New Paper Mill
Project B9

PRELIMINARY HAZARD ANALYSIS

- Final
- 12 December 2006

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1. Introduction

1.1 Introduction

AMCOR Packing proposes to install a major paper making facility (referred to as the New Paper Mill), which uses 100% recycled waste paper, at their Botany site in Sydney, NSW. This New Paper Mill would replace the two existing papermaking machines (No. 7 and No. 8) at the site, increasing paper making capacity from the current 250 000 tonnes per year to around 290 000 tonnes per year. Replacement of the two 1960s vintage paper machines with a single machine, incorporating modern technology, would result in significant increases in efficiency of the paper making process.

Currently a range of chemicals and dangerous goods are stored and used on site. The quantity of chemicals and dangerous goods would change with the New Paper Mill. It should be noted that AMCOR has not used chlorine gas in the paper making process since 2000.

AMCOR is now seeking to gain development approval from the Minister for Planning for the New Paper Mill. In accordance with State Environmental Planning Policy (SEPP) No. 33 Hazardous and Offensive Development this Preliminary Hazard Analysis (PHA) has been prepared to accompany the development application to provide an assessment of the risk from hazardous and dangerous goods stored on site.

1.2 Project Staging

There are four phases in the proposed development. These being:

- Existing Operations (which is not assessed in this study);
- Construction Phase (which is not assessed in this study);
- Transition Phase during which Paper Machine No. 7 would be decommissioned and Paper Machine No.8 would remain operational while the New Paper Mill was being commissioned; and
- Operation where the New Paper Mill would be operational and Paper Machine No. 8 would be decommissioned.

New chemical and fuel storage and delivery facilities would be constructed as part of the New Paper Mill. This includes a dedicated and centralised Main Chemical Storage Area and Delivery Area which would store the majority of chemicals used in paper making.

Presented in **Table 1-1** is a summary of dangerous goods stored on site for the Existing Operations, Transition Phase and New Operation. These are discussed in more detail in the following sections.

1.3 State Environmental Planning Policy (SEPP) No. 33 Hazardous and Offensive Development

Recycling of wastepaper requires relatively few chemicals, as most of the chemical processing has been undertaken in the processing of the wood into virgin pulp and paper. However due to the large volume of wastepaper recycled, large quantities of some chemicals are required to be stored on site. The proposed development is required to be assessed against the provisions of *SEPP 33 – Hazardous and Offensive Development*. This involves:

- a Screening Level Assessment to determine whether any of the types, quantities and location of the dangerous goods stored on site potentially pose a risk to surrounding land uses. Based upon Screening Threshold Levels specified in the guidelines accompanying SEPP33, the activity is either; not potentially hazardous and no further assessment is required: or potentially hazardous and an additional assessment is required; and
- If an activity is considered as potentially hazardous – the risks must be classified and prioritised and a further analysis of potential impact is required via a Preliminary Hazard Assessment.

1.4 Delivery of Chemicals

Presented in **Table 1-2** is a summary of suppliers, delivery routes and the approximate number of deliveries per week for major chemicals. In terms of risk from the transport of these substances, the direct chemical delivery route uses major road transport routes and does not deviate into suburban streets. This presents very little risk to surrounding receptors. There are 2 chemical deliveries a day which would include Class 3, 5.1, 6.1 and 8 substances. This equates to approximately 14 deliveries a week which is below the SEPP 33 screening level threshold for all substances except Class 6.1 (Toxic) substances. The delivery volumes and frequencies of other dangerous goods on site are considered low and do not warrant any special consideration.

1.5 Location of Nearest Receptors

The nearest residential dwellings to the Botany Mill site are located to the north and east of the site off Australia Avenue, Partanna Avenue, Moorina Avenue, Murrabin Avenue and McCauley Street. As shown in **Figure 3.1** (of the EIS), the nearest residences, located off Partanna Avenue and Australia Avenue, are approximately 30-50 m from the northern boundary of the site.

