Rose-Anne Hawkeswood

Sent: Thursday, 28 March 2019 3:01 PM

Subject: RE: Follow up on our conversation on FSRU Port Kembla [External Sender]

Hi Doris,

Apologies for the delayed response. Please find below responses to your queries.

Let me know if you require any further information.

Regards,

Andrew Fergusson
Principal Safety & Risk Engineer

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Subject: Follow up on our conversation on FSRU Port Kembla [External Sender]

Hi Andrew,

Based on our conversation from the past Thursday, you agreed to provide additional justification on the following items:

1. LSIR encroaching to PKCT existing truck wash area.

[Fergusson, Andrew (Brisbane)] The current location of the 1E-05 contour extends beyond the proposed eastern site boundary and is west of PKCT Truck Wash. This area is not normally occupied and PKCT have advised AIE that the truck wash is a back-up to their northern truck wash and would only be used rarely if the northern truck wash is out of service. When in use occupancy of truck drivers is expected to in the order of minutes not hours. Hence, occupancy per annum will be low. The equipment adjacent the truck wash undergoes maintenance for a period of 2-3hrs once per quarter. Again occupancy per annum will be low. The risk contours presented in the existing PHA take no credit for fire or gas detection, or emergency shut down and blowdown and are therefore conservative. With further detailed assessment some contraction of the contours may occur.

2. Dangerous Goods handling at other berths.

[Fergusson, Andrew (Brisbane)] According to the shipment data provided by the Port Authority (see attached), there were three explosive types that entered the harbour between Feb 2013 and May 2018 (i.e. 1913 days) with the following maximum quantities:

- Class 1.2E, Cartridges for Weapons, 1,441 kg – 2 shipments
- Class 1.3C, Smokeless Powder, 13,995 kg – 5 shipments
- Class 1.4S, Small Arms Cartridges, 17,424 kg – 5 shipments

Studies have shown that the ignition of small arms cartridges, produces no explosion overpressure or projectiles at high velocity. The Fridley Minnesota Fire Department in July 1983 conducted various ammunition impairment tests with 281,000 rounds of ammunition containing more than 180 kg of power.
One of the tests involved confined burning of ammunition placed in a specially built 6 x 6 foot concrete block structure with oil-soaked scrap timber stacked beneath the ammunition and a flat boilerplate placed on top of the structure to complete the confinement of the ammunition.
The outcome of the tests concluded that:

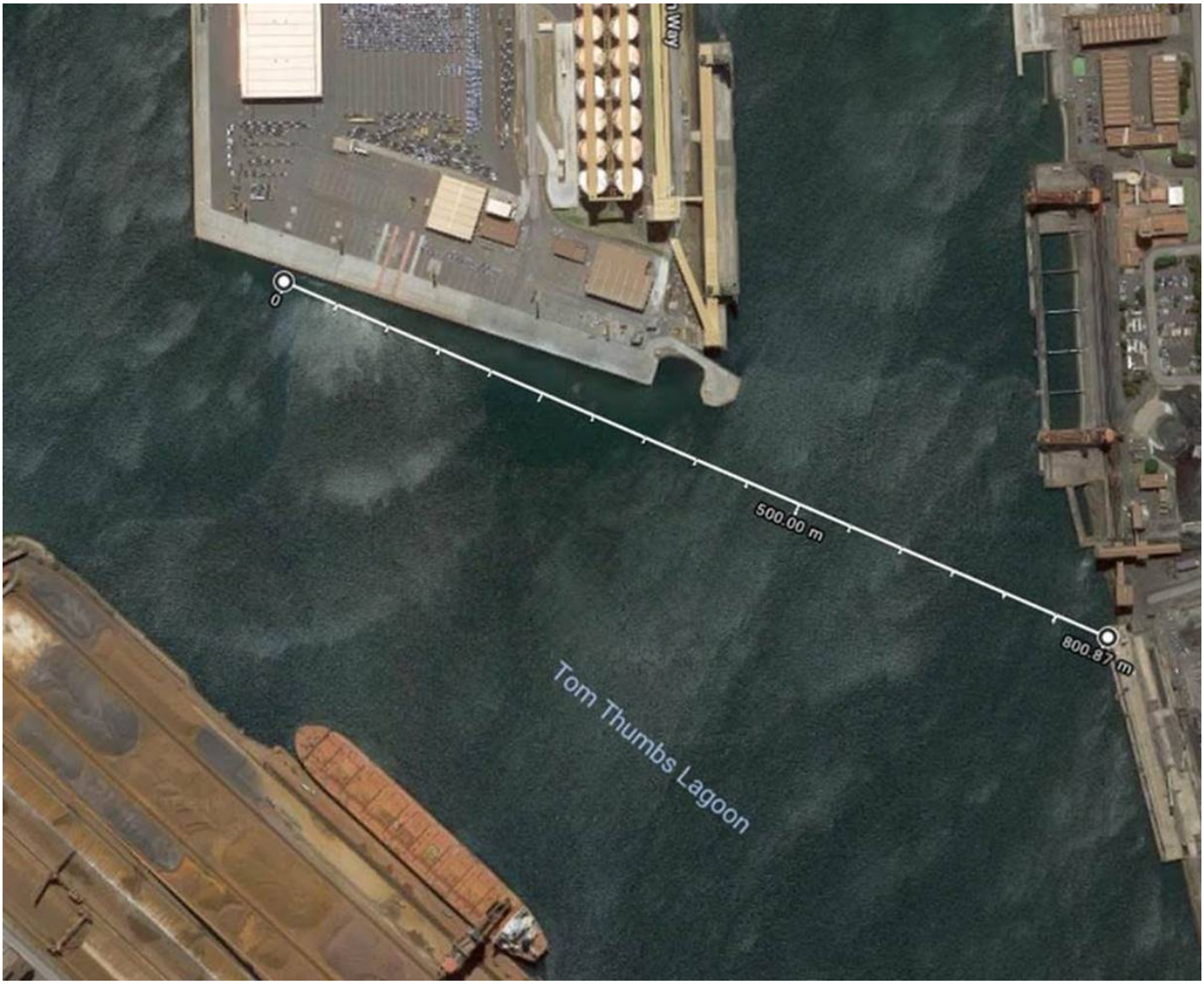
- When ammunition is involved in a fire, it will not mass detonate or explode.
- Projectiles from ammunition are at low velocity and do not present any significant hazard to firefighters wearing standard firefighting and face protection.
- Ammunition will not support its own combustion.

