Narangba Industrial Estate:

Multi-Agency Fire and Firewater Risk Minimisation Inspection Program

Conducted by:

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FOREWORD

The report on the Narangba Industrial Estate: Multi-agency Fire and Firewater Risk Minimisation Inspection Program is an outcome of on-going collaboration among State agencies and the Caboolture Shire Council to address matters of mutual regulatory interest regarding the ongoing viability of the Narangba Industrial Estate and to plan integrated responses to issues that require a multi-disciplinary approach.

The inspection program focussed on 17 industrial premises that store hazardous materials and are located on the Narangba Industrial Estate. The 17 premises are considered to be high-impact industries in that they undertake operations involving hazardous materials. Of the premises, 2 are classified as Major Hazard Facilities and 14 as Large Dangerous Goods Locations under the *Dangerous Goods Safety Management Act*.

High-impact industries undertake noxious, offensive or hazardous operations and are subject to a range of management strategies and regulatory regimes administered by a number of government agencies.

The findings from this inspection program have revealed issues that are relevant to the future location, management and regulation of high impact industries in Queensland.

Recommendations from the report have been directly influential in action currently being taken by the Queensland Government to address:

- appropriate design requirements to adequately cater for the location of high-impact industries and manage any off-site impacts from future State industrial estates;
- identification, planning and development of appropriate new industrial sites and establishment of a land bank to meet Queensland's industrial land use needs for the next 50 years;
- gaps in existing management strategies and regulatory regimes for high-impact industries; and
- progressive adoption of new standards consistent with national policies relating to the control of workplace hazardous chemicals and the management of major hazard facilities.

Those actions will be co-ordinated through an accelerated planning initiative which the Queensland Government has endorsed to deliver:

- industrial sites suitable for the operation of high impact industries, namely those industries which undertake noxious, offensive and hazardous operations, and whose location is incompatible with residential land use; and
- management strategies and regulatory regimes to adequately address the operations of high-impact industries and minimise potential off-site impacts of their operations, including but not limited to odour, noise, health and environmental harm.

EXECUTIVE SUMMARY

Following the chemical fire at Binary Industries in the Narangba Industrial Estate in August 2005, a multi-agency program was instituted to inspect industrial premises storing hazardous materials in the estate, in addition to the existing regulatory inspections carried out by the relevant Government agencies.

The aim of the program was to identify immediate risks associated with the operations of these facilities, especially with regard to risk of fire and to firewater management and to assess the level of compliance with relevant legislation.

Under the program, a total of 17 premises were inspected by teams drawn from three State Government departments and Caboolture Shire Council.

The program identified a range of issues relating to fire protection, early fire detection and suppression, fire response and firewater containment. In addition, a wide range of issues with varying implications for safety were identified in relation to compliance with legislation relating to storage of dangerous goods, including associated building issues.

This report provides a summary of the inspection program and issues that it identified. The risk of fire and the consequent need for firewater management receive special attention.

Recommendations are made in regard to future strategies for managing hazardous materials storage and fire risk in the estate.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

CCA	copper-chrome-arsenate (timber treatment material)
CSC	Caboolture Shire Council
CHEM Services	Chemical Hazards and Emergency Management Services (DES)
DES	Department of Emergency Services
DGSM Act	Dangerous Goods Safety Management Act 2001
DIR	Department of Industrial Relations
EPA	Environmental Protection Agency
EP Act	Environmental Protection Act 1994
ERA	Environmentally Relevant Activity
IBC	Intermediate Bulk Container
NIE	Narangba Industrial Estate
QFRS	Queensland Fire and Rescue Service (DES)
WHS Act	Workplace Health and Safety Act 1995
WHSQ	Workplace Health and Safety Queensland (DIR)

Dangerous Goods classification (see also Appendix 1)

Class 1	Explosives
Class 2.1	Flammable gases
Class 2.2	Non-flammable and non-toxic gases
Class 2.2 sub-risk 5.1	Oxidizing gases
Class 2.3	Toxic gases
Class 3	Flammable liquids
Class 4.1	Flammable solids
Class 4.2	Substances liable to spontaneous combustion
Class 4.3	Substances that in contact with water emit flammable or toxic gases
Class 5.1	Oxidizing substances
Class 5.2	Organic peroxides
Class 6.1	Toxic substances
Class 6.2	Infectious substances
Class 7	Radioactive material
Class 8	Corrosive substances
Class 9	Miscellaneous dangerous goods and articles

1.0 INTRODUCTION

The Narangba Industrial Estate (NIE) is located within the South East corner of the Caboolture Shire (Figure 1), approximately 30km north of Brisbane and on the boundary of Pine Rivers Shire. The NIE was first established in 1960s primarily as a location for hazardous, noxious and offensive industries in the south-east region of Queensland. Approximately 60% of the land within the estate has now been developed.

