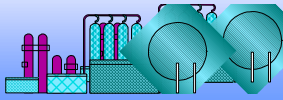


PRELIMINARY HAZARD ANALYSIS (PHA) OVERVIEW



Preliminary Hazard Analyses - PHA

PHA Methodology:

- DIPNR HIPAP No. 4 – Land Use Risk Criteria
- DIPNR HIPAP No. 6 – Hazard Analyses
- Three Broad Stages:
 - ▶ Identify the Potential Hazardous Events
 - ▶ Assess the Risk
 - ▶ Review the Adequacy of the Safeguards
- Primary Concern is Off-Plot Risk

Definitions

- **Hazard** – a Characteristic with the Potential for Harm, e.g. to People, the Environment or Property
- **Risk** – the Likelihood of an Outcome (in a PHA, adverse consequential impacts)
- **Safeguards** – Control Measures used to Prevent a Potential Hazardous Event from Occurring or Mitigate the Effects once a Potential Hazardous Event has occurred

GTP – Materials of Interest

- EDC, Ethylene Dichloride (toxicity / flammability) and other Groundwater Contaminants
- Recovered Waste EDC (toxicity / flammability)
- Natural Gas (flammability)
- Hydrogen Chloride (corrosive)
- Corrosive Liquids, i.e. Hydrochloric Acid (5wt%), Caustic Soda (46wt%), SMBS, Sodium Hypochlorite

Potential Hazardous Events Summary – Modelled in the PHA (acute effect)

- Piping and Equipment Failures Releasing EDC, HCl, Other Gases
- Recovered Waste EDC Isocontainer Events:
 - BLEVEs
 - Pool Fires and Smoke Plumes
 - EDC Plumes from Releases in the Bund
- Natural Gas Line Failures (fires / explosions)
- Thermal Oxidiser Explosion
- Caustic Scrubber Failure

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Potential Hazardous Events Summary – Previously Analysed

- Aircraft Crash
- Road Tanker Crash (recovered waste EDC)
- Releases of Groundwater from Piping

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Potential Hazardous Events Summary – Not Modelled in the PHA

- Dioxins
- Off-specification Plant Liquid Discharges
- Activated Carbon Fires
- Sabotage / Terrorism
- Electrical Faults
- Others (on-plot issues, e.g. sampling mishaps)

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Proposed Safeguards

- Hardware Controls:
 - Burner Management System for the Thermal Oxidiser
 - Bunded Areas (e.g. recovered waste EDC)
 - Control and Trip System
 - Equipment and Piping Design and Isolation
 - Fire Protection
- Software Controls:
 - Safety Management System (e.g. procedures)

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Consequence Modelling Results – Gaseous Releases

- Materials of Interest, e.g. EDC, HCl
- ERPG (Emergency Response Planning Guidelines) used for Irritation and Injury Risk
- SLOT (specified levels of toxicity) used for Fatality Risk
- 325 metres to the Nearest Public Road (Denison Street)

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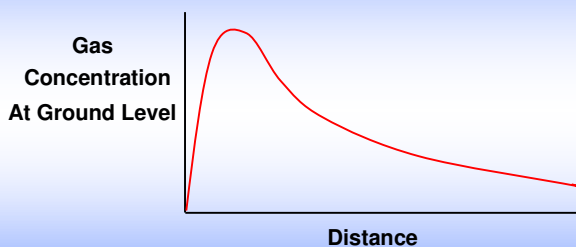
Consequence Modelling Results – Gaseous Releases Continued

- Low Initial Concentrations
- Low Pressure (7.5 kPag – 75 cm of water)
- Releases from 50 mm Holes or Smaller – Local Impact Only
- Complete Pipe Ruptures:
 - EDC – No Off-site Fatality or Injury; Irritation for Stable Wind / Weather Conditions Only
 - HCL - No Off-site Fatality; Injury for Stable Wind / Weather Conditions Only; Irritation for most Wind / Weather Conditions

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Consequence Modelling Results – Gaseous Releases Continued



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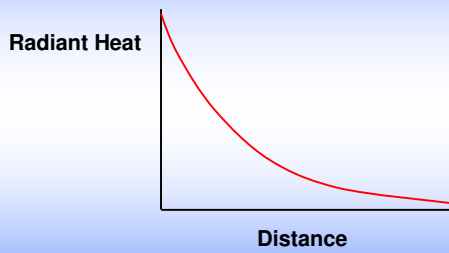
Consequence Modelling Results – Recovered Waste EDC

- BLEVE – Fireball Radius 81 m
- Pool Fires – Local Radiant Heat Impact Only
- EDC Plumes from Spills
 - No Off-site Fatality or Injury; Irritation for the Most Stable Wind / Weather Condition Only

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Consequence Modelling Results – Gaseous Releases Continued



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Consequence Modelling Results – Natural Gas Line Failures

- 80 mm Diameter, 80 m Long
- Jet or Flash Fires, or Explosions – Local Impact Only

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Consequence Modelling Results – Thermal Oxidiser Internal Explosion

- Flammable Gas Inside the Thermal Oxidiser Ignites
- No Off-site Fatalities, Injuries or Irritation due to Overpressures

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Consequence Modelling Results – Caustic Scrubber Failure

- No Scrubbing of Hydrogen Chloride
- Thermal Oxidiser Discharge Stream is Vented at 20 m Above the Ground
- No Ground Level HCL ERPG 1 Concentration Predicted
- Stream Disperses at Height

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Risk Results

The GTP Poses Broadly Acceptable Risks for the Following:

- Fatality Risk, Injury Risk and Irritation Risk
- Societal Risk
- Transport Risk
- Propagation Risk
- Cumulative Botany / Randwick Area Risk

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Risk Results

The Main Reasons for the Above Results:

- Few Significant Large Consequential Impact Events and their Low Likelihood;
- The Large Distance to the Nearest Public Area (Dension Street); and
- The Low Concentrations of Gases in the Process Streams

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THE END

