

TO: Secretary of the Board
National Energy Board, 444 Seventh Ave SW, Calgary AB T2P0X8

FROM: Jack Gin, PEng

RE: Trans Mountain Expansion Project – Letter of Comment
Filing Id A58229 - Trans Mountain Pipeline Hearing
NEB submittal TransMountain pipeline v6

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Table:

1. Background on Jack Gin
2. Preamble
3. Risk of pipeline damage in dense urban areas
4. Risk of holding tank catastrophe in dense urban areas
5. Risk of oil tanker catastrophe in congested marine environments
6. Liability and authoritative duty of care
7. Alternative considerations

Appendix A – Photo Summary

Appendix B – All the Oil – a Security Nightmare in Vancouver

Appendix C – TransMountain Pipeline Expansion Fatally Flawed

Appendix D – TMTF Tactical Risk Analysis – Burnaby Fire Department

1. Background on Jack Gin

J.M. (Jack) Gin, PEng, is professional (civil) engineer, corporate director, and a retired export-business entrepreneur. He is a long-time resident of Burnaby (since 1975), born in Vancouver, and is a graduate of the University of British Columbia (UBC APSC 1983). A company he founded in 1997 called Extreme CCTV Inc. immersed Jack Gin in the global security industry as he became an expert on surveillance and a speaker at international security conventions. Extreme CCTV was acquired by Bosch gmbh in 2008, and Jack Gin subsequently became more involved in the local community, giving his time as an entrepreneur-in-residence at Simon Fraser University, as a corporate director of startup technology companies, as a philanthropist, and as a volunteer.

Early in his career, Jack Gin worked as a junior design engineer at the Chevron oil refinery located on Penzance Drive in Burnaby. While he has travelled extensively around the world, he now prefers to stay close to his homes in Burnaby and Whistler and contribute to his communities that he resides in. He is a member of Burnaby's Environmental Sustainability Strategy Steering Committee. He is a recent graduate of the Institute of Corporate Directors (ICD) DEP 8 program.

Disclaimer ... The following written work below is the opinion of the writer and is based on data believed to be true but gathered from various sources which have not been thoroughly investigated for accuracy. The material provided is offered as an opinion for review and

consideration by the NEB. Jack Gin is retired and does not receive any income from any of the parties written about. He has no political affiliation. He does not knowingly own any shares in the companies mentioned. There is no intention to cause any material harm to any of the people or organizations mentioned. The purpose of this writing stems from his concern for the security and safety of people living in his greater community.

An article written by Jack Gin, titled “All the Oil – a Security Nightmare in Vancouver” was NOT released due to security concerns. It is attached as an Appendix B for the NEB to read.

2. Preamble

Burnaby's population density is growing at an unprecedented rate. The “great financial crash” of 2008 only had a nominal effect on the real estate market in Burnaby and the Vancouver area, as the population continued to grow. Since 2013, the growth has accelerated. Residential towers as high as 75 stories are now approved for construction near the pipeline terminal and holding tank farm. New bridges and highways and rapid transit have recently been completed to make it much more efficient to move a lot of people and goods through what is the center of the greater Vancouver region.

To get to Vancouver, commuters from Coquitlam, Port Coquitlam, Port Moody, Pitt Meadows, Maple Ridge, Surrey, Langley, Clearbrook, Sumas and Abbotsford go through Burnaby. All of these suburban municipalities are also growing in population.

Demand for housing in Burnaby is driving its increase in density, yet parkland has been maintained at 25% of the city's area, with even more open space being created below new tall towers to make for more liveable, breathable, open environments. The densification of this city is happening under this balance of environmental stewardship and social planning.

And while Burnaby has been transforming itself into a densely populated, modern, environmentally balanced place to live and work, it seems there has always been a refinery and holding tank facility at its north end facing Burrard Inlet and nestled on the side of Burnaby Mountain. This energy infrastructure facility was approved and built decades ago when Burnaby was a fraction of what it is today, well before a major university was built above it, and well before all of the surrounding available land was subdivided into homes, schools and business properties.

So while one could argue that the refinery came first, the reality is that a lot has changed since the refinery was established at this once remote location outside of Vancouver, and it is now in the very heart of Greater Vancouver. ***NEB Directors are of course expected to address the realities of today and the expected reality ahead.***

As an engineer and businessman, I am not opposed to the export of Canadian oil overseas, and am not opposed to pipelines in general. I know that transport by pipeline is a relatively safe way to move this volatile liquid export good. But it does not make sense to me to expand this pipeline and this operation at this Burnaby location. If the authorities having jurisdiction and responsibility were to pick a place to locate a pipeline terminal on the west coast of Canada, it

would very likely not pick today's Burnaby for safety, security and liability reasons alone. As a professional engineer, a former security advisor, a father and a citizen, I raise a few of many alarming points that ought to be addressed.

3. Human density will cause human error

A rapidly growing, changing and healthy city expects and desires a lot of construction activity. Human error has been blamed as the cause the last time a Kinder Morgan pipe was broken during construction activity in Burnaby. The damage to homes was significant. The damage to the ocean and other environments was significant. All parties and stakeholders involved pointed their blame-fingers at others for inaccurate data and miscommunication. I understand that Kinder Morgan has paid a penalty for being considered partially at fault.

The confluence of urban density and pipelines do not mix well, and failures caused by human error will most certainly happen again.

Appendix A. Photo 1. KM pipeline rupture in Burnaby. All parties pointed their blame-fingers at others for inaccurate data and miscommunication. Human error ultimately took the blame, and Kinder Morgan was required to pay a partial fine for the damage.



This risk of failure caused by human error will play out in every municipality that is growing rapidly with embedded pipelines under its streets. To state the obvious, increasing human density and activity on or around pipelines, increases the likelihood of human error.

Throughout history, human error has been a most reliable cause of infrastructure failure. Expanding the oil tank farm and its marine terminal in this densely populated location that is rapidly growing and transforming, raises the opportunity for more failures by human error.

4. Risk of holding tank catastrophe in dense urban areas

The general public is not aware that the holding tanks nestled on the side of Burnaby Mountain are proposed to increase in number by 100% and volume by 350% - from a current 1.6 million barrels to a target 5.6 million barrels of holding tanks. Without increasing the overall acreage of the tank farm, the densification will mean a precarious volume of much taller tanks that could literally flow down on an unsuspecting population in an uncontrollable fire.

Appendix A. Photo 2. The oil tank farm on Burnaby Mountain is unusually located on a hill, about 100 meters above residences. The only two access roads straddle this tank farm. Burnaby's Fire Chief has raised the concern that an oil tank fire here would likely require road closures due to toxic smoke that could engulf and trap the university community above.