The NIE accommodates a number of businesses considered hazardous because dangerous goods or other hazardous materials[1] are used or stored; these include businesses conducting timber treatment, oil recycling, tanning, chemical formulation, waste treatment and commercial irradiation. These sites are scattered throughout the NIE with most concentrated on the eastern side of the estate.

The estate is linear in layout, with Potassium St providing the main corridor from Old Gympie Rd in the west across the current Bruce Highway to Boundary Road at the eastern end, with a number of short streets coming off – Boron, Magnesium, Krypton and Neon Streets – see aerial photo in Appendix 2.

In August 2005, a fire occurred at the chemical warehouse and formulation plant known as Binary Industries situated within the estate, resulting in a major release of chemicals and contaminating the adjoining watercourse, a tributary of Saltwater Creek. The incident has significantly impacted on the watercourse and has incurred substantial financial costs for containment and clean-up which have fallen to government.

Aim of inspection program
In response to the Binary fire, Caboolture Shire Council at its meeting held on 27 September 2005, resolved that a comprehensive safety inspection program be initiated between the Department of Emergency Services (DES), Department of Employment and Industrial Relations (DEIR), the Environmental Protection Agency (EPA) and Caboolture Shire Council (CSC).

The aim of the Inter-Agency Fire and Firewater Risk Minimisation Inspection Program was to undertake joint inspections of all premises within the NIE that store large quantities of dangerous goods, and to assess immediate risks and level of statutory compliance associated with the operations of these facilities, especially with respect to the possible consequences of fire and firewater. Statutory compliance relates to requirements made under the following legislation and code:

Dangerous Goods Safety Management Act 2001 (DGSM Act)
Workplace Health and Safety Act 1995 (WHS Act)
*Fire and Rescue Service Act 1990 (*FRS Act)
Building Act 1975
Building Code of Australia 2006

Under the provisions of the DGSM Act, facilities that store Dangerous Goods are classified as Minor Storage Workplaces, Dangerous Goods Locations, Large Dangerous Goods Locations

[1] For a description of the terminology relating to hazardous materials, see Appendix 1.

or Major Hazard Facilities, according to the types and quantities of dangerous goods and combustible liquids stored and handled. Their obligations under the Act increase with their classification. In addition, sites that store flammable and combustible liquids in excess of prescribed quantities are required to hold a licence with Local Government.

Under the *Workplace Health and Safety Act 1995, w*orkplaces have obligations to provide a safe place of work for staff.

Chemical contamination of the firewater from the Binary fire is considered to have caused environmental harm. Hence the EPA contribution to the inspection program was to estimate approximately the capacity of each site to retain firewater and to identify where excess firewater would be directed. This information can be used to determine potential for environmental harm in the future from firewater and the need for contingency measures to contain it.

Fire and Rescue Service Act 1990 states the functions of the service are to protect persons, property and the environment from fire and hazardous materials emergencies.

Under the provisions of the *Building Act 1975* and Building Code of Australia 2006, there are requirements to ensure the safety of established buildings by the proper interpretation and application of this legislation, standards and codes.

2.0 THE INSPECTION PROGRAM

The inspected premises
A total of 17 premises were selected for inspection on the basis of having significant quantities of hazardous materials on site. These are listed in Table 1.

With one exception, the premises store and handle dangerous goods in sufficient quantity to be classified as a Major Hazard Facility (MHF) or Large Dangerous Goods Location (LDGL) under the *Dangerous Goods Safety Management Act*. Because it handles radioactive materials, Steritech is regulated under the *Radiation Safety Act*.

Many of the premises conduct Environmentally Relevant Activities (ERAs) under the Environmental Protection Act and are regulated as such by the Environmental Protection Agency or Caboolture Shire Council.

As MHFs under the DGSM Act, Accensi and McDonald Agencies are subject to a comprehensive regulatory regime that aims to minimise the risk of a hazardous material emergency, with particular emphasis placed on the development and implementation of safety management systems that address all aspects of the facility's operation. This regime is regulated directly by CHEM Services, Department of Emergency Services.

For the LDGLs, day-to-day regulation under the DGSM Act, where appropriate, is the responsibility of Workplace Health and Safety Queensland in the Department of Industrial

Relations (for the full range of stated dangerous goods and combustible liquids[2]) and Caboolture Shire Council (for flammable and combustible liquids licensing).

The *Radiation Safety Act* is administered by the Radiation Health Branch of Queensland Health.

A summary of the classes/types of dangerous goods and combustible liquids held at the MHFs and LDGLs is given in Table 2 below.

Relative to the MHFs and LDGLs in the NIE, Steritech is in a class of its own because of the nature of its hazardous materials, its design and operations, and its rigorous management systems. In relation to the aims of the inspection program, it is not considered to present any issues of concern.

