

**Brief to the  
BC Environmental Assessment Office  
Victoria, BC.**

# **Vancouver Airport Fuel Delivery Project**

**by**

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**Richmond, B.C.**

**April 26, 2011.**

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**1.0. Introduction:**

The constant expansion of the Vancouver International Airport (YVR) has over the years caused many environmental conflicts such as noise, new runway development threats to wetland habitat and birds, fuel and de-icing fluid spills, water quality and now climate change issues. However, it is realized that in this modern era, air transportation is a key reality of modern business and public travel and also a source of jobs and prosperity for many Canadians. The issue is how do we balance that mode of transportation and do a better job to protect our environment that has been harmed by over 140 years of constant industrial growth affecting our air, water, land and Fraser River Estuary habitats?

Every few years the environment is exposed to yet another expansion proposal or problem created by ever increasing development or expansion at YVR. The application by the Vancouver Airport Fuel Facilities Corporation (VAFFC) is one more expansion proposal by those using or owning assets at YVR that again pits relatively continuous economic growth with quality of life and a healthy and sustainable Fraser River ecosystem.

**2.0 YVR and its Need for Fuel:**

About 25 years ago, a consortium of airline companies and / or airline interests proposed that they be allowed to buy fuel from international locations in that they could avoid higher Canadian taxes and barge it up the North Arm of the Fraser River to a new fuel transfer terminal that they were planning to build near MacDonald Beach on Sea Island. Superficially this seemed to make sense from an airline economic and transportation view in that they could buy cheaper fuel

from the US than from local Canadian refineries and ship it by barge almost directly to YVR.

Fortunately the proposal by the YVR parties some 25 years ago were submitted to a higher level and pioneering Federal Environmental Assessment and Review Office (FEARO) Public Panel hearing review process. After two days of hearing the Panel concluded that the proposal described above, would cause too great a hazard to the North Arm of the Fraser River and its estuary and recommended that it not proceed.

At the time, the hearing heard that the pipeline that supplied jet fuel from Burrard Inlet refineries to YVR was at capacity and was corroded and could give rise to leaks, damage the environment and be a hazard to the public. Despite that being said some 25 years ago, the same pipeline still flows through Burnaby from its north Burrard Inlet shore refinery area to the North Arm of the Fraser River and across to the airport. I have no knowledge or data to show that an accident or spill has occurred at any time in the 40 years this pipeline has been in place. Despite that urgent need for a new fuel source some 25 years ago, we have heard little about the urgency of upgrading that old system until now.

Leaving this needed extra fuel transport capacity review to the eleventh hour does raise real issues. That alone has caused the review process to be rushed and it has given the public an impossible task of reviewing giant binders of consultant studies that desperately need close scrutiny. Also the EAO has allowed the VAFFC to apply for permits ahead of time. Can that not bias the review and does that not undermine public confidence in this 'impartial' review?

We are now told that the Burrard Inlet refining capacity and the Burnaby Kinder Morgan pipeline is now below required capacity. To overcome that fuel refinery capacity, fuel is barged from the Arco Refinery in Washington State at Cherry Point and shipped into Burrard Inlet where it is then pumped through this old Burnaby pipeline to the airport. In that this fuel transport method does not supply the airport with adequate fuel due to the pipeline being only 8 inches in diameter and therefore allows inadequate transport volume, each day several truckloads of fuel are transported by road tanker from the U.S. Arco refinery to YVR each day.

The proposal that is before the BC EAO is to address the problem of inefficient fuel transfer and allow larger volumes to be transferred to address future growth at the airport and that will allow greater airline traffic over the next several decades. Despite the fact that more fuel that is sent to the airport will result in an ever greater carbon footprint, the VAFFC studies claims that the present transport system is inefficient and the new proposed system will lower the transportation carbon footprint. In reality, the proposed system will do everything to promote the generation of an overall greater carbon footprint originating at

YVR and the consultants should have examined the issue in context of the long term full accounting of all aspects of this proposal.

The present proposal is advertised as efficient, results in cost savings making YVR more competitive with US and other airports and reduces the carbon footprint and even if (when) it does have spills, they are more or less benign to Fraser River aquatic life and will have little or no impact on the citizens of Richmond or traffic on the Fraser River. Many citizens of Richmond do not find the multiple pages of consultant reports that make these claims to be re-assuring or a proper review of the issues and options available. The study put total emphasis on what option VAFFC preferred and short changed a proper and full review of other key options that are highly preferable.

What has caused the greatest uproar with Richmond citizens is the fact that the above proposal will ship millions of gallons of fuel up the Fraser River to a fuel transfer terminal that is to be constructed about two kilometers upstream of the Deas (Massey) Tunnel and stored there in six (or more) giant tanks near the Fraser River shoreline and then be piped across Lulu Island (Richmond) to the airport as it is needed. At YVR additional storage tanks are being built for additional fuel storage.

The idea of a pipeline across Richmond farmland, undeveloped land, residential and commercial / industrial areas has caused a great deal of concern in terms of its wisdom as related to public safety. Many of those same concerned citizens and others are just as concerned about the prospect of having one or more weekly barges and monthly shipments of PanMax jet fuel tankers coming up the Fraser river to discharge its millions of gallons of fuel at a fuel transfer terminal in the middle of the Fraser River Estuary.

The Fraser River Estuary and its relatively high abundance of fish and wildlife populations, that has been greatly reduced by mans activities over the past 140 or more years, has generally been safe from any new large high risk developments during the past several years other than the near continuous Roberts Bank port and YVR airport expansion.

The Fraser Estuary has already been stressed out beyond its safe limits in that we have lost too many of our estuarine living and habitat resources and with such a high risk fuel transport proposal, its time to say enough is enough. For the river and estuary and its fish and wildlife resources to survive for another 100 years they will have to battle other great stressors that seem to be beyond the will of our government to control (i.e. global warming) and we must take action on at least the stressors we can prevent especially if we have other highly preferable options that can be pursued to address that economic / industrial need. That especially applies to the VAFFC proposal before us.

### **3.0 The Airport and the Fraser River Estuary – Sustainable Development?**

Once again, the Fraser Estuary is asked to accept another threat piled on it since development first hit the estuary in about the 1860s when the first marshes in Richmond were dyked off from the river and estuary to promote the development of farms to grow food to sell to those associated with the Cariboo gold rush.

Since the 1950s, the Fraser Estuary has been greatly altered by dyking, filling of marsh lands and water lots, river channelizing and river training walls to promote shipping, log booming and foreshore destruction by a myriad of industries and with significant industrial and domestic waste discharges that have added large quantities of many contaminants that has harmed its pristine state and affected life in the estuary.