The proposed taller and denser tank farm on Burnaby Mountain puts residents and (SFU) students at far greater risk. And while Kinder Morgan can claim that they have never had a tank fire in 60 years at this location, Canada must consider the fact that terrorist attack has never been more likely on its population. As of September 5, 2014, Canada has joined the USA and other allies against the threat posed by the Islamic State in Iraq and Levant (ISIL). Never in the

history of Canada, have globally-connected terrorists had the ability to live and hide among its population.

This security issue at the Kinder Morgan tank farm has not been addressed. It is probable that Kinder Morgan does not consider a terrorist attack, a relevant concern to their operations since it cannot be predicted with certainty, nor does it appear that they consider it their responsibility to protect their facilities from terrorist attack. Certainly today, the current tank farm is utterly exposed. Yet, for those in the business of terror, energy infrastructure in dense populated areas are prime targets especially if there is a combination of low security and high population. Kinder Morgan would absolve itself of any responsibility for damage and death in the event of a terrorist attack. ***But the directors of the NEB and the government of Canada cannot absolve itself of responsibility if they were to approve the construction of such a lethal situation.***

In the 2013 - 2014 case of the Lac-Megantic disaster in Quebec, criminal negligence charges on the rail operators may now be dropped as a Transportation Safety Board summary has concluded that the industry has allowed a “weak safety culture”, that authorities having jurisdiction have had poor oversight in the industry, and that a criminal negligence conviction that requires evidence of a “wanton and reckless disregard” for public safety may be pointed at others beyond the employee operators of the runaway train.

Appendix A. Photo 3. STEEP CONCERNS - in a photo taken at 3:30 pm on Saturday Sept 6, 2014, the writer was able to park his vehicle near a fence undetected and stay for 15 minutes without seeing anyone on either side of this single, low height fence. Several photos were taken near and at the fence. While the writer did not trespass over the fence-line, he did not see any surveillance cameras, nor did he trigger any sensors while getting within close range of the tanks.



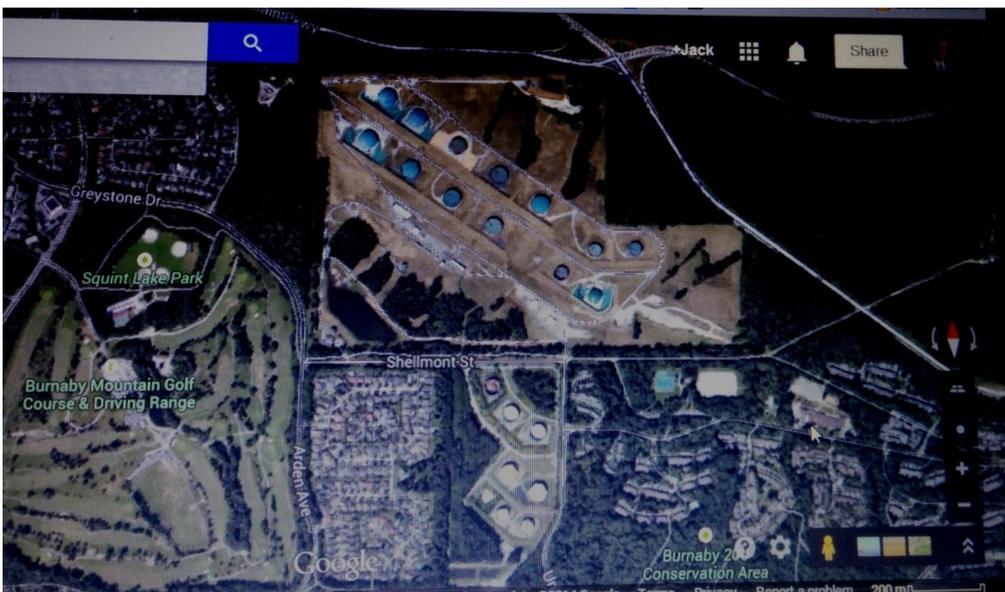
Appendix A. Photo 4. Perched on the side of Burnaby Mountain. A disaster here would wreak havoc to residents below and students trapped at SFU above. Toxic fumes from a fire would cause closures to the only roads to SFU. Densifying the number of tanks while increasing the height of each by 50% raises the risk of an uncontrollable inferno on this hill.



Doubling the density of the tank farm and increasing the height of each tank by 50% raises doubt that a rupture could be stopped by the containment berms that can be seen at the downhill end of each tank.

All of these holding tanks are located on a slope facing southwest, above residences, schools and industrial buildings. The grade continues to fall through dense residential areas until it flattens out at Burnaby Lake to the south.

Appendix A. Photo 5. Unusually built on a hill, the 13 oil tanks were designed some 60 years ago.



Appendix A. Photo 6. The proposed expansion utilizes all the space on its same footprint while increasing the height of each tank by 50%. The public has been told that the tanks are to double in number, yet the reality is that the volume of flammable oil is to increase by 350%.



A pond at the lowest end of the tank farm likely serves as a water reservoir to be pumped uphill should a fire occur. This pond naturally exits into Eagle Creek. Should a catastrophic, multiple tank rupture occur and the containment berms prove inadequate, this pond would become contaminated. And given the likelihood of a fire and more explosive tank ruptures, the devastation would amplify unabated downstream.

Eagle Creek is considered one of the most important natural waterways in Burnaby that feeds into Burnaby Lake. "Streamkeepers" have worked for decades to protect and improve the creek which is now home to spawning salmon. [http://en.wikipedia.org/wiki/Eagle_Creek_\(Burnaby\)](http://en.wikipedia.org/wiki/Eagle_Creek_(Burnaby))

Of course, there are volunteer Streamkeepers now caring for the environment on every stream in Burnaby, many of which feed into Burnaby Lake, which exits into the Brunette River which then exits into the Fraser River, which of course sustains one of the most important fishery in Canada and is the largest salmon producing river in the world.

Immediately above the tank farm is the campus and residences of Simon Fraser University (SFU). The only two roads that exit SFU run alongside the tank farm. So in the event of a catastrophic

fire, the roads would be closed, and the caustic plume of smoke would engulf thousands of students and residents above it.

Canada has recently experienced a catastrophic event with a large number of petroleum tank cars that rolled into the town of Lac-Mégantic. There the combustible material in 74 freight tanks crashed into the town via a runaway rail. Much of the town was destroyed. More than 30 buildings representing half of the town's buildings were destroyed, and some 47 people perished. The blast radius from the fire was more than 1 kilometre. The courts sought prosecution of the train operators while the company that operated the rail service declared bankruptcy. The company is gone, and the government is pointing fingers at the train operators, while defense lawyers are citing the government for negligence. The tragedy of Lac-Mégantic remains in a legal quagmire, while the victims are left with their deep loss.