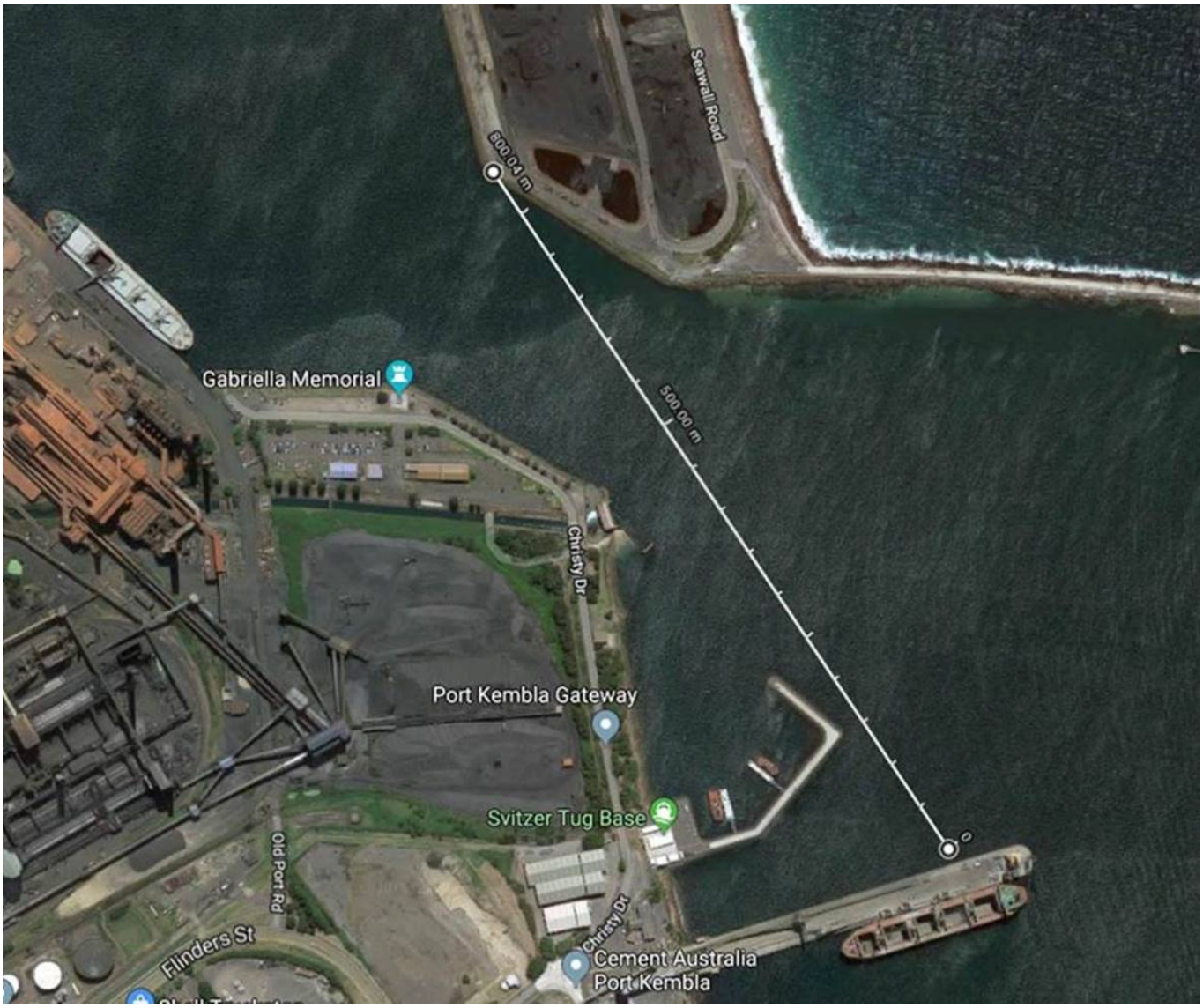
Therefore, shipments of small arms cartridges are not expected to generate damaging explosion overpressure toward the LNGC / FSRU.