TABLE 1: List of premises inspected

PREMISES	ADDRESS	ACTIVITY	RATIONALE FOR SELECTION
Accensi	60 Potassium St	Chemical formulation/storage	MHF
McDonald Agencies	97 Potassium St	Chemical formulation/storage	MHF
All-treated Timbers	22 Neon St	CCA timber treatment	LDGL
Austech	45 Magnesium St	Chemical formulation/storage	LDGL
Australian Biodiesel	195 Potassium St	Biodiesel manufacture	LDGL
BCD Technologies	8-12 Krypton St	Organochlorine waste treatment	LDGL
Boral Asphalt	34 Potassium St	Asphalt plant	LDGL
Cox's Timbers	28 Magnesium St	CCA timber treatment	LDGL
Custom Chemicals	103 Potassium St	Chemical formulation/storage	LDGL
Ecotech	179-185 Potassium St	Biodiesel manufacture	LDGL
Nationwide Oil	26 Potassium St	Waste oil recycling and chemical waste treatment	LDGL
Oil Technology	1 Potassium St	Chemical formulation/storage	LDGL
Packer Leather	101 Boundary Rd	Leather tanning	LDGL
Permalog	11-49 Potassium St	CCA timber treatment	LDGL
Sunstate Coatings	9 Boron St	Galvanising	LDGL
Wildcat Chemicals	15 Magnesium St	Chemical formulation/storage	LDGL
Steritech	180-186 Potassium St	Sterilisation by irradiation	Hazardous materials

[2] For definition of 'stated dangerous goods and combustible liquids', see Appendix 1.

TABLE 2: CLASSES OF STATED DANGEROUS GOODS AND TYPES OF COMBUSTIBLE LIQUIDS for the MHFs and LDGLs inspected

PREMISES	CLASS / DIVISION / TYPE (tonne or kL)																
	2.1	**2.2**	2.2 - 5.1	**2.3**	Aerosols	Cryogenics	**3**	**4.1**	4.2	4.3	**5.1**	**5.2**	**6.1**	**8**	**9**	**C1**	**C2**
Accensi	✓						✓					✓	✓		✓	✓	✓
McDonald Agencies				✓			✓				✓		✓				
All Treated Timbers														✓			
Austech	✓				✓		✓							✓			
Australian Biodiesel							✓										✓
BCD	✓	✓	✓			✓							✓	✓	✓		✓
Boral Asphalt	✓	✓	✓				✓								✓	✓	
Cox's Timber														✓			
Custom Chemicals							✓	✓			✓			✓	✓		
Ecotech							✓										✓
Nationwide Oil							✓									✓	
Oil Technology							✓						✓	✓		✓	
Packer Leather		✓					✓				✓			✓	✓	✓	
Permalog														✓			
Sunstate Coatings	✓						✓				✓		✓	✓		✓	
Wildcat Chemicals													✓	✓	✓	✓	
Binary (pre-fire)							✓				✓		✓	✓	✓	✓	

The inspection program commenced in late 2005 and was completed in 2006. A multi-agency team made a visit of approximately two hours duration to each of the selected premises. The visits took the following format:

1. a brief meeting with the occupier to advise of the reason for the inspection programs, how it is to be conducted and to answer any questions the occupier may have, and to gather more knowledge about the site and its operations;
2. a general inspection of the site and its associated storage areas to identify imminent risks and statutory non-compliances;
3. a general debriefing session with the occupier to outline findings. Imminent risks identified were raised immediately with the occupier and with formal enforcement directives issued to address the matter.

After the inspection program was completed, the agencies involved conducted a risk and consequence assessment workshop to develop an overview of the fire and firewater risks for the inspected premises.

Outcomes
As part of the program, a number of areas of legislative non-compliance were identified in the inspected premises, many of which did not relate directly or strongly to the issues of fire and firewater risk minimisation. Also, it became evident that some of the fire and firewater issues are not dealt with specifically by current legislation.

The outcomes of the inspections are discussed in the following sections from two perspectives:
- fire and firewater risk minimisation; and
- legislative compliance.

3.0 FIRE AND FIREWATER RISK MINIMISATION

Extinguishment of the Binary fire was a major exercise made more difficult by factors relating to the site.

While measures to contain the firewater commenced during the firefighting operation, they needed to be significantly upgraded to provide for secure containment before treatment and disposal could commence.

THE BINARY FIRE
From these experiences, a number of factors have been identified that contributed to the Binary fire, its extent and its impact, in some way:

1. type and quantity of chemicals present
2. storage practices and process activities
3. absence of automatic fire detection/suppression systems
4. accessibility for the fire service
5. containment capability
6. proximity to creek
7. proximity to other premises storing dangerous goods

According to its inventory for August 2005, Binary Chemicals had over a thousand tonnes of chemicals and chemical products on site at the time of the fire, i.e. raw materials and formulated products. Approximately three-quarters of the total chemical inventory were not dangerous goods[3]. Binary had one of the largest hazardous materials inventories in the NIE.