Upon their review, Transportation Safety Board (TSB), made the following statement, "the derailment, subsequent explosions, and fire were the result of factors that included "a weak safety culture" at MMA. The company did not have a sufficient safety management system in place and so was unprepared to manage known risks, or identify and address new concerns."

At the Burnaby Mountain tank farm, safety management or "operational safety" is not the primary concern. It is security and the risks associated with a terrorist attack that has not been addressed.

Kinder Morgan does not have a sufficient security management system in place and is unprepared to manage the terrorist risk which is a new concern. Advising citizens that they have been operating safely for 60 years is irrelevant to this new concern.

Times have changed. Hazardous and flammable materials should not be located in or rolled by residential communities, especially when the volumes can cause death and destruction well beyond its own facilities. Furthermore, the greater the risk of collateral damage, the more likely the facility would be a target for terrorists.

Recent events:

2009 Sep 23 – Puerto Rico – Catano Oil Tank farm fire – 10 oil tanks

2013 Jul 6 – Lac Mégantic Quebec – Crude oil train derailment and fire – 74 tank cars

2015 Mar 7 – Gogama Ontario – Crude oil train derailment and fire – 94 tank cars

2015 Aug 12 – Tianjin China – Chemical storage facility

Most Canadians have not heard of the Gogama train derailment. The Gogama derailment occurred in a remote location. The fire was contained. Toxins were released into the air. And oil polluted the adjacent river. No lives were lost. No significant collateral damage occurred.

At Lac Mégantic, the train derailment was a national disaster. No one had considered the possible effect of 74 freight cars loaded with flammable oil beside a town center.

How much energy is there in 74 oil freight cars?

A barrel of oil equivalent (BOE), is a unit of energy based on 42 US Gallons or 159 Litres.

1 barrel of crude oil = 5.8 million BTU = 6.1 GJ (giga-joules) of energy.

In Canada, freight cars are typically known as CTC-111A which have a capacity of 131000 litres or 824 barrels.

So 74 freight cars x 824 barrels / car x 6.1 GJ/barrel = 371,908 GJ = 372 TJ (terra-joules)

So roughly 61,000 barrels of crude oil, caused the destruction of 30 buildings, the contamination and subsequent destruction of 36 other buildings and the lives of 47 citizens.

The aftermath of two train wrecks:

Gogama:

- Number of tank cars: 94
- Number of lives lost: zero
- Number of buildings destroyed: zero
- Number of business destroyed: zero

Lac Megantic:

- Number of tank cars: 74
- Number of lives lost: 47
- Number of buildings destroyed: 66
- Number of business destroyed: numerous

The Gogama train comprised of new rail cars that met newer standards for safety as recommended by the Transportation Safety Board (TSB) subsequent to the Lac Megantic disaster. Yet the TSB has now noted that the new standard rail cars would not have made a difference in the level of destruction that occurred.

The point to note here is that danger and potential disaster has much more to do with location than with safety standards. In other words, extreme danger is best kept away from people rather than managed near people.

Today (Aug 15, 2015) in Tianjin China, this is unfortunately understood now, after its disaster at a chemical storage facility in close proximity to residences.

What would be the possible effect of millions of barrels of crude oil above a residential community? For Burnaby Mountain, the proposed Kinder Morgan expansion calls for 5.6 million barrels.

5,600,000 barrels x 6.1 GJ/barrel = 34,160,000 GJ = 34,160 TJ

This is roughly 90 times the amount of energy that rolled into Lac Megantic.

Of course, the situation in Burnaby may appear very different since the holding tanks are designed to be structurally sound and earthquake resistant and cannot roll away on rails. However, the fuel in each holding tank has inherent potential energy by virtue of their elevated location. One tank rupture coincident with a fire could cause a chain reaction and an

unstoppable firestorm from consecutive tank fires. The volume of fuel would be far greater than that in Lac-Megantic and it might flow downhill faster than that of a rolling rail car?

To fathom what thousands of terra-joules of burning oil looks like, one can view the videos of the Catano oil tank fire of 2009.

<https://www.youtube.com/watch?v=vFtB0lxXTb0>

In Tianjin, the death toll has surpassed 100, and the world has received photos of the destruction that occurred, while it asks how authorities there could allow that much volume of hazardous material be stored beside a dense residential area. Yet, here, we ask the same question for the Burnaby Mountain Tank Farm?

Kinder Morgan is asking the NEB to approve the storage of 5.6 million barrels of oil above a residential community. The amount of this possibly destructive energy equates to 90 times that which destroyed Lac Megantic.

The fireball in Tianjin has all the appearances of a boil-over event where a combination of burning fuel and trapped water reaches a vaporization point that instantly expands 1700 times. Both Kinder Morgan and the Fire Department of Burnaby describe the possibilities of a boil-over event at the Burnaby Mountain Tank Farm. While the two organizations disagree on the amount of destruction that this would cause, the NEB must understand that there is real potential for a massive catastrophic event.

Burnaby's Deputy Fire Chief Chris Bowcock describes the possible boil-over event in his May 2015 report which I have attached as an Appendix D item. It is recommended that the directors of the NEB read pages 59 to 65 of this report to appreciate the anticipated burden of the fire responders should a fire occur on the Burnaby Mountain Tank Farm.

Yet, to add further burden, it appears that both Kinder Morgan and the Burnaby Fire Department have not contemplated mode of failure by terrorist attack. Given the ease of access and ability to hide in an urban setting, a terrorist attack could very well be by an IED (improvised explosive device). Various modes of failure not previously contemplated in tank design should now be addressed if citizens are to be in harm's way.

To ignore the possibility of terrorist attack given today's global reality, could be considered a wanton disregard for the safety and security of the general public. Whereas Kinder Morgan reminds us of their safety record for the past, the NEB must consider the security threats of today and the future.

British Columbians must not believe that terrorist attacks would not occur here.

2013 Jul - An unsuccessful attempt to ignite ied pressure cooker bombs at the grounds of the BC provincial legislature buildings at a time when there was to be a maximum number of citizens on a holiday weekend.

2014 Oct – a “lone wolf” attack on Parliament Hill on Ottawa kills a Canadian soldier on ceremonial sentry duty.

2015 Jul 15 – Marseilles France – Petro-Chemical tanks bombed by terrorists

2015 Aug 12 – UK on high alert for terror threat due to returning ISIS fighters

2015 Aug 14 – Hamza (son of Osama) Bin Laden calls on jihadist to attack the West.

NEB directors should ask what might prevent this scenario from becoming a very far and wide catastrophe on Burnaby Mountain. Most tank farms are built on level grade on low lying areas away from residential communities. Google-search “oil tank farm” for images and you will see all tank farms on flat remote locations without any signs of residential communities.