Since the 1860s, the estuary has lost over 80 percent of its marsh lands key to the maintenance of some of the largest bird populations in North America and that provided nursery grounds for many fish species including the millions of salmon that migrate up the Fraser River to spawn and the 600 million to one billion young salmon that migrate back downstream each year and pass through or rear in the estuary before migrating into the open ocean to develop into adults to complete this complex life cycle.

In a good year, over 30 million adult salmon can migrate up the Fraser River through its estuary and onto their freshwater spawning grounds. Such large runs are more a thing of the past but such an exceptional year occurred in 2010. Despite the setbacks on the Fraser, this river still supports the largest salmon runs from any single river in the world. This alone requires special consideration in that salmon and dependent species like bears and eagles are a iconic symbol of the West Coast life style and our quality of life.

In that this river is in the middle of over two million residents, it is a resource and treasure that others in the world can only dream about having. Unfortunately government and industry and even many residents take this natural wealth for granted and continue to put excessive emphasis on greater growth and economic development and each time we see another VFFC proposal we can see another nail in the river, its estuary and its legacy of living resources.

It is a simple fact that the Fraser Estuary has been compromised beyond limits to properly support healthy fish and wildlife resources that make British Columbia what it is. Some call it Beautiful British Columbia or Super Natural British Columbia and others have called it the Greatest Place on Earth. Without our clean rivers, estuaries and its legacy of life, it simply wouldn't be such. Despite the sell BC slogans, government could do much better to protect our natural legacies for future generations. One cannot ethically promote our natural wealth

and constantly undermine this natural legacy with each opportunity to develop industry with a ever growing ecological and carbon footprint. When you properly consider the ecosystem health, cumulative impacts and good precautionary scientific decision making, this is simply not sustainable development.

#### **4.0 The Fraser River Estuary – It Life, People and Fuel Supply Hazards:**

The value of the estuary has been adequately described above. Anyone living in British Columbia or in government in Victoria or Ottawa need not be reminded that the Fraser River and its estuary and living resources is a national treasure and has to be protected at all costs. Further all those involved in this proposal should be aware that it is an ecosystem that has to be protected and where possible be restored. If we are concerned about our future, YVR, VAFFC and the governments through this BC EAO review have to show leadership in terms of the welfare and health of our children and their supporting environment. The health of the Fraser River and its estuary is really a giant canary in the proverbial coal mine i.e. the large fossil fuel consuming economy.

The consultants for VAFFC seem to have given superficial coverage of what many of us see as a significant risk to life and quality of life in the Fraser River Estuary and surrounding areas as noted in their studies and in the rather inadequate hearings that have been held to date. No where in the studies does it note that the Fraser River Estuary and its adjacent outer estuary Boundary Bay support Canada's largest over wintering waterfowl habitat that must be protected from one of waterfowls greatest threats – petroleum product spills into their habitat and direct contamination of waterfowl.

The Proposal seems to dismiss projected jet fuel spills into the Fraser as a relatively minor incident and the probability of the volumes various spills of jet fuel occurring each few years is given as through one was pouring just a bit more waste water into the river. The study risk analyses indicate that we should expect up to a 50 barrel spill every 1 to 6 years. Even at this described 'low' volume it is more or less summarily dismissed in that solution will be the dilution and evaporation for this volume and any larger spill that are to be expected at the fuel Terminal as determined from spill data at similar fuel transfer facilities elsewhere in the world. The Fraser Estuary is just not another harbor elsewhere in the world!

The consultants that prepared the reports indicate that jet fuel (kerosene) rapidly evaporates and all the Terminal operators have to do is flush it out into the river and it will harmlessly dissipate into the atmosphere. This is simply not an acceptable approach to such probable spillage of flammable and such a highly toxic material into such a highly productive and extremely sensitive habitat area.

As a habitat protection and water quality specialist for DFO and DOE from 1969 to 2002, I have inspected and/or participated in the cleanup or legal action related to over 50 spills of various petroleum products in BC, Alberta, the Yukon and the North West Territories. These spills have included everything from bunker C tanker fuels along the coast and in the Fraser River (From Cannery Channel to Surrey Fraser Docks), a diesel spill in the North Arm to light fraction fuel spills such as naphtha into the Little Campbell River and into the Athabasca River from the Suncor tar sands plant at Ft. McMurray. Spills have always occurred and will continue to occur despite statistics showing that the incidence of spills is down globally.

Jet fuel is a middle distillate fraction of crude oil and is less volatile than gasoline or naphtha. It is more volatile than diesel fuel and much more volatile than bunker or most types of crude oil. Generally smaller fractions of fuel oil are more toxic and such oil will dissolve and significant quantities can mix and form emulsions in the water column when spilled. Once in the water column the jet fuel will not readily evaporate and when in the water column it can be more available to aquatic life and exert a greater toxic effect to invertebrates (dipterans, shrimp, crab, mysids. etc), plants and fish.

The VAFFC EA reports give the impression that the jet fuel will evaporate relatively quickly and pose little environment threat. That is far from the truth. During the October to May times of the year, the waters of the Fraser River are relatively cold to very cold and at times are at freezing temperatures. When jet fuel is spilled onto cold water, it simply will not evaporate rapidly and it will therefore be spread widely into the river and estuary through wind and currents – often to upstream sites. These currents and wind action will also drive the fuel into the water column where it will exert a greater toxic effect.

In that this grade of kerosene fuel will dissolve into the water column to a small degree, it can and will taint fish and affect their health. In addition the fuel on the surface of the river would contaminate sea mammals (harbor seals, sea lions and an odd beaver or river otter) and a multitude of aquatic birds. The fuel would get on their hair, skin and feathers and also be ingested as the animals tried to clean themselves off. This most often results in the death of the animal. In addition many fish including salmon do break the surface as migrating adults and young salmon such as chum salmon fry. Fry feed extensively on the surface of the river near the shoreline and even during a small spill that covers the river in a very thin layer, the fish food would be contaminated by toxic oil and the oil would coat their very permeable skins and gill structures.

Kerosene is presented as a less than high risk material to be introduced into the estuary. The Chevron – Phillips data sheets refer to jet fuel as moderately to highly toxic and the impact of a spill is long term especially to the aquatic environment. Kerosene or Jet A grade fuel can have up to 200 additives (Chevron-Phillips Material Safety Data Sheet 2001) added to it to combat metal



corrosion, reduce static electricity buildup in the fuel, stop bio growth in the fuel system, prevent fuel degradation, prevent ice buildup and freezing and improve lubrication properties of the fuel (Chevron Phillips Chemicals - Material Data Sheet Version 1.1 Oct 2010). The exact nature of these additives and the toxic enhancing effect they may have on the Jet A fuel has not been properly covered in the VAFFC studies.

