



Orica Kooragang Island

Legislative Council Select Committee on the Kooragang Island Orica chemical spill –
Site Inspection

Stuart Newman, Host
Peter McGrath, Ammonia Plant Manager
Warren Ashbourne, Ammonia Team Leader

14 November 2011

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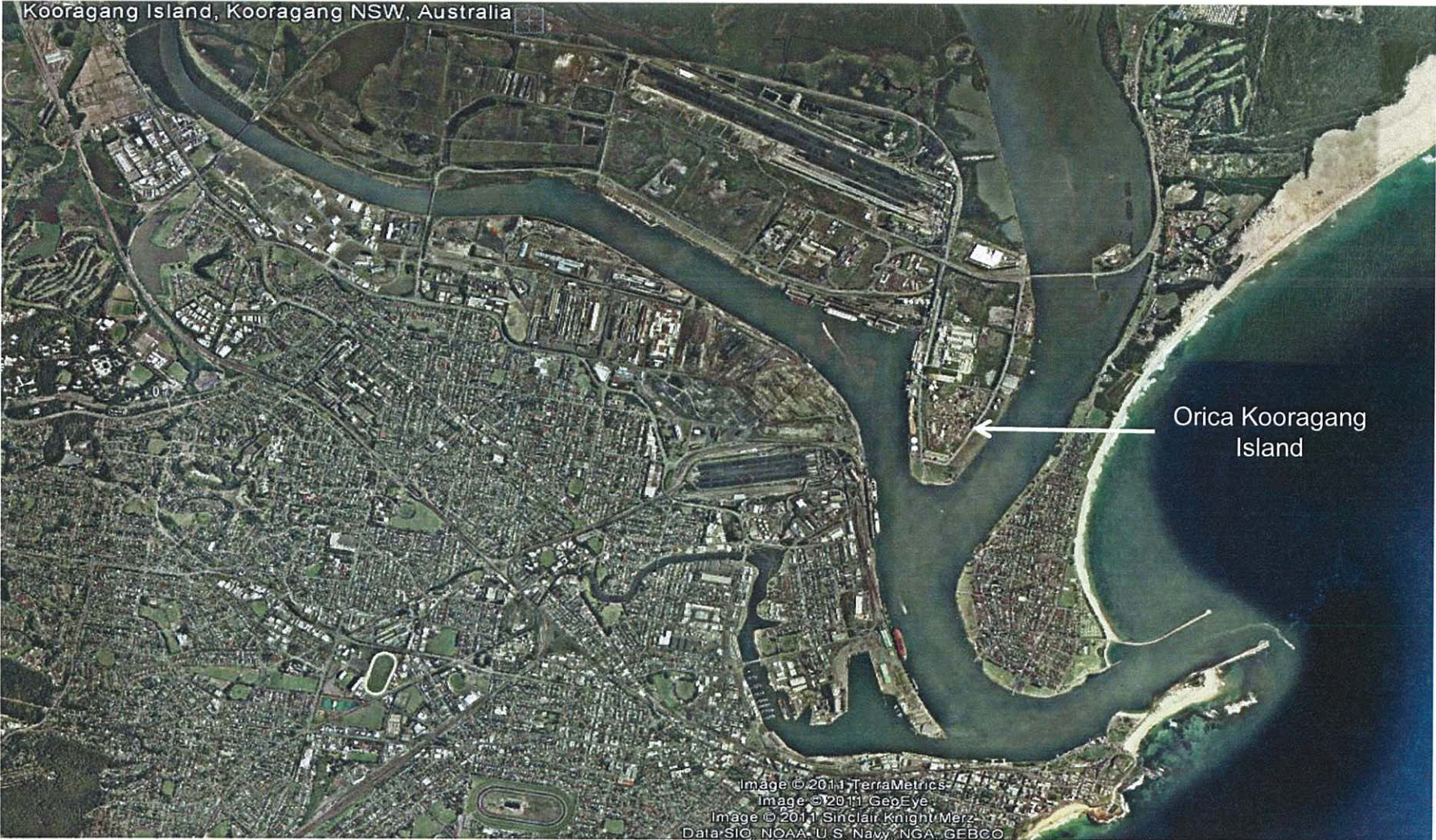
Agenda

- Introduction to Orica & Kooragang Island
- Ammonia Plant
- Incident & Corrective Actions
- Your Safety on the Tour
- Site Tour
- Q&A Session