The great majority of the total was pesticide, as either active ingredient (typically greater than 90% pure) or formulation (typically 10-50% active ingredient). The main active ingredients were herbicides (in particular, glyphosate and 2,4-D) which is believed to have resulted in the death of vegetation in the creek afterwards.

Nearly all these materials were stored in packages (bottles, cartons and drums up to 205 litres capacity) and intermediate bulk containers (IBCs, typically 1000 litres capacity). Empty plastic bottles and the plastic liners of IBCs provided fuel for the fire, as did accumulations of paper labels, cardboard cartons and wooden pallets. The fuel load was increased by the presence of flammable and combustible chemicals. Blending of formulations was a major part of Binary's operations.

Binary did not have automatic fire detection or suppression systems, i.e. fire alarm or sprinklers. Although not required under the Building Code of Australia, if such systems had been installed, faster response to the fire could have occurred and the fire may not have grown as quickly or as greatly as it did.

During the fire, access to the property by fire appliances was limited by the arrangement of the buildings and the location of chemical containers throughout the site.

While some containment capacity for normal operations was provided within the operating areas, Binary also made use of a drainage system which flowed to either of two sumps, which could be pumped out to a large 'dam' at the rear of the premises. During the fire, the power was turned off, so the sump pumps were not available.

While not immediately adjacent to a flowing creek, Binary drained directly into the catchment of a stream which is a tributary of Saltwater Creek.

Binary was relatively isolated from its neighbours. Located at the end of Magnesium St, it had no neighbour to the south. The land immediately on the northern side was vacant, so the nearest neighbour on that side, Cox's Timber, was 80 metres away. To the rear was bushland. Opposite Binary on the other side of Magnesium St, Austech was located, a chemical formulator.

Hence, the fire itself had little direct impact on Binary's neighbours, but could have done so, because one burning drum is reported to have been projected from Binary over the road to Austech. Burning projectiles are believed to have been the mechanism by which the fire spread between the two major structures at Binary.

[3] For a description of the Dangerous Goods classification system, see Appendix 1.

COMMON ISSUES

From the inspections, a number of issues common to the MHFs and LDGLs were identified.

Type of hazardous material

The impact of chemicals on a watercourse depends on the properties of the chemicals. Biologically active materials such as herbicides can have a major impact on stream flora, as occurred after the Binary fire. Other chemicals may also have toxic effects. Oils and other water-immiscible materials can form layers on water surfaces and coatings on vegetation and animals. Corrosive materials (acids and alkalis) can significantly alter the pH of the water, causing harm to animals and plants.

Flammable liquids elevate the risk of fire starting, while combustible liquids contribute to the fire load once impacted by a fire that starts elsewhere.

In general, the types of hazardous materials stored and used at the MHFs and LDGLs inspected will have deleterious effects on watercourses, to a greater or lesser extent, depending on the circumstances of release. Several of the inspected premises store pesticides.

The quantity of dangerous goods stored ranges from tens of tonnes to hundreds of tonnes.

By comparison, the storage capacity of combustible liquids at the two biodiesel plants, Oil Technology and Nationwide Oil exceeds 500 tonnes each. However, much of this is C2 combustible liquid (oils, tallows) and presents a relatively low fire risk.

Storage and handling practices

Some premises are similar to Binary in that their chemicals are largely stored in packages. Others have both tank storage and package storage. For some premises, chemicals handling is limited to storage only, while for others, some processing activity (usually blending) is also conducted.

The presence of ordinary combustible materials is an important fire risk factor. Cardboard cartons, paper labels and plastic bottles are commonly found in chemicals formulation premises. Where Intermediate Bulk containers (IBCs) consist of a plastic bladder inside a wire cage, the plastic bladder can feed the fire, even when filled with an aqueous product, because the top of the bladder can ignite and burn to the liquid line.

Early fire detection and fire suppression

None of the premises inspected have a fire alarm that is connected to the Fire Communications centre (Firecomm). The lack of a fire alarm system means that, in event of fire, alerting the fire service is likely to be delayed, giving more time for the fire to grow before the fire service can attend.

One site has a partial sprinkler system. The general lack of sprinkler systems means that early suppression of fires (before the fire service attends) is not possible.

It should be noted that, while fire alarm and sprinkler systems may be desirable as fire protection measures in many cases, they are prescribed by the Building Code only in specific circumstances, mainly in relation to protection of life.

Accessibility by fire service
Accessibility has two aspects: external and internal. External access is access the premises from adjoining roads and other land. Internal access is access within the property to its various parts.