Jet A fuel is very toxic to fish and invertebrate life and its toxicity can be equivalent to many pesticides that are to not be used adjacent to a waterway. In fact Chevron – Phillips specifies that when a kerosene or jet fuel fire is addressed by fire fighters, efforts must be made to prevent runoff water from entering any drain or water course. Kerosene is indeed used as a pesticide by some to spray over a pond to kill mosquito larvae. It is very effective in its toxic effect and will contaminate the breathing apparatus of some aquatic life such as mosquito larvae. Kerosene is often a major component in many pesticides used to kill insects. Irwin notes in the kerosene entry in the 1997 Environmental Contaminants Encyclopedia (US Nat. Park Service) that kerosene is used as dormant oil spray to kill insects on citrus trees.

In work by Parkerton, Stone and Letinski (2000 Toxicology Letters Vol 112-113) they showed that kerosene type distillate fractions (eg. jet fuel) will kill aquatic life by a narcotic effect and the petroleum product accumulates in the lipid tissue of the organism. Also the toxicological effect from different distillate fractions is additive. Jet fuel or kerosene has many different fractions of oil in it including aromatics like benzene, phenols, naphtha, gasoline and even lower diesel fractions.

Baxon, Podrabsky and Ricker (1999 Aquatic Toxicology Vol 146) did work with well weathered kerosene and that product was able to kill mysid shrimp at levels as low as 0.9 to 1.5 parts per million. At levels of 0.13 to 1.1 ppm the oil was shown to curb the growth of that invertebrate. The examination of this animal is relevant in that mysid shrimp are a key food organism for young trout and salmon and other species of fish in the Fraser Estuary.

The Handbook of Green Chemicals shows that rainbow trout are killed at kerosene test exposures of 8.7ppm ( LC50 test results). However sub-lethal effects can be shown to occur at 4.1ppm and in the harsh natural world a fish that suffers sub-lethal effects is most often preyed upon and in a sense is moribund and ecologically dead before it is killed by the toxicant. Conoco - Phillips in a Safety Data Sheet 2001 noted that Jet A fuel is “toxic to aquatic life with long lasting effects” and is toxic in the range of 1 – 100 ppm.

In addition during the April to September time period the Fraser River has a very heavy sediment load and any spilled oil can and will adhere to sediment particles and can then settle down to the bottom of the waterway. Here such contaminated

sediments can do great damage to benthic life. This life is important as food for bird and fish life.

To put VAFFC claims of evaporation rates into perspective, let's look at an even more volatile fuel i.e. naphtha. In the 1970s, a truck tanker of naphtha jack knifed at the Canada – US Douglas border crossing and the contents of a large tank spilled into the Little Campbell River. The spill flowed a long distance to get into the river and then well downstream despite the application of many barriers, i.e. straw bales and absorbent pads. The water was at ambient cool winter coastal weather conditions and this fuel (more volatile than jet fuel) did not evaporate rapidly and the piles of absorbent and straw had to be burned to rid the site of this spilled fuel. The cold waters of the Campbell River simply did not allow rapid evaporation of this fuel type and jet fuel would evaporate much more slowly. The day after the spill the river still had a very strong smell of this lighter fraction fuel. The consultants study would lead one to conclude that the impacts of this spill would not be a great concern given their optimistic statistics of kerosene's rapid evaporation rate i.e. the naphtha would even evaporate more rapidly.

After 48 hours of a kerosene spill onto cold waters, some of the spilled fuel will remain in that the larger molecule fractions will evaporate last and be most persistent in or on the river and in its sediments. Also any fuel that gets onto or into the river banks will persist for days or weeks. Many river bank, mudflat, sandflat and marsh areas and detrital collection areas will be very susceptible to the absorption of jet fuel. The contamination of organic detritus is of special concern in that this is the 'fuel' that keeps the estuary food web operating much of the year i.e. the food source for the key lower trophic levels of the food chain will be poisoned..

In about 1982, the Suncor Plant in Ft. McMurray had an upset and naphtha flowed out of the plant across their large warm effluent treatment pond, through an oil separator and into the cold ice filled waters of the Athabasca River. The naphtha persisted in the cold river for over 200 km and when the aboriginal fishermen cut holes in the ice on Lake Athabasca a few days later, the oil was noticeable to the eye and the smell was obvious. The fuel contaminated their gillnets and the fish they caught smelled of fuel and could not be eaten. In such cold conditions on the Fraser River, a heavier fuel such as jet fuel would be relatively persistent and could therefore spread over a much greater distance than one would be led to believe in the VAFFC studies.

The VAFFC modeling studies are often helpful when used appropriately but real world experience tells us a great deal of how fuel would act in certain conditions and that experience and field data must be used to test and calibrate models if they are to be fully applicable to the Fraser River circumstance.

In the 1970s I was called as an expert witness on the deleteriousness of marine gasoline which was spilled into the Powell River boat harbor when the operators and the barge unloading the fuel into a Standard Oil tank farm did not take adequate precautions in terms of alarms and shut offs and the fuel overflowed the tanks and flowed out of a failed fuel containment dyke and flowed into a well used marina. The local fire department was shocked at the hazard and did everything to disperse the fuel with fire hoses. The local fire department was not trained nor equipped to combat a fuel spill on water and their only recourse was to disperse the fuel with water fire hoses before it was ignited. The spill caused a fish kill and the involved companies were found guilty for permitting the discharge of a deleterious substance into fish frequented waters i.e. a violation of Section 36 of the Fisheries Act.

Times and equipment may have changed, but when you transfer fuel from barges onto land tank storage, spills can and will occur. In this proposal the VAFFC will argue that it has or will practice all due diligence but they do admit that spills will occur and over the longer term one can expect the probability of a larger spill. Also the large land tank farm fuel containment works will only contain the fuel spilled from one tank and 10% of the other tanks. If two tanks rupture in an event such as an earthquake, the containment of all spilled fuel would not work and millions of liters of flammable and toxic kerosene could flow onto the adjacent land and probably into the Fraser River. Also under such events the probability of fuel ignition is a high. We are led to believe that Jet A fuel is difficult to ignite especially on water. Despite that, we have all seen documented large infernos caused by jet or similar fuel that has been ignited at various facilities.

Chevron – Phillips data safety sheets (2010) notes that the flash temperature of kerosene vapors are quite low (37.8 °C). They also note that all sources of ignition or hot surfaces and even cell phones must not be allowed around such fuel facilities. If ignited it should only be fought with dry chemicals, carbon dioxide or alcohol resistant foam. The use of high volume water jets is to be avoided in that it could spread the fire and be ineffective in extinguishment and firefighting crews are to not allow the flow of fire fighting runoff into any drain or watercourse thereby creating an aquatic toxicity or sewer explosion hazard.

