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1 December, 2020

Mr. Chris Ritchie
Director – Industry Assessments
Department of Planning, Industry & Environment
Locked Bag 5022
PARRAMATTA NSW 2124

Dear Chris

**RE: SHOALHAVEN STARCHES EXPANSION PROJECT**
**MODIFUICATION NO. 19 (MOD 19)**
**RESPONSE TO REQUEST FOR ADDITIOAJL; INFORMATION**

I refer to the Department's email dated 30th October 2020 which detailed issues arising from an assessment of the application by DPIE's Hazards Team. This submission has been prepared to respond to the matters raised in this email. The responses are a combination of comments supplied by Pinnacle Risk Management ("PRM") (who prepared the original PHA for this Mod and it is the PHA that is referenced through this submission) as well as staff from Shoalhaven Starches. The submission utilises the same numerical approach adopted by the Department's email.

***Issue Raised by DPIE***

1. *Shoalhaven Starches has been rapidly expanding. Although it is noted that all the previous modifications have fulfilled the relevant hazards assessment requirement, it is difficult to gain an overview of the overall transport of dangerous goods frequency and the overall risk for the site. Please provide details of transport of dangerous goods frequency (including class 3 tanker movements) and the dangerous goods storage & process locations, quantities for the entire site. In view of transport of dangerous goods, it is requested to undertake transport risk assessment if the transport movements has increased from previously approved levels.*

***Manildra Response:***

The approximate number of bulk tanker movements per week are as follows:

1. Class 8 (corrosive) x 10 deliveries (incoming)
2. Class 3 (flammable) x 3 deliveries (incoming)
3. Class 3 (flammable) x 75 despatch (outgoing)

As outlined in the Traffic Assessment that supported the application, Mod 19 will not result in any change to the current overall approved ethanol production of 300 ML per annum., As such according to the Traffic Assessment prepared by Bitzios Consulting and which formed Annexure 7 to the Statement of Environmental Effects that supports Mod 19, no changes are envisaged in relation to heavy vehicle movements and to and from the site associated with Mod 19.

The dangerous goods storage and process locations, and the quantities for the entire site, have been provided to the Department in the Site Wide Fire Safety Study. This information will, according to PRM, be included in the Site Final Hazard Analysis when complete.

***Issue Raised by DPIE***

2. *Shoalhaven Starches relies on compliance with relevant standards to control its risk of handling hazardous material along with other engineering safeguards for its operation. As the site is expanding and additional tanks and equipment are introduced, the Department is unsure of whether the site can continue comply with AS 1940 and AS 3780. It is requested to engage a dangerous goods consultant to ensure the overall site including those as proposed in MOD 19 can continue comply with relevant standards and report on findings to the Department.*

***Manildra Response:***

Attached to this submission are two reports prepared by accredited dangerous goods consultant LCF & Associates (Member of the Australian Institute of Dangerous Goods – Membership N0. 002) (the "LCF reports"). The LCF reports summarise compliance audits of the bulk storage of Class 8 corrosive substances as well as the bulk storage and handling of Class 3 flammable liquids on this site.

The LCF reports include recommendations to ensure the site complies with relevant Australian Standards. Shoalhaven Starches undertake to review the recommendations of the LCF reports and to formulate and implement an Action Plan to respond to the recommendations of these two reports.

***Issue Raised by DPIE***

3. *It is difficult to identify the new location for the Distillery control centre in Figure 2 or Figure 6, please indicate where the new location in a figure and verify whether any fire or explosion impact may affect the control room in the new location.*

***Manildra Response:***

The control room is labelled "Approved Control Room Mod 15" on Figure 2 in the PHA and is located adjacent to Bolong Road for ease of escape in an emergency. It is double-brick construction, re fire resistant. At this location, according to PRM, the radiant heat may be up to 12.6 $kW/m^2$ from a large pool fire at the Beverage Grade Ethanol Plant Number 1. The explosion risk is discussed on Point 5 below.

***Issue Raised by DPIE***

4. *Along with Figure 7 of the SEE which indicates the production capacity from various MODs approved previously, the Department raises the following questions:*

a. *Whether the ethanol plant will be operated with two trains (i.e. Distillery 2020 and Distillery 2017) to achieve a total of 200ML production per annum? If the two trains of ethanol plant are proposed, are they going to operate simultaneously at all times?*

***Manildra Response:***

Beverage Grade Ethanol Plants 1 (2017) and 2 (2020) will operate as two separate trains simultaneously.

