WITNESS STATEMENT OF CAPTAIN WILLIAM KOREVAAR

To the

FORMER PORT PHILLIP WOOLLEN MILLS AVISORY COMMITTEE (FPPWMAC)

February 2011

1- **I, William Korevaar of 43 Railway Crescent Williamstown in the State of Victoria, Master Mariner, make this statement providing a professional opinion in relation to the following list / overview of points:**

- There are significant hazards associated with tankers (ships) and their cargo operations that present serious risks to health and safety at Point Gellibrand and surrounding areas
- Those risks are foreseeable and I believe they will be increased by inappropriate Planning and Urban Design decisions
- I believe it cannot be claimed that risk of fatality beyond the 300m WorkSafe Victoria amenity Buffer Zone is a less than one in ten million year likelihood
- Planning Authorities have a responsibility for safety over town lands
- No other Authorities have a defined responsibility for planning and urban design matters, especially over areas not within their defined legal boundaries
- Planning Authorities have responsibility for protecting public utilities such as the port and its infrastructure and operations
- Risk Assessment is required for thoroughness and transparency in robust decision making about whether Planning determinations may or may not result in increased risk.
- No thorough and proper risk assessment has yet been done to determine the impact of Planning and Urban Design matters on risks to health and safety of all stakeholders
- No risk assessment has yet been done. No assessment of the effect of Planning and Urban Design decisions on potential incident magnitude, consequences or impact on emergency preparedness has been undertaken
- Conduct of risk assessment process should be undertaken in accordance with the Standard AS*/NZ ISO 31000:2009 Risk Management,*
- I propose questions that I believe it is essential are answered prior to decisions being made on planning and urban design matters
- Likelihood of an incident causing fatality in the land being considered is far greater than claimed, demonstrated by Australian and Industry data.
- Fatalities could occur beyond Major Hazard Facility boundaries
- Incidents can escalate: in the international ship and shore petrochemical industries there are significant numbers of minor and serious incidents involving tankers and petrochemical plants each year, demonstrating that incidents which can trigger catastrophic outcomes do occur relatively frequently.
- Factors contributing to incidents continue to exist despite best endeavours to remove them
- Potential exists for major incident in Williamstown

- The severity of consequences of a major incident is likely to become more catastrophic with increased building heights and density of building occupancy close to Point Gellibrand.
- Risk Controls in Planning Schemes should be in accordance with known good practice standards

2- **I believe I have suitable qualifications and experience to advise the FPPWMAC on these matters for the following reasons**:

3- I am a Master Mariner with an Australian "Master – Unlimited" Certificate of Competency.

4- For 12 years I worked in the Offshore Oil and Gas Industry involved in exploration, development and support for production of hydrocarbon resources. As well as routine work on ships, with oil rigs in Australia, the North Sea, Middle East and South East Asia in the Oil and Gas Industry, I have personally been involved in a number of emergency response campaigns including two to hydrocarbon fire incidents, one in Bass Strait Oil Filed in 1989 and one to a Gas Platform blow-out off India in 1999. I participated with the ship's crew and local fire authority in combating a grain fire on a bulk ship in Hobart in 1984 and have undertaken a number of ocean salvage and emergency response operations in Australia, Papua New Guinea and the Philippines.

5- As a Ship and Operations Manager for a major international shipping company (P&O) over 5 years I undertook various forms of training in safety, quality, contract and systems management. I developed risk management systems and facilitated safety training and management courses and I undertook incident investigations as well as ship audits and inspections for quality and safety compliance as part of the Company's risk management processes.

6- I have participated in various Victorian Ports and Government marine Risk Assessment Workshops and consultation processes, including the *Marine Emergency Framework Review* undertaken by the *Office of the Emergency Services Commissioner* in 2007.

7- For the last 10years I have been a Master of the tug boats in ports of Melbourne, Geelong and Hastings. Whilst providing routine towage assistance for ships, including tankers entering and leaving those ports, the tugs are also expected to be available 24 hours a day to provide the waterborne fire fighting and emergency response platforms for the Metropolitan Fire and Emergency Services Brigade (MFB) and Country Fire Authority (CFA). Regular emergency response preparedness training and exercises are a fundamental part of seagoing life.

8- At the end of this statement I provide further overview of my qualifications and career, including operational, management and industry representation experience that I consider to be relevant to this matter.

9- I have offered to provide advice to the FPPWMAC based on my qualifications and experience in the Maritime Industry.

10- In the following points I provide more detail and reasons for my belief of the matters listed in Point 1.

11- **HAZARDS AND RISK AROUND POINT GELLIBRAND:**

12- I believe serious risks to persons, property and environment exist at and around the Point Gellibrand site and that in low frequency / high consequence fire and explosion events the risks are far greater than those that may be claimed to exist near a simple tank farm / storage facility.

13- The greater risks exist in my view due to the combination of the Mobil tank farm along with the presence and activities of the tankers / ships visiting the Point Gellibrand Tanker Jetty loading and unloading hazardous hydrocarbon cargoes via pipelines and ship-to-shore connections.

14- The tankers that visit Pt. Gellibrand may be a source of serious risk through fire and or explosion themselves; they may also present a serious risk of escalation of a major fire or explosion incident that could occur at the tank farm, on the jetty or at ship to shore interface.

15- The Australian Department of Transport: *Code of Safe Working Practices for merchant Seamen* states: "*Tankers are at risk from fire or explosion arising from ignition of vapours from the cargo that may in some circumstances penetrate into any part of the ship"*

16- The Hazards that result from serious fire and explosion include over-pressurisation (shock waves), thermal radiation, toxic smoke and fumes.

17- For these reasons, it is normal for oil tanker jetties to be situated as far from townships and residential areas as port permits.

18- Further in this statement I give examples of incidents of fire and explosion on tankers, data detailing incidents on tankers internationally and some incidents that occurred on tankers in Australia I believe had very real potential to escalate into major explosions with possibly devastating effects to nearby areas ashore.

19- It is argued that the Risk associated with all these hazards will increase directly and unreasonably with any increase in building height and occupancy density levels of buildings in close proximity, and that the Advisory Committee cannot claim the risks are negligible, unforeseeable.