It is most unusual to see an oil tank farm on a hill above populated areas. This just makes sense for safety reasons. But if you add in the concern for security at a time in history when Canada (and the USA) are involved in a war on terrorists who may hold Canadian and USA passports, no responsible professional would approve of a new oil tank farm on a slope so near schools and residences.

Yet oil tank farms have been known to ignite on their own. In Puerto Rico, a malfunctioning oil fuel gauge caused the start of a fire at the Catano oil refinery tank farm in 2009. The closest 10 other large oil tanks subsequently caught fire as well, and it took two days for the fires to extinguish.

That site of course, was flat ... and the fire stopped once the fuel burned itself out. Firefighters used seawater to keep other tanks cool. In that disaster, the owners (Caribbean Petroleum Company) filed bankruptcy, resulting in another legal quagmire for civic and federal authorities to wade through. http://en.wikipedia.org/wiki/2009_Catano_oil_refinery_fire

Appendix A. Photo 7. Fire at the Catano oil refinery tank farm started as a small fire in one tank that quickly spread to 9 other tanks. Caustic smoke affected the neighbouring township, while the owner operator declared bankruptcy. No lives were lost thanks to its manageable flat terrain and its distance away from people.



For Burnaby Mountain, it would be prudent to **consider eliminating or relocating the current** tank farm. In the short term, security should be improved, and expansion plans put on hold.

In the UK, where I was involved with security for 15 years as the CEO of a surveillance company that served Mi5 among other public and private agencies, a double perimeter chain link fence would be expected in this type of critical infrastructure location. Between fence lines, there would be a no-man zone and this zone would be covered 100% with sensors and day and night vision surveillance with 24/7 central monitoring.

Energy infrastructure sites are common targets in war times. In July 2014, Israel bombed the only oil refinery and holding tank facility in the Gaza Strip. By late 2014, a coalition force that includes Canada had bombed or disabled several oil refineries controlled by ISIS. And it is well known that ISIS jihadist terrorists consider this a time of war citing Canada among its enemies. And while security fencing and electronic sensing would ensure early detection of intruders, it is also believed that ISIS has the intelligence and money to operate airborne drones which are designed to operate undetected by conventional sensors.

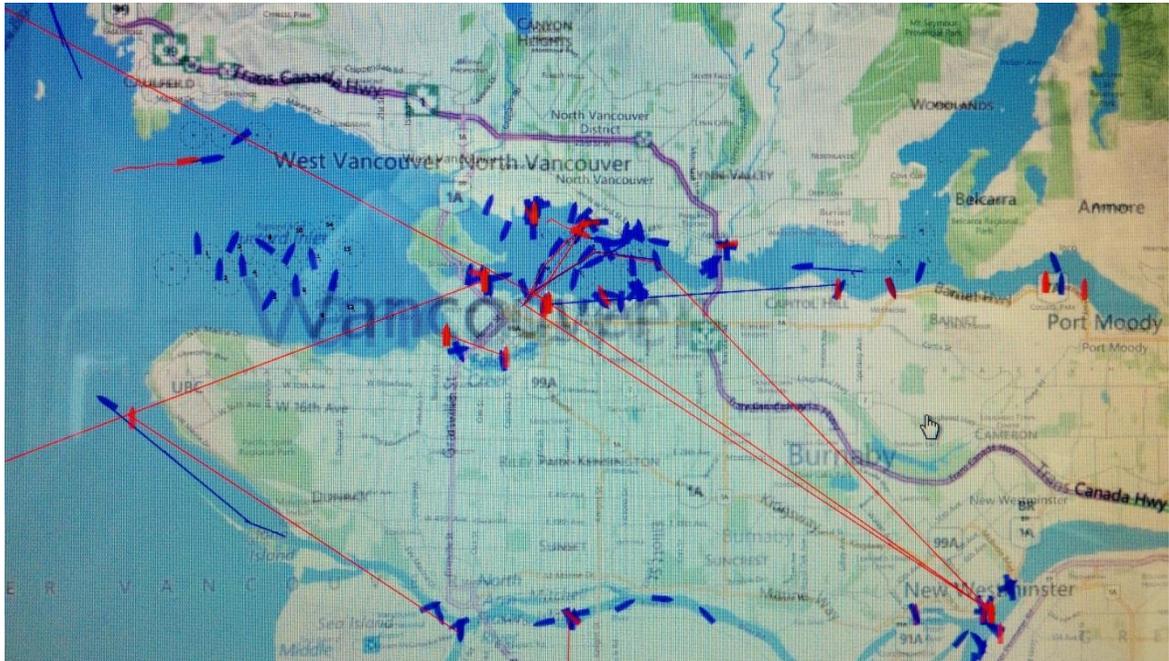
At Burnaby Mountain, the tank farm may already be a soft target for terrorist attack. Should the NEB approve of increasing the density by 100% and volume by 350% to 5.6 million barrels of potentially deadly fuel, they will be making this target all the more attractive to those with terrorist intentions.

5. Risk of oil tanker catastrophe in congested marine environments

The terminus of the proposed pipeline is at the Westridge facility in north Burnaby near the east end of Burrard Inlet. Tanker ships would have to travel past Stanley Park, under the Lions Gate Bridge, past a large (flammable) sulphur terminal, past two major cruise ship terminals, past Vancouver's major container handling terminal, past a large (flammable) coal terminal, under the Second Narrows Bridge and under a rail lift bridge. In addition to container ships and cruise ships and the Seabus transit vessel, there can be several pleasure craft and tourist tour vessels in this inlet water channel at any time. There are also seaplanes and helicopters that navigate and land on this harbour.

Over the extent of this inlet, it would be virtually impossible to secure.

Appendix A. Photo 8. A screenshot from the Vancouver Port Authority taken on 2014 Sept 9th, shows all the vessels in Burrard Inlet on a typical weekday morning. An Aframax oil tanker requires multiple tugboats and an escort captain to navigate almost the entire length of Burrard Inlet. Canada's Coast Guard regards the waters in the second narrows as Canada's highest navigational hazard.



Kinder Morgan proposes to increase the number of tanker ships by 700% from a current average of about one per week to about one per day. The type of tanker ship proposed is called the Aframax which is about 34 meters wide and 245 meters long. This is longer than the tallest building in Vancouver, yet this vessel is considered small compared to the largest oil tankers in the world. Why would Kinder Morgan propose a less than maximum size tanker? Because the narrow Burrard Inlet cannot support any ship larger.

In fact, the Aframax, which has a capacity of 750,000 barrels of crude oil must be loaded to less than 80% of capacity because of draft restrictions under the Second Narrows Bridge. Not only is the Burrard Inlet narrow, its waters are shallow. Further requirements that tankers only be allowed into Burrard Inlet in the daytime at high tide are indicative of the tight tolerances apparent and the skill needed to move each tanker through the harbour.