Commercial offices are located beyond the western boundary of the site, on the western side of McCauley Street, and immediately to the east. Industry associated with Port Botany, including the CTAL Container Terminal and Bulk Liquids Storage Area, the Patrick Container Terminal (Australian Stevedore), and the Caltex Oil Terminal are located to the south and south-east.

- **Table 1-1: Summary of Dangerous Goods Stored on site**

Dangerous Good Class	Typical Materials	Existing Operation	Transition	Transition Total Quantities per Class	New Paper Mill Operation	Operation Total Quantities per Class
2.1	LPG (litres)	6,775	13,550	13,550	6,775	6,775
	Acetylene-dissolved (m^3)	1650	1650	1650	1650	1650
2.2	Compressed Gasses (litres)	120	350	350	150	150
3	Boiler Treatment (litres)	4,800	4,800	4,800	4,800	4,800
5.1	Ammonium Persulfate (litres)	7,000	15,000	15,000	10,000	10,000
6.1 & 8	Toxic Liquid, Organic (litres)	30,000	30,000	30,000	15,000	15,000
8	Sodium Hydroxide (litres)	47,500	100,000	174,600	60,000	119,600
	Sulphuric Acid (litres)	4,600	4,600		4,600	
	Sodium Hypochlorite (litres)	15,000	30,000		15,000	
	Corrosive Liquids (litres)	38,000	40,000		40,000	
C1	Diesel (litres)	25,000	20,000	20,000	20,000	20,000
C2	Oil & Grease (litres)	73,500	173,500	73,500	100,000	100,000

- **Table 1-2: Transport Routes of the Delivery of Chemcials**

Chemical Class	Supplier	Traffic Route	Approx No. of Deliveries Per Week
Classes 2.1 and 2.2	-	Vary dependent on deliveries to other customers	4
Class 3	USF Chemfeed - Homebush	Foreshore Roadd, General Holmes Drive, Botany Road / O'Riordan Street, Gardeners Road, Ricketty Street (Canal Rd), Princes Highway, Forrest Road, Stoney Creek Road, King Georges Road, Homebush Bay Drive	2
	Veolia - Seven Hills[1]	-	
Class 5.1	Manildra - Auburn	South Parade, Auburn, Coronation Drive to Lidcombe, Centenary Drive (Homebush Bay Drive), Roberts Road, King Georges Road, Stoney Creek Road to Bexley, Forrest Road to Rockdale, Bay Street, General Holmes Drive, Botany Road.	2
Class 6.1 & 8	Orica – Botany	Denison Road, Beauchamp Road and Botany Road	4
	Spectrum - North Ryde	Hermitage Road West Ryde, Victoria Road,, Western Distributor Freeway, Elizabeth Street, Park Street, Wouldiam Street, Bourke Street, Eastern Distributor, Dowling Street,, Wentworth Ave, Denison Street, Beauchamp Road, Botany Road.	
Class 8 - Sulphuric Acid	Port Kembla	Southern Freeway, Mt Ousley Road, Princes Hwy, President Avenue Kogarah, West Botany Street, Botany Road, Foreshore Drive.	2

2. Existing Situation

Chemicals currently stored on site with the maximum and typical quantities and the distance to nearest residences are presented in **Table 2-1**. A map showing the location of these chemicals on site is presented in **Figure 2.1.** This figure demonstrate**s** there are numerous chemical storage areas throughout the site. All existing chemical storage facilities on site comply with Dangerous Goods storage requirements.