20- THE RISK TO WILLIAMSTOWN IS FORESEEABLE

21- In a report investigating a devastating series of explosions that caused tremendous damage to an oil storage depot in Buncefield, UK, the village of Buncefield itself as well as surrounding areas prepared by the Steel Construction Institute for the *UK Health and Safety Executive 2009*, titled *Buncefield Explosion Mechanism Phase 1,* it was stated that *"one important aspect of the incident was the severity of the explosion, would not have been anticipated in any major hazard assessment of the oil storage depot before the incident"*.

22- In a VCAT decision for Stephen Street, Sandbar Properties Pty Ltd v Maribyrnong CC (No 2) [2010] VCAT 678, (48) stated they thought it was *reasonable to conclude* that the area where the individual risk of fatality from potential incidents of 1 chance in 100,000 years would be contained within the site of the Yarraville Major Hazard Facility.

23- I believe such claims are misleading and unreasonable.

24- From their earliest seagoing training days, seafarer's are warned about the risks of catastrophic outcomes possible through fire and explosion of hazardous cargoes such as liquid and gaseous hydrocarbons, as well as from solid combustible materials in small particular form, such as grain dust. I recall as a Deck Officer Cadet in 1983 being shown photos of the 1976 incident involving the Crude Oil tanker "Sansiena" in Los Angeles, which exploded when hydrocarbon vapour accumulated in still air conditions around the ship and when ignited exploded. The massive explosion split the ship in two; large sections of the ship were

blasted into surrounding areas, an entire mid-ship deck weighing 2,500 tonnes section was blown off the ship landing on nearby land. Buildings in the immediate area were flattened; windows up to 25 miles away were blown out of buildings.

25- As Captain of a ship involved in combating a Gas Platform blow out in Indian waters, my ship was stationed some 1000metres away from a fireball that had diminished to about 40metres in diameter over the 2 months prior to our arrival onsite. The radiant heat could be clearly felt. Heat radiation diminishes as a square function of distance; as we moved closer the intensity of heat rose increasingly rapidly. We could not safely approach closer than 300 or 400 metres for any length of time without risk to ship and personnel.

26- In their presentation to the Port and Environs Planning Advisory Committee on the 22nd of September 2010, Mobil stated that an explosion which occurred at a chemical plant in Buncefield, UK, 11th of December 2005 "altered the perception of credible risk"

27- It is argued that the Advisory Committee cannot claim the risks are negligible or unforeseeable.

28- **PLANNING AUTHORITIES HAVE RESPONSIBILITY FOR SAFETY:**

29- Amongst the Objectives of the *Planning and Environment Act 1987 Section 4* is: *(1) (c) "to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria"*

30- I understand that *Planning Schemes*, under of the *Planning and Environment Act 1987, Part 2, Section 6, (1)(a) must seek to further the objectives of planning in Victoria;* and that a planning scheme may as appropriate under *Section 6, (2)(e) "regulate or prohibit any use or development in hazardous areas or in areas which are likely to become hazardous areas;"*

31- I believe therefore that responsibility to assess and control risks to safety that may arise as a result of the development of land in Victoria rests with Planning Authorities; the Planning Minister and Municipal Councils, as defined in the Act.

32- If this is not the case, then in relation to point Gellibrand and surrounding areas, including the former Port Phillip Woollen Mills site I believe the following question must be answered by the Advisory Committee: "If not Government Planning; who has the responsibility to ensure risk is not increased across other land or sea areas when a Planning decision is made or a Planning Scheme is amended"?

33- I ask this because from my knowledge of relevant International as well as National and State Marine legislation, including the *Victorian Marine Act*, the *Marine Safety Amendment Act*, the *Australian Navigation Act 1912* and *Australian Marine Orders*, I believe that no other Authority has a responsibility to ensure there is no increased risk brought about by off-site land based developments. The FPPWMAC should be aware that:

- Both Australian and foreign registered ships are regulated by their Flag State or (national Government Maritime Authority). The Master, Owner and Managers are primarily responsible for their condition and safe operation, but they rely on Ports Authorities to ensure the development of the port the ship enters is maintained in a safe and appropriate condition for the vessels they permit to enter.
- Port Authorities are responsible for ensuring their port infrastructure, waters, land areas and operations are maintained, managed and operated in safe and sustainable manner, however they are not responsible for the appropriateness or otherwise of developments on land not under their defined control

- The Lessor of the Port Authority land, Mobil at the Point Gellibrand MHF has a responsibility under the *Victorian Occupational Health and Safety Regulations 2007, Part 5.2- Major Hazard Facilities* to ensure risks to health and safety do not exist either on or off site, however to expect them to account for what could only be deemed at the time of their undertaking Risk Assessment for their Safety Case, a hypothetical high rise residential development right on the edge of a 300metre buffer zone designed primarily for protection of amenity from noise and pollution, would be extremely unreasonable.
- It is understood that Emergency Response Authorities, such as the MFB have responsibility to ensure commercial sites are developed in accordance with regulations; however they have no responsibility for Planning matters and risk management at the Planning Control stage.
- Similarly, it is understood WorkSafe Victoria can advise on such matters as the appropriateness of proposed developments, but have no authority or responsibility to control land development.
- Risks may combine and overlap the multiple areas of Ships, Sea, Major Hazard Facility, Public and Private land in areas such as Point Gellibrand and its surrounds, the control of Risk across those overlapping areas MUST in my opinion be driven from the start at the highest level of State and Local Planning.

34- The *Victorian OH&S Act 2004* provides relevant guidance in *Section 20: The Concept of Ensuring Health and Safety (1).* Considering the *Objectives* of the *Planning and Environment Act*, the *OH&S Act Division 5 – Duties of other persons,* I believe such duty of Care obligations extend to Planning Authorities and as such also this Advisory Committee. I believe the Advisory Committee should consider a risk assessment an essential part of their process to ensure they: are "adequately aware of risks", "know what they ought to know about those risks" and about "ways of removing or reducing them so far as possible" and advise the Minister and Municipal Council accordingly.

35- **PLANNING AUTHORITIES HAVE RESPONSIBILITY FOR PROTECTING PUBLIC UTILITIES**

36- Another Objective of the *Planning and Environment Act 1987 Section 4* is (1) *(e)" to protect public utilities and other assets and enable the provision and coordination of public utilities and other facilities for the benefit of the community;"*

37- The waters and land managed by the Port of Melbourne Corporation are Crown property. The development and operation of the port is essential state infrastructure. Should development of land close to the Port later be assessed as exposed to unreasonable risk, it is foreseeable there would be enormous pressure brought on Mobil to remove the tanks farm and for the port to cease tanker operations at Point Gellibrand.