Most of the properties inspected have only one street access; in some cases, the street frontage is short. Other properties have two or even three street frontages.

Some properties are almost totally covered by one or more buildings, with limited access around and between them. Others have a number of buildings, tanks and other structures dispersed across the site and surrounded by sufficient open space to permit good access for the staging of fire appliances to combat a fire.

Firewater retention
It is not possible to determine in advance the quantity of water that may be needed to extinguish a fire at an industrial site. While containment capacity for stormwater and spillages can be valuable in retaining firewater, there can be no guarantee that it will be adequate in any particular fire situation.

While the premises inspected generally have adequate containment systems for spillages around tanks and package stores, only a few have significant additional containment capacity that could be used for firewater retention (notably Accensi, Nationwide Oil, and Packer Leather). This additional capacity is usually designed for retention of potentially contaminated stormwater (first flush) or for waste treatment.

To be useful for firewater retention, containment systems need to be fed by gravity flow from across the site and, if in separate sections, the sections need to be appropriately interconnected to maximise capacity. Containment systems that depend on the operation of pumps are ineffective when the power supply is cut.

The construction of temporary containment and diversion structures in the creek contaminated by the Binary firewater raises the possibility of providing structures that serve the estate as a whole, or large parts of it. To serve the estate as a whole, structures would need to be provided on Saltwater Creek proper, downstream of All Treated Timber. Those structures built for the Binary fire would directly serve only the premises on Magnesium St, but could provide storage for other premises if pumping or trucking were available.

Watercourses
Because of the location of the estate within a drainage basin, all premises are close to a watercourse, if not directly abutting one. Because of the undulating nature of the topography, opportunities to retain firewater between leaving a site and before reaching a watercourse are generally limited.

For all the MHFs and LDGLs inspected, the potential to contaminate the local watercourses in the event of firewater runoff should be regarded as significant.

Proximity to other MHFs or LDGLs
Many of the inspected premises have neighbouring properties immediately adjacent. In some cases, these immediate neighbours are also LDGLs or MHFs. This presents a risk of a fire in one premises affecting the other through ‘knock on’ effects such as burning drums of chemical projected from the burning premises to the other.

4.0 LEGISLATIVE COMPLIANCE

At each premises inspected, a number of regulatory compliance issues were identified, of varying significance in relation to risk control of hazardous materials. These issues related to provision of information, management and operating systems, engineering and equipment, fire protection, and provision and maintenance of safety equipment. Different issues were observed for different premises.

Directives and notices were issued to occupiers, requiring them to take action to address observed compliance issues, thereby reducing risk for workers and the community.

While the nature of the issues was such that they should be dealt with promptly in order to reduce risk, no issues were found that were sufficiently serious to warrant the raising of a directive to suspend operations under Section 97 of the DGSM Act.

Nonetheless, the number and nature of the enforcement actions indicates that, the businesses inspected generally require further assistance to achieve best practice in the management of their dangerous goods.

The following list illustrates the range of issues identified across the premises inspected.

- Provision of information
  - Dangerous Goods inventory
  - Provision of Material Safety Data Sheets
  - Labelling of packages
  - Placarding
  - Emergency manifests

- Engineering and equipment
  - Management of storage and handling systems
    - Design of storage facility (e.g. ventilation, electricals)
    - Corrosion of tanks and fittings
    - Testing of tanks and fittings
    - Impact protection for storage systems
    - Stacking of packages and IBCs (too high)
  - Control of ignition sources
    - Earthing for decanting operations
    - Mixing tank electricals
    - Non-flameproof fork-lift truck
  - Spills containment
  - Spills clean-up equipment

- Operating and management systems
  - Hazard identification and risk assessment
  - Hazardous area classification
  - Systems of work – inadequate or not followed
    - Dangerous goods handling
    - Decanting
    - Hot-work permits
    - Spills clean-up
    - Equipment testing
  - Isolation
    - Separation from protected places (such as boundary or exit door)
    - Segregation of incompatible materials
  - Housekeeping
    - accumulation of ordinary combustible materials
  - Training – programs, procedures, keeping of records
  - Emergency plans and procedures
  - Accident reporting and follow-up
  - Keeping of records
    - Training
    - Tank maintenance
    - Fire safety equipment maintenance
  - Security
  - Safety Management System

- Personal Protectie Equipment (PPE) and safety equipment
  - Storage and maintenance of PPE
  - Safety showers
  - Safety signs

- Fire safety
  - Exit doors and paths of travel
  - Exit signage and emergency lighting
  - Fire suppression
    - Fire extinguishers
    - Fire hose reels
    - Fire hydrants
    - Rack sprinkler systems

- Licences, certificates, documentation
  - Flammable and Combustible Liquids licence
  - Certificates of Approval (Building Code)
  - Development Approvals
  - Large Dangerous Goods Location notification

The inspection agencies made follow-up inspections of the premises with respect to directives and notices issued at the initial inspection. Further follow-up on issues is conducted through ongoing routine operations.