Appendix A. Photo 9. An AFRAMax tanker is 245 meters long, 34 meters wide, and a draft of 13.5 meters depending on load. Because of their huge mass, AFRAMax tankers have a large inertia, making them very difficult to steer. A loaded tanker could take a few kilometers and several minutes to come to a full stop. Multiple tugboats are required to assist this tanker through the narrow Burrard Inlet.



It must be noted, that the Second Narrows “Ironworkers” Bridge is not the lowest or smallest bridge. The Second Narrows Rail Bridge is a lift bridge remotely operated by CN Rail. A tower on this bridge was struck by a vessel as recently as Aug 2014. On a foggy day in 1978, a Japanese freighter, 1/5th the size of today’s freighters, struck this bridge tower and knocked the bridge out of service.

Appendix A. Photo 10. Photo: The CN Rail Bridge is remotely operated to serve a regular rail service. It adds to a lot of moving parts for an AFRamax oil tanker to move from Westridge Terminal to open waters beyond the Lions Gate Bridge.



Appendix A. Photo 11. The waters under the Second Narrows are turbulent and fast moving especially during tidal changes. This was a factor when one of the towers was struck by a yacht in August 2014. Fog was a factor when a freighter knocked out a tower in 1978.



The navigable channel near this rail bridge is only 121 metres across and as little as 12 metres deep at zero tide. Yet tankers with a draft of 13.5 meters will be permitted to transit through during high tide. With high tide being about 14 feet (or about 4 meters), that nets a maximum clearance at the freighter keel of about 2.5 meters (which is about 1% of its length). Only under this ideal daily condition, would the AFRAMax freighter be barely scraping the bottom.

Appendix A. Photo 12. The keel of a loaded AFRAMax tanker is deeper than the depth of water at Burrard Inlet's Second Narrows except at high tide.



The Canadian Coast Guard has listed the Second Narrows CN Rail bridge as the highest navigational hazard in Canada.

Just this fact alone should alarm NEB Directors.

To summarize this potential daily picture, AFRAMax tankers, 245 metres long and 34 meters wide will navigate through the turbulent Second Narrows, requiring the assistance of multiple tugboats, between the two towers of the CN Rail Bridge and under its moveable bridge deck, requiring high tide to avoid hitting rock bottom in what is rated as the highest navigational hazard by the Canadian Coast Guard.

And furthermore, each AFRAMax tanker must be loaded to 80% or less in capacity or risk its draft being too deep, again, to avoid hitting rock bottom.

All of these tight tolerances and all of the moving parts, along with the possibilities of extreme weather, increase the chances of human error being blamed for an AFRAMax accident in Burrard Inlet.

To summarize all the moving parts:

- Weather
- Current
- Tide
- Less than full capacity loading at 80%
- CN Rail lift bridge deck
- Yachts and smaller pleasure boats
- Container ships
- Coal ships
- Sulfur ships
- Other freighters
- Cruise ships
- Log booms pulled by tugboats
- Tourist tour boats
- The Seabus
- Seaplanes
- Other tugboats

Given all of the information provided above, it appears probable that attempting to navigate a 245 meter AFRamax oil tanker through Burrard Inlet to Westridge Terminal every day would be an accident that is going to happen.

But while we think we can rely on modern navigational tools and excellent barge services that Vancouver is known for, there is another risk factor that has likely not been considered.

The risk of terrorism must weigh on the National Energy Board.

Canada must consider the fact that terrorist attack has never been more likely on its population. As of September 5, 2014, Canada has joined the USA and other allies against the threat posed by the Islamic State in Iraq and Levant (ISIL or aka ISIS). Never in the history of Canada, have globally-connected terrorists had the ability to live and hide among its population.

This security issue regarding these AFRamax tankers at Westridge Terminal and while in Burrard Inlet has not been addressed. Terrorist attack on ships is not new to the world.

There are the warning signs that should not be ignored.

Oct 2014 – Al-Qaeda, in its magazine “**Resurgence**”, urges jihadists to attack U.S. and foreign oil tankers. In Al-Qaeda’s own words, “even if a single supertanker were to be attacked in one of the chokepoints or hijacked and scuttled in one of these narrow sea lanes, the consequences would be phenomenal”.

Sep 2014 – U.S. intelligence agencies reported that a group of 22 Yemeni-Americans were training in Houston to be seamen on oil tankers, raising terrorism concerns over the unusual activity.

May 2011 – According to documents seized from Osama bin Laden’s compound in Pakistan, Al-Qaeda considered hijacking and detonating oil tankers to provoke an “extreme economic crisis” in the West.

Aug 2010 - A Japanese oil tanker is the target of a failed terrorist bombing in the Strait of Hormuz. Al-Qaeda claimed responsibility for the attempt.

Feb 2004 – A Philippines super-ferry is bombed and sunk by the Abu Sayyaf, an Al-Qaeda affiliate, using a remotely controlled IED, killing 116 people.

Oct 2002 – A French oil tanker is bombed in Yemen. An explosives laden small vessel rammed into its side penetrating both hulls of the double walled tanker. 90,000 barrels of oil pour into the Gulf of Aden. Almost a decade later, documents seized by U.S. Special Forces at bin Laden’s compound reference this attack and a declaration by al-Qaeda that attackers will have to board these ships to blow them up from the inside.

Mar 1993 – Al-Qaeda bomb the World Trade Center with an explosives laden van but fail to down the tower. Some 8 years later, they return with shocking success.

With the proximity to AFRAMax tankers in Burrard Inlet to land and bridges, an attack could occur from these shore vantage points or even from some private residences. But a bomb-laden pleasure-craft in the busy waters of Burrard Inlet could easily get much closer without detection.

Converging flammable and explosive energy infrastructure in a densely populated and world-class tourist location provides a dangerous cocktail for terrorist thirst. Having that target presented as a 245 metre behemoth moving along the full length of Burrard Inlet makes it near impossible to ensure security.

Appendix A. Photo 13. In Oct 2002, a French oil tanker is bombed by Al-Qaeda. An explosives laden small vessel rammed into its side penetrating both hulls of the double walled tanker.



AFP

6. Liability and authoritative duty of care

Kinder Morgan wants the Burnaby Fire Department to be first responders in the event of a fire at its tank farm and at its terminals. A fire on Kinder Morgan property would likely be an extraordinary if not catastrophic event. Subsequent assessment of damages and harm to outlying properties and people would be subject to argument between Kinder Morgan and the City of Burnaby. Kinder Morgan might claim that the Burnaby Fire Department did not adequately respond and address the fire to mitigate damage and harm to property and people.