38- As the tankers and tank farm form major and essential links in the supply chain of hydrocarbon products to Victoria, it is argued that the to permit the development of land near the site would be a breach by Planning Authorities of the Planning and Environment Act.

39- RISK ASSESSMENT IS REQUIRED

40- Risk can be defined as a product of the Likelihood of an event and the consequences should the event occur.

41- In order that it may be determined without reasonable question or doubt whether risk to health and safety would be increased by Planning and Urban Design factors and decisions, it is absolutely necessary that systematic assessment of risks be undertaken.

42- **NO ASESSMENT OF RISK HAS YET BEEN UNDERTAKEN.**

43- It is my belief that no proper assessment has been undertaken of risk that may arise through any change in height restrictions of buildings, increase in residential component of development or population density at or around Point Gellibrand.

44- Informal consultation I have had with Victoria Police, Metropolitan Fire and Emergency Services Board (MFB), WorkSafe Victoria Hazard Management Division, Port of Melbourne Authority and Mobil all confirm that no proper process has yet taken place to assess the risks that may arise, or be exacerbated by increased nearby building heights, or assess the risks that may specifically result from potential high rise, high density residential development such as currently being proposed in close proximity to Point Gellibrand MHF and tanker jetty.

45- It is my understanding that those parties do however hold belief that significant increased risk to health and safety will result from any high level, high occupancy density development on the site of the former Port Phillip Woollen Mills.

46- It is my understanding that both the Port of Melbourne Corporation and Mobil are required as part of their risk management processes to identify and assess risks, and remove or minimise any risks associated with their undertakings, however I believe neither of those parties could be expected to have undertaken any detailed risk assessment of potential high density / high rise residential development on their doorstep. It would be unreasonable for anyone to expect them to have risk assessed what in the past could only have been a quite hypothetical hazard scenario, beyond the boundaries for which they are legally directly responsible. My experience is such that I believe those parties would vigorously defend a position that they are not responsible for risks that increase through alterations to land use off-site permitted by Planning.

47- Review of publicly available documents such as the Mobil overview of the Safety Case for the Altona MHF including Point Gellibrand, as well as my involvement in Risk Assessment workshops and consultations held by various Victorian Port Authorities and the Office of the Emergency Services Commissioner in relation to marine emergency response would serve to also confirm this.

48- I am happy to disclose to the FPPWMAC Members names and details of persons I have "informally" consulted with, however elect not to disclose their names in this public document as consultation with such people and Authorities should be done in a full, transparent and robust manner during the formal risk assessment process where their input may be put on public record first hand.

49- **CONDUCT OF RISK ASSESSMENT**

50- Risk Assessment process should be undertaken in accordance with the Standard AS/*NZ ISO 31000:2009 Risk Management,*

51- Proper risk assessment includes the systematic activities of communicating, consulting, establishing context, identifying, analysing and deciding on appropriate Risk Controls risk with ALL stakeholders. Subsequently, there is evaluation, monitoring and review.

52- The Risk Assessment must take account appropriate compliance codes and guidelines, including those of Emergency Management Australia (Attorney General's Department) as well as established good industry / planning practices elsewhere in Australia and overseas.

53- It is essential that the Risk Assessment is thorough, robust and transparent.

54- It is essentials that Risk Assessment is undertaken with the involvement of representatives for all stakeholders, including: Industry, Government, Emergency Management Agencies, Emergency Service Organisations, Essential Services, Recover Agencies and importantly in this case Community Representatives & Organisations.

55- It is essential that both internal and external context is properly established, taking full account of all Stakeholders' concerns, including those of nearby Community.

56- **PROPOSED STARTING QUESTIONS FOR RISK ASSESSMENT**

57- In the absence of evidence of previous assessment of risks associated with changes to Planning and Urban design matters affecting the land being considered, I propose the following initial input to the Risk Assessment process:

58- What are the current and possible future uses for the Gellibrand MHF site, its current and possible future tanks and pipelines?

59- What products and quantities may be expected to be imported and / or exported at the site?

60- Is a major vapour cloud explosion, of Buncefield proportions possible now, or conceivably in the future?

61- If a major air/fuel-vapour cloud explosion occurred, what resultant pressure wave /over-pressure forces could be expected?

62- How would over-pressure incidents be affected by the presence of high level, possibly sheer sided buildings nearby?

63- What damage to existing or proposed buildings at various building heights and ranges could be predicted?

64- What flying debris could result?

65- What thermal radiation could occur with single or multiple tank fires?

66- What impact could the addition of pipeline rupture leading to fire on hydrocarbons around the site?

67- What impact could escalation of fire and or explosion of quantities onboard ships cause?

68- What specific emergency plans and resources are in place to deal with a major emergency?

69- What impact would result on community evacuation and incident site access to Emergency Response Services in the event of a major fire or explosion?

70- Is the current MFB – Shelter-in-doors policy appropriate?

71- What scientific reports are available answering the above questions?

72- Where is the evidence that Emergency Service Organisations and Emergency Management Team member have had full and complete detail of all of the above and are happy that high rise high density developments in close proximity would NOT unreasonably increase risk to persons and property.

73- LIKELIHOOD OF INCIDENT CAUSING FATALITY IS GREATER THAN ONE CHANCE IN TEN MILLION YEARS

74- I put to the FPPMAC that although devastating incidents occur with relatively low frequency, they are possible and many have occurred in recent years both ashore and at sea.

75- I believe the current WorkSafe Victoria - Inner Advisory Planning Area claims of risk of fatality occurring more than 300metres from a Major Hazard Facility being a less than one in 10 million years event should be drawn into question.