Smokeless powder and weapon cartridges cargoes are unloaded at the following berth locations:

- Smokeless powder cargo berth 106, 107 or 203.
- Weapon cartridges cargo berth 202 or 203.

The closest berth location to berth 101 (LNGC / FSRU) is berth 106 / 202 with a distance of 800 m (shown below).


0
500.00 m
800.87 m
Tom Thumbs Lagoon



Explosion modelling was conducted and determined that a TNT mass of ~ 135,000 kg is required to generate a 14 kPa blast overpressure at berth 101 (LNGC / FSRU).
Both of the Class 1.2E and Class 1.3C explosive shipments to Port Kembla are significantly lower than the required TNT mass to generate the blast overpressure for propagation.
Therefore, the location of berth 101 (LNGC / FSRU) is considered to be sufficiently far from the explosive cargo berths.

In terms of propagation risk from explosive carrying cargo ship movements close to berth 101 (LNGC / FSRU) to get to their berth (i.e. smokeless powder cargo ship), the propagation risk is estimated to be 5.5×10^{-8} per year with the following inputs:

- Berth 101 is assumed to be exposure to 2 hours of explosion hazards from explosive carrying cargo ship heads toward their berths within the inner bay.
- 5 shipments every 5.2 years (supplied by Port Authority).
- 2.5×10^{-4} per year of cargo ship total loss due to fire and explosion (historical data from 2000 to 2010 – Report for AMSA Ship Oil Spill Risk Models by DNV 2011)

Therefore, based on the historical ship fire incident data and explosives shipment data, the cargo ship explosion risk toward berth 101 (LNGC / FSRU) is considered to be acceptable (below the 50 in a million years 14 bar propagation frequency from HIPAP 4).

3. Biophysical Environment Risk.

[Fergusson, Andrew (Brisbane)] LNG, odorant and diesel are all located on either the FSRU or wharf and have the potential to impact the environment in the event of a loss of containment from any of their respective systems. The Hazardous Industry Planning Advisory Paper No. 4 (HIPAP 4) for Risk Criteria for Land Use Safety Planning suggests

assessing the likelihood and size of accidental release and making a judgement on what the consequences of such releases are based on Table 3 of Section 2.4.4.1 in HIPAP 4.
LNG releases have been assessed in the PHA. An LNG release to grade or to water will flash rapidly to its vapour phase and disperse and is considered unlikely to cause significant environmental damage. When assessed against Table 3 in HIPAP 4 the environmental consequence would be ranked as “Moderate” defined as “temporary alteration or disturbance beyond natural viability” with “recovery <5 years”. This is the lowest consequence category in the table, only above “Not detectable”. The likelihood of such a release is summarised in the leak frequency sections in the PHA and PHA addendum and is considered low.
Odorant releases have been assessed in Section 6 of the PHA Addendum. The odorant will only be stored in small volumes at the facility and will be contained, with a very low likelihood of a leak / rupture. An accidental release would mainly impact the public as assessed in the addendum, with negligible impact to the environment. The environmental consequence of this release would be “not detectable” per Table 3 in HIPAP 4 with “alteration or disturbance within natural viability, effects not accumulating, and resources not impaired”.
Diesel fuel is stored at the wharf as fuel for the fire water pumps and as an emergency backup to LNG for the FSRU fuel. The diesel for the fire water pumps will be stored in small quantities as it is only required in emergency situations. This storage will comply with relevant Australian Standards and will have bunding as a minimum. The highest risk activity is refuelling either the onshore storage or the FSRU as the most likely leak would be in the transfer system rather than the storage equipment. There are known controls such as hose inspection and testing, dry break couplings, ignition control and spill containment should a release enter the water. Considering the controls and experience from a similar FSRU which has not refuelled in 5 years. Therefore, likelihood of an environmental release is considered to be very low. The environmental consequence is ranked as “Moderate”, similar to LNG above.

I wonder if you could provide the information to us soonest possible so we can finalise our assessment.

Regards,

Doris Yau
Team Leader - Hazards
NSW Department of Planning & Environment