Introduction to Orica

- Orica is an Australian-owned, ASX listed company
- Orica has three business units – Orica Mining Services, Orica Chemicals and Minova
- The Kooragang Island site is an important part of Orica's Mining Services operations in Australia
 - supplies 80% of the Hunter Valley resources operations with commercial explosives, initiating systems and blast-based services
 - at current capacity, meets 60% of NSW demand and 25% of national demand
 - only manufacturer of ammonium nitrate in NSW – 90% of the ammonium nitrate manufactured on-site (430,000 tonnes per annum) is sold locally
- Orica's commercial blasting products are preferred by Australian industry because they are safety-focused, cost-effective, accurate and flexible

Location of Kooragang Island Site



Orica and its neighbours



Orica's Kooragang Island Site



Kooragang Island – Ammonia Plant



Kooragang Island – Nitric Acid Plant



Kooragang Island – Ammonium Nitrate Plant



Kooragang Island Site operations

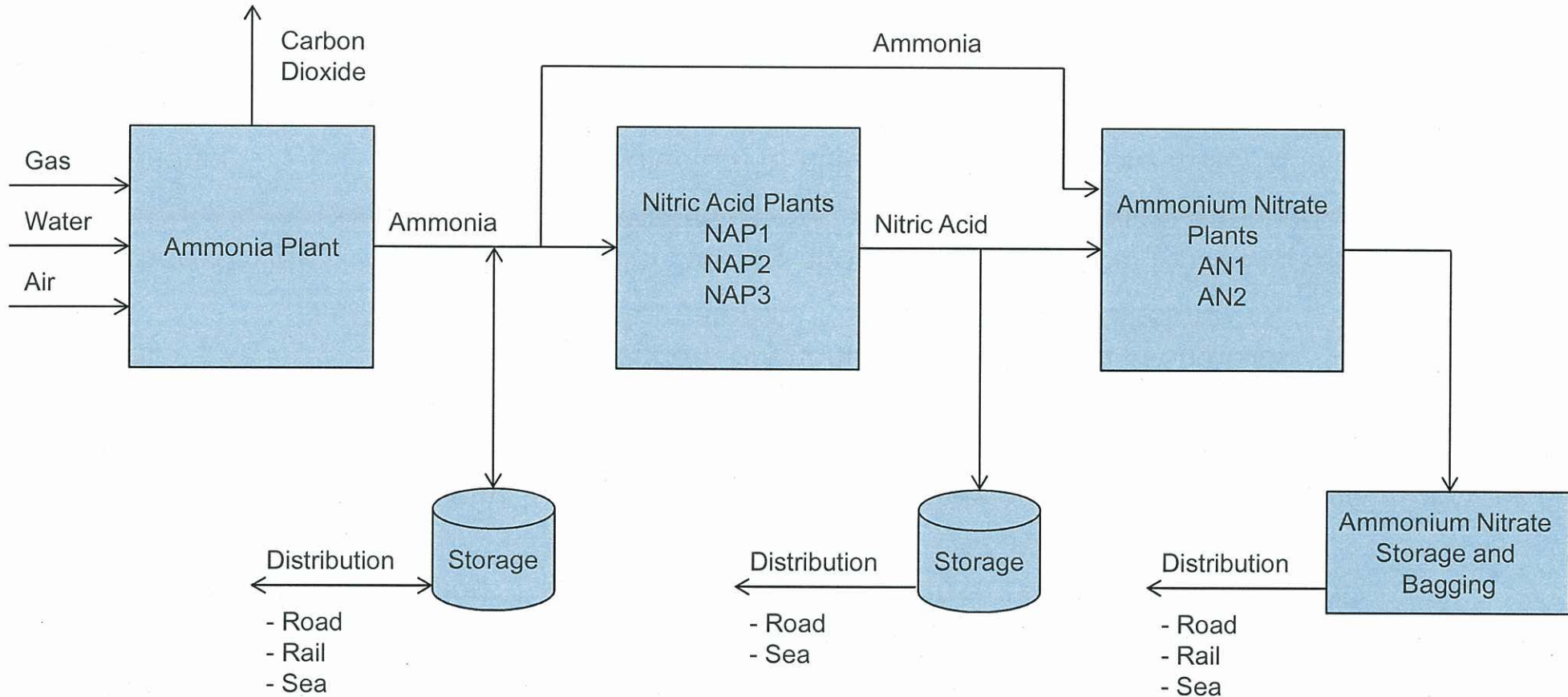
- The KI site operates 24 hours a day, 365 days a year
- During normal operation, 170 permanent staff and about 150 contractors
- During site maintenance, on-site population can rise to greater than 700 people during the day and about 70 staff after hours



