

A Perfect Scenario for a Horrible Environmental Disaster in the Pacific Northwest

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1 - Introduction

This paper is about a severe threat to the Pacific Northwest coast of North America, and specifically to the coasts of British Columbia, Southeast Alaska and Washington. The threat arises from the proposal by the Canadian pipeline company Enbridge Inc. to ship diluted bitumen from the Alberta tar sands via pipeline and a fleet of supertankers through the heart of the Great Bear Rainforest of the BC coast. The environmental assessment undertaken by the Joint Review Panel of the National Energy Board has been in progress since July, 2010. The environmental assessment process has been extensive. Public hearings have been conducted in many communities in Alberta and BC over many months and hundreds of written submissions have been received. Now, in late January, 2013, the last of the oral comments have been received and the Joint Review Panel must consider all the issues and inputs and complete their assessment and make their recommendations.

2 - About the Proposed Enbridge Northern Gateway Project

The Enbridge Northern Gateway Project involves the construction of two pipelines and the construction and operation of a Marine Terminal in Kitimat, British Columbia. The two pipelines are each approximately 1,170 kilometres in length, from Bruderheim, Alberta to Kitimat. One line would carry on average 525,000 barrels per day of diluted bitumen (dilbit) west to Kitimat. The other line would carry on average 193,000 barrels of condensate per day east to Bruderheim. Condensate is used to thin bitumen for pipeline transport. Enbridge is already considering to increase the initially stated capacity significantly over time.

The Kitimat Marine Terminal would have two ship berths and a number of storage tanks for condensate and dilbit. A fleet of supertankers, operating under foreign flags, would transport the dilbit to markets in Asia and would bring back the condensate for re-use. The initial capacity would require approximately 250 supertanker trips per