Safety Engineering & Technical Services Pty Ltd

WORK HEALTH, SAFETY & ENGINEERING CONSULTANTS

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18 October 2019

The Manager
Lendlease Building
Exchange Place
300 Barangaroo Avenue
BARANGAROO NSW 2000

Attention: Mr Gordon T Brown – Project Manager/Design

Dear Sir

re: Hazardous Chemicals (Dangerous Goods) Matters – Advice in Relation to Quantities - Storage and Handling of Dangerous Goods for the Proposed Integrated Acute Services Building (IASB), Prince of Wales Hospital, Randwick

In your email request of 10 October 2019 (Brown/Underwood) you instructed me to provide a response to an item raised by NSW Department of Planning Industry and Environment ("DPI&E"), namely to:

- *identify and clarify whether the storage and handling of dangerous goods in the proposed development is below threshold quantities in the Department's* Applying SEPP 33 *guidelines and provide a preliminary risk screening in relation to the storage and handling of dangerous goods for this proposal in accordance with State Environmental Planning Policy No 33 – Hazardous and Offensive Development ("SEPP 33"), if required.*

My previous report on the applicability of SEPP 33 to the now approved ASB project, had a listing of the anticipated dangerous goods quantities identified for the ASB. (Appendix A).

The summation of dangerous goods of the various classes then informed my opinion as to the applicability of SEPP 33 to the proposed IASB Project, was based on the quantities described in Table 1 of that report, along with the transport movements involving dangerous goods above the stated threshold limits and frequency as described in Table 2.

For this report for the IASB Addition development application, I have used the quantities in respect of the storage of the various classes and transport movements in the initial ASB report, to determine (by difference), the additional allowable margin available to IASB Addition activities before SEPP 33 would be triggered for the joint ASB/IASB Addition.

SEPP 33 is an enabling instrument that links safety and pollution control performance, to the permissibility of an industrial proposal. It is not a 'design standard'.

SEPP 33 applies to proposals that fall under the policy's definition of:

- '**potentially hazardous industry**' - where the quantities of dangerous goods or transport movements involving dangerous goods exceeds the threshold limits described in the document *Applying SEPP 33*, or
- '**potentially offensive industry**' - a proposal that, in the absence of safeguards, would emit a polluting discharge which would cause a significant level of offence.

Assessing whether a proposal is potentially hazardous industry

The screening process relies on a sorting procedure related to the nature and quantity of dangerous goods present on the site of the proposed development.

Dangerous goods are a group of substances that have been recognised as having some immediate public safety threat due to their hazardous properties. Dangerous goods have been listed in a number of national and international publications (in Australia this list is set out in the *Australian Dangerous Goods Code* – currently in the 7th edition - version 7.6).

A system of classification and labelling of dangerous goods has been adopted by Australia which is consistent with systems used throughout most of the world. This system has been devised to help people quickly recognise dangerous goods and their properties and hazard potential.

All dangerous goods that are handled or transported must be accurately classified into classes that reflect their characteristics (it being the responsibility of the manufacturer or importing agent to ensure that the dangerous goods are accurately classified).

Dangerous goods are divided into nine '**classes'** (and in the case of dangerous goods of Classes 1, 2, 4, 5 and 6 these classes are further subdivided into '**divisions**'). Each 'class group' is comprised of substances that have similar properties or hazards. Goods having more than one hazardous property are classified under their primary class and where they have some additional hazard, they are also assigned a '**subsidiary risk**'.

Substances within Classes 3, 4, 5, 6 and 8 are further subdivided into **Packing Groups** (abbreviated as PG) to indicate their relative inherent risk (PG I - high risk, PG II - moderate risk, and PG III - least risk).

The various dangerous goods classes are:
Class 1 – Explosives - are substances and articles used to produce explosions or pyrotechnic effects.