- **Table 2-1 Existing Dangerous Goods**

No	Depot Type	Goods	Class	Maximum Quantity (Litres unless otherwise stated)	Typical Quantity Litres unless otherwise stated)	Approximate Distance to Nearest Residence (m)
1	Above ground tank	LPG	2.1	5700	3500	175
10	Above ground tank	LPG	2.1	5700	4000	269
11	Above ground tank	Sulphuric Acid	8	4600	3000	160
12	Above ground tank	Sodium Hydroxide	8	21000	15000	374
13	Above ground tank	Sodium Hydroxide	8	7000	5000	125
14	Above ground tank	Sodium Hydroxide	8	13000	9000	245
15	Above ground tank	Corrosive Liquid	8	1500	1000	265
16	Above ground tank	Corrosive Liquid	8	2000	1000	243
17	Above ground tank	Corrosive Liquid	8	2000	1000	277
18	Above ground tank	Corrosive Liquid	8/6.1	1500L	1000L	146
19	Storage Area	Combustible Liquid	C2	40000	20000	110
20	Roofed Store	Corrosive Liquid	8	30000	20000	200
21	Roofed Store	Toxic Liquid	6.1	30000	10000	187
23	Storage Area	Combustible Liquid	C2	2000	1500	75
24	Storage Area	Oxygen compressed	2.2	120m^3	40 m^3	150
24	Storage Area	Rare gasses and nitrogen	2.2	120 m^3	40 m^3	150
25	Cylinder Store	Air compressed	2.2	1650kg	1000kg	150
25	Cylinder Store	Acetylene dissolved	2.1	50 m^3	50 m^3	100
26	Roofed Storage	Morpholine	3	2000	1500	100
27	Above ground tank	Morpholine	3	800	600	170
28	Storage Area	Combustible Liquid	C1	5000	5000	250
30	Storage Area	Ammonium persulfate	5.1	4000	3000	118
31	Above ground tank	Sodium Hydroxide	8	2500	1000	153
32	Above ground tank	Sodium Hydroxide	8	2500	1000	288
33	Storage Area	Ammonium persulfate	5.1	12000	3000	288
34	Above ground tank	Lubrication oil	C2	18000	9000	103

No	Depot Type	Goods	Class	Maximum Quantity (Litres unless otherwise stated)	Typical Quantity Litres unless otherwise stated)	Approximate Distance to Nearest Residence (m)
35	Above ground tank	Lubrication oil	C2	13500	6000	228
37A	Storage Area	Argon compressed	2.2	400	200	60
37B	Storage Area	Oxygen compressed	2.2	350	200	60
37C	Storage Area	Acetylene dissolved	2.1	35 m^3	35 m^3	60
37D	Storage Area	Petroleum gases, liquefied	2.1	135kg	135kg	60
5	Underground tank	Diesel	C1	20000	15000	175
6	Underground tank	Diesel	C1	1000	7000	175
40	Above ground tank	Corrosive liquid	8	1500	1000	138
41	Above ground tank	Corrosive liquid	8	1500	1000	237
42	Above ground tank	Corrosive liquid	8	1500	1000	312
43	Above ground tank	Corrosive liquid	8/6.1	1500	1000	301
44	Above ground tank	Corrosive liquid	8	1500	1000	159
45	Above ground tank	Corrosive liquid	8	1500	1000	129
46	Above ground tank	Corrosive liquid	8	1500	1000	133
28	Storage Area	Combustible Liquid	C1	5000	5000	150
5	Underground tank	Diesel	C1	20000	15000	175
6	Underground tank	Diesel	C1	1000	7000	175
19	Storage Area	Lubrication oil	C2	40000	20000	110
23	Storage Area	Lubrication oil	C2	2000	1500	75
34	Above ground tank	Lubrication oil	C2	18000	9000	103
35	Above ground tank	Lubrication oil	C2	13500	6000	228

A summary of the dangerous good stored on site by class is presented in **Table 1-1**.

Large quantities of Class 8 (Corrosive) substances are stored and used on site. A Class 5.1 (Ammonium persulphate) substance is stored on site for use in the starch cooking process. Both LPG and diesel are stored on site. In addition, large quantities of lubricant oil for the paper machines are stored on site.

