



# DEAC Contaminated Waste Treatment (diethyl aluminium chloride)

Presentation for Community Liaison Committee

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# Background

- **DEAC**
  - Used in the Propathene plant, which ICI operated between 1977 and 1998
  - Regularly imported from the USA during operation of the plant
  - Dilute DEAC in heptane was created during operation of the plant and sent back to the provider in the USA
- **DEAC contaminated Waste**
  - Contains traces of DEAC (on average 7.5%) in heptane (a solvent similar to petrol)
  - Approx 3.1 tonnes stored at BIP since 1996
  - Same Dangerous Goods classification as the EDC condensate from the Steam Stripping Unit
  - Export of DEAC contaminated waste no longer permitted
  - Stored at BIP in a registered dangerous goods store
  - Small amount of waste that hadn't come up in recent community discussion forums about key Orica legacy projects



# Treatment Investigations

- **Regulations**

- In 1996 amendments to Hazardous Waste (Regulation of Exports and Imports) Act, 1989
  - effectively reclassify the DEAC contaminated waste as “hazardous waste”
  - unable to send it back to manufacturer
- Four unsuccessful attempts to export the waste since 1996

- **Qenos**

- Further export attempt considered in parallel with triethyl-aluminium (TEAL) waste from Qenos
  - Not progressed as Qenos found in-house treatment solution for TEAL
- September 2005, Orica asked DECC if Qenos could also treat the Orica DEAC waste
- DECC asked for a detailed application
- Hazard study conducted by Qenos in 2007
  - Identified that the Qenos process could produce HCl vapour
  - This could cause corrosion in the Qenos facilities, therefore not acceptable

# Orica Decision Making Process

- Objective to safely destroy a legacy waste with minimum handling
- Strong operational reasons to proceed
  - Experienced technical personnel with good knowledge of the waste currently available, but planning to retire
  - Owner of vessels advised that the containers needed to be returned
  - Orica keen to find treatment solution to avoid operators handling contents during transfer to new containers
- **Mid October 2008**
  - Plan of work for November shutdown firmed up
  - GTP Operations Manager identified that shutdown work would facilitate any post DEAC treatment vessel cleaning
    - Fouling or build-up could be easily removed
    - Re-lining of refractory was already planned for 2008 shutdown (not necessarily conducted each year)
  - Preliminary Hazard Study undertaken
- **21 October 2008**
  - HAZOP Study (hazard and operability) conducted
  - Hazard study confirmed that the waste treatment could be managed effectively and decision made to progress
  - Community notification to follow approval from DECC

# Discussions with DECC

- Tuesday 22 October
  - Following HAZOP Study, Orica wrote to DECC Sydney Industry advising of intention to treat the DEAC contaminated waste
  - Correspondence copied to DECC Contaminated Sites, Waste Branch & Air Branch and the Department of Planning
- Monday 27 October
  - DECC raised a series of questions about treatment of the waste
    - Was it all from BIP?
    - Who prepared the HAZOP Study and can results be provided to DECC?
    - Concentration and composition of the waste?
    - Comprehensive stack monitoring likely to be required
    - Has the CLC been advised?
- Tuesday 28 October
  - Orica replied and noted key timing considerations

# Discussions with DECC

- Wednesday 29 October
  - DECC raised additional questions
    - Has the risk of spontaneous combustion been considered?
    - What happens to aluminium in the destruction process?
    - How will spill risks be managed?
    - Request for aluminium monitoring and mass balance
    - How much fouling is expected?
    - Orica to advise CLC Chair, John Kent
- Thursday 30 October
  - Orica responded to further DECC questions and spoke with John Kent
- Friday 31 October
  - DECC conditional approval granted
- Wednesday 5 November
  - e-mail to notify CLC
- Monday 10 November
  - phone calls received from some CLC members