While a large range of compliance issues were observed, the significance of them for fire protection is not always direct. There are many potential causes of fire in industrial premises.

Some of these causes may be readily identified and controlled, e.g. hot work near flammable or combustible materials. Control of others may not be so obvious, e.g. deterioration in electrical equipment that may lead to overheating. In such cases a systematic approach to management of safety issues can help ensure that they are identified and dealt with before a problem emerges.

Under the DGSM Act, occupiers of MHFs and LDGLs are required to develop a documented system for managing the safety of dangerous goods and combustible liquids at their sites, i.e. a Safety Management System (SMS). Developing an effective SMS can be a difficult process for some businesses because, depending on the nature of the business and its operations, it can require the application of significant time and resources to develop, implement and maintain. Other than the MHF occupiers, most occupiers showed little evidence of having an adequate SMS in place.

For the two MHFs, the development and implementation of SMS has been well advanced under the MHF regulatory regime.

To enable occupiers to strive to meet best practice, future enforcement activity for LDGLs in the estate will need to give a high priority to the development and implementation of SMS by their occupiers.

5.0 CONCLUSION

The inspection program identified in broad terms issues relating to minimising the risk from fire and firewater in the Narangba Industrial Estate.

Measures to reduce this risk for the estate must address fire prevention, early fire detection, early fire suppression, site accessibility for the fire service and containment of firewater. As resolution of these issues may involve great expense, justification of any measures would require detailed risk assessment of individual premises and the estate as a whole, a process that was beyond the scope or resources of the inspection program.

In addition, the program assessed the level of legislative compliance relating to the storage of dangerous goods, fire safety and building approvals to not be adequate to minimise the associated risks.

Strategies and policies need to be developed for the estate as a whole. Their implementation would require coordinated ongoing monitoring of the estate by relevant government agencies, each from its own perspective. A major focus of the monitoring program should be to direct and guide LDGL occupiers in the development and implementation of Safety Management Systems.

For several LDGLs in the estate, an accurate assessment of the risk would require a detailed technical study. It is considered that such studies need to be conducted as a high priority. Their results would provide guidance as to the selection of appropriate risk control measures.

Appropriate risk management strategies and policies be developed and implemented as soon as possible on an ongoing basis.

As the state government has developed the estate and continues to manage it, it would appear appropriate that it fund and manage this process.

At present, there is not a coordinated Emergency Management Plan for the estate. Such a plan is necessary for providing a comprehensive approach to managing the risks of the estate (particularly fire risk), addressing community concerns and protecting the natural environment. In developing such a plan, consideration could be given to providing certain facilities to serve the whole estate or part of it, e.g. common firewater retention facilities.

Looking beyond the issues of the Narangba estate, there appear to be limitations in current legislation, codes and standards relating to dangerous goods storage and fire protection requirements for dangerous goods storage. Guidance and direction is very limited in relation to such issues as taking total fire load into account when assessing risk, installing early fire detection and suppression facilities, and providing for firewater containment.

6.0 RECOMMENDATIONS

While the primary responsibility for safe management of hazardous materials always remains with the occupiers of premises, the following recommendations are made specifically in relation to the Narangba Industrial Estate with the aim of providing a sound framework to assist occupiers to strive for best practice in achieving safety:

1) That, in view of lessons learnt from the Binary fire, the regulation of dangerous goods storage and handling in the estate place greater priority on fire risk management, commensurate with the requirements of the *Dangerous Goods Safety Management Act*, the *Fire and Rescue Service Act*, the *Building Act* and other relevant legislation;

2) That the State Government work with occupiers to establish an ongoing risk assessment program within the estate, including cumulative effects, with the aim of identifying options for minimising the risk from or involving hazardous materials, in particular, the risk from fire.

   This should be done by an appropriately qualified consultant with experience and expertise in areas such as fire engineering, hazardous materials management and emergency management;

3) That a Whole-of-Government strategy be developed for the management of hazardous industry in the estate, with emphasis on emergency risk management of hazardous materials, i.e. prevention and mitigation, preparedness, response and recovery.

   The strategy should specifically address:

   - the promotion of best practice by industry within the estate for the management of dangerous goods and combustible liquids, particularly the development of effective Safety Management Systems;
   - fire prevention, early fire detection, early fire suppression, accessibility for fire fighting activities, and the management of firewater; and
   - the development of an Emergency Management Plan for the estate as a threat-specific functional plan of the Local Disaster Management Plan which includes the possible provision of emergency management resources to serve the estate as a whole, e.g. for management of firewater;

   The strategy should interface with other strategies that address other public health and environmental issues of concern for the estate, such as odour and fire smoke.

