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9 November, 2021

Our ref: 21/29

Your ref: MP10_0108-Mod-1

Joanna Bakopanos
 Industry Assessments
 Department of Planning, Industry and Environment
 12 Darcy Street
 PARRAMATTA NSW 2150

Dear Joanna

**RE: SHOALHAVEN STARCHES – GAS PIPELINE (MP10_0108-MOD 1)
 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

I refer to the Department's letter dated 21st October 2021 in relation to the above project. The Department's letter requested additional information in relation to this Modification Application, and specifically in relation to the Preliminary Hazard Analysis that supported the Modification Application.

The issues raised by the Department have been referred to Dean Shewring of Pinnacle Risk Management who was the author of the Preliminary Hazard Analysis that supported the Modification Application. The following responses have been provided by Mr. Shewring to the issues raised by the Department and are supported by a revised PHA which is attached to this submission for the Department's consideration.

- The maximum release rate of natural gas in section 5.1 of the Preliminary Hazard Analysis (PHA) is evaluated at 256 kg/s. However, in Table 3, a natural gas flowrate of 287 kg/s is used. Furthermore, the Hazard Analysis performed in 2011 (Hazard Analysis, Manildra Bomaderry Pipeline, URS Australia, Pinnacle Risk Management, Revision B, 7 March 2011) estimated the release rate at 286 kg/s for a smaller pipe diameter. Please clarify on the assumptions and methodology used to estimate the release rate for the modification and confirm whether appropriate release rate has been considered for the consequence analysis.*

Response:

The correct figure is 256 kg/s and this has been used in the calculations. This corresponds to a release near the populated areas, i.e., towards the end of the pipeline. At this location, choked flow exists in the pipe (the correlations for this event are included in TNO's EFFECTS modelling package). This is the location where residential areas exist, i.e., where the risk assessment is performed.

The value of 286 kg/s corresponds to an initial flowrate from a break at the start of the pipe. However, as there are no nearby residential areas (such as the township of Bomaderry) then was not used in the calculations.

2. *In reviewing Table 7 of the PHA, it appears that the intent is to establish maximum individual risk from the pipeline and verify it would comply with the risk criteria for surrounding land uses. However, the methodology adopted could potentially under-estimate the risk as it only considers larger hole sizes. In addition, the directional consideration assumption may be optimistic. The Department suggests identifying a residence that is closest to the pipeline with assessment of the potential individual risk at this point. This approach should consider all hole sizes of releases that may reach to this residence.*

Response:

The PHA has been updated with small and pinhole releases. The probabilities for wind direction are based on the modelling results. Further explanation of QRA modelling has been provided in Section 5.4.

3. *In addition to point 2 above, the directional consideration may be difficult to establish using a spreadsheet model. The Department considers that the analysis should adopt a conservative assumption by not using directional considerations. If directional consideration is required, a realistic and conservative assumption that is relevant for the event should be adopted.*

Response:

As per Query 3 above, the probabilities for wind direction are based on the modelling results. Further explanation of QRA modelling has been provided in Section 5.4. All QRAs take into consideration wind direction; this is a standard part of the QRA modelling approach. The wind direction probabilities are realistic as they are based on the estimated plume sizes and angles.

4. *The relocation of the Gas Pressure Reduction Facility (GPRF) closer to Bolong Road decreases the separation distances to surrounding areas. Noting that the GPRF is now closer to the distillation plant, the PHA must demonstrate that the consequence of events associated with the GPRF meet the risk criteria in Hazardous Industry Planning Advisory Paper No.4 and that propagation risks are met.*

Response:

Propagation risk is discussed in Section 5.5 of the PHA. The cumulative failure and ignition likelihood for all three release scenarios from Table 11 is approximately 2.2×10^{-9} per m per year. The individual fatality risk is estimated to be 5.2×10^{-8} per year. Both these values are below the HIPAP 4 propagation criterion of 50 pmpy.

I trust the above and attached revised PHA are of assistance to the Department's consideration of this Modification Application.

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

Yours faithfully

A handwritten signature in black ink that reads "Stephen Richardson." The signature is written in a cursive style with a large, stylized 'S' and a trailing dot at the end.

Stephen Richardson
COWMAN STODDART PTY LTD

Enc.