Unfortunately this proposal does not include a specific fire fighting capability to enhance the municipal fire fighting capability at a spill site in the river, on the tanker or at the Terminal and pipeline. I do not believe the capability to fight a large fuel fire can be found in the Richmond Fire Department. Also the nearest station and fire boat is located well removed from the proposed Terminal site so immediate response is near impossible.

Further if an emergency of any sort occurs at the proposed Terminal or adjacent Richmond areas, ground emergency access to the site at morning and afternoon traffic rush hours is near impossible with all roads leading to the Massey Tunnel in almost total gridlock on most days. For at least four hours each day, any

emergency response to the Terminal area could suffer long delays. I have often seen traffic stopped for up to an hour at a time and that is not uncommon. It is one of the most congested traffic areas in BC. In that road access to the Terminal is through a heavily congested traffic area, the locating of a facility that handles a volatile, flammable and toxic liquid material is less than good planning and not responsible to workers, the public or the environment. Assistance from the Delta and / or Vancouver fire departments would be of little assistance in that they would run into the same or worse traffic congestion problems if asked to respond to an emergency in the Terminal area.

The above scenario was one of the arguments why Richmond had to build the \$37 million No 2 Rd. Bridge. The existing bridge (Dinsmore) was always plugged with morning and evening rush hour traffic and that made it impossible for fire fighting equipment to reach the airport area or for any transportation to reach the Richmond Hospital. As part of this proposal, is VAFFC willing to greatly improve access to the No 6 Rd. area and build an overpass across Highway 99 at Williams Road to get around the grid lock described above? Lives and property loss could depend upon good and ready access to the proposed Terminal site.

To allay fears, VAFFC seems to have incorporated a boat into the dock complex at the Terminal. However it seems to be no more than a run about and it would be of little use other than to pluck a drunken sailor out of the river or recover a kerosene soaked bird.

Jet fuel is definitely a deleterious substance and it is not a material that should be introduced into the Fraser River Estuary on bulk carriers and unloaded at a proposed terminal which VAFFC predicts will have spills into the Fraser River. At the recent EAO hearing in Richmond, an airport lobby group noted that the proposal to transport jet fuel up the Fraser River does not set a precedent in that many fuels are daily transported on the river. This is hardly true if one puts the VAFFC proposal into perspective. At no time have we seen a proposal or facility designed to transport and off load such large quantities of a very toxic fuel in the middle of the Fraser Estuary. The Dow / Chatterton facility did that some years ago but in smaller quantities and that tank facility has now been phased out.

A spill in cold water conditions (six months of the year) would be relatively persistent, would spread rapidly and affect over wintering birds and a spill at the biologically more active times of the years (March to October) would cause a direct hazard to all life in the river from seals, to birds to fish. To pretend that significant spills (as predicted by VAFFC) would not be a major issue is indeed not supported by the diligent application of the precautionary principle and the application of good science and adverse risk management decision making.

A significant fishery can occur at various intervals in the summer and fall of each year. This involves an aboriginal and commercial and recreational fishery. Recreational and aboriginal fisheries can occur at other times of the year. Any

fuel covering on the river would result in the contamination of fish gear and catch and would necessitate the closure of the fishery. Such a closure due to such an event is covered in the Fisheries Act and allows those that have to forgo a fishery due to such an event the right to recover lost income due to their forgone catch and damaged or polluted gear.

I have been involved in two spills on this section of the Fraser River that have resulted in fishery closings about 20-25 years ago. These small spills were a significant hardship to the fishery in that fishing is a marginal way of people to make a living. One of the closures extended well downstream and over the banks and the other closure occurred during a large sockeye fishery causing maximum impact to those in the fishery that was shut down. The spill gave rise to a long court battle with the fishermen. In a spill event, the fishery regulator must take a precautionary approach and close the fishery. Putting such a facility in such a location is truly foolhardy.

Some 30 years ago a company planned a tank farm on the Richmond Landfill site area. It was discouraged and the plan was dropped. The Dow / Chatterton tank farm and transfer facility at Tilbury Island was phased out over 10 years ago. Past toluene and phenol spills at this site severely contaminated the soil and ground water and the contamination is still being studied and past attempts to clean up the site for other industrial uses is still not complete. This shows that even a highly volatile substance like toluene when it contaminates the soil and ground water will persist for decades and cost a fortune to clean up. However, the phase out of that tank farm was in the best long term interests of the estuary which should be relatively free of the large and continuous transport of such toxic liquid cargoes.

They the best way to avoid obvious environmental impact is to determine the best location for that industry. Putting a toxic fuel type facility in the middle of a globally significant estuary where any spill will often cause significant harm and the spill will be hard to clean up due to strong tidal and river currents and strong winds is less than diligent. Containment of spilled fuel and protection of sensitive sites (marshes or condominiums) from a spill is highly unlikely in terms of quick response and the reality is that it is near impossible to direct a spill or recover it from a river due to often unfavorable weather and river and associated ocean conditions. Regardless of the amount of risk and spill behavior modeling that is done, it will not change the reality of what happens when a spill occurs on most occasions.

In that VAFFC seems to not be willing to dedicate a special fuel spill and accident response team and equipment to address spills on land or in the river, it is impossible to believe that any response will be rapid. In that time is everything, a spill will be long gone before any effort will be possible to contain it. That is probably why the VAFFC has determined that the best treatment of a spill is to

disperse it into the river and hope nature will shortly address the problem impacts.

## **5.0 The Review Process.**

A group opposed to this proposal (VAPOR) was knocking on doors in a south east Richmond neighborhood this past week asking residents what they thought of the fuel pipeline going through their neighborhood and near their homes e.g. on their residential street. Most were unaware of this proposal and were upset that anyone would plan to put a fuel pipeline through their subdivision area without directly advising them of their plans. The VAFFC has argued that their review is rigorous and this is a proper and comprehensive review. However when you do not notify those that are living along the proposed route of the pipeline and do not have neighborhood meeting to discuss the matter, the process that allows that is sadly lacking in credibility. This lack of local neighborhood consultation is not acceptable under any circumstance!