- **Figure 2-1 Location of Existing Dangerous Goods on site**

3. Transition

3.1 Introduction

During Transition Paper Machine No. 7 would be decommissioned and all chemicals directly used in its operation would be removed (See **Table 3-1**). Machine No.8 and auxiliary infrastructure such as the DAF would still be operational. The stores of Class 3 (Boiler Treatment - Morpholine) substances would be moved from the existing store at No. 26 and transferred to another store at No. 20 (refer **Figure 2.1**). The cylinders of acetylene, rare gases and compressed air would also be moved to the store at No. 20.

- **Table 3-1 Transition- Dangerous Goods**

No	Depot Type	Goods	Class	Maximum Quantity (Litres unless otherwise stated)	Typical Quantity Litres unless otherwise stated)	Approximate Distance to Nearest Residence (m)
1	Above ground tank	LPG	2.1	5700	3500	175
10	Above ground tank	LPG	2.1	5700	4000	269
17	Above ground tank	Corrosive Liquid	8	2000	1000	277
20	Roofed Store	Corrosive Liquid	8	30000	20000	200
21	Roofed Store	Toxic Liquid	6.1	30000	10000	187
21	Storage Area	Oxygen compressed	2.2	120m^3	40 m^3	187
21	Storage Area	Rare gasses and nitrogen	2.2	120 m^3	40 m^3	187
21	Cylinder Store	Air compressed	2.1	1650kg	1000kg	187
21	Cylinder Store	Acetylene dissolved	2.1	50 m^3	50 m^3	187
21	Storage Area	Argon compressed	2.2	400	200	187
21	Storage Area	Oxygen compressed	2.2	350	200	187
21	Storage Area	Acetylene dissolved	2.1	35 m^3	35 m^3	187
27	Above ground tank	Morpholine	3	2000	50	170
14	Above ground tank	Sodium Hydroxide	8	13000	9000	245
35	Above ground tank	Lubrication oil	C2	13500	6000	228
5	Underground tank	Diesel	C1	20000	15000	175
41	Above ground tank	Corrosive liquid	8	1500	1000	237
33	Storage Area	Ammonium persulfate	5.1	12000	3000	288
43	Above ground tank	Corrosive liquid	8/6.1	1500	1000	301
42	Above ground tank	Corrosive liquid	8	1500	1000	312
32	Above ground tank	Sodium Hydroxide	8	2500	1000	288

No	Depot Type	Goods	Class	Maximum Quantity (Litres unless otherwise stated)	Typical Quantity Litres unless otherwise stated)	Approximate Distance to Nearest Residence (m)
New Paper Mill						
	Bunded Chemical Storage Area	Sodium Hydroxide	8	30000	20000	300
	Bunded Chemical Storage Area	Corrosive liquid	8	35000	25000	300
	Bunded Chemical Storage Area	Corrosive liquid	8/6.1	4500	3000	300
	Bunded Chemical Storage Area	Lubrication Oil	C2	55000	30000	300
	Storage Area	Ammonium persulfate	5.1	12000	3000	300

For the New Paper Mill, the storage of chemicals and fuels would be consolidated into a smaller number of areas, with the major portion of bulk chemicals located in a centralised area adjacent to the north eastern wall of the paper machine building.

Presented in **Table 3-2** is the Screening Level Assessment (SEPP33) for hazardous substances which would be stored on site during Transition. The classes of dangerous goods which exceed SEPP 33 screening level guidelines are Class 5.1 (Oxidising Agents), Class 6.1 (Toxic) Substances and Class 8 (Corrosive Liquids).

Class C1 and C2 (combustible) liquids which are stored on site should theoretically be classified as Class 3 (Flammable Liquids) substances because of the presence of other Class 3 substances on site. However, in this instance it was not necessary because the volume of Class 3 liquids on site is extremely low (< 5000 L) and are stored at least 100 m from C1 and C2 substances.

