



**APPENDIX C8**

**Addendum to the Preliminary Hazard Analysis**



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Our Ref: 21450\_PHA\_Impacts-Design\_Change\_V1

1 September 2022

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APA Group

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Dear Tom

**RE: Kurri Kurri Lateral Pipeline - Assessment of Project Amendments on PHA Outcomes**

Umwelt (Australia) Pty Ltd prepared the preliminary hazard analysis (PHA) for the Kurri Kurri Lateral Pipeline Project (the Project) on behalf of APA Group (APA) which was included in the Environmental Impact Statement (EIS) for the Project. The PHA provides an assessment of the potential health and safety risks to off-site receivers associated with relevant Project components (i.e. the transmission pipeline, storage pipeline and associated surface facilities) and concluded that the risks associated with the Project would not exceed *Hazardous Industry Planning and Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning* (HIPAP 4) (NSW Department of Planning, 2011) criteria.

Umwelt understand that since submission of the KKLP EIS in March 2022, APA has continued to consult with directly affected landholders, and stakeholders more broadly. Ongoing consultation has led to several Project amendments, including the relocation of the JGN offtake facility to the eastern side of Lenaghans Drive, an adjusted transmission pipeline alignment in several locations including either side of Buchanan Road, a refined footprint for the storage pipeline and adjustment of the equipment arrangement within the Compressor Station and Delivery Station. Umwelt has reviewed the Project amendments to assess whether the changes have a material impact on the outcomes of the PHA. A summary of the review and assessment is provided in the following sections.

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## 1.0 JGN Offtake Facility

The maximum modelled distance of a credible hazardous event with a fatality impact at the JGN Offtake Facility is associated with thermal radiation from a DN350 flange jet fire and extends 28 m from the point of release potentially impacting off-site receivers. Injury impacts associated with the DN350 flange jet fire extend 31 m from the point of release. The original location of the JGN Offtake Facility was within a rural residential area with no dwellings located within the hazardous event fatality impact extent, i.e. the jet fire thermal radiation contour adopted as having a 100 % fatality impact ( $12.6 \text{ kW/m}^2$ ), and assessed based on HIPAP 4 risk criteria for active open space land use. The cumulative risk of a flange jet fire within the JGN Offtake Facility and the transmission pipeline was estimated to be  $9.89 \times 10^{-7}$  fatalities /year which is below the HIPAP 4 risk criteria for active open space land use of  $10 \times 10^{-6}$  fatalities/year.

The relocated JGN Offtake Facility is also in a rural residential area with no dwellings (the facility boundary is approximately 180 m from the nearest dwelling to the north east and approximately 240 m from the nearest dwelling to the south) within the fatality or injury impact zones. As such, the relocated JGN Offtake Facility has been assessed based on HIPAP 4 criteria for active open space.

There are no changes assumed in the operating pressures or pipe mechanical design (including the number and size of pipe fittings such as flanges) associated with the relocation of the JGN Offtake Facility for this analysis. As such, there is no change to the worst case hazard event consequences or frequency of hazardous events. Therefore, the individual fatality risk associated with the relocated JGN Offtake Facility is considered to remain unchanged and below HIPAP 4 criteria, i.e.  $10 \times 10^{-6}$  fatalities/year. Note that HIPAP 4 injury risk criteria does not apply to active open space land use.

## 2.0 Transmission Pipeline Re-alignment

All credible hazardous events associated with the transmission pipeline will have possible off-site fatality impacts and the section of pipeline to be realigned either side of Buchanan Road is in an area previously assessed based on HIPAP 4 risk criteria for residential land use. Whilst other sections of the transmission pipeline are proposed for minor realignment, the section adjacent to Buchanan Road is assessed here as the transmission pipeline will be close to residences clustered around the intersection of Louth Park Road and Mount Vincent Road.