76- Comparatively minor and yet still serious incidents are relatively common both in Australia and internationally. Such incidents can escalate and are generally identified as being a cause or preliminary stage of subsequent catastrophic fires and explosions. The following are some International Oil and Gas Tanker Incident Data:

- From *Lloyds Register* (one of the world's largest ship Classification Societies) database of <u>*serious*</u> *Gas and Oil Tanker incidents:*
  - From 2000-2005 there were 106 Fire/Explosion incidents, or average 1.7 serious incidents per month. Some were total losses.
  - From 2007 to Oct 2010 there were 85 Fire/Explosion incidents, or an average of 1.8 serious incidents per month. Some were total losses.
- From *Riverlake Shipping Report: Intertanko* data from 2000 – 2006, there were 169 Fire / Explosion Incidents involving tankers.
- From the *Australian Transport Safety Bureau* reports*,* all vessel types, fire incidents investigated; From 1991 to January 2005 –there were a total 22 fires on ships in Australia
- At least 4 serious fires on Tankers in Australia since 1992 (*DoTARS*)

77- Incidents do not just occur at sea or in ports of poor standards, analysis of *Lloyds Register* data for incidents involving tankers during the years from 2000 to 2004 indicates, there were 547 total incidents, of which 286 occurred in port or port approaches: which is 52%.
Of these, a sample of "respected maritime nations" having incidents are as follows:

- Australia: 4, New Zealand: 5, United States: 57, Britain: 19, Europe and Scandinavia: 44, Japan: 26, Singapore: 14

78- It is of note that *Lloyds Register* is just one of five major Classification Societies internationally and there are a number of other smaller ones. All Societies would have incident numbers in addition to those recorded by Lloyds.

79- Again, in the *UK Health and Safety Executive 2009*, report *Buncefield Explosion Mechanism Phase 1,* by the Steel Construction Institute, investigating the explosion mechanism of the Buncefield tank farm explosion incident in 2005 a comparison was made with **eight international similar incidents of significance spanning only about twenty five years.**

80- **POSSIBLE INCIDENT CONSEQUENCES COULD INCLUDE MULTIPLE FATALITIES BEYONF MHF BOUNDARIES**:

81- Account should be taken by the FPPWMAC of consequences of some major incidents in the international petrochemical refining and transport industries ashore and at sea.

82- **Sansinena:** In December 1976, The Crude Oil tanker "Sansiena" had discharged crude oil Los Angeles; it was loading fuel and ballasting tanks when it exploded.

- It is believed displaced hydrocarbon vapour accumulated in still air conditions and when ignited exploded.
- The massive explosion split the ship in two, large sections of the ship were blasted into surrounding areas, an entire mid-ship deck weighing 2,500 tonnes section was blown off the ship landing on nearby land

- Buildings in the immediate area were flattened; windows up to 25 miles away were blown out.
- **6 onboard killed, 3 missing / dead, 46 people in surrounding area injured 9 severely**
- fire spread across the dock and around the ship

83- **Betelgeuse** - in 1979 a 121,432 Deadweight Tonnes (DWT) Crude oil tanker "Betelgeuse" (similar in size to those expected at Point Gellibrand) exploded in Bantry Bay, County Cork Ireland at the Whiddy Island Terminal. The Irish Examiner headlined: "When the fires of hell erupted into the night"

- **The explosion and resulting fire claimed 50 lives aboard and ashore.**
- Local residents reported the tanker was engulfed in a ball of fire moments later when oil spilled from the vessel and ignited, turning the sea into an inferno generating temperatures in excess of 1000degrees Celsius. The vessel split in two, the jetty collapsed, local residents fled for their lives.
- Fire fighters were unable to approach the vessel due to extreme heat; they concentrated their effort on preventing the fire spreading to the adjoining tank farm.
- It is reported that after about 12 hours the vessel eventually sank at her moorings which largely extinguished the fire, however rescue workers were not able to approach the wreck for a further two weeks due to the clouds of toxic and inflammable gas surrounding the wreck.
- Among the possible causes and contributing factors were believed to be contaminated ballast tanks, in which explosive gases can accumulate and if ignited explode, which in this case was believed to have been caused by the tearing of the ship's corroded and overstressed steel structure.

84- **Bow Mariner:** In February 2004: A Chemical and Oil Tanker of 39821 Deadweight Tonnes, "Bow Mariner" was carrying petroleum products when it caught fire and exploded off the coast of Florida, United States.

- The vessel was destroyed.
- **Of the 27 crew, only six survived, numbers reported killed varied between 21 and 24**
- The major blast was seen 18miles away
- The ignition source could not be ascertained but the cause was the ignition of a fuel air mixture either on deck or in the cargo tanks that was within the flammable limits.
- The crew were engaged in gas freeing and cleaning empty tanks.
- An inert gas system installed on the vessel was not in use.

85- **Tatuma:** In June 2006: An Oil Tanker of "Tatuma" was discharging petroleum products at the Ibafon Terminal in Lago when it exploded

- **24 crew reported killed**

86- **Noord Europa:** In June 2006, A Danish Oil Tanker "Noord Europa " was berthed at Harbour Junction Wharf, Motiva Facility, Rhode Island, Providence - Southeast New England, US. From the US Coastguard reports:

- Explosion and major fire occurred on the tanker terminal jetty with the tanker alongside discharging gasoline.

- Suspected but not confirmed; lightning strike caused damage to the ship/shore interface and pipelines, spilling fuel and igniting it. Gasoline spilled from the pipeline burned and subsequently the fire spread to the wharf, destroying it.
- Fire-fighters stated major catastrophe could have occurred if fire spread to the shore tank farm, but was averted because tanker was able to leave the berth "in a hurry" under its own power.
- It is generally not possible for most ships visiting Point Gellibrand to leave immediately under their own power without tugs due to the restricted waters around the jetty compared to Motiva facility.

87- **1997 - Explosion** at Visakhapatnam refinery, Hindustan Petroleum Corporation. Liquefied Petroleum Gas was released during a ship to shore transfer. A spreading vapour cloud ignited and caused a massive explosion which destroyed administration buildings ashore, LPG storage vessels, processing units and liquid petroleum storage terminal.

- **56 People were declared dead**, **the actual death toll was thought to be up to 3 times this.**

88- **Flixborough** - in June 1974, in Flixborough North Lincolnshire UK, a vapour cloud explosion occurred following a leak of flammable chemical called cyclohexane.

- **28 people in total were killed and 36 seriously injured.**
- 18 employees at the plant were killed, **it is claimed that had the blast occurred on a weekday, more than 500 plant employees would have been killed.**
- Around 1800 buildings within a mile radius were damaged, with destruction of properties in the village of Flixborough and two nearby villages kilometres away..
- Significant structural damage affected Southcorpe, eight miles way.