- **Table 3-2 Summary of Dangerous Goods during Transition**

Dangerous Good Class	Typical Materials	Transition	Distance from nearest residences (m)	SEPP 33 Screening Level	Above SEPP 33 Screening Level
2.1	LPG (litres)	13,550	>175	16,000 L	No
	Acetylene-dissolved (m3)	1650	>187	> 1000 m^3	No
2.2	Compressed Gases (litres)	350		Class 2.2 Goods Not considered Hazardous by SEPP33	No
3	Boiler Treatment Chemicals (Morpholine) (litres)	4,800	170	> 1,000,000 L	No
5.1	Ammonium Persulfate (litres)	15,000	> 200	5000 L	Yes
6.1	Toxic Liquid (litres)	30,000	> 100	2500 L	Yes
8	Sodium Hydroxide (litres)	100,000	> 200	25 000 L	Yes
	Sulphuric Acid (litres)	4,600	> 200		
	Sodium Hypochlorite (litres)	30,000	> 200		
	Corrosive Liquids (litres)	40,000	> 200		
C1	Combustible Liquid - Diesel (litres)	20,000	NA	None	No
C2	Oil & Grease (litres)	173,500	NA	None	No

In terms of Class 5.1 (Oxidising Agents) the consequences of credible accidents should the Screening Level Threshold be exceeded should be quantified. For Class 8 (Corrosive) substances, a qualitative analysis which demonstrates compliance with relevant standards and codes is necessary. For Class 6.1 (Toxic) substance, an assessment of societal risk is required.

3.2 Class 5.1 (Oxidising Agents) Substance

Storage of Class 5.1 substances (ammonium persulphate) on site during Transition would increase compared to the Existing Operations. Ammonium persulphate is a liquid used in the starch cooking process and is capable of causing fire when in contact with combustible materials. The most obvious combustible material on site is wastepaper, however, the chance of a Class 5.1 substance coming into contact with the waste paper is negligible. All of the new and existing storage locations are at least 150m from Wastepaper Storage Area. Even if a catastrophic rupture of a tank and overtopping of bunding was to occur, the liquid would be directed to the process water system before reaching the wastepaper.

Class 5.1 substances are delivered by tanker to the site.

Credible incidents involving the Class 5.1 substances include:

- Rupture of tank
  - All existing storages of Class 5.1 substances are bunded and these bunds meet the requirements of 120% of the volume of the tank. No combustible material is stored in the bunds. If the tank was to rupture, the bunded area would contain the contents of the tank. In the unlikely event of the bund leaking, the existing Class 5.1 storages are in areas which drain to the sewer rather than the stormwater system; and
  - The new Chemical Storage Areas would be specially built facilities in the New Paper Mill that would conform to all dangerous goods codes and storage requirements. Individual bunded areas would be constructed for each type of chemical, and any spills would be contained and returned to the process.
- Spill while unloading
  - There a minor risk of spillage outside the bunded area in existing storage areas (i.e. if the hose from the tanker ruptured at the outlet point from the tanker). However, existing storages drain to the sewer rather than the stormwater system. Spill volumes would also be small as the unloading operations are supervised at all times. Spill kits are located at all unloading points; and
  - A bunded chemical delivery area would be constructed adjacent to the New Main Chemical Storage Area. All spills would be contained and returned to the process.

Overall the risk of storing and unloading Class 5 substances on site during the Transition is considered negligible due to the mitigation measures already in place.

3.3 Class 8 (Corrosive) Substances

There would be an increase in the quantity of Class 8 substances in the Transition Phase compared to the Existing Operations. However, Class 8 substances create little risk to surrounding receptors as the only pathway for impact is direct contact with the substances. As they are liquids and are not flammable or explosive, the risk of direct contact is negligible given that there is at least 100 metres between storage locations and the nearest receptors.

All existing Class 8 substances (refer **Table 3-1** and **Figure 2-1**) are stored in bunded areas that conform to relevant standards and codes. In the unlikely event of the bund leaking, the existing Class 8 storages drain to the sewer and not to stormwater.

New Chemical Storage Areas in the New Paper Mill would conform to all dangerous goods codes and storage requirements. Individual bunded areas would be constructed for each type of chemical.