*b. Or the upgrade of ethanol plant is about integrating Distillery 2020 with Distillery 2017, and be installed with larger column with similar operating conditions (as such some of the equipment numbers remain the same as those in Distillery 2017 e.g. D 530)?*

***Manildra Response:***

There will be two separate distilleries, i.e. Beverage Grade Ethanol Plants 1 (2017) and 2 (2020). These two plants will be operated independently of each other. Beverage Grade Ethanol Plant 2 (2020) is not an upgrade of Beverage Grade Ethanol Plant 1 (2017), it will be a stand-alone plant.

*c. Which equipment in the distillery 2017 will be demolished to allow for the upgrade?*

***Manildra Response:***

No equipment in Beverage Grade Ethanol Plant 1 (2017) will be demolished. It will remain as it is.

*d. If any existing equipment is to be refurbished and operate at slightly different pressure, what steps are taken to ensure the existing equipment can continue fit for the intent operation.*

***Manildra Response:***

No existing processing plant will be refurbished and operate at different pressures. There will be no change to the operating parameters of Beverage Grade Ethanol Plant 1 (2017).

***Issue Raised by DPIE***

*5. The explosions event has been ruled out as it was stated in the PHA that little confinement along Bolong Road. However, the Department queries whether confinement would occur between the columns and pipe work within the ethanol distillery facilities. It appears that the upgraded ethanol distillery facility would be further confined with additional columns. The explosion risk and the associate propagation impact should be assessed and demonstrate it can comply with the relevant risk criterion.*

***Manildra Response:***

The potential for explosions due to ignition of vapour clouds is initially acknowledged in the PHA. As the detailed review progressed throughout the consequence section then the risk of explosions did not become credible as follows.

The estimated maximum vapour release for the two beverage grade plants, according to PRM, is approximately 0.4 te. Vapour cloud explosions (VCE) are discussed in a number of process safety references. The following is from CCPS, Guidelines for Chemical Process Quantitative Risk Analysis, Second Edition:

> *"Other experimental studies have also demonstrated that there is a minimum mass of flammable material that is required to allow transition from a flash fire to VCE. These estimates range from 1 ton (Wiekema, 1975) to 15 ton (Health and Safety Executive, 1979)."*

This reference also provides caution for more reactive materials, e.g. hydrogen, where VCE's have occurred with quantities as low as 0.1 te. However, as ethanol vapour is not a reactive material, the total vapour quantity is approximately 0.4 te (not all of which will be in the flammable region) and ethanol distilleries are not significantly congested or confined with walls etc then explosions are not deemed credible. Correspondingly, they are not included in the PHA.

***Issue Raised by DPIE***

6. *The upgrade of ethanol plant proposed in MOD 19 has adopted a quantitative approach for only release scenarios that may result in fire impact from the distillery columns to the site boundary. It does not include the event that may result from propagation impacts, such as from explosion (see point 5 above) or any jet fire impingement from neighbouring columns. Please update the table in Appendix E of PHA to include the risks from explosion, or any propagation risk that may affect that ethanol plant.*

***Manildra Response:***

Propagation from explosions is not deemed credible given the response in Point 5 above.

The table in Appendix E of the PHA is for quantitative estimation of off-site risk. As the estimated jet fire length for a 50 mm hole is approximately 8 m and therefore does not impose significant levels of radiant heat at the nearest site boundary then, according to PRM, jet fires do not need to be included in Appendix E.

According to PRM, jet fires can cause on-site propagation due to creep failures. Given the short jet fire lengths, the only equipment that can be impacted are the adjacent heat exchangers, columns etc. If these fail, there will be a release of liquid ethanol and hence a pool fire (as included and modelled in the PHA).

***Issue Raised by DPIE***

7. *Overfilling and hose uncoupling from driveaway scenarios from ethanol unloading bays do not appear to be included in the quantitative analysis. Depending on the filling frequency and the filling flowrate of the ethanol loading bays, not including these scenarios in the risk analysis may potentially underestimate the risks. Please provide details on number of ethanol trucks movement in the new loading bay, the overall ethanol truck movement of the site and the filling flow rates. Also please comment on how the increased in tanker loading frequency (if any) may change the overall risk of the site.*

***Manildra Response:***

The consequence modelling in Appendix C of the PHA is for all credible causes for losses of containment at the existing and proposed road tanker loading bays (see Scenarios 6a and 6b). This modelling assumes worst-case, i.e. the contained area is completely flooded with ethanol and on fire.

The 4.7 kW/m$^2$ contours do not travel off-site for these scenarios. Therefore, according to PRM, it does not matter what the release cause is or how frequent the transfers are, the HIPAP 4 criteria will be satisfied and no further assessment is warranted.

I trust the above and attached is of assistance to the Department's consideration of this Modification Application. If you require any further information in relation to this mater please do not hesitate to contact me.

Yours faithfully

Stephen Richardson
COWMAN STODDART PTY LTD

Enc.