Products manufactured at the KI site

Product	Use	Features
Nitropril	Raw material in blasting	Stable compound so safer and more predictable blasts
Ammonium nitrate solution	Raw material for emulsion-based explosives	Used for blasting wet ground.
Chemically pure ammonium nitrate	Production of medical gases	Only plant in Australia capable of producing this product
Opal	Melt grade ammonium nitrate material	Used in emulsion manufacture
Carbon dioxide	Health industry and in beverages	50% of NSW Market. Very difficult to transport.
Ammonia	Manufacture of nitropril and ammonium nitrate solution	Key raw material for production for the Site.

Kooragang Island – An Integrated Process

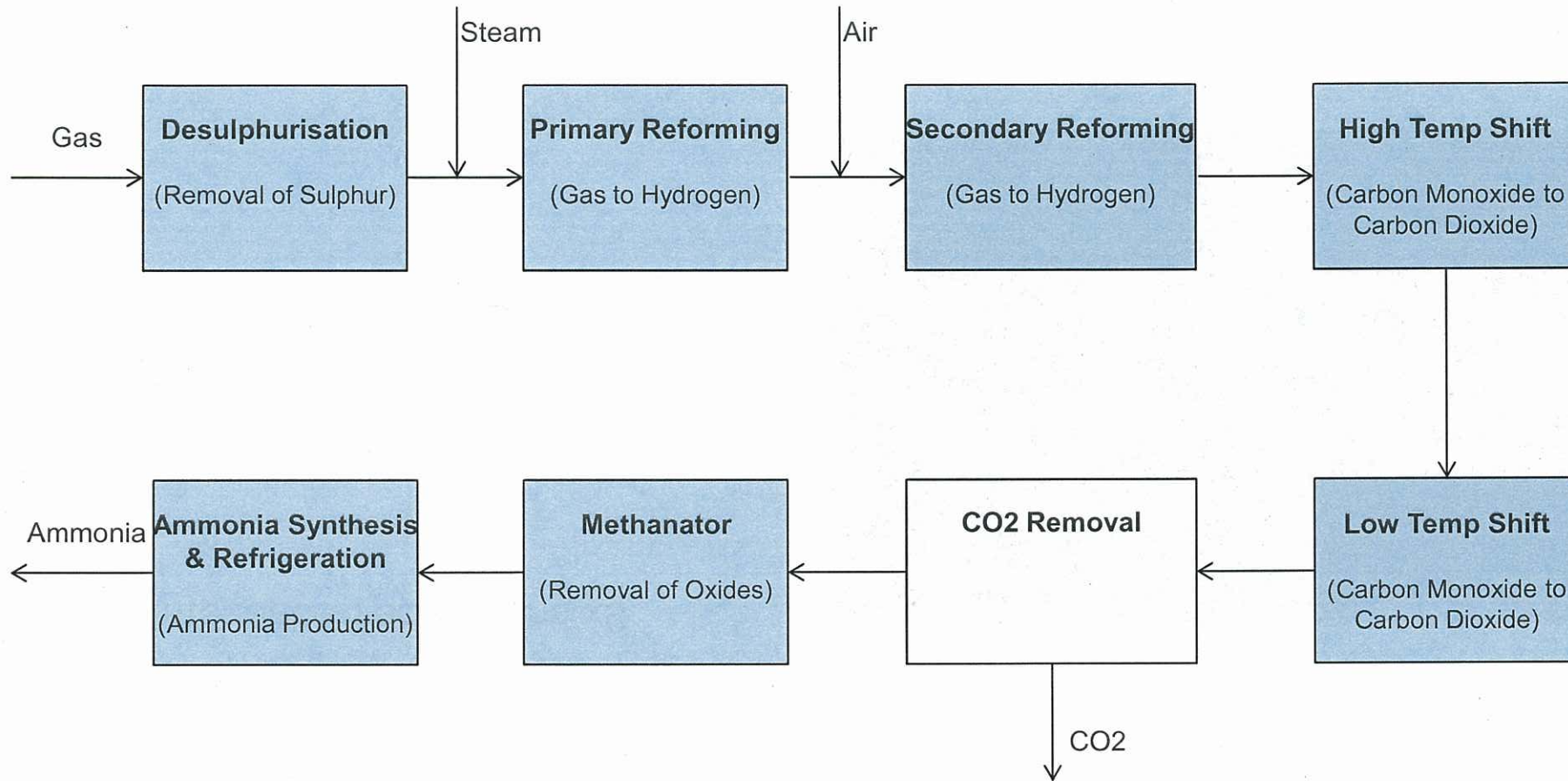


Kooragang Island Site – Ammonia Plant Personnel

- Plant Manager, Peter McGrath
- Shift Supervisors, x5 Warren Ashbourne
- Engineering Support Team x5