Some 20 years ago I wanted to put a deck on my front steps. A registered letter had to go to all houses on my block and on the adjacent street so as the neighborhood was notified that they could speak against my proposal at a meeting schedule to hear my application before a Board of Variance. If a deck on someone's home requires such a review and neighborhood notice, how about a flammable and toxic jet fuel pipeline going down the street in front of your home? Also if you want to build a pub in Richmond you have to canvass the entire neighborhood in a door to door survey. Why is the jet fuel pipeline and Terminal and shipping proposal subjected to a much lower standard of public notice and consultation? This omission in the BC EAO process is unacceptable. It is also of great concern that the City of Richmond did not have the wherewithal to advise their citizens of this threat to one of their neighborhoods.

Also as this proposal is before us, Richmond City has seen fit to issue a building permit to the Riverport development area to allow the building of another residential complex about one half kilometer downstream of the proposed fuel terminal. This shows the terrible disjointed planning between the City, the port and those at YVR.

I question why such a project of such high public concern and of significant risk to the environment isn't subject to a proper environmental review. It says very little about the environmental review process in Canada and in BC that this proposal to send jet fuel PanMax sized tanker ships up the Fraser River, build the largest fuel facility of any type on the bank of the Fraser River in the middle of the estuary and run a significant fuel pipeline across a city of 200,000 people and that does not qualify for a higher level review and proper public hearings. Having one or two short one night public hearing and limiting the attendees to a two (2)

minute presentation is actually a bit of a farce at the time governments brag about transparency, proper scientific review and public consultation.

Father to the above, it is odd that the proponent should be given the opportunity to opt for a BC EAO review when the proposal involves ocean shipping, marine shipping law, a federal harbor, federal harbor lands, a federal airport and affects federally protected and managed resources i.e. the fish and migratory birds in the Fraser River and its estuary. Where is the federal government and its CEAA? Why would the assessment process be so weak as to have a trigger that neither the BC or Federal process would activate or a process where the proponent could select who should lead the assessment? This is akin to shopping for the process that can serve you the best.

It is fact that the BC EAO and supporting legislation has been around for many years yet in its countless assessment processes, only one has ever been turned down. The federal process is as dubious in that the FEARO office does not direct the federal process in Metro Port waters. The CEAA is delegated to the Port Metro to do its own assessment and here they are cooperating with the process in a process called 'harmonization'. It is the fox that appears to have the power to study the safety of the chickens in the chicken coupe.

Some 12- 25 years ago things were done in an environmentally more responsible manner. The FEARO office directed a higher level review of the original fuel consortiums plans to barge fuel up the North Arm. The process of the mid 1980s realized that significant risk was involved and high public concern and interest and allowed a longer hearing without a limit on the presentations. At that time the DFO even made a public presentation so the public could see where their stewards of the fishery and environment actually sat i.e. transparency. We now see DFO, DOE and MOE sitting on a technical committee that has been created and cannot see them take a position at any public hearing and be open for cross examination.

The EA process as headed by the BC EAO and partnered by Metro Ports in their role under CEAA is a charade in comparison to what would have and indeed what did take place some 25 years ago. Why do we now allow environmental assessments to facilitate or expedite the process for the benefit of the development and to the detriment of the environment? Why should we accept less of a threshold for such an environmental review than 25 years ago even though the proposal of today is a much greater risk, has greater public concern and is to be rushed through the review process with inadequate regard to the public nor the real environmental risks. What makes the EAO process even more suspicious and appear biased is that they have allowed VAFFC to obtain all their construction and other permits prior to the environmental review being done and decided upon.

The present review process is based on often irrelevant triggers such as project monetary worth (dollar worth of the project to the economy) or the tons of ore the mine will dig up, etc. The Vancouver Island Highway project indeed got around the BC EAO by breaking the highway project into contracts of less than 20 million dollars and that therefore did not trigger an environmental review. The highway indeed did significant damage to the salmon streams along its route and protection of that facilitated project undermined proper environmental protection. Proper environmental reviews must be based on the public interest and the real risk to the environment irrelevant of the cost of the works or some size standard. Sometimes the small poorly thought out and poorly located projects can cause the greatest environmental damage. This is indeed the VAFFC proposal.

In terms of process, why has the Federal Government and its agency Port Metro made itself an apparently subservient to the BC EAO? The process is a so called 'harmonized process'. However, the full partner in the process, Port Metro has recently forwarded their comments and criticisms of this proposal to the BC EAO. This is odd in that they should be a full partner in the so called harmonized process. Is the BC EAO also going to send themselves a brief on the weakness of the VAFFC proposal?

Also, it is my understanding that the final decision on this application is to be made by three BC Ministers. If this is a harmonized and partnership review, where is the federal ministers that should also participate in the final decision? The Federal government has set a bad precedent in that it has put constitutionally superior legislation in a subservient position to the provincial review and decision making. If Ottawa argues that this has not been done, they are simply fooling themselves. They have in a 'defacto' sense delegated discretionary responsibilities to the Province and it would be difficult for them to disagree with the final decision and they cannot say their actions did not fetter the powers of the Federal Crown (e.g. Section 35 and 36 of the Fisheries Act).

I have recently written to the BC EAO and asked them two questions which they refused to answer until the EA process is complete. First, in that the VAFFC seems to be a paper company as established by several international airlines, how does anyone including even the Federal Crown hold anyone responsible for construction problems such as habitat destruction or fish and migratory bird kills due to fuel spills or even labor standards on federal land? Also I posed the question, since this project did not trigger BC EA or the Federal CEAA process (due to those processes having too high a threshold bar to take notice of such a controversial project) and that the VAFFC volunteered to submit to the BC EA process, what laws will force the VAFFC to abide by the conditions issued by the BC EAO as approved by Provincial Ministers?



## 6.0 Cumulative Impact:

The VAFFC consultant studies did short shrift of the cumulative impact of this proposal to the welfare of the estuary in the overall ecosystem and over the longer term. The river is extremely valuable in terms of its biological resource and recreational and industrial uses. However, over the past 140 years the industrial uses along and on the river and estuary have greatly harmed it and many biological values are only a remnant value of what used to be there even 60 years ago.

The cumulative impact of such a proposal cannot just relate to local reaches of the river. Such an assessment is anti-ecosystem in its thinking and myopic in its scope. The entire river and its estuary have gone through multiple harmful water quality and habitat impacts over the past many decades. Most of these impacts have persisted and are additive and cumulative. Each time another 100,000 people settle here, there are greater strains on the rivers wellbeing as seen through its water quality and habitat impacts.

Many pulp mills that discharge into the Fraser River at Prince George, Quesnel, Kamloops and New Westminster and the countless sewage discharges and storm water discharges in the estuary lower the quality of the water in the river and affect the ability of a fish to respond to additional environmental stressors such as a jet fuel spill. It is totally invalid to take a section of a major river with countless stressors in the adjoining ocean and in hundreds of kilometers of upstream areas and ignore those outside stressors or conditions and comment of that section of the river in isolation of those outside influences.