Class 2 – Gases - includes gases which are compressed, liquefied or dissolved under pressure. Some gases have subsidiary risk classes (i.e. other risk characteristics such as 'flammable' or 'corrosive'):

- Division 2.1 - Flammable gases are gases which ignite on contact with an ignition source (such as acetylene, hydrogen, LP gas)
- Division 2.2 - Non-flammable gases are gases which are neither flammable nor poisonous (such as oxygen, nitrogen, medical air, argon)
- Division 2.3 - Poisonous gases are gases liable to cause death or serious injury to human health if inhaled - such as ammonia, chlorine, carbon monoxide

Class 3 - Flammable liquids – are liquids which can be ignited and will burn on contact with ignition sources

C1 & C2 combustible liquids – are liquids that will burn (often fiercely) when they are heated and ignited – C1 combustible liquids are of relatively lower flashpoint and include liquids such as diesel fuel, olive oil and other vegetable oils while C2 combustible liquids have a high flashpoint and include substances such as lubricating and hydraulic oils

Class 4 - Flammable Solids – are solids that have characteristics that pose a risk of fire and/or explosion and includes:

- Division 4.1 - flammable solids that are easily ignited and readily combustible - such as nitrocellulose, phosphorus, matches, hexamine;

- Division 4.2 - spontaneously combustible substances - such as aluminium alkyls, white phosphorus);
- Division 4.3 - substances emitting a flammable gas when wet, or which react violently with water (such as aluminium phosphide, calcium carbide).

Class 5 – Oxidising substances – are substances that can promote or exacerbate the effect of fire and include

- Division 5.1 - Oxidizing agents other than organic peroxides (such as calcium hypochlorite (pool chlorine), ammonium nitrate, hydrogen peroxide); and.
- Division 5.2 - Organic peroxides - liquid or solid - (such as methyl ethyl ketone peroxide, benzoyl peroxides, cumyl hydroperoxide).
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Class 6 – Toxic and Infectious Substances - (this classification does not include poisonous gases), and are further classified as being either:

- Division 6.1 - Toxic substances - which may be liquids or solid) and which are liable to cause death or serious injury to human health if inhaled, swallowed or absorbed through the skin (such as cyanides, arsenic compounds), or which are harmful to human health (such as low toxicity pesticides).
- Division 6.2 – are Infectious substances (such as vaccines, pathology specimens).

Class 7 – Radioactive Substances – are substances that either alone, or in a combination of substances, emit ionising radiation (such as uranium, radioisotopes).

Class 8 – Corrosives - are substances (either solids or liquids) which may harm living tissue or damage equipment - such as hydrochloric acid, sodium hypochlorite (liquid pool chlorine), sodium hydroxide, and lead acid batteries.

Class 9 - Miscellaneous Dangerous Goods - are substances that are not classified elsewhere but which are known to have a safety risk when being transported - such as molten naphthalene, molten bitumen, polyester beads, and lithium batteries.

Establishing allowable IASB Addition potential for co-stowage of dangerous goods together with the Approved ASB

Tables 1 & 2 overleaf shows the potential for co-stowage before the screening method from *Applying SEPP 33* for the aggregated quantities of dangerous goods listed, triggers the requirement to undergo the SEPP33 review protocol.

Assessing whether a proposal is potentially offensive industry

As regards any requirement to apply the SEPP 33 process for potentially offensive hazardous development.

The primary consideration in assessing whether any proposal falls within the 'potentially offensive industry' category is whether the consent authority is satisfied that there are adequate safeguards to ensure that any emissions from a facility can be controlled to a level at which they are not significant.

Where proposed activities do not require a licence pursuant to *Protection of the Environment Operations Act 1997*, or where they do require a licence but in the opinion of the environmental regulator the proponent can fully meet its licence requirements, a proposal is not deemed to be 'offensive industry'.

I am advised that no licence is required pursuant to Chapter 3 of the *Protection of the Environment Operations Act 1997* by either the approved ASB project or the proposed IASB Addition activities in the shell-spaces at IASB Addition. As a consequence, the proposed development is not potentially offensive industry in accordance with the screening method for the application of SEPP 33.