   In the longer term, it should also reflect developments in Government policy and legislation that emerge in relation to hazardous materials management following the Binary fire, such as the management of post-incident recovery, the management of buffer zones around hazardous industry, and the development of a more rigorous regulatory regime for LDGLs approaching MHF status.

4) That an ongoing multi-agency program of monitoring, inspection and enforcement at MHFs and LDGLs in the estate be established as follows:

   - that each of the inspection agencies (CHEM Services, EPA, QFRS, WHSQ, Caboolture SC) be represented, as well as the Department of Infrastructure;
   - that the agencies work individually and collectively to ensure legislative compliance;
   - that continuity and consistency of agency commitment to the program and corporate knowledge about the estate be maintained as a high priority; and
   - that joint inspections by all agencies of hazardous materials premises be conducted annually.

   It should be noted that, for the MHFs, this recommendation is largely accomplished under the existing MHF regulatory regime.

5) That existing and new businesses within the estate be required to develop an Emergency Plan appropriate to their level of risk that interfaces with the estate-wide emergency management strategy.

6) That mechanisms be developed to ensure that all relevant aspects of hazardous materials risk management are addressed both at the Development Application stage for a proposed new industry in the estate, and whenever a Material Change of Use is proposed for an existing industry; and

7) That, in the longer term, the learnings from the Binary fire and the Narangba Industrial Estate be applied to the management of hazardous materials storage at other industrial locations across the State.

8) That through participation in the Australian Building Codes Board and other relevant bodies, the Queensland government representatives advocate change in the Building Code of Australia and relevant National Standards and Australian Standards, so as to provide specific guidance on fire risk management for dangerous goods storage, particularly in high risk facilities, which can be reinforced by appropriate legislation.

APPENDIX 1: Overview of Hazardous Materials Classification and Regulation

'Hazardous materials' is a term used to refer broadly to materials that can cause harm. Under the ***Dangerous Goods Safety Management Act*** **(DGSM Act)**, 'hazardous materials' are defined as materials that can harm people, property or the environment by virtue of their chemical, physical or biological properties. The term specifically includes dangerous goods and combustible liquids. In its abbreviated form 'hazmat', the term is used widely in relation to emergency response.

For the inspection program, the target premises store and handle at least one of the following types of hazardous material:

- Dangerous Goods
- Combustible Liquids
- Chlorinated Organics
- Radioactive Substances

Dangerous Goods are classified under an international system into nine Classes, some with Divisions, according to primary hazard, as shown in the following table. The criteria for inclusion focus on the potential for immediate danger. So, for example, Dangerous Goods of Class 6.1 are toxic substances with acute effects rather than chronic effects.

For Dangerous goods with more than one significant hazard, the most significant hazard determines the Class/Division, and the remaining hazards are referred to as Sub-risks.

CLASS	DIVISION	DESCRIPTION
1		Explosives
2	2.1	Flammable gases
	2.2	Non-flammable, non-combustible gases
	2.2 sub-risk 5.1	Oxidising gases
	2.3	Toxic gases
3		Flammable liquids
4	4.1	Flammable solids
	4.2	Spontaneously combustible substances
	4.3	Substances that in contact with water emit flammable or toxic gases
5	5.1	Oxidising substances
	5.2	Organic peroxides
6	6.1	Toxic substances
	6.2	Infectious substances
7		Radioactive substances
8		Corrosive substances
9		Miscellaneous

Dangerous goods of classes 3, 4, 5, 6.1, 8 and 9 are further classified according to danger into Packing Groups (PG), as follows:

Packing Group I	Great danger
Packing Group II	Medium danger
Packing Group III	Minor danger

Combustible liquids are liquids that burn but need higher temperatures for ignition than do flammable liquids, so are less hazardous. They are not classified as Dangerous Goods but flammable liquids (Dangerous Goods Class 3) and combustible liquids are closely related types of materials for which the controls for safe management are closely related.

Combustible liquids are divided into two types, C1 and C2, with C2 being less dangerous because higher ignition temperatures are required.

The DGSM legislation regulates the storage and handling of dangerous goods and combustible liquids but does not require licensing or approval, except that flammable and combustible liquids storage is licensed by local governments.

The **DGSM Regulation** specifically regulates the following:

- **Stated dangerous goods**, which includes:
  - Dangerous Goods of Classes/Divisions 2, 3, 4, 5, 6.1, 8 and 9;
  - Goods too Dangerous to be Transported (as defined under the Australian Dangerous Goods Code);
- **Stated combustible liquids**, which includes:
  - C1 combustible liquids in all circumstances, and
  - all combustible liquids (C1 and C2) when stored with Fire-risk Dangerous Goods (which are dangerous goods of Class/Division 2.1, 3, 4 or 5).