A review of the detailed design of the new Chemical Storage Areas would be undertaken by a specialist to ensure that the design complies with standards and codes (primarily AS1940 and Dangerous Good Storage codes).

3.4 Class 6.1 (Toxic) Substances

The quantity of Class 6.1 (Toxic) substances stored on site does not change during Transition from the Existing Operation.

The following estimation of societal risk is based upon the modified IAEA risk assessment methodology contained in the "Manual for classification of risks due to major accidents in process and related industries" as recommended by Department of Planning (DoP) in its Multi-Level Risk Assessment Guidelines (1997).

The potential consequences of the escape of a Class 6.1 (Toxic) substance are injury or death to residents or workers in surrounding suburbs or businesses.

Class 6.1 (Toxic) substances are stored in a 30,000 L tank in the Old Finishing Building (No. 21) towards the northern boundary of the site. The closest stationary off-site receptors are residences in Partanna Avenue that are 187m distant from the storage tank. The most likely incident is a rupture of the tank.

Other likely incidents include:

- Incident involving delivery tanker – a delivery tanker contains less than 30,000 litres and would not pass though site closer to the stationary receptors than the current storage location; and
- Incident during unloading – the risk of the entire load spilling during unloading is minor. The area containing the storage tank drains to sewer rather than the stormwater system so any spill would not travel off-site.

Based on the above analysis of incidents, the release of 30,000 L of a Class 6.1 (Toxic) substance stored in the tank in the Old Finishing Building (No. 21) may have the greatest consequences and is therefore assessed below.

Based on IAEA Table (IV) (A), 30,000 L of a Class 6.1 (Toxic) substance has a Reference Number of 18 and a classification of effect of AIII. Based on IAEA Table V, the maximum effect distance for A category substances is 25m. All receptors are greater than 180m distant from the storage tank and therefore the risk to the receptors (i.e. the residences in Partanna Avenue) are negligible and are not further considered**.**

3.5 Summary

The following points summarise findings from the risk assessment for the Transition Phase:

- Class 5.1 substances – negligible risk provided correct unloading and storage measures are undertaken;
- Class 8 substances – negligible risk provided correct unloading and storage measures are undertaken;
- Class 6.1 substances – negligible risk as distance to receptors greater than 150m; and

4. Operation

Presented in **Table 1-1** is a summary of the proposed dangerous goods to be stored on site by class. There would also be reductions in the quantities of, diesel and Class 6.1 (Toxic) substances stored on site compared to both the Transition and Existing Operations

The New Main Chemical Storage Area would contain all Class 5.1, 6.1 and 8 substances. LPG would be stored adjacent Product Store. All chemical storages associated with Machine No.7 and Machine No. 8 would be decommissioned. Class 3 substance would be stored at No. 21. Eventually Class 3 substances would be relocated to the New Paper Mill. This would occur in conjunction with future boundary changes at the AMCOR site

In **Table 4-1**, the quantities of dangerous goods are compared against the SEPP 33 Screening Level guidelines. The classes of dangerous goods which exceed SEPP 33 screening level guidelines are Class 5.1 (Oxidising Agents), Class 6.1 (Toxic) Substances and Class 8 (Corrosive Liquids).

Class C1 and C2 (combustible) liquids which are stored on site should theoretically be classified as Class 3 (Flammable Liquids) substances because of the presence of other Class 3 substances on site. However, in this instance it was not necessary because the volume of Class 3 liquids on site is extremely low (< 5000 L) and are stored at least 50 m from C1 and C2 substances.