Conclusion on the applicability of SEPP 33

Provided that the ASB and the IASB Addition limit the scale of the storage of dangerous goods as described in Table 1 & 2, a consequence of being neither potentially hazardous nor potentially offensive industry, is that SEPP 33 would not apply to the proposed co-joined activity at the ASB and the IASB Addition.

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SEPP 33 applies if	**SEPP 33 Threshold**	**Approved ASB**	**Allowable SEPP 33 marginal quantity for the Proposed IASB Addition**
Class 2, Division 2.1 - compressed flammable gases in cylinders if quantity limits exceed limit of 100 kg as shown in Figure 6 of Appendix 4 in *Applying SEPP 3* in Figure	Limits are set for LPG and separately for compressed flammable gases in cylinders	None present	100 kg – SEPP33 threshold set in Figure 6 *General Screening Threshold Quantities* (i.e. 2 x G-size cylinders) *Note that Figure 6 would allow a greater quantity to be kept dependent on location separation distance (e.g. 350 kg if boundary separation distance of 20 m is available)*
Class 2, Division 2.2 non-flammable gases, non-toxic gases, and cryogenic liquids exceed limit described in Appendix 4 - Table 3 in *Applying SEPP 33*	No limit is set	SEPP 33 - does not apply	Unlimited
Class 2, Division 2.3 toxic gases exceed the threshold limit as described in Appendix 4 - Table 3 in the section Risk Screening in the document *Applying SEPP 33*	100 kg limit	Allowance of 10kg (previously estimated) – sterilization no longer uses toxic gas – quantity 0	100 kg limit
Class 3 dangerous goods (flammable liquids) exceed the lower threshold limit) and are not sufficiently separated from the boundary by the distance given in the section Risk Screening – Figures 8 & 9 of the document *Applying SEPP 33*	Lower threshold of • 2 tonnes (for PG I goods) • 5 tonnes (assuming goods are of PG II & III)	Less than 100 L maximum - Quantities below SEPP 33 threshold limit - SEPP 33 does not apply	Worst case (i.e. PG I) up to 1,900 L may be kpt without tripping threshold limit
C1 combustible liquids (Class 3 Category 4 as defined by GHS)	No limit is set	SEPP 33 - does not apply	Unlimited

Table 1 – Applicability of SEPP 33 for potentially hazardous industry (Present on Site)

SEPP 33 applies if	**SEPP 33 Threshold**	**Approved ASB**	**Allowable SEPP 33 marginal quantity for the Proposed IASB Addition**
Quantity of goods of Class 4 substances exceeds threshold limit in Appendix 4, Table 3	Threshold quantities: • 5 tonnes (Class 4.1) • 1 tonne (Class 4.2) • 1 tonne (Class 4.3)	None reported - SEPP 33 does not apply	Limits: • 5 tonnes (Class 4.1) • 1 tonne (Class 4.2) • 1 tonne (Class 4.3)
Quantity of goods of Class 5.1 substances exceeds threshold limit – Appendix 4, Table 3	Threshold quantities: • 5 tonnes	Only small quantity (< 20 L or kg) reported - SEPP 33 does not apply	4,980 kg
Quantity of goods of Class 5.2 substances exceeds threshold limit set in Appendix 4, Table 3	Threshold quantities: • 10 tonnes	None reported - SEPP 33 does not apply	10,000 kg(L)
Quantity of goods of Class 6.1 exceeds threshold limit set in Appendix 4, Table 3	Threshold quantities: • 0.5 tonnes for PG I; • 2.5 tonnes PG II/III	Less than 2 kg - Quantities below SEPP 33 threshold limit - SEPP 33 does not apply	Assuming worst case (PG I) limit of 498 kg(L) could be kept by UNSW before triggering SEPP 33 threshold
Quantity of goods of Class 6.2 exceeds threshold limit set in Appendix 4, Table 3	Threshold quantities: • 0.5 tonnes	Maximum quantity 250 kg - Quantities below SEPP 33 threshold limit - SEPP 33 does not apply	Up to 250 kg could be kept by UNSW before triggering SEPP 33 threshold
Quantity of goods of Class 8 exceeds threshold limit set in Appendix 4, Table 3	Threshold quantities: • 5 tonnes for PG I • 25 tonnes PG II; • 50 tonnes PG III	Only small quantity (< 50 L in aggregate) – Quantities below SEPP 33 threshold limit - SEPP 33 does not apply	Assuming worst case (PG I) limit of 4,950 kg(L) could be kept by UNSW before triggering SEPP 33 threshold