- Operators x25
- Maintenance Technicians x9



Ammonia Plant Process



- **8 steps** in ammonia plant process
- Process is reliant on **catalysts** to promote the required chemical reactions

Ammonia Plant Turnaround

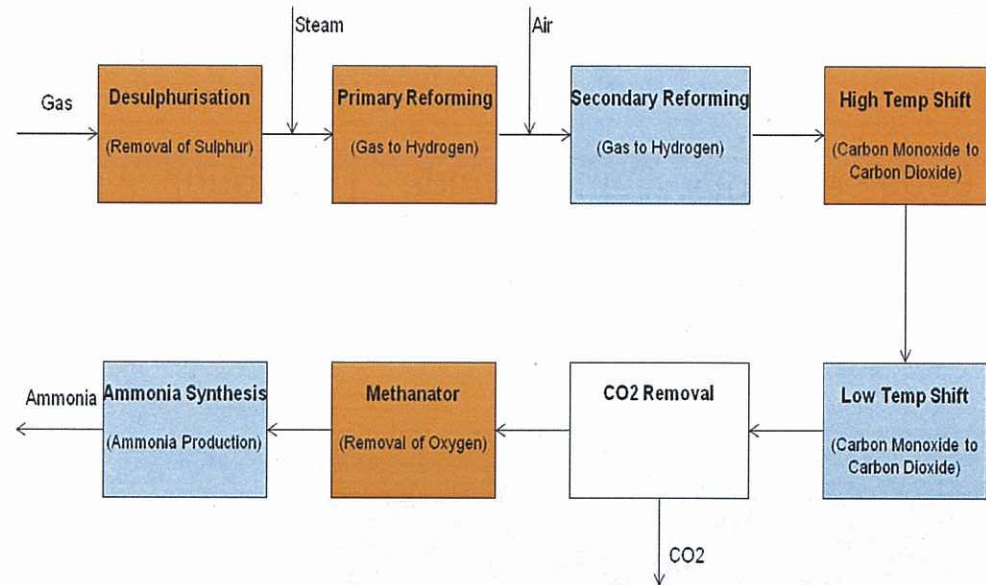
- The KI Ammonia Plant operates continuously.
- Has ongoing routine inspections and maintenance.
- A major turnaround every five years.
 - detailed internal inspection of machinery and equipment to ensure its ongoing reliability & integrity
 - testing critical trips & alarms
 - general repairs and improvements
 - replacement of catalysts.



- The Ammonia Plant turnaround was commenced in June 2011 - approximately \$40M has been spent on the turnaround.
- Approximately 700 contractors per day were engaged to undertake this work.
- In addition, an upgrade to the plant costing \$100M+ was installed throughout 2010 and 2011