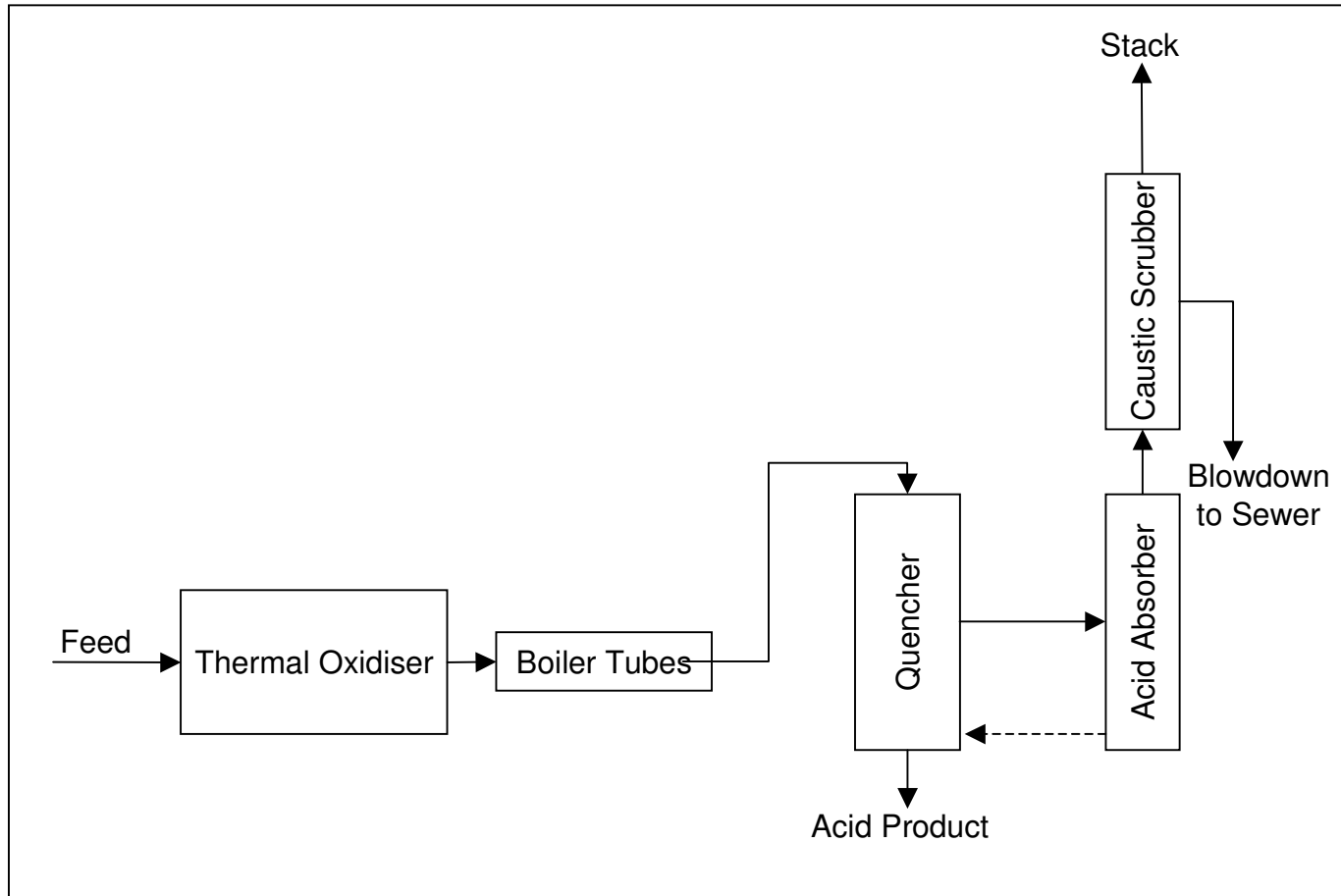
# DECC Conditions

- Notify CLC Chair
- Detailed stack monitoring
- Mass balance to account for aluminium entering and leaving the GTP (noting that accuracy may be reduced due to complexity)
- Daily aluminium monitoring in the scrubber and quench water
- Contaminated HCl and other liquid wastes to be disposed of appropriately and ensure that cross-contamination does not occur between the various parts of the GTP
- Stop immediately if directed to do so:
  - Due to complaints regarding pollution, odours or malfunctioning of the GTP
- Results to be provided no later than 28 days after completion of the tests