Agvet chemicals are chemicals used for agricultural and veterinary purposes, such as herbicides, insecticides and other pesticides. Many but not all agvet chemicals meet the criteria to be classified as dangerous goods.

Chlorinated organics are chemicals that, because of their composition, are very stable and resistant to decomposition or biodegradation, such as chlorinated pesticides and polychlorinated biphenyls (PCBs). They can have significant chronic toxicity and environmental impacts. Under the Dangerous Goods classification system, they may be classified as Class 6.1 (if their acute toxicity is sufficiently great) or Class 9 (on the grounds of environmental hazard).

Radioactive substances are dangerous goods Class 7 but are regulated under the *Radiation Safety Act*.

Appendix 2: NARANGBA INDUSTRIAL ESTATE

December 2005

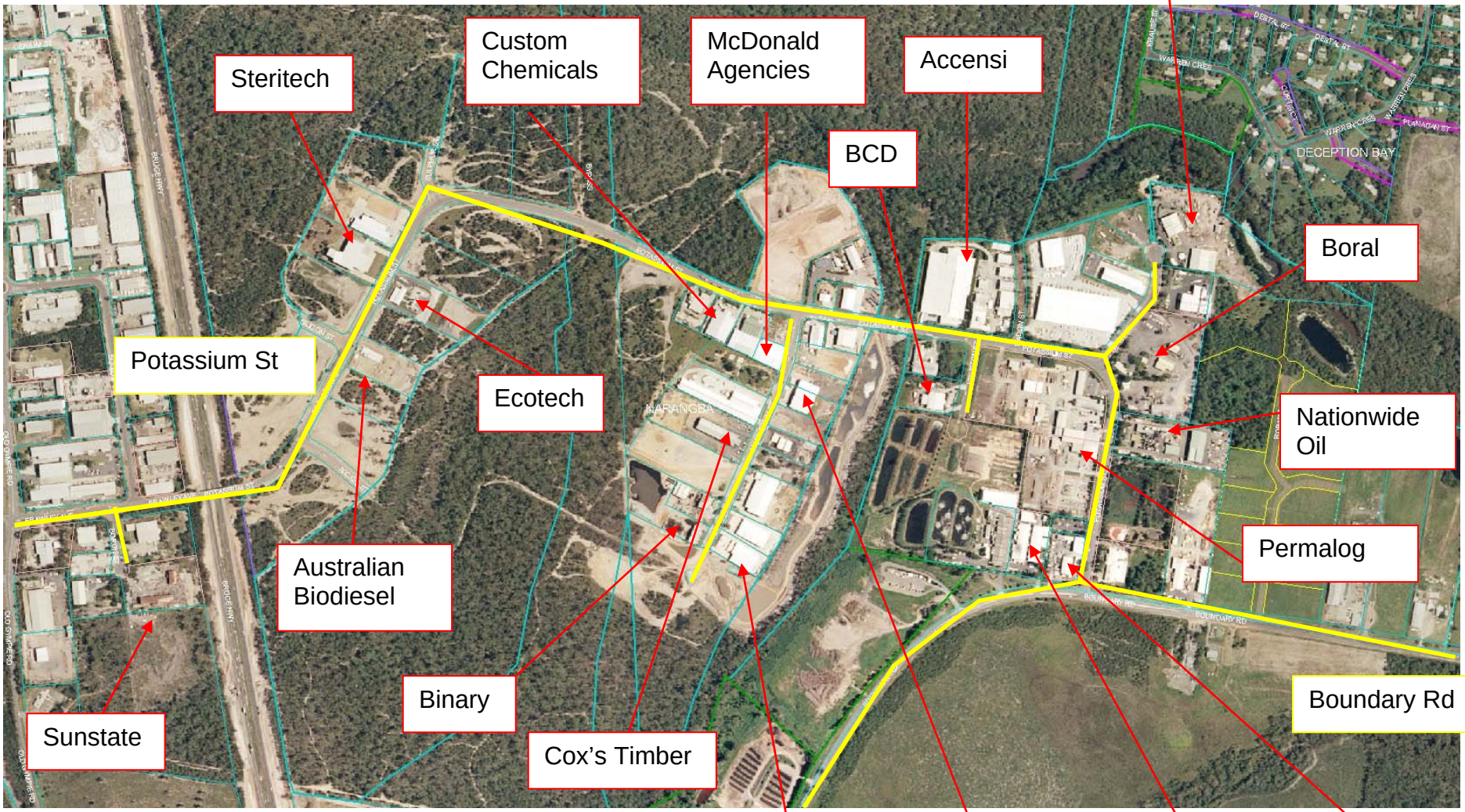

Photo courtesy Caboolture Shire Council