HyNet Hydrogen Production Plant 1 – Technical Note

EPR Response 19c – Risk assessment for abnormal CO2 venting emissions

Summary

Provide an environmental risk assessment for these emission points following the methodology set out in Environment Agency guidance https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Where applicable, the risk assessment should be informed by an appropriate dispersion model for all the applicable CO2 venting points, following the guidance set out in Environmental permitting: air dispersion modelling reports - GOV.UK (www.gov.uk) and taking into account the higher density of concentrated CO2 emissions (dense gas modelling). Notes: Table 7-4 of the Application Supporting Document refers to a CO2 compressor vent. Item 1.3 of the Accident Risk Assessment provided in Appendix A.4.0 of the Application Supporting Document states that CO2 discharge to atmosphere is planned during plant start-up and shutdown. However, you have not risk assessed these emission points.

Details

CO2 dispersion modelling provided as Attachment 1 with points for consideration below:

- Dispersion modelling has been completed to support the process design and hence is not in the same format of an Environmental Permit Air Dispersion modelling report. It was developed so that we could consider, early in design, the impact of potential CO2 venting on personnel working at the Stanlow Site – for example, it informed the height and location of the vents based on worst case scenarios.

- There are no documented 'offsite' limits for CO2 in the same way as there are for NOx/SOx etc. and we need to understand if we are expected to derive from WELs.

- Deriving appropriate offsite limits for substances from WELs is a very complex process for 'normal' substances. We have been advised by two independent consultants that they are not clear how appropriate this is as CO2 does not typically fit this process - it is a dense gas where the impact is acute not chronic.

- HSE EH40 WELs for CO2 are LTEL 5000ppm 8hr TWA; STEL 15000ppm 15min TWA
  API 521 (2020) suggests *"Concentrations of toxic vapors, at the company property line, shall not exceed levels that cause life threatening health effects [e.g. emergency response planning guideline (ERPG)-3 or equivalent]".* There are no ERPG values for CO_2 but as *"ERPG-3 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects"* an equivalent could be IDLH which is broadly similar. IDLH is 40000ppm for CO2.

- The dispersion model includes plots including extreme weather conditions and although it does not use actual meteorological data, it considers the 100th percentile results at ground level. We ensured that the vent heights selected did not result in ground level concentrations above the 15,000ppm STEL, and this approach was considered conservative.

Attachment – CO2 Vent Dispersion Study.