The City of Burnaby should not be exposed to the risk and liability associated with the Kinder Morgan pipeline and tank farm. Kinder Morgan is already conducting its business in Burnaby as if it can disregard the bylaws of the city it is operating in.

For Kinder Morgan to ignore City of Burnaby bylaws and requests for information, while asking its fire department to be ready to take care of any fires their operation may produce, is a double standard that does not encourage a good relationship.

The NEB must know that an uncooperative relationship between Kinder Morgan and the City of Burnaby increases safety risk. The NEB should review in detail the events surrounding the pipeline rupture in Burnaby in 2007, and how all parties responded and engaged with each other. If there has not been an improvement in communication since that event, then there is likelihood that another rupture by "human error" will occur again.

Fires do occur at refineries. At a recent fire at Cherry Point in nearby Washington State, BP's own fire crew responded to the fire and requested assistance from Whatcom County fire districts. BP took responsibility for the fire, was its first responder, and received help from civic fire fighters. Good communication and cooperation seems apparent at Cherry Point.

Fires also occur at oil tank farms. Subsequent to the Catano oil tank farm fire, the operating company declared bankruptcy as it could not survive the resulting litigation. Can a city or township survive a similar litigation? No civic fire department should put its city at risk of a similar litigation. Kinder Morgan is in a multi-billion dollar industry with an operating budget that is likely an order of magnitude larger than that of the City of Burnaby.

Is it clear that Kinder Morgan would take responsibility for fires and spills of its caustic and flammable crude? I believe that a cloud of uncertainty on this issue serves no one.

The NEB should require a fire response plan from Kinder Morgan, with Kinder Morgan being responsible to lead as a first responder and to be able to direct those from civic fire departments. Like any private or corporate citizen, Kinder Morgan should welcome and encourage a cooperative relationship with all of its stakeholders. Kinder Morgan should demonstrate to the NEB that it has the cooperation of and understanding from civic fire fighters, without which causes risk to all.

Safety and Security should trump all other issues. Security must not be ignored over safety. If two parties are at issue on any other topic, safety should not be disregarded. The NEB should require that Kinder Morgan and the City of Burnaby as well as other stakeholders, have

independent safety officers who can engage with each other to constantly monitor and improve safety.

I am not an expert on law and litigation. The NEB must know that this is an issue that can affect the security and safety of innocent and unknowing residents.

Appendix A. Photo 14. Cherry Point Refinery fire, Nov 2013. BP, the owner of the refinery, employs its own fire crew who applied foam to control the fire, while Whatcom County fire districts were asked to assist under their direction. Cooperation and communication exists where the operator takes responsibility for damage and costs.



NEB directors have a fiduciary duty of care to the citizens of Canada, and that holds great responsibility and liability. To excerpt from the NEB website, “safety is a matter of primary public interest and has been included in the Board's mandate since 1959.”

I have described the risk and exposure to Canadians of having a large oil tank farm expanded and perched above a large population.

I have described the risk and exposure to the environment with increased oil tanker activity in a narrow, congested and vitally important inland waterway.

I have warned of the new exposure to terrorist attack and touched on how simple a massively destructive attack could be executed.

I have touched on how Kinder Morgan can limit its liability exposure to leave citizens without adequate recourse in the event of a catastrophe.

National Energy Board directors must consider their fiduciary duty of care to the citizens of Canada when they make their final recommendation regarding the Kinder Morgan pipeline and tank farm expansion.

If there is not enough information, time should be given to gather that information. The issue of terrorism is an unknown. The situation is unfolding. But there is already concern in the USA, France and the UK, that “homegrown” jihadists could make their way back to their home countries after having become members of ISIL (ISIS). And we also know for certain that ISIL jihadists have emerged from Calgary and from Montreal.

The NEB must consider the risk of terrorism.

The NEB’s official duty is to “promote safety and security, environmental protection and economic efficiency in the Canadian public interest within the mandate set by the Parliament of Canada”.

This is a triple mandate with conflicting demands. Safety and security *should* trump both environmental protection and economic efficiency. In plain language, the environmentalists and the capitalists should take a back seat to the safety and security guys. So no fighting in the back seat until we sort out our problems out front.

7. Alternative considerations

Canada has a strong and diverse economy, and the export of oil is one of many reasons why all Canadians enjoy its high standard of living and social benefits. There is a belief by many that exporting significantly more oil to Asia via pipelines to the west coast is critically important for our economy.

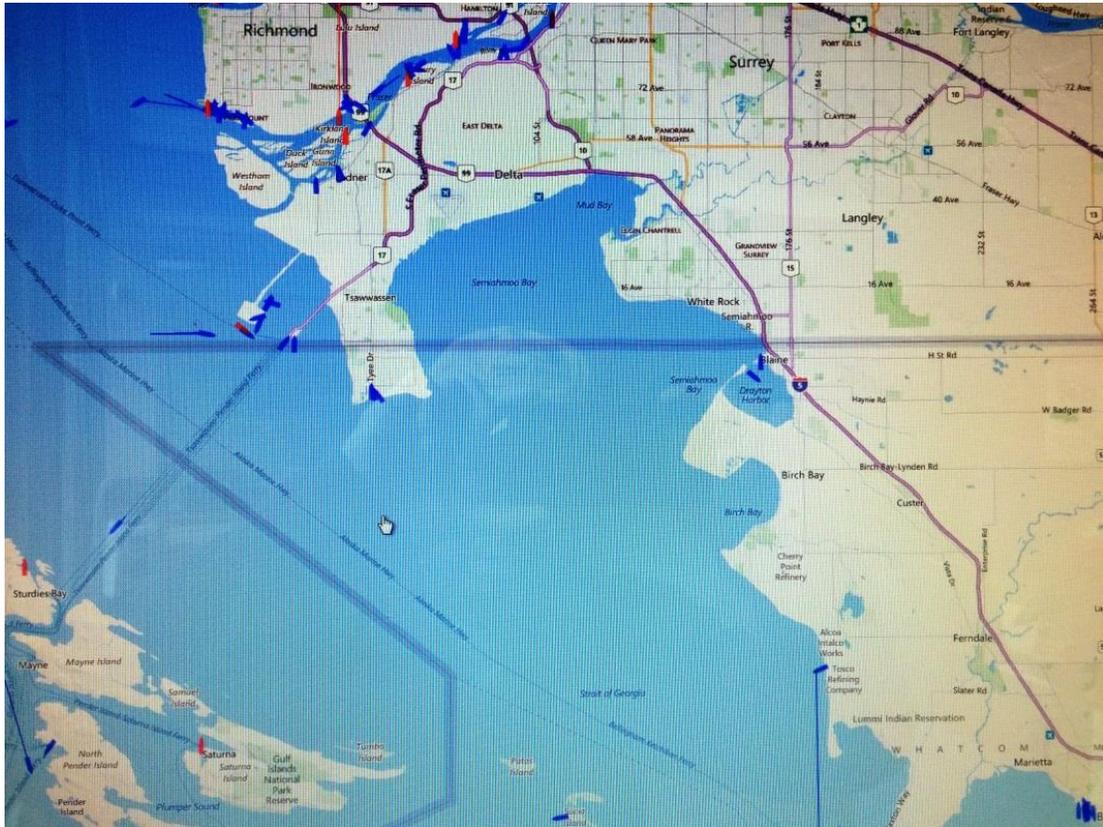
But tripling the amount of crude oil through the terminal in Burnaby is wrought with numerous unintended consequences, raising extreme safety risk and extreme security risk. Furthermore, it is clear that the Westridge Terminal in Burrard Inlet is not adequate for AFRamax tankers which can only be loaded to a maximum of 80% capacity.