I see no indication how at least 1-2 additional two way ship or barge movements in the Fraser River during the summer will affect the fishery and the methods of fishing in the river during a fishery opening. What is the cumulative impact of that additional traffic and any spill at the time of a fishery?

The fish and birdlife and sea mammals simply do not relate to or are isolated to a section of the river that can be impacted by the Terminal and fuel spills and local shipping as proposed. The river and estuary is a remnant of what it used to be and any new development in it of this type is another nail in the coffin of the estuary and the fishery and its large populations of bird life.

Also the shipping traffic levels from Arco at Cherry Point and from Chevron in Burrard Inlet may increase if the Kinder Morgan pipeline's use is discontinued. How will this affect the sea life (including marine mammals) in Burrard Inlet, English Bay, the Strait of Georgia and Juan de Fuca and even Puget Sound? We are given no indication where the source of future jet fuel shipments will come from considering that in the future most of North America will more rely upon Albert tar sands oil.

The estuary is under great stress from global warming i.e. the river has warmed up about two degrees centigrade in the past several years (Hinch and Martens 2011 A Review of Potential Climate Change Effects on Survival of Fraser River Sockeye Salmon and an Analysis of Interannual Trends in En Route Loss and Pre-spawn Mortality. Cohen Commission. 2011) and this has greatly affected survival of the salmon in the river. In that many trends are downhill, restoration has to be the order of the day and this proposal simply is another stressor and above all, any spills into the river which will be extremely harmful and an unacceptable additional risk considering the history and the state of the river.

## **7.0 Accountability.**

Accountability issues were also raised in above section. In that the VAFFC is a non-profit paper organization, how will it be held legally accountable by the public and the courts if necessary to cover damages during construction and /or during operation if there are any losses associated with land and / or water spills that may damage property or result in the loss of life or the use of the fishery or damage to habitat? Will the BC EAO require that the consortium put up a performance bond of at least a reasonable amount of money to address such contingencies i.e. in the range of 50 to 100 millions dollars?

In that the VAFFC volunteered to submit this project to the BC EAO, how are they legally bound to accept the recommendations of that process and certificate since it in law does not require that this project be reviewed under the BC EAO process?

I have written a note to DOE, CWS, DFO and BC MOE and asked them what is their position is on this proposal. To date I have had no response from them. When I called DFO two years ago, they had not even heard of what VAFFC was planning to do. ENGOs seemed better informed than one of our key environmental agencies. In that the roles of Environment Canada and CWS (CEPA, SARA and Migratory Birds Convention Act) and DFO (Fisheries Act) have apparently been muzzled by this BC EAO review process, where are they when it comes to taking a strong position in terms of protecting the wildlife and fisheries resources under their conservation mandate? Some 25 years ago DFO was front and centre in a public hearing to oppose the original proposal by the airlines to barge fuel up the North Arm of the Fraser River. They seem to have made no attempt to make their position public at any of the public hearings. Is this the new invisible government that we are to now expect in terms of environmental protection and the EAO process?

## **8.0 Risk of Fuel Transfer by Barges and Tankers.**

The casual reader is given the impression that the use of modern shipping methods using barges and tankers is almost fool proof and it is therefore very safe. The lowered rate of shipping accidents as indicated in the VAFFC risk studies is re-assuring but not in the middle of a globally significant estuary.

In my professional lifetime in environmental protection work on the BC Coast I have been involved in a number of Terminal spill and shipping accidents that have spread oil onto many habitat areas. In the mid 1970s a freighter (the Irish Stardust) with a Canadian pilot on board and modern navigation equipment of the day ran directly into an Island near Alert Bay and spread oil all over the Alert Bay islands area. At almost the same time, in excellent weather the freighters Erawan and Sundance ran into each other in English Bay and caused an extensive spills affecting the Vancouver – West Vancouver shoreline. Many years ago the Terminal at Cherry point caused a crude oil spill that spread onto the beaches of White Rock and Boundary and Mud Bays. The spill did kill waterfowl.

The above should not now happen but the EXXON Valdez also seemed to have a similar problem many years later and of very recent history a BC Ferry ran into an island on mid coast and sank and spread fuel around the area. Also the Nustucca fuel barge spill at Grey's Harbor contaminated much of the open West Coast from Washington to Tofino. Many more barge and ferry accidents can be referenced where fuel loss to the environment from ships or loading or offloading terminals has been an issue along the BC Coast.

Spills and shipping accidents are not uncommon and one occurs almost every 5 years along our coast affecting our beaches and fish and wildlife resources and property. The VAFFC proposal indicates the probability of up to a 50 barrel spill once every six years and over longer time periods much larger spills ie a probability of a 1000 Barrel spill every 32 years. The VAFFC seems to indicate that ship accidents and fuel spills rarely now occur and when they do occur, the fuel will quickly dissipate and not be a great environmental concern. Allowing such a projection of spills as to be expected and are acceptable in that they will have minimal impact in the Fraser River Estuary is simply unacceptable. This logic may apply to a more open docking facility but not in the biggest and most productive estuary we have on the Canadian West Coast.

Strong ocean winds can produce rough water conditions in the Fraser River water in the vicinity of the oil terminal site. With a flood tide, a spill under such conditions could direct the spill a few kilometers upstream into Richmond Shelter Island marina and house boat sites. There is probably a greater risk of a spill spreading downstream into the Richmond Islands – Ladner area and into Gunderson Slough and Steveston Harbour. One cannot just let a spill float

around a busy estuary for two or more days hoping for evaporation and dispersion to mitigate the problem. The risk is just too great to aquatic life and those that live on the river. Although the risk of a spill of kerosene to the river may only exist for a few days, the risk to a fish or bird that comes in contact with kerosene even for a few seconds or minutes could result in their immediate or eventual death.

## **9.0 The Long Term Jobs, Business and Fuel Security Implications for YVR.**

If this less than acceptable proposal was unwisely approved by the BC EAO how does this affect the Chevron refinery as a fuel supplier and the Morgan Kinder existing pipeline? At the most recent public hearing the impression was that the pipeline would probably be abandoned because all fuel would now come up the river and across Richmond to the airport.

Having totally control of your own pipeline and fuel supply may well be good for the many airlines supporting this VAFFC bid but is it acceptable when other unacceptable tradeoffs must take place? How many Canadian jobs will be lost with the closing down of the Morgan Kinder pipeline?