- **Table 4-1 Summary of Dangerous Goods during Operation**

Dangerous Good Class	Typical Materials	New Paper Mill Operation	Distance from nearest residences	SEPP 33 Screening Level	Above SEPP 33 Screening Level
2.1	LPG (litres)	6,775	185 m	16,000 L	No
	Acetylene-dissolved (m^3)	1650	300 m	1000 m^3	No
2.2	Compressed Gases (litres)	150	300 m	Class 2.2 Goods not considered Hazardous by SEPP33	No
3	Boiler Treatment Chemicals (Morpholine) (litres)	4,800	285 m	> 1,000,000 L	No
5.1	Ammonium Persulfate (litres)	10,000	300 m	5000 L	Yes
6.1	Toxic Liquid (litres)	15,000	300 m	2500 L	Yes
8	Sodium Hydroxide (litres)	60,000	300 m	25 000 L	Yes
	Sulphuric Acid (litres)	4,600	300 m		
	Sodium Hypochlorite (litres)	15,000	300 m		
	Corrosive Liquids (litres)	40,000	300 m		
C1	Combustible Liquid – Diesel (litres)	20,000	NA	None	No
C2	Oil & Grease (litres)	100,000	NA	None	No

In terms of Class 5.1 (Oxidising Agents) the consequences of credible accidents should the Screening Level Threshold be exceeded should be quantified. For Class 8 (Corrosive) substances, a qualitative analysis which demonstrates compliance with relevant standards and codes is necessary. For a Class 6.1 (Toxic) substance, an assessment of societal risk is required.

4.1 Class 5.1 substances (Oxidising Agents)

Storage of Class 5.1 substances (ammonium persulphate) on site would increase compared to the Existing Operations. Ammonium persulphate is a liquid used in the starch cooking process and is capable of causing fire when in contact with combustible materials. The most obvious combustible material on site is wastepaper, however, the chances of a Class 5.1 substance coming into contact with the wastepaper are negligible. The new Chemical Storage Area is 100m from the Wastepaper Storage Area. Even if a catastrophic rupture of a tank and overtopping of bunding was to occur, the liquid would drain to the process water system before reaching the wastepaper.

Both these Class 5 substances are delivered by tanker to the site.

Credible incidents involving the Class 5 substances include:

- Rupture of tank
  - The new Chemical Storage Areas would be specially built facilities in the New Paper Mill that would conform to all dangerous goods codes and storage requirements. Individual bunded areas would be constructed for each type of chemical.
- Spill while unloading
  - For the New Main Chemical Storage Area, a bunded chemical delivery area would be constructed. All spills would be contained in this area.

Overall the risk of storing and unloading Class 5.1 substances on site during the Operation is considered negligible due to the mitigation measures proposed above.

4.2 Class 8 (Corrosive) Substances

The quantity of Class 8 substances required for the New Paper Mill would be significantly less than Transition. There would be a slight increase in the quantity of Sodium Hydroxide and Corrosive Liquids required for the New Paper Mill compared to the existing operations whilst quantities of Sulphuric Acid and Sodium Hypochlorite would remain the same. Class 8 substances generally pose little risk to surrounding receptors as the only pathway for impact is direct contact with the substances. As they are liquids and are not flammable or explosive, the risk of direct contact is

negligible given that there is at least 100 metres between storage locations and the nearest receptors.

The new Chemical Storage Areas would be specially built facilities in the New Paper Mill that would conform to all dangerous goods codes and storage requirements. Individual bunded areas would be constructed for each type of chemical. A review of the detailed design of the New Chemical Storage Facilities would be undertaken by a specialist to ensure that the design complies with standards and codes (primarily AS1940 and Dangerous Good Storage codes).

4.3 Class 6.1 (Toxic) substances

The quantity of Class 6.1 (Toxic) substances stored on site would significantly reduce compared to the Existing Operation and Transition Phase.

The following estimation of societal risk is based upon the modified IAEA risk assessment methodology contained in the "Manual for classification of risks due to major accidents in process and related industries" as recommended by DoP in its Multi-Level Risk Assessment Guidelines (1997).

The potential consequences of the escape of a Class 6.1 (Toxic) substance are injury or death to residents or workers in surrounding suburbs or businesses.

The Class 6.1 (Toxic) substance would be stored in a 30,000 L tank in New Chemical Storage Area. The closest stationary off-site receptors are commercial premises in McCauley Street that are 110m from the storage tank. The most likely incident is a rupture of the tank.