The cumulative risks associated with all credible transmission pipeline failure modes and leak sizes at any point along the transmission pipeline alignment was estimated to be  $2.39 \times 10^{-7}$  fatalities/year and  $3.87 \times 10^{-7}$  injuries/year which are below the HIPAP 4 criteria for residential land use of  $1 \times 10^{-6}$  fatalities/year and  $50 \times 10^{-6}$  injuries/year respectively.

The realignment of the transmission pipeline either side of Buchanan Road does not result in a change to:

- the land use category and therefore the HIPAP 4 risk criteria that applies;
- the range in credible loss of containment scenarios;
- the extent of hazardous event impacts, including the jet fire thermal radiation contour adopted as having a 100% fatality impact ( $12.6 \text{ kW/m}^2$ ) and the jet fire thermal radiation contour adopted as having an injury impact ( $4.7 \text{ kW/m}^2$ ); or
- the frequency of credible hazardous events.

Therefore, the risk of injury and fatality associated with the transmission pipeline realignment is considered to remain unchanged and below HIPAP 4 criteria, i.e.  $1 \times 10^{-6}$  fatalities/year and  $50 \times 10^{-6}$  injuries/year.

### 3.0 Storage Pipeline

All credible hazardous events associated with the storage pipeline will have possible off-site fatality impacts and the storage pipeline is within an area previously assessed based on HIPAP 4 risk criteria for active open space land use. The cumulative risk associated with all credible storage pipeline failure modes and leak sizes at any point along the storage pipeline was estimated to be  $1.98 \times 10^{-5}$  fatalities/year which is below the HIPAP 4 criteria for residential land use of  $10 \times 10^{-6}$  fatalities/year. Note that HIPAP 4 injury risk criteria does not apply to active open space land use.

The refined storage pipeline layout does not result in a change to:

- the land use category and therefore the HIPAP 4 risk criteria that applies;
- the range in credible loss of containment scenarios;
- the extent of hazardous event impacts, including the jet fire thermal radiation contour adopted as having a 100% fatality impact ( $12.6 \text{ kW/m}^2$ ); or
- the frequency of credible hazardous events.

Therefore, the risk of injury and fatality associated with the transmission pipeline realignment is considered to remain unchanged and below HIPAP 4 criteria, i.e.  $10 \times 10^{-6}$  fatalities/year.

### 4.0 Compressor and Delivery Station

The rearrangement of the Compressor and Delivery Station equipment results in the compressors and aftercoolers being closer to the northern site boundary, which adjoins the Hunter Power Project. Hazardous events associated with the compressors and aftercoolers were a compressor enclosure vapour cloud explosion (VCE) and a jet fire due ignition of a gas release from an aftercooler pipe rupture. The fatality consequences associated with these hazard events did not extend off-site for the original Compressor and Delivery Station arrangement assessed in the PHA. However, the revised arrangement results in potential fatality impacts due to overpressure and thermal radiation extending off-site into the neighbouring property to the north that is for industrial land use with a HIPAP 4 risk criteria of  $50 \times 10^{-6}$  fatalities/year.

The PHA assessed the cumulative individual fatality risk on the neighbouring industrial land based on a DN400 flange jet fire (associated with the Compressor and Delivery Station pipework), a jet fire from the transmission pipeline (for all failure modes) and a jet fire from the interconnect pipeline (for all failure modes). Given the proposed rearrangement of the Compressor and Delivery Station, the cumulative off-site individual fatality risk needs to also account for a compressor enclosure VCE and aftercooler jet fire. The cumulative individual fatality risk at the neighbouring industrial property associated with the rearranged Compressor and Delivery Station is estimated to be  $7.11 \times 10^{-6}$  which is below the HIPAP 4 risk criteria of  $50 \times 10^{-6}$  fatalities/year.

## 5.0 Conclusion

The proposed design changes to the Project are not considered to have a material change on the overall outcomes of the PHA and the off-site risks associated with the Project are considered to remain below HIPAP 4 risk criteria.

We trust this information meets with your current requirements. Please do not hesitate to contact the undersigned on 1300 793 267 should you require clarification or further information.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Tim Procter', is positioned above the printed name.

**Tim Procter**

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