If the Morgan Kinder pipeline is shut down, how will Chevron get their Burnaby refinery fuel to YVR? Will they now load barges and take it out through the less than safe First and Second Narrows of Burrard Inlet, across the Sturgeons Banks mudflats and marsh habitats and up the Fraser River and add to the traffic volume in the estuary as caused by Barging oil from Arco in Washington State and other international off shore sites by means of relatively large PanMax tankers?

How will the Chevron refinery and Canadian jobs at that refinery fare if they are even less competitive due to the loss of their relative cost effective and safe Kinder Morgan pipeline directly from their refinery to YVR? Will Chevron cease to refine jet fuel?

Is there not a fuel security procurement security issue here especially in times of international incidents or emergencies such as an earthquake. Is it wise to put all of your eggs in one basket i.e. only one option requiring marine fuel transfer to a Richmond terminal on a large unpredictable river?

Finally, what would this fuel unloading terminal mean in terms of long term implications for bulk liquid transport on the Fraser River and its estuary? Some 30 years ago a bulk loading facility at No. 8 Road was advanced. A bulk facility was located at the old Dow/ Chatterton site on Tilbury Island across the river from the proposed VAFFC Terminal. Obviously there is a need for that type of a facility. Is this terminal just the tip of the iceberg and will it foster and attract more customers to this site for methanol or various other bulk exports or imports via

river shipping? Its existence would definitely not be a detriment to planning more commodity export or import at that site and therefore that terminal would be a terrible precedent and foot in the door. Such bulk shipments of toxic or deleterious substances have been largely phased out of the estuary and must be kept out of the estuary.

## **10.0 The Alternatives.**

It is fairly obvious that an objective review of other fuel supply options to YVR has been influenced by an unstated agenda than the VAFFC want total control of their fuel system and do not want to be obligated to work with other parties such as the existing fuel transfer facilities at Chevron, Kinder Morgan pipeline through Burnaby or even the fuel handling facilities at Cherry point. Economic advantages are often gained by not relying on middle parties to supply your product to your facilities. That luxury should not be at the expense of the environment. The jet fuel that is now used at the airport totally comes from Chevron refinery in Burnaby and from the Arco refinery at Cherry Point, Washington State.

To consolidate all fuel delivery into one option may not be wise given international situations, the future of fossil fuels and natural calamities such as an earthquake or extensive Fraser River flooding, or a fuel delivery accident including a possible failure of a pipeline. A number of examples of pipeline failures have occurred in the past few years but can most often be avoided by better pipeline maintenance and protection.

I agree with the VAFFC's rejection of an offshore or even a possible jetty Terminal in the Iona area. Considering all the engineering, the environmental impacts of building and risks of operating the terminal there and the unfavorable weather conditions, a new facility at that site is totally unacceptable despite the fact that the Mayor of Richmond seemed to promote that option for some unknown reason. To build any new industrial facility that handles large quantities of bulk fuel that is very toxic to aquatic life on the Sturgeon's Bank would also be an environmental disaster in waiting and compounds the impacts of the less than informed decision to locate a super port on Roberts Bank in the 1960s. Any industrial development on the remaining more pristine bank areas must be totally rejected.

In that Kinder Morgan has indicated that their pipeline from Burrard Inlet to YVR is in good condition (email to VAPOR in April 2011) and the fact that much of the YVR fuel does come from the Burrard Inlet Chevron refinery, it is only logical to maintain that option in that it has been in place for over 40 years and has served the airport well. One just has to be assured by Kinder Morgan that the pipeline

maintenance remains a high priority. Also if that pipeline is not subjected to high pressures by removing barged in Arco fuel it should be safer to operate.

Many have suggested that Kinder Morgan should upgrade their pipeline to a higher capacity and you then have one pipeline as has been the case for 40 years and you would not have any other fuel delivery to YVR. However to be fair and not demonstrate a NIMBY mentality, is it proper and ethical to direct more fuel traffic into Vancouver Harbor and through the high risk shipping bottle necks of the First and Second Narrows and expose West Vancouver, Vancouver, the North Vancouvers, Burnaby and the Pt Moody areas to the threat that we are trying to avoid in Richmond and the Fraser Estuary? However, the environmental sensitivity of fuel spills and traffic is of much greater risk to the Fraser Estuary than to Burrard Inlet. Human concerns may be another issue.

The Kinder Morgan pipeline is in place in a legitimate right of way and could be doubled or replaced with a larger capacity line. The negative aspect of increasing the capacity of the Kinder Morgan pipeline is that the extra fuel has to be shipped into Burrard Inlet from the Arco Refinery in Cherry Point, Washington. This makes little sense in that the fuel has to cross the outer Fraser River Estuary and enter Vancouver Harbor through two marine narrows i.e. First and Second Narrows. Any increased fuel transport into such a busy harbor with totally developed shorelines is not in anyone's best interests and Vancouver has already questioned the amount of fuel oil that is shipped through that harbor.

Likewise, if the VAFFC shipping and Fraser River marine terminal is approved, the Kinder Morgan pipeline may well be closed down as noted at the March 7, 2011 hearing. This would force Chevron (the only Canadian source of fuel for the airport) to reduce or shut down its jet fuel refining process or load it onto barges and ship it across the estuary and up into the Fraser River to access the VAFFC proposed Terminal in Richmond. That indeed would be foolhardy in that an efficient pipeline that has to date caused no great risk to people or environment would be replaced by more high risk fuel transport in the Vancouver Harbor and the Fraser River Estuary with a higher probability of spills into the estuary than stated in the reports.

It is strongly urged that the Kinder Morgan pipeline be maintained as a Chevron outlet for continuing its transport of fuel to YVR. Any expansion of that line would result in more fuel shipment into Burrard Inlet (e.g. from Arco) and that is not good planning.

The only logical option is to maintain and augment the Kinder Morgan line with another pipeline to YVR directly from the other main source of fuel i.e. the Cherry Point Arco Refinery in Washington State. Much of the fuel is already coming from there so why not transport it directly to the airport in a more environmentally friendly manner i.e. by a new pipeline?

Some will note that this is much further than just a pipeline across Richmond. Considering the pipeline technology and the thousands of miles of pipelines in North America and the miles of new ones that are laid each day, a line from Cherry point to YVR is no great engineering feat and is not that great a cost in comparison to building a terminal, dealing with the bigger people issues and the ongoing risk to people and the environment and ongoing significant shipping and pilotage costs to navigate it through the Fraser River Estuary for decades to come.

The VAFFC has stated that such a pipeline option from the Arco refinery had to be rejected in that that option contained too many jurisdictional issues and one could not assure security of that pipeline. This seems to be a feeble attempt to dismiss one of the better options that in reality would offer greater environmental security (i.e. less risk of spills and accidents) and therefore be more environmentally friendly and allay the fears of the people of Richmond.