89- **Buncefield** – In December 2005, in Buncefield in the UK at the Hertfordshire Oil Storage Terminal, what is believed to have been a major conflagration caused by a series of explosions occurred. Initial explosions and fire led to eventual overwhelming of 20 large oil storage tanks.

- Explosions were heard 200km away
- The timing of the explosions, around 0600on a Sunday morning, meant nearby office blocks and school buildings were unoccupied, but several of these buildings were devastated with almost every window and door, front and back, blown in as the blast passed through them. Had the incidents occurred when the buildings been occupied it is believed there would have been many fatalities.
- An entire wall was blown off a warehouse 800m from the site

90- INCIDENTS CAN ESCALATE

91- Professor James T. Reason provided an analogy proposing Risk Controls are like slices of Swiss Cheese. The path of event from safety to catastrophic outcome in an incident is like an arrow passing through a number of Controls which are placed like walls or slices of Swiss Cheese between the initial event and the eventual outcome. Most Risk Controls or Swiss Cheese slices have holes in them, but they are not necessarily all aligned with each other, such that what one Control may miss another hopefully stops. It is proposed by Reason and can be demonstrated that the more risk controls that exist the greater the chance of mitigating more severe outcomes.

92- The following are incidents that occurred on tankers in Australia and I believe are relevant to the consideration of risk near to Point Gellibrand as had they happened and mitigation not occurred, worse, or catastrophic outcomes could be foreseen.

93- **Kirki**: In July 1991 in coastal waters off Western Australia, the entire forward / bow section of the Greek registered tanker Kirki literally fell off in heavy seas. The ship's structure had been severely weakened by undetected corrosion, the forepeak tank integrity was

compromised and it filled with water whilst the ship was steaming down the West Australian coast towards Kwinana with about 82,660 tonnes of light crude oil cargo onboard. The ship's forward structure failed completely due to the stresses of vessel movement and wave action, with the focsle section tearing completely away from the ship, exposing and damaging the bulkheads of the first crude oil tanks.

- Fire erupted at the front of the ship on the oil in the sea on no less than 6 occasions, caused it was believed by the tearing of metal and / or the presence of live electrical wiring. Fortunately due to the pounding wave action each of these fires were rapidly extinguished and did not escalate. Some 17000 tonnes of crude oil were lost into the sea, gushing uncontrollably out of the damaged forward oil tanks.
- Authorities at the time stated this incident could have happened in port during cargo work or had the ship collided with a wharf.

94- **Osco Star:** In December 1993 the Australian flag tanker Osco Star was loading petroleum products at the Geelong Shell refinery terminal. A tank pressure relief system valve failed to operate correctly causing a cargo tank to become over-pressurised as the tank was being filled. The vessel suffered severe structural damage with deformation and splits occurring in the steel bulkheads between cargo tanks, trunkways and ballast tanks. The major cause for the incident was equipment failure, with a pressure / vacuum valve failing to operate as required, however there had been a history of problems with the P/V system and both human and management systems failures contributed. The *Australian Transport Safety Advisory Bureau (ATSB) report, Marine Accident Investigation Report No. 60*, states:

- "*Over-pressurisation incidents on ships, particularly tankers, are not uncommon. On tankers such incidents have the potential to result in explosion, subsequent loss of life and pollution.*
- *On the 7th of November 1989, the Bermuda flag very large crude carrier, Mobil Petrel suffered major structural damage to cargo tank bulkheads when a tank was over-pressurised."*
  The report by the United kingdom's Marine Accident Investigation Branch (MAIB) noted that the Salvage Association's Casualty Information Retrieval System revealed that five such incidents had occurred in the years 1984 to 1998.
- The full ATSB report is available at: http://www.atsb.gov.au/publications/investigation_reports/1993/mair/mair60.aspx

95- **Osco Star:** On January 17th 1994, the same ship Osco Star suffered another over-pressurisation incident at Kwinana refinery in Western Australia. On that occasion was loading a combination of two grades of motor spirits and an aviation fuel for discharge at Sydney and Geelong. ATSB Report No.63 provides detail. http://www.atsb.gov.au/media/24916/mair63_001.pdf. Primary contributing factor for this incident was human error, probably exacerbated by fatigue, causing incorrect cargo loading procedures to be adopted and errors of calculations made at a critical time.

96- **Kinna**: In February 2007, An LPG Tanker, MT "Kinna" suffered an uncontrolled escape of Liquefied Petroleum Gas (LPG), whilst loading at the Esso Long Island Point tanker jetty. The leak was discovered and cargo transfer stopped before fire or explosion occurred and the vessel was removed from the terminal to anchorage in Westernport bay. Uncontrolled escape was then defined as a *Major Incident* by the *Victorian Major Hazard Regulations 2000*.

- After the incident it was discovered that large sections of major steel cargo transfer pipeline on Kinna were corroded in excess of 20% beyond minimum thickness permitted by design Classification Society and SOLAS (Safety of Life At Sea Convention) tanker design rules and standards. Such extensive corrosion does not occur over a short period of time and this incident demonstrates not all unsafe ships are able to be detected by Authorities or prevented from entering and operating in Australia by AMSA under Port State Control.
- It was discovered that about 180 metres of corroded cargo pipeline had been covered with "gaffa" tape and painted over to conceal the rust and damage.
- The following images were taken by local witnesses showing some of the replacement pipeline being loaded onto a barge for transport to Kinna whilst at anchor in Westernport Bay.

There were a number of such truck loads of pipe sent to Kinna, such was the scale of corrosion on the ship.

LPG Tanker – Kinna. Hastings 3/2007

Another "well maintained" tanker, similar to The "Bow Mariner" visiting Coode Island in Maribyrnong, Melbourne, in 2007.

97- **Laura D'Amato:** on 3 August 1999, the Italian flag 80,000 DWT motor tanker Laura D'Amato spilled an estimated 250 tonnes / 294,000 litres of light crude oil into Gore Bay, Sydney Harbour, Incorrect valve arrangements caused release of crude oil from the tanker into Sydney Harbour.