# DEAC Contaminated Waste Treatment

- Commenced trial on Friday 31 October
- Waste treatment in 4 batches from 3 November to 12 November
- Injected into the GTP thermal oxidiser
- Waste material breaks down into:
  - Hydrochloric Acid – which is routinely produced at the GTP
  - Aluminium Oxide – some of which dissolved in the hydrochloric acid product formed in the quencher and acid absorber and the balance deposited in the thermal oxidiser and the quencher
- Stack monitoring
  - Stevenson Environmental Management 4 November
  - Airlabs Pty Ltd 10 November
- Mass balance
  - To account for material injected in and destination (i.e. HCL, stack or accumulated)

# Aluminium Mass Balance for DEAC Waste Treatment



Sampling demonstrated that the mass balance was achieved

# Stack Monitoring Results

Analyte	Result
Carbon Monoxide	√ Compliant
Hydrogen Chloride	√ Compliant
1,2 Dichloroethane	√ Compliant
VOC	√ Compliant
Vinyl Chloride	√ Compliant
Oxides of Nitrogen	√ Compliant
Sulphur Dioxide	√ Compliant
Total Solid Particulate Matter Licence limit 20 mg/m <sup>3</sup>	√ One compliant (6.8 mg/m <sup>3</sup> ) ✗ One exceedance (42.2 mg/m <sup>3</sup> )
Dioxins and Furans	√ Compliant

# Orica Botany Waste/ Contamination Matters

- Treatment of the DEAC contaminated waste has led to questions from the CLC regarding Orica wastes at Botany
- Orica Botany wastes include:
  - Legacy wastes
  - Operational wastes

Orica's Environment Protection Licence permits:

- waste processing (non-thermal treatment)
  - e.g. spent pickling acids are received from Blue Scope Steel and used as feed stock to produce ferric chloride that is used for drinking water purification by Sydney Water
- waste disposal (thermal treatment)
  - e.g. treatment of contaminated groundwater at the GTP
- Waste coming to site is tracked in the DECC on line or Commonwealth paper systems
- Details of waste types outlined in Section L5 of EPL2148

# Legacy Wastes

## Stored wastes

- HCB Stores
- Mercury contaminated material from former ChlorAlkali plant
- No more DEAC contaminated waste stored by Orica at Botany

## Contaminated waters

- Groundwater pumped from containment areas
- Groundwater collected during bore testing, well development and works in pipes and pits
- CPWE Stormwater
- Contaminated liquids from HCB waste repackaging operations (EDC waste)
  - raised with DECC and CPRC the possibility of treating at the GTP (as outlined in the HCB Waste Repackaging EA)
- Water from mercury soil washing trials and former ChlorAlkali Plant Area

## Excavated contaminated soil

- CPWE
  - Mercury contaminated soil from former ChlorAlkali Plant area
  - Other HCB related waste (as discussed with the CPRC)
    - Soil adjacent to and possibly beneath the existing HCB Stores, Denison Street landscaping mound & Pacific National Stockpile
  - Drilling and excavation spoil
- Small volumes of material returned from research & development projects
    - e.g. bioremediation trials

# Operational Wastes

## **GTP**

- e.g. hydrochloric acid, salty water reject from reverse osmosis plant, used filter cartridges and membranes

## **HCB Waste Repackaging Plant**

- e.g. spent activated carbon from vapour emission control systems
  - have raised with DECC and CPRC the possibility of regenerating carbon from G/H stores at the GTP

## **ChlorAlkali Plant**

- e.g. sulfuric acid, oil

## **Other Wastes**

- Sewage
- Stormwater
- Transformer oils
- General wastes (packaging, used equipment, paper, food refuse etc)
  
- Destination of operational wastes (which may be temporarily stored)
  - Reused
  - Recycled
  - Discharged to sewer in accordance with Sydney Water Trade Waste Agreement
  - Tested and sent to landfill in accordance with waste classification

# Draft Community Notification Protocol

Tabled for discussion.....