Other likely incidents include:

- Incident involving delivery tanker – a delivery tanker contains less than 30,000 litres and would not pass though site closer to the stationary receptors than the current storage location; and
- Incident during unloading – the risk of the entire load spilling during unloading is minor. The new chemical delivery area would be bunded and would drain to the new wastewater treatment system so any spill would not travel off-site.

Based on the above analysis of incidents the release of 30,000 L of a Class 6.1 (Toxic) substance would potentially have the greatest consequences and therefore is assessed in the following sections.

Based on IAEA Table (IV) (A), 30,000 L of a Class 6.1 (Toxic) substance has a Reference Number of 18 and a classification of effect of AIII. Based on IAEA Table V, the maximum effect distance for A category substances is 25m. All receptors are greater than 100m distant from the storage tank

and therefore the risk to the receptors (i.e. the commercial premises in McCauley Street) are negligible and are not further considered.

4.4 Summary

The following points summarise findings from the above risk assessment for operation of the New Paper Mill:

- Class 5.1 substances – negligible risk provided correct unloading and storage measures are undertaken;
- Class 8 substances – negligible risk provided correct unloading and storage measures are undertaken; and
- Class 6.1 substances – negligible risk as distance to receptors greater than 150 metres.

5. Conclusion

The Botany Paper Mill currently stores and uses relatively large quantities of chemicals and dangerous goods on site. Most of the chemicals are used in the treatment of water, either wastewater before discharge to the sewer, internal process water, or boiler water. These chemicals include:

- Class 3 (Flammable) Liquids
- Class 5.1 (Oxidising Agents) Substances
- Class 6.1 (Toxic) Substances
- Class 8 (Corrosive) Substances

Small quantities of diesel, LPG and other gases such acetylene are also stored on site.

Dangerous goods are stored at many locations throughout the site under the Existing Operations, with all storages complying with relevant codes and standards.

The new Chemical Storage Areas would be specially built facilities in the New Paper Mill that would conform to all dangerous goods codes and storage requirements. Individual bunded areas would be constructed for each type of chemical. The bunded areas would contain all spills and leakages. A bunded chemical delivery area would also be built. A review of the detailed design of the New Chemical Storage Areas would be undertaken by a specialist to ensure that the design complies with standards and codes (primarily AS1940 and Dangerous Good Storage codes).

The classes of dangerous goods which exceed SEPP 33 screening level guidelines during Transition are Class 5.1 (Oxidising Agents), Class 6.1(Toxic) substances and Class 8 (Corrosive Liquids). **Section 3** discusses the PHA that was undertaken for these substances and concludes that provided correct procedures and codes were adhered to during storage and handling of these substances there would be negligible risk to surrounding land uses.

Chlorine gas is not used under the Existing Operations nor would it be used in the New Paper Mill, all remnant stores of chlorine gas have been removed from the site. There would also be reductions in the quantities of diesel and Class 6.1 (Toxic) substances stored on site compared to both the Transition and Existing Operations. The classes of dangerous goods which exceed SEPP 33 screening level guidelines for the Operation are Class 5.1 (Oxidising Agents), Class 6.1 (Toxic) substances and Class 8 (Corrosive Liquids). **Section 4** presents the PHA that was undertaken for these substances and concludes that provided correct procedures and codes were adhered to during storage and handling of these substances there would be negligible risk to surrounding land uses

The risks associated with the transport of chemicals to the site are considered small as and there only approximately 14 chemical deliveries a week and delivery routes are via major roads and highways, not suburban streets.

Overall the New Paper Mill should result in a considerable reduction in hazard to the surrounding land uses due to:

- The location of new Chemical Storage Areas further away from residences;
- The new Chemical Storage Areas would be constructed to comply with all standards and codes and would generally drain to the process water system;
- The detailed design of new Chemical Storage Areas would be reviewed by relevant specialist; and
- The quantities of diesel and Class 6.1 (Toxic) substances stored on site would reduce once the New Paper Mill is fully operational.