- It is of note that whilst an order for the tanker to cease pumping immediately was apparently issued at about6.25pm, the actual flow of oil into the harbour did not actually cease until between 6.45 and 6.48pm. (source: NSW Court Systems media comment)

98- **Lleyte Spirit**: On the 21st of August 2009, the Bahamian registered crude oil tanker Lleyte Spirit was discharging crude oil at the Mobil Gellibrand terminal. A rapidly developing severe squall of wind speeds up to 68knots passed over the terminal without prior warning being received by the ship or terminal. The severe winds cause the ship to break away from the berth, severing the cargo transfer connection with the wharf, luckily the cargo transfer was stopped about one minute prior to the incident so in that case only a reported 100 litres of crude spilt onto the ship and a further 40 litres reportedly entered the water. It is argued that:

- Had the incident occurred prior to the ship shutting down its pumping systems then the oil spilt would have been vastly more
- Had the squall been accompanied by lightning storm as was the case with the Noord Europa incident in the Motiva Facility incident in June 2006, serious fire could have resulted.

99- **FACTORS CONTRIBUTING TO INCIDENTS**

100- The most common factors deemed to contribute to incidents may broadly be categorised as, Human, Equipment or Environmental, they continue to exist despite Industry attempt to control them.

101- However, it is fair to say that in recent decades there has been very significant reduction in major pollution incidents from tankers.

102- Great improvements have come about through improved design criteria such as double-hulls and segregated ballast tanks, mandatory new management initiatives of the International Safety Management Code requiring safety management and certification in accordance with the "International Management Code for the Safe Operation of Ships and for Pollution Prevention". In addition there has been a quite massive increase in various voluntary inspection and auditing regimes such as SIRE (Ship Inspection Report) Programme through the Oil Companies International Forum (OCIMF), as well as individual company internal vessel inspection and suitability auditing. Of which it must be said all the Oil Majors, including Exxon Mobil are strong participants.

103- However despite the massive auditing and inspection of vessels, incidents such as those on the Kirki, Kinna and Osco Star described above continue to occur.

104- The Australian Maritime Safety Authority, through its "Port State Control" program monitors the standards of foreign ships and their crews that visit Australian ports. Ships are inspected for deficiencies in structure and equipment, management system as well as crew fatigue levels, knowledge, and emergency preparedness.

105- Ships may be detained and prevented from sailing for deficiencies that pose real threat to safety or environment. Information and data are available at: www.amso.gov.au/Shipping_Safety_Port_State_Control

106- From the 2009 Port State Control Report the following information is provided:

- A ten year summary of inspections, detentions and deficiency rates over the years 2000 to 2009 inclusive, shows that whilst the number of ship inspections has remained relatively constant, from 2926 inspections in 2000 rising about 10% higher to 2994 ship visits in 2009,
- Total annual detentions rose by almost 100% from 125 to 248.
- Detention rate rose progressively from 4.3% of visits in 2000 to 8.3% in 2009.

107- Around 3 to 4% of oil tankers inspected were detained, or about 5 to 6 tankers per year on average.

108- Review of reports for detentions from a period January 2005 to January 2007, shows that 10 tankers were detained for reasons of serious fire and emergency response equipment deficiencies that could, in my opinion result in the escalation and possible loss of control of fire onboard those ships. It is of note that 3 of those tankers were on charter to ExxonMobil visiting Melbourne.

109- **POTENTIAL FOR MAJOR INCIDENT**

110- It is stated in risk management concepts there is an incident pyramid. For example, for each 1000 near-miss incidents (with little or no consequence) there are say 100 incidents with moderate to serious consequences and eventually one major or catastrophic incident. The logic is that the contributing factors and sequences of events in the near-miss, minor and major incidents are usually the same, but events in a major or catastrophic incident continue through risk controls to a worse outcome.

111- It is intended that in providing the above information about some devastating incidents, some serious near misses as well as Australian Government and Classification Society data demonstrating minor incident still occur, and that hazards that may lead to serious incidents and escalation still exist, it is understood that it must be assumed catastrophic incidents are always possible. The Gellibrand area is no exception whenever hazardous cargoes are being handled there.

112- It must I believe be accepted that potential for major escalation exists, especially should the loss of containment / spillage of hydrocarbons occur as an accumulation of hydrocarbon vapour may result. If flammable or explosive limits are reached and a source of ignition is present, major incident will result. It is a fact that such contributing factors cannot be removed with guarantee. Whether such conditions exist on any random occasion are not necessarily the result of good management, rather they are often to a degree just a matter of luck, especially considering human and equipment failure factors.

113- **MAJOR INCIDENT CONSEQUENCES WILL INCREASE WITH BUILDING HEIGHT AND OCCUPANCY DENSITY LEVELS**

114- It is my opinion that should a fire and / or explosion incident occur at the Point Gellibrand MHF or Tanker terminal in Williamstown of magnitude similar to Bantry Bay Ireland in 1979, Flixborough North Lincolnshire UK in 1974, or Buncefield UK in 2005, the potential for complete devastation to any high rise residential buildings within at least 1000metres (or possibly 2 to 3 times that) along with large numbers of fatalities for persons within and around them would be an almost certainty.

115- RISK CONTROLS

116- In the recommended hierarchy of Risk Controls, it is stated (in WorkSafe approved OH&S Representative Training Course provided by "Enhance solutions") and generally accepted that "some controls are more effective than others and the various ways of controlling risks can be ranked from the highest level of protection and reliability to the lowest."

117- Eliminating the risk is the best, substituting a lower risk alternative follows and engineering safeguards into the design of something is ranked third in the list of options to provide a "Safe Place" for people and the environment.

118- Having administrative procedures in place and requiring use of personal protective equipment should be considered as last resort Risk Control options because they rely on the individual person to maintain safety.

119- A major risk management principal is that risk of an event can be removed or reduced by removing the hazards in the first place.

120- In the case of risk of major fire and or explosion as exists at Point Gellibrand and surrounds, I believe it would be negligent of Planning Authorities to accept anything other

than Elimination of the Risk by ensuring inappropriate development of the land within appropriate distances, such as high rise buildings, does not take place in the first place.

121- There are accepted Planning Standards in existence interstate in Australia, in respect of Buffer Zones for fuel importation and exportation activities. Such as the 1000m buffer zone recommendation under Western Australia's EPA document "Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) Separation Distances between Industrial and Sensitive Land Used No.3 June 2005" (see tables at: http://www.epa.wa.gov.au/docs/1840_GS3.pdf.) Fuel Importation / Fuel unloading from ships, storage and despatching / Impact RISK / 1000 m Buffer.

