



# City of Richmond

Schedule 1 to the Minutes of the  
General Purposes Committee  
meeting held on Monday,  
January 16, 2012.

## Memorandum

Fire-Rescue Department

**To:** Mayor and Councillors  
**From:** Tim Wilkinson  
Deputy Chief - Operations

**Date:** October 13, 2011  
**File:**

**Re:** Response to Jet Fuel Pipeline Update Referral From  
September 12, 2011 Council Meeting

### Origin

This memo addresses the following staff referral made by Council when discussing the "Response to Jet Fuel Pipeline Update" item at their September 12, 2011 meeting:

*"In addition, staff were directed to provide an update regarding the implications for the City's emergency response in case of a fire or other disaster involving the jet fuel line or the proposed fuel storage facility."*

### Background

Vancouver Airport Fuel Facilities Corporation (VAFFC) has been examining various delivery options to secure a jet fuel supply for Vancouver International Airport (YVR). The proponent indicates in their proposal that the current delivery system is unable to meet YVR's fuel requirements during peak periods without the use of daily tanker trucks to augment the system. VAFFC evaluated 14 options and identified a preferred option.

VAFFC's preferred option consists of a marine terminal and fuel receiving facility (tank farm) at an existing industrial site located on the south arm of the Fraser River, and an underground jet fuel pipeline connecting the marine terminal with the receiving facility and YVR.

### Risks Associated with the Preferred Option

The activities conducted by a fuel services operation have inherent risk associated with them. VAFFC proposes to receive, maintain and transport through a pipeline Jet "A" and Jet "A-1" fuels. These fuels are a kerosene-type distillate with a flash point of 38-41 degrees Celsius which makes the fuel difficult to ignite but once ignited difficult to extinguish. Jet "A" fuels are considered to be relatively low in toxicity causing only minor irritation when coming into contact with skin or eyes. Jet fuels will not readily biodegrade and the possibility of bio-accumulation exists.

From the time the fuel enters the fuel system until it is finally loaded onto an aircraft there are a variety of risks that require consideration. The main risks are as follows:

1. Natural events – lightning strikes, earthquakes, etc.
2. Intentional damage to the fuel system
3. Fire
4. Fuel spills
5. Catastrophic failure of one or all tanks at the tank farm
6. Equipment failure
7. Pipeline rupture

There are only two alternatives for combating a jet fuel fire - either to let it burn out and thereby self extinguish or alternately actively extinguish the fire using fire fighting agents.

Allowing a tank to self extinguish is likely to take days, assumes a complete loss of product, environmental problems and large cooling operations to protect against fire spread to adjacent tanks. In addition to these hazards in some severe cases a boil over or BLEVE may occur which will lead to catastrophic failure of the tank(s).

Statistics gathered by the Swedish National Testing and Research Institute regarding tank farm fires indicate that between 1951 and 2003, some 480 tank fires were reported. Two recent examples of tank fires that have burned for extended periods occurred at Miami International Airport in March of 2011 and Bayamon Oil Refinery (San Juan, Puerto Rico) in October of 2009.

In the case of a large tank-fire occurring, extinguishment will only be achieved through the use of fire fighting agents within automatic fire suppression systems and a fire fighting crew equipped with a large fire fighting agent capacity within close proximity.

### **Emergency Response**

Large scale tank fires are rare, but when they occur they present a severe challenge for any fire department. The impacts to the City of Richmond in providing emergency response to a fuel tank farm and/or its associated pipeline cannot be underestimated.

Richmond Fire-Rescue's (RFR) response to the proposed tank farm area is currently 9 minutes from both the Crestwood and Shellmont Fire halls. This response time is outside the industry standards (NFPA 1710) of 4 minutes and 20 seconds. An extended response time allows a small fire to grow exponentially into a large fire thus rendering the event larger than that which RFR is currently equipped or staffed to manage.

Vancouver International Airport (YVR) does have a trained fire response team with significant fire suppressing capability. While the YVR response capabilities would be helpful in response to fighting a tank farm fire, RFR can not rely on this resource. YVR fire response crews would assume no role outside of the aerodrome's secure area as their primary duty is dedicated to Aircraft Rescue Fire Fighting.

A fire in a tank farm can burn for days expelling large doses of CO, CO<sub>2</sub>, sulphur and soot into the environment. A significant fire could potentially burn for up to one week. Given prevailing winds, it is very conceivable that Steveston Highway, Highway 99, the George Massey tunnel and surrounding area roadways may be impacted with no or low visibility due to heavy black smoke from a fuel tank farm fire. The low visibility and impact on traffic flow will affect RFRs response times as direct routing to the fire may not be possible.

Residences and businesses in the Watermania and Ironwood areas may be significantly impacted by a "shelter in place" order in the short term or an evacuation order for a longer period of time due to the health issues with the smoke. However, it is noted that evacuation into the smoke will be hazardous unto itself, especially for the vulnerable population and challenges to complete logistically and safely. Residents may be only able to return to their home for a brief period of time even after the evacuation order has been lifted and the fire response is complete. The limited return is due to the continuing impacts of the smoke or other resulting contaminants from the fire. Additionally, there will be an environmental impact to the Fraser River from the fire.

RFR is identified in the City of Richmond Emergency, Spill Response and CBRNE plans as the lead agency in the case of a major fire, or fuel spill within the boundaries of Richmond.

RFR does have a capable and ready Hazardous Materials Team. This team is not equipped or staffed to mitigate a fuel spill that resulted from a catastrophic failure of one or all of the proposed tanks nor a catastrophic failure of a pipeline. To mitigate an event of this magnitude RFR would engage the services of several lower mainland fire departments through existing mutual aid agreements. There would be significant costs associated with provision of the mutual aid services over an extended period.

RFR has studied the activities of Phoenix Regional Fire who service Sky Harbour Airport in Phoenix, Arizona. Phoenix has a fire station located close to the tank farm with an additional two stations located within minutes of the tank farm who also have tank farm fire fighting capacity. Phoenix has specialized equipment, stringent fire prevention planning and enforcement, specialized training for fire fighters and mutual aid response agreements in place to mitigate the tank farm fire and spill risk.

RFR would recommend a fully staffed Fire Station be situated sufficiently close to the tank farm site to mitigate the risk. A fire station is estimated to cost \$7-8 million in capital, land and construction costs, purchase of a fire apparatus costing \$1.2 million and operational staffing of 24/7 crews are approximately \$2.5 million annual cost (2010 collective agreement). RFR personnel would also need to be trained in shipboard and tank farm firefighting techniques as this is not part of RFR's current training platform.

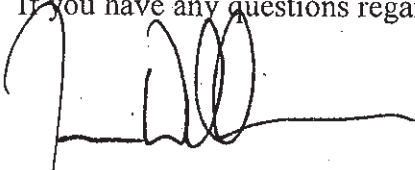
Currently, fires that occur aboard a ship midstream are the responsibility of the Canadian Coast Guard however once a vessel is moored it is the responsibility of RFR. RFR does not have the capacity or training to fight fires that occur aboard ships. To mitigate this risk, RFR would, at a minimum, enter into agreements with other agencies to provide on-the-water fire coverage.

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The City of Richmond has requested that the VAFFC group assume the costs associated with this proposal and to date, the VAFFC has not agreed. The VAFFC responds that the tank farm will have a state of the art suppression system in their plan but RFR has not been made privy to their plan despite requests to be provided with the information.

If you have any questions regarding this information I would be pleased to answer them.



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