If we were to consider a blank canvas and start again with safety, efficiency and security as primary concerns, two options come to mind:

7.1 Expansion to Cherry Point

7.2 Expansion to Tsawwassen Deltaport

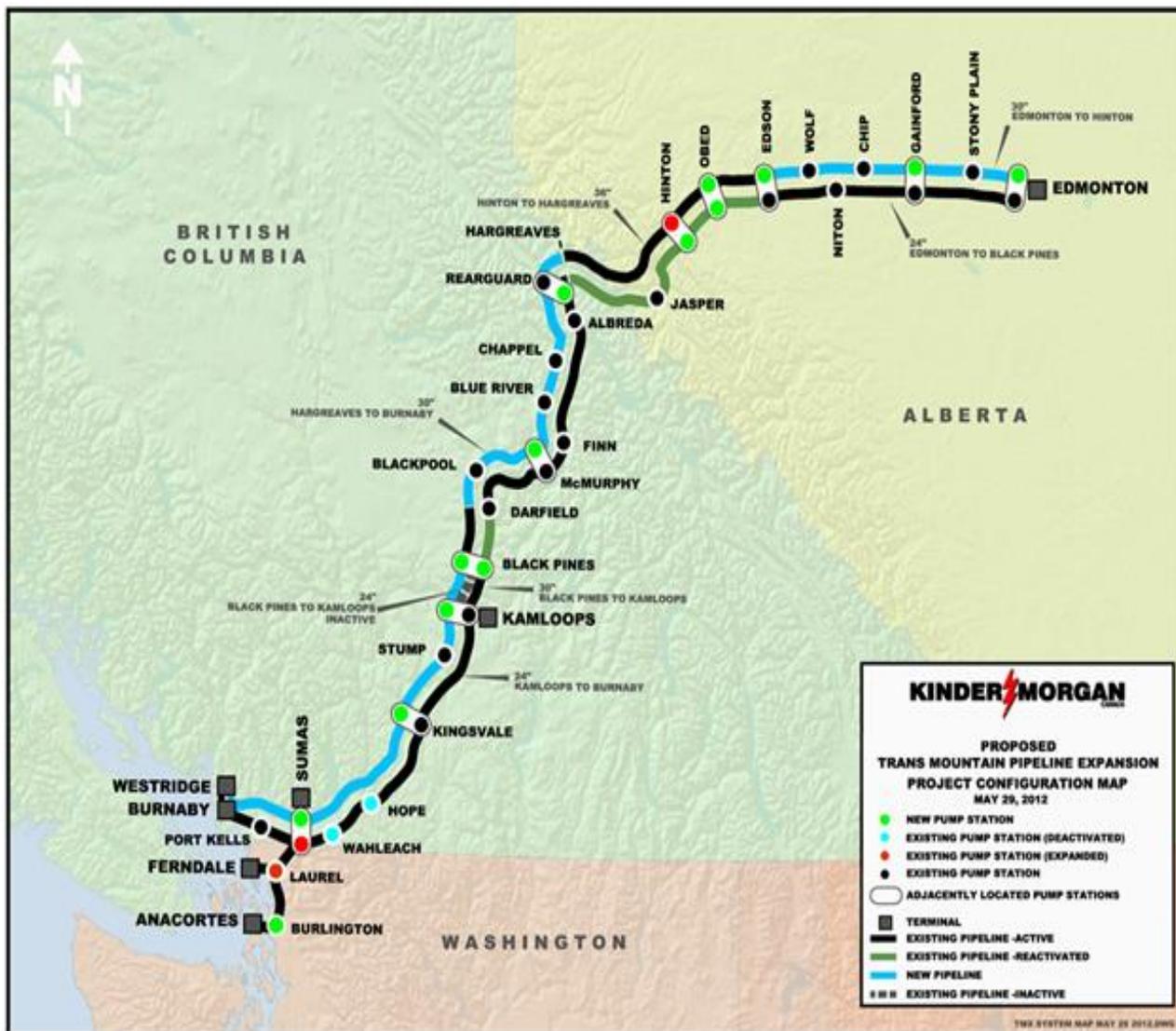
Appendix A. Photo 15. Cherry Point and Tsawwassen offer open waters without congestion as compared to Burrard Inlet. Cherry Point already has a Kinder Morgan pipeline to Alberta. Both locations allow for larger supertankers. Both locations allow for US Coast Guard protection in the event of terrorist risk.