Table 1 – Applicability of SEPP 33 for potentially hazardous industry (Present on Site) (continued)

SEPP 33 applies if	**SEPP 33 Threshold**	**Approved ASB**	**Allowable SEPP 33 marginal quantity for the Proposed IASB Addition**
Number of significant transport movements meeting the specified criteria in Table 2 of Chapter 7 of *Applying Sepp33* are exceeded	Number of traffic movements of dangerous goods greater than 1 tonne capacity exceed the frequencies set in the screening threshold	It is not expected that there will be any transport movements of loads greater than 1 tonne capacity - SEPP 33 does not apply	It is not expected that there will be any transport movements of loads greater than 1 tonne capacity - SEPP 33 does not apply

Table 2 – Applicability of SEPP 33 for potentially hazardous industry (transport)

Some further comments on the proposed storage, use and management of dangerous goods at the IASB Addition

As raised earlier in this report, being within the threshold limits of SEPP 33 is solely a criteria for determining the development application process. It is not a design standard that must be followed.

The design of the facilities for the receiving, storage, handling and use of hazardous materials, at the proposed IASB Addition activities to be provided within the ASB building, are required to be in accordance with:

- the National Construction Code 2017
- the NSW *Work Health and Safety Act* 2017 and the Work *Health and Safety Regulation 2017* (particularly Chapter 7 – *Hazardous Chemicals)*
- the various standards relating to the storage and handling of specific classes of dangerous goods, including:
    - AS 1894-1997 *The storage and handling of non-flammable cryogenic and refrigerated liquids*
    - AS/NZS 4332-2004 *The storage and handling of gases in cylinders*
    - AS 1940-2017 *The storage and handling of flammable and combustible liquids*
    - AS/NZS 5026-2012 *The storage and handling of Class 4 dangerous goods*
    - AS 4326-2008 *The storage and handling of oxidising agents*
    - AS 2714-2008 *The storage and handling of organic peroxides*
    - AS/NZS 4452-1997 *The storage and handling of toxic substances*
    - AS 3780-2008 *The storage and handling of corrosive substances, and*
    - AS/NZS 4681-2000 *The storage and handling of Class 9 (miscellaneous) dangerous goods and articles*
- standards covering laboratory design and safety, including:
    - AS/NZS 2982-2010 *Laboratory design and construction*, and
    - the AS/NZS series 2243 Saf*ety in laboratories*
- standards covering the classification of hazardous areas that describe the spaces from which ignition sources must be excluded, particularly AS/NZS 60079.10.1- 2009 Explosive Atmospheres – *Part 10.1 : Classification of areas – Explosive gas atmospheres (IEC 60079-10-1, Ed. 1.0(2008) MOD)*

- the *Code of Practice – Managing risks of hazardous chemicals in the workplace – July 2014* – WorkCover NSW.

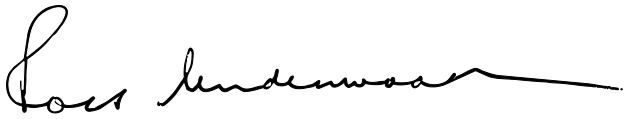
General conclusion

As stated earlier in this advice, provided the threshold limits as described in this report are not exceeded by the combination ASB/IASB Addition activities, it is my opinion that SEPP 33 does not apply to the proposed co-located ASB and IASB Addition inventories of dangerous goods, in the IASB building at Randwick.

Should you need to clarify any of this advice, or raise any other issues, I would be happy to provide further assistance.

I thank you for the opportunity to provide advice in these matters.