122- Other distances specified in those Guidelines of relevance to land in the vicinity of Point Gellibrand Mobil MHF, Oil Tankers, and Shipbuilding yards are: (a) Boat Building & Maintenance - 200- 500m; (b) Fuel Storage- 300 -500m; (c) Floating Rooves - 200 - 1000m.

123- All these distances are greater than the comparative WorkSafe Victoria recommended distances of inner and outer Buffer Zones around MHF of about 300m and 150m respectively.

124- Full and detailed research must be undertaken into industry and town planning accepted good practice elsewhere, in developing Victoria's Planning Schemes for such areas.

125- **RECOMMENDATIONS:**

126- I believe it is therefore quite simply unsafe for Planning to consider permitting high level multi storey buildings of any sort and in particular any high density residential buildings to be developed within areas of less than one thousand metres from Point Gellibrand tanker terminal and tank farm. Therefore I believe the Planning Advisory Committee should advise specifically against residential development at the FPPWM site, especially high level and / or high density residential development because it is land located in an area which is hazardous and may become more hazardous.

127- I believe that should Planning Authorities permit high rise buildings and high density residential occupancy to occur within 1000m of Point Gellibrand MHF and Tanker facilities, there would in time come inevitable and extreme pressure to end the import and export of hazardous cargoes through the area, placing industry, community and state interests at risk and this should be avoided.

128- I believe it is essential that prior to the FPPWMAC making any final recommendations regarding Planning and Urban Design matters at the Former Port Phillip Woollen Mill site, leading to Planning Schemes that define what may be appropriate for the site, a full Risk Assessment is undertaken in accordance *AS/NZ ISO 31000:2009 Risk Management Standard*.

129- As Planning Schemes *must*, under the Act, seek to secure a safe working, living and recreational environment for Victorians, I recommend and argue that it is at the Planning Scheme level that the legal framework for appropriate Risk Controls, such as appropriate height and building purpose and content, *must* be established. This should be a recommendation of the FPPWMAC.

130- In developing Risk Controls in Planning Schemes, Victoria should adopt good industry practice risk controls.

END OF STATEMENT – PERSONAL PROFILE FOLLOWS

Captain William Korevaar – Professional Profile

1- I commenced my seagoing career as a Cadet Deck Officer with the Australian National Line in 1983. I worked mostly in the Offshore Oil and Gas Industry but also in the Container trade, Bulk trade, Dredging, Bunkering, Harbour Towage and Salvage Industries.
2- I progressed through all ranks to Master and have in excess of 20 years of experience as captain of various vessels. I was first offered command of an ocean going vessel by Australian Offshore Services, an Australian subsidiary of P&O, the UK based Peninsular & Oriental Steam & Navigation Company, at the age of 28 and advised at the time I was one of the youngest Officers to be offered such a privilege by that internationally respected company.
3- I have served the last 10 years as Master on the Tugs servicing commercial ships entering and leaving the Victorian ports of Melbourne, Hastings and Geelong. These tugs also provide the major waterborne fire fighting support to the Victorian Emergency Services; MFESB (MFB) & CFA.
4- I am an elected Member of the Nautical Institute, a London based international organisation that exists to maintain and improve professional standards and knowledge of Masters.
5- I am a nationally elected Offshore Division Delegate of the Australian Maritime Officers Union, an organisation that serves to protect the professional and industrial interests of Deck Officers
6- I am a State elected qualified Health and Safety Representative for a designated workgroup of Victorian Tug Masters operating in the ports of Melbourne, Geelong and Hastings.

Professional qualifications considered relevant to this matter:

a. 2007 **Master - Unlimited STCW 1995 Certificate of Competency** Australian Maritime Safety Authority: A qualification that entitles the holder to command any size ship in all navigable waters, worldwide.
b. 2006 **Global Maritime Distress & Safety Systems** – revalidation
c. 2006 **STCW'95 Deck Officer Revalidation Course** – Australian Maritime College – (includes Advanced Fire Fighting – Command and Control)
d. 2001 **Master Class 1 - Unrestricted STCW 1995 Certificate of Competency** Australian Maritime Safety Authority
e. 2000 **Lead Auditor / Auditor Training Course in Quality Management Systems ISO 9000 Series** 5-Day IRCA Registered course by Ferriby Marine IRCA (International Register of Certified Auditors)
f. 2000 **Auditing Maritime Safety Management Systems ISM** 2-Day IRCA Registered training course by Ferriby Marine
g. 2000 **Helicopter Underwater Escape & Sea Survival Training** National Safety Council of Australia, N.T.
h. 1998 **Master Class 1 - Certificate of Competency** Australian Maritime Safety Authority Unrestricted - Offshore Industry Vessels
i. 1998 **Norwegian Qualification Document** Endorsement 1978, Deck Officer Class 1- Master Mariner
j. 1996 **P&O Emerging Managers Program** Maquarie Graduate School of Management Pty. Ltd.
k. 1995 **Safety Leaders Course** Esso Australia Ltd.

l. 1995 **Helicopter Underwater Escape & Sea Survival Training** National Safety Council of Australia, Vic.
m. **Internal Quality Auditing** Ferriby Marine Workshop: Relating to I.S.O. 9002 & the requirements of I.M.Os International Safety Management (I.S.M.) Code
n. **Carriage of Dangerous Goods by Sea** Australian Maritime Safety Authority
o. 1994 **Fundamentals of Contract and Change Management For Ship Construction, Repair and Design.** Fisher Maritime Transportation Counsellors Inc.
p. 1993 **Helicopter Underwater Escape & Sea Survival Training** Victorian Safety Council
q. 1993 **Train The Trainer** DRAKE Training
r. 1991 **Medical Training for Shipmasters Certificate**. (Master Class 1) Australian Maritime College. No.1055
s. 1991 **Advanced Fire Prevention and Control on Board Ship**. (Master Class 1) Australian Maritime College. No.1087
t. 1992 **Master Class 3 Trading Certificate of Competency** Marine Board of Victoria No.V-5859 Local-Knowledge Endorsements for ports of: Melbourne, Geelong, Port Phillip, Corner Inlet, Maribyrnong River & Yarra River
u. 1992 **Chief Mate Class 2 Certificate of Competency** Australian Maritime Safety Authority
v. 1989 **Master Class 4 Trading Certificate**. (Local Knowledge Endorsements as above) Marine Board of Victoria
w. 1988 **Second Mate Class 1 Certificate**. Australian Maritime Safety Authority.
x. 1987 **Master Class 5 Trading Certificate** (Local Knowledge Endorsements as above) Marine Board of Victoria
y. 1986 **Diploma of Applied Science (Nautical)** Australian Maritime College, Tasmania
z. 1983-1986:
    i. Proficiency in Survival Craft
    ii. Prevention and Control of Fires On Board Ship
    iii. Radar Observer
    iv. Restricted Operators Certificate of Proficiency in Radiotelephony.
    v. Certificate of Safety Training
    vi. First Aid at Sea