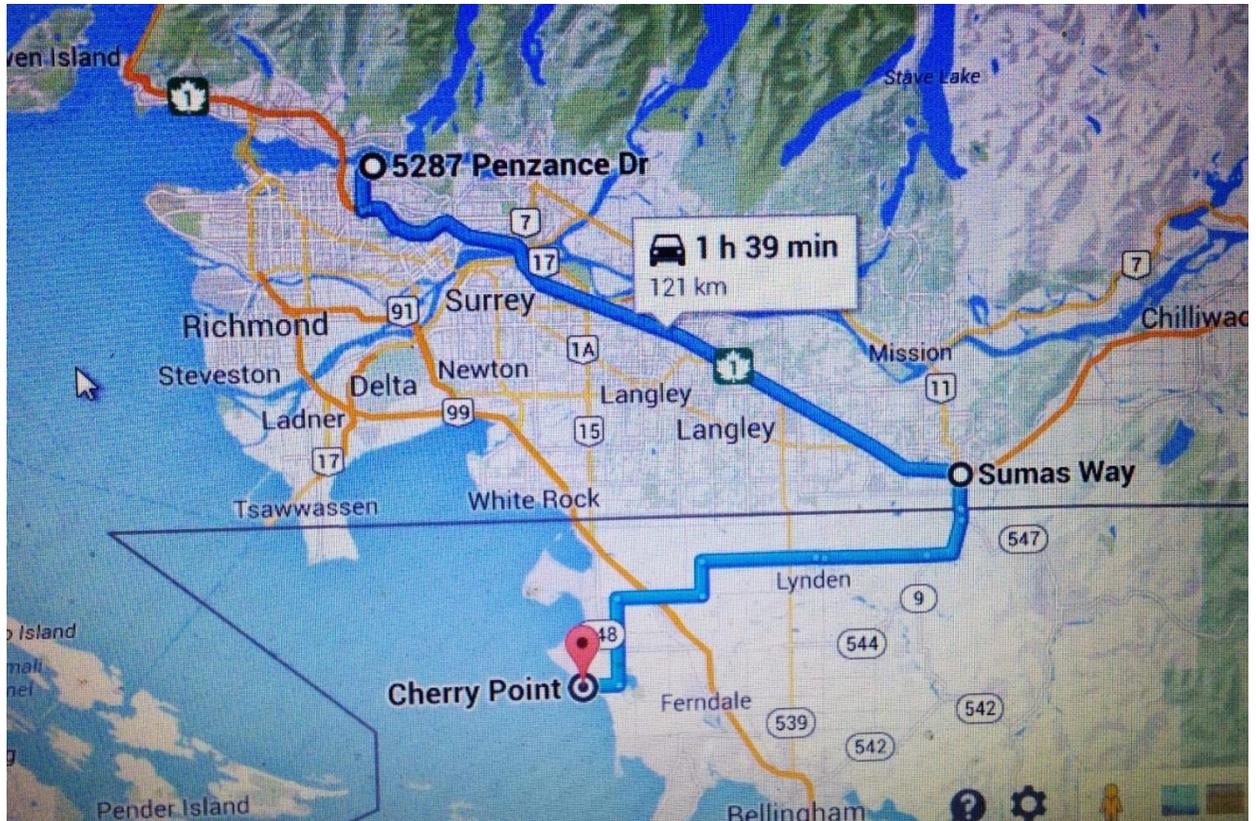
7.1 Expansion to Cherry Point

The existing Kinder Morgan pipeline already runs from Sumas to Ferndale where its terminal is known as Cherry Point. Cherry Point is a large terminal, with open space, a flat oil tank farm and open waters. The location is much easier to secure. And there is no density of population in the area.

Appendix A. Photo 16. Kinder Morgan's pipeline from Alberta to Burnaby also extends from Abbotsford to Suma, WA to Ferndale. Its terminus at Cherry Point offers a securable open port and a flat tank farm away from residential communities.



Appendix A. Photo 17. A tale of two Kinder Morgan pipelines. The route to Burnaby is through a dense, fast-growing, expensive metropolis. The route to Cherry Point is through mostly rural agricultural land. Both routes already have existing pipelines.



Significant Advantages of Cherry Point over Westridge Terminal:

- Shorter pipeline distance through cheaper agricultural land
- Flat open available land for a tank farm expansion
- No considerable population issues
- Open seas at terminal port allowing full capacity AFRamax tankers
- Open seas also allow for much larger tankers and less frequency of loadings
- Shorter distance for tankers to travel back to the Juan de Fuca straight.
- Tankers avoid urban congestion
- Greater assurance of security
- Dedicated fire crews on site

Significant Disadvantages of Westridge Terminal over Cherry Point:

- Exposed tank farm above an urban population
- Extreme tanker risk through Burrard Inlet
- Extreme high cost of land and construction
- Lack of dedicated fire crews on site.

While some stakeholders may object to seeing Canadian crude transit through the USA to find its way into an Asia bound tanker, this is still exporting a natural resource product. And there is nominal value-loss to the Canadian economy should this option occur. Barrels of oil are still sold into Asia, while safety and security is maintained in Greater Vancouver. The pipeline is already owned by Kinder Morgan on both sides of the border. Cherry Point would not be a prime terrorist target since there is not a high population in nearby Ferndale. Furthermore, there is a higher level of security at this terminal.

7.3 Expansion to Tsawwassen Deltaport

With credit to oil industry engineer, Mike Priaro, who recommends that a pipeline be built to transport crude and refined products from the Chevron Burnaby refinery to the Tsawwassen Deltaport on the Strait of Georgia, or, relocate the marine oil tanker terminals and Chevron refinery to the West Coast at Tsawwassen. Either eliminates all oil tanker traffic through Burrard Inlet and Vancouver's inner harbour.

"Mike Priaro, B.Eng.Sc. (Chem.Eng.), U.W.O., former member APEO and APEGGA, worked in facilities, production, operations and reservoir engineering, as engineering consultant, and in engineering management in Alberta's oil patch for 25 years for companies such as Amoco and Petro-Canada. He worked the historic Turner Valley oilfield and brought in under-balanced drilling technology to drill out and complete several of the highest producing gas wells ever in Canada at Ladyfern. He co-authored 'Advanced Frac Fluids Improve Well Economics' in Schlumberger's Oilfield Review and developed the course material for the 'Advanced Production Engineering' course at Southern Alberta Institute of Technology."

If Kinder-Morgan's proposed TransMountain pipeline expansion were to transport only conventional crude and upgraded pipeline-quality bitumen to an expanded Chevron Burnaby refinery, then refined products could be transported with a new pipeline from the Burnaby refinery to the Tsawwassen Deltaport on the Strait of Georgia. From there, oil tanker access to the wide-open Strait of Juan de Fuca is available. This removes all oil tanker traffic from Burrard Inlet and Vancouver's inner harbour and allows safer and much more environmentally acceptable shipping of high-value refined products, conventional crude and upgraded bitumen to the U.S. west coast and Asia.

Even better, there may be an opportunity to negotiate moving the refinery, marine terminal and tank farm from Burnaby to a suitable location on the west sea coast near the Deltaport in Tsawwassen as shown on the map below. Refineries, marine terminals and tank farms are essentially modular and can be physically moved and set-up elsewhere though it would not be inexpensive.

But this could be an opportunity to establish a safe and secured new refinery, terminal and tank farm in Canada's west coast while allowing large tankers easy access to take on full loads. Being located near the current coal terminal, it is already an industrial zone that might be welcomed by the City of Delta.

Appendix A. Photo 18. Possible Relocation of Chevron Burnaby Refinery and Westridge Marine Terminal and Re-routing of Kinder-Morgan TransMountain Pipeline (yellow) to Tsawwassen (magenta). Source, Mike Priaro



Mike Priaro offers an independent and objective plan that brings to the forefront long term safety and security. Long term economic efficiency is also considered while mitigating exposure to the environment. This plan meets with the triple mandate of the NEB and is described in detail in Appendix C – “TransMountain Pipeline Expansion Fatally Flawed”. The Mike Priaro article is important and is considered a part of this submission to the NEB.

Best regards,

J.M. (Jack) Gin, PEng
18 August 2015