4 for highly flammable liquid, such as Ethanol. Please provide justification on the adopted frequency or consider using frequency that reflect the ethanol characteristic.

Please feel free to call me if you need clarification on the above questions.

Doris Yau

Risk Specialist (Hazards) – Team Leader

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