7- Operational experience considered relevant to this matter:

aa. 1998: I took delivery as Master of a new ship named "Lady Sandra"; a 16,000bhp, 190tonne bollard pull - Fire Fighting Ship - Anchor Handling Tug Supply (AHTS) vessel. At the time, Lady Sandra was one of the largest and most capable Offshore vessels in the world and was the flag-ship of P&O's international Offshore Industry fleet.
    i. Providing anchor handling, towage, cargo support and Safety / Emergency Standby services to Oil and Gas Industry offshore rigs in the North Sea, Middle East and South East Asia.
    ii. **Combat fire** – B-121 Gas Platform / well blow-out in Bombay high Oil Field, on charter to Cud Well Control: (competitor to the Red Adair Company). Photos follow.
    iii. Emergency assistance and preventative grounding of a sinking offshore support vessel, Malampaya Sound – Philippines

Lady Sandra – Fire Fighting systems

Lady Sandra: in perspective, Haugesund, Norway

B-121 Gas Platform blow-out: 40 metre diameter fire-ball. Radiant heat felt at combat location 1 km distant.

Note entire upper structure destroyed and helicopter landing pad molten and sagged.

bb. Master: Lady Elaine – Fire Fighting Ship- F1 / Anchor Handling Tug Supply Ship, providing anchor handling, towage, cargo support and Safety / Emergency Standby services to oil rigs in Australia and South East Asia

cc. Master: Lady Lorraine – Fire Fighting Ship- FiFi 1/2 Anchor Handling Tug Supply Ship providing anchor handling, towage, cargo support and Safety / Emergency Standby services to oil rigs in Australia

dd. 1990 Second Officer Senorita - Fire Fighting Ship- FiFi2 / Anchor Handling Tug Supply Ship -

   i. Attended oil rig fire in Bass Strait oil and gas production platform : 4 in total Fire Fighting ships attended on emergency best speed basis and requested to standby with all fire fighting appliances ready, up-wind of platform

ee. 1989- 2000: Various capacities as 2nd Officer, Chief Officer and Master on various Offshore Oil and Gas industry support and specialist ships, undertaking statutory monthly drills and training as well as crew development exercises in emergency response and fire fighting with Oil Rigs and other industry vessels and facilities.

ff. 1985 – As Cadet on Australian registered 30,000tonne - self discharging bulk ship River Torrens, berthed in Salamanca Hobart Tasmania, was involved in combat of a smouldering grain fire in the cargo discharge system adjacent highly explosive grain dust filled empty cargo hold. Extinguished fire and boundary cooled cargo hold structure with assistance of shore based fire fighters.

gg. Various salvage and emergency assistance operations on tugs:

   i. Master, tug Keera, salvage / refloat Indian registered bulk ship Devprayag grounded off Portland in severe weather.
   ii. Assisted Salvage Officer during refloating of fishing vessel in Papua New Guinea
   iii. Master, assisting various emergencies calls in port of Melbourne and Port Phillip bay / Bass Strait

hh. 1983 – Current: Monthly onboard fire and emergency drills and training exercises as both participant and controller through the ranks from Cadet, 2nd Officer, Chief Officer and Master.

8- Management and Industry representation experience considered relevant to this matter

ii. 2006 to current: AMOU representative to Port Authorities and Government during Marine Emergency risk assessments and the "Victorian Marine Emergency Framework Review 2007" conducted by the Office of the Emergency Services Commissioner.

jj. 1998 – 1999 Master of MV. Lady Sandra – developed and implemented onboard Safety Management Systems that were audited and certified by Lloyd's Register under the requirements of the International Maritime Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code)

kk. 1997 Appointed as Owners Representative (deputy) to the Marine Council (Australian Federal Minister of Transport Advisory Council, Navigation Act 1912)

ll. 1994 – 1997 Ship Manager - Australian Offshore Services / P&O Maritime Services

mm. 1993 – 1997 Offshore Oil and Gas Industry Representative for Support Vessel Operators to Professional / Industrial liaison Bodies including:
    i. Australian Petroleum Producers and Exploration Association (APPEA)
    ii. AMSA Marine Operations Safety Advisory Group (MOPSAG) reporting to the Federal Minister of Transport
    iii. Australian Shipowners Association (ASA)
    iv. National Maritime Industry Training Committee Ltd. (NMITC)

nn. 1995 Appointed to the Board of Directors of the National Transport and Distribution Industry Training Advisory Board (T&D ITAB)

oo. 1994 Appointed to the Board of Directors of the National Maritime Industry Training Committee Ltd. (NMITC)

pp. 1993 Commenced as Assistant Operations Manager - Australian Offshore Services / P&O Maritime Services

qq. 1993 – 1997 As a Manager with P&O I assisted develop management systems that brought Australian Offshore Services accreditation under both ISO9001 Quality Assurance and ISM with Lloyds Register. AOS was the first Offshore Vessel Industry operator in the world to voluntarily attain such accreditations. Practical Safety Management Systems I played a key role in developing included Job Safety Analysis, Toolbox Meetings, Incident Reporting and Investigation systems to industry leading standards / audited by Esso Australia / Exxon Mobil / BHPP etc.

rr. 1993 – 1997 On behalf P&O, undertook numerous ship suitability and management system audits, vessel inspections and incident investigations throughout Australia, as well PNG, Asia, Europe and the UK.

ss. 1999 – Current - Operations and Safety Management Systems design, development and review. Implementation and auditing of, as well as training of personnel in, Safety Environment and Planned Maintenance Management Systems.

Declaration: "I have made all the enquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel"

Signed

Captain William T. Korevaar