Yours faithfully
Safety Engineering & Technical Services Pty Ltd



Ross Underwood, MIEAust, CPEng, MSIA, MAIDGC
General Manager

Disclaimer

This opinion in relation to the compliance of the proposed IASB Addition facilities to be provided at the ASB at Prince of Wales Hospital, Randwick was prepared impartially, and the assessment completed independently, by Safety Engineering & Technical Services Pty Ltd. The report reflects our best judgement based on the information available at the time of preparation. Any use that any party makes of the documentation, however, is the responsibility of such party. Safety Engineering & Technical Services Pty Ltd accepts no responsibility whatsoever for damages (if any) suffered by any party in reliance on information contained in this report.

APPENDIX A Who prepared this report?

This report was prepared by Ross Underwood, a graduate mechanical engineer with postgraduate qualifications in industrial engineering from the University of New South Wales, with over 51 years of experience in industrial practice in high hazard environments.

The first 12 years of his professional career were spent in the petrochemical industry where he was involved in a variety of different functions including engineering maintenance, major new plant construction, project work associated with energy conservation and improving environmental performance, and chemical plant production management. He then spent 3 years managing reconstruction works at the Pyrmont Sugar Refinery, before being appointed as Personnel and Administration Manager for a major manufacturing activity, a position he held for 5 years.

In 1986 he established Safety Engineering and Technical Services Pty Ltd, a safety consulting and engineering contracting/consulting business. His company has undertaken a substantial number of consulting tasks in safety management for a very diverse range of private sector industrial and government clients including what was then the NSW WorkCover Authority.

Ross has conducted specific training programs and seminar sessions in safety awareness, accident investigation & other safety skills at all organisational levels. He was formerly accredited by WorkCover NSW as a trainer in workplace consultation, building industry induction, hazardous substances and risk management courses. He has trained management & employee safety committee representatives from over 80 different organisations. He has lectured in OH&S for both undergraduate and postgraduate students at the universities of UNSW, Sydney, Western Sydney and the University of Technology. He has undertaken longer term engineering contracting/consulting assignments in the brewing, building and manufacturing/industrial, warehousing and transport, government and military sectors.

His particular areas of expertise include:- dangerous goods storage, handling and transport matters; laboratory design, classification of hazardous areas; occupational health and safety performance auditing; construction management; plant & machinery safety, maintenance; industrial relations; accident investigation; workplace and safety system auditing; product packaging and labelling; and, the formulation and maintenance of safe work systems (including the preparation of emergency response and environment management plans). He has also been involved in the pre-planning and design of a number of major manufacturing plant and warehouse projects and has prepared risk and

hazard analyses as part of the process for securing development approval for these facilities.

He has provided a number of expert opinion reports for litigated matters related to oh&s and dangerous goods matters.
He has provided specialist advice on dangerous goods and more general occupational health and safety issues associated with several major building/re-building projects most recently including:- the Ingham Health Research Institute at Liverpool Hospital; the Hunter Medical Research Institute; the Australasian Institute for Innovative Materials at the University of Wollongong; a Veterinary Diagnostic laboratory at Charles Sturt University at Wagga Wagga; the Special Operations Working Accommodation Upgrade Project; the 171 Aviation Squadron (Blackhawk helicopter) Relocation Project; HMAS CRESWELL Redevelopment at Jervis Bay, the ASC Shipyard Redevelopment, and the upgrade of HMAS PENGUIN – all for the Australian Defence Forces; and, the major redevelopment of the University of New South Wales North Mall (including new facilities for Applied Science and Chemistry)

Ross has contributed as an author to a number of technical journals and to the CCH International *Occupational Health & Safety Manual*, the *Plant Safety* manual, the *OHS Manager- The Hands on Guide* and the *2003 Australian master OH&S & environment guide*.

He is a Member of the Institution of Engineers, Australia, a Member of the Safety Institute of Australia, a Chartered Member of the Australian Human Resources Institute, and a founding member of the Australasian Institute of Dangerous Goods Consultants.

He has completed Certificate IV courses in Workplace Safety, and Workplace Assessment and Training, the Risk & Liability Management short course convened by Engineering Education Australia, classification of hazardous areas course convened by Illawarra TAFE.