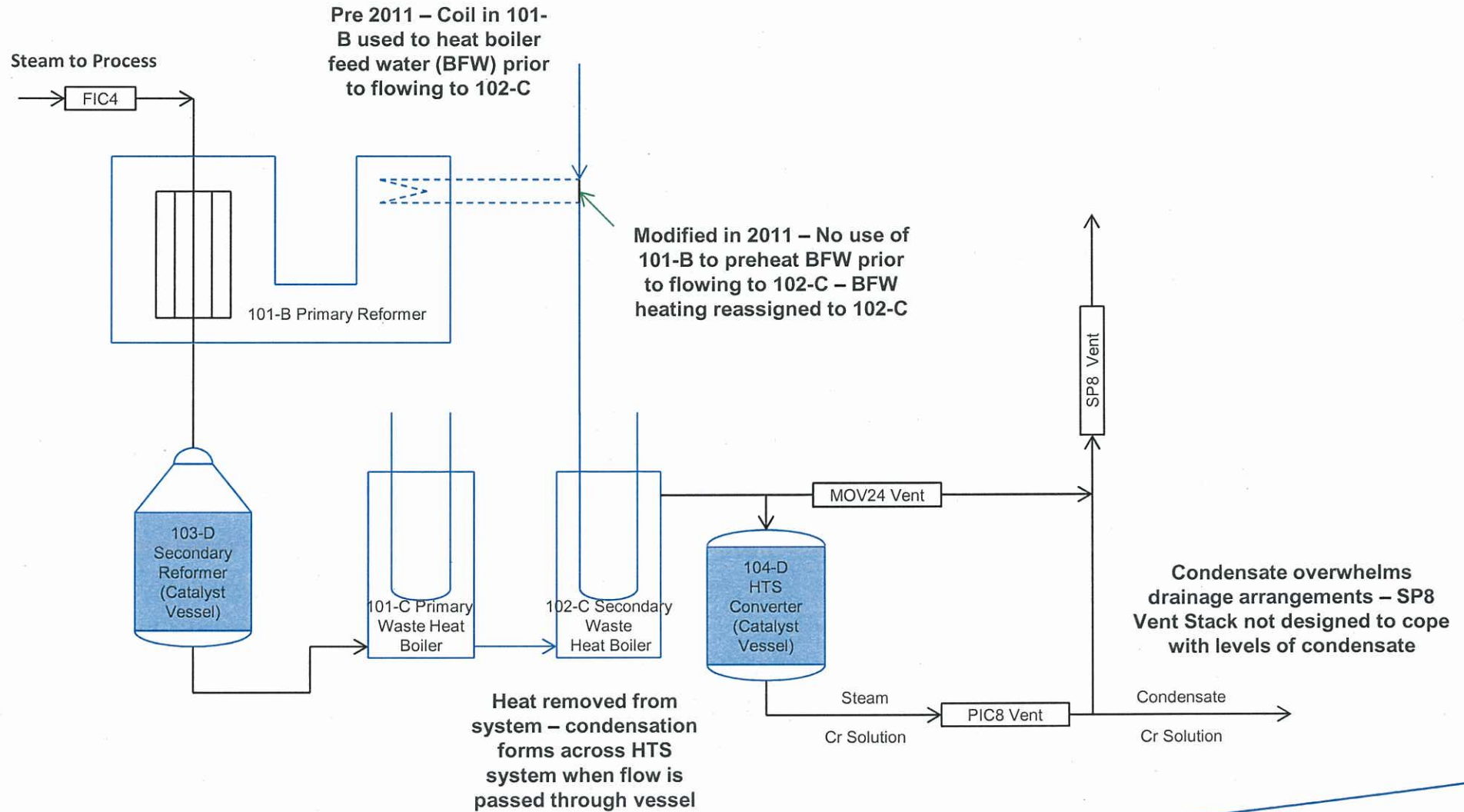
Ammonia Plant Catalyst Replacement

- During plant turnaround, catalysts which have been deactivated or have had significant reductions in efficiency are replaced
- One of the catalysts that was replaced was the high temperature shift (HTS) catalyst
- The HTS catalyst contains iron (93.3%), copper (1.4%) and chromium (5.3%)
- The chromium is present in the catalyst in two forms when supplied:
 - Trivalent Chromium - CrIII (4.8%)
 - Hexavalent Chromium - CrVI (0.5%)
- The Cr VI does not stay in this form for long as the start up process converts it to Cr III once natural gas is introduced to the process.



Catalysts in Orange were replaced in 2011

Restarting the Ammonia Plant – what happened on 8 August 2011



Ammonia Plant – Preventing Recurrence of the Incident

- Consistent with the recommendations of the independent engineering report by Johnson Matthey Catalysts report, modifications to the plant have been made to:
 - Modify the plant so that condensation does not occur,
 - Heat the catalyst with nitrogen,
 - Replace and improve drains & containment systems.
- A comprehensive review of the start-up procedure has been undertaken to understand if any further hazards exist either with the new or previous design of the plant. Critical parameters and checklists were added to the procedure.
- Chromium residue has been removed from internal and external plant surfaces, with the clean-up independently verified
- The site emergency response plan has been revised with the assistance of Fire and Rescue NSW and WorkCover to provide improved emergency response
- Orica has prepared a new notification procedure.
- Plant technicians and engineers have been re-trained in start-up procedures