Some may be concerned that the residents of Richmond will be opposed to a pipeline across Richmond regardless whether it's the one as mapped across Richmond from the Terminal to YVR or any other option. I would strongly disagree with that opinion in that a pipeline does not have to go near any populated areas to cross Lulu Island. A pipeline from Cherry Point would have to cross U.S. land jurisdictions and once into Canada could follow the far side of the ditch of the No. 99 Highway. The pipeline would be on BC Government lands and lead almost directly to YVR.

The VAFFC notes of a concern of a lack of pipeline security from YVR to Arco seems to have no basis. What threats has the Kinder Morgan pipeline been exposed to in its 40 years of existence?. How many deeply buried pipelines in the US North West been attacked by terrorists? None that I am aware of. The jurisdictional issues are also unconvincing and seem to be a bit of a smoke screen. Many Canadian content pipelines cross the border to the USA and more are planned e.g. Keystone Pipeline from Ft. McMurray to Texas.

More paperwork may be required to construct a pipeline from Cherry Point – Arco but when VAFFC can assemble a giant team and create a giant report to rationalize a terminal and pipeline in Richmond, it is not asking too much of VAFFC to direct their efforts to a logical option which reduces the greenhouse gas transport footprint and is not a real threat to the Fraser River Estuary. Canada seems to have many pipelines sending our oil to the US. Why is it an insurmountable obstacle to build a very small pipeline from Arco to YVR and pipe US ARCO jet fuel to YVR?

Some will also note that such a pipeline would have to cross several waterways including the Little Campbell, Serpentine, Nicomekl and the Main and North Arms of the Fraser River. Such crossings are very possible with directional drilling and with a deep crossing in a double walled line, with ample shut off valves and

modern duplicate system monitoring methods, the risk to the environment would be small in comparison to the weekly shipping of fuel into the estuary on barges and ships and the constant risk associated with the unloading of that fuel with known probabilities of spillage as acknowledged in the VAFFC studies.

## **11.0 Conclusions and Recommendations:**

- 1. The Fraser river and its estuary is still a globally significant estuary that is reasonably healthy and is a very productive ecosystem that requires a greater deal of due diligence in its restoration and protection. Shipping and unloading fuel in it is simply foolhardy planning.**
- 2. The present proposal is not well thought out as to the risk it will incrementally add to an already over stressed Fraser River Estuary. The shipment of large volumes of flammable and toxic fuel into the estuary for off loading in the middle of the estuary is simply unacceptable if we are to have a healthy estuary for many generations to come.**
- 3. The VAFFC studies do not adequately address the risk and cumulative risk this proposal adds to an already over stressed estuary and its aquatic life forms. Spill impacts have not been adequately addressed. In addition inadequate due diligence has been applied to containment of storage tanks rupture and little or no fire fighting capability is offered if fuel ignition occurs.**
- 4. Even if the environmental sensitivity of this proposal is ignored, other considerations seem to indicate that it is a proposal that is not well thought out and the obvious more environmentally friendly options have to be exposed to better public consultation and objective review.**
- 5. A pipeline, if constructed properly and well buried under waterways in armor and away from residential areas, is much more preferable to having jet fuels being transported in barges and ships into Burrard Inlet or worse yet, into the Fraser River Estuary.**



- 6. It is only logical option is to maintain the existing pipeline from Burrard Inlet that sends Chevron refinery fuel to YVR and since YVR needs more fuel all additional fuel from the Arco refinery must be transported to YVR via a new pipeline from that refinery i.e. the Arco refinery at Cherry Point and located well away from any human settlement areas ie in the highways rights of way.**
- 7. Building a new ARCO pipeline to augment the Burrard Kinder Morgan pipeline to the airport is a small investment when amortized over 50 years and when the true ecological and carbon footprint is taken into account. Installing such a pipeline should not be a difficult jurisdictional issue.**
- 8. If any additional fuel storage capacity is necessary it would occur on airport property where YVR needs the fuel and where YVR has the fire fighting capability to address any fuel fires.**
- 9. Greater local government and public consultation is required in projects of this type and the Federal government has to assume greater responsibility for the conservation and environment assessment of projects that most affect their mandate(s).**
- 10. The Federal and BC Governments make grandiose claims about reducing fossil fuel use. This proposal is to greatly enhance the use of more fossil fuel use by the airline industry. In that no limits or caps seem to be on any agenda, how can government reconcile the promotion of more development of this type and the use of more fossil fuels while claiming they are addressing the problem of reduced fossil fuel use and reduced global warming?**
- 11. The BC and Federal environment review processes are full of loopholes that allow them to largely ignore proper public project review when the impacts are significant and the public concern is very high. This voluntarily review as requested by VAFFC indicates how government has disemboweled the environmental review process with discretionary triggers and often meaningless economic thresholds and not according to real environmental risk and impact and real public concern.**

- 12. It would be a responsible move for the VAFFC to withdraw this application from the BC EAO process and rethink and submit a much better option that does not rely upon any marine or river transport of any fuels to YVR.**

Respectfully submitted by:

A handwritten signature in black ink, appearing to read "O. E. Langer". The signature is fluid and cursive, with the first name "O." and last name "Langer" clearly distinguishable.

**Otto E. Langer BSc(Zool), MSc  
Fishery Biologist and Aquatic Ecologist**

## **12. APPENDIX - Qualifications of Otto E. Langer**

I have an honors BSc(Zool) in biology with an emphasis on fish and aquatic ecology and a minor in chemistry. My MSc is in the field of fish biology / aquatic ecology.

I have been a project and management biologist in the Department of Fisheries and Oceans and Environment Canada for over 32 years. During that time I have personally investigated and directed team studies into many physical impacts on fish habitat and contaminant issues across Canada. I have been directly involved in the investigation and in the role of an expert witness into petroleum product spills into the freshwater and marine environments of BC, Alberta, Yukon and the North West Territories. Many of those spill were from ships, land based or from marine terminals. I have been qualified as an expert witness into harmful alteration of fish habitat and in the deposit of deleterious substances into fish frequented water in 100 different court cases.

During the latter part of my career I worked with the David Suzuki Foundation and established their Marine Conservation Team and directed that program for about four years.

I have lived in the Fraser Estuary in Richmond for almost 40 years and have a very good understanding of the geography of the river and its associated land base and of the life in the river and its estuary. I am very familiar with the history and the river and habitats around the VAFFC proposed Terminal site in Richmond and have done significant work along that section of the river during all seasons over the past four decades. I do feel I have good expertise on the state of the Fraser River and of the impacts that can cause the greatest threats to fish and aquatic life and their associated habitats in the river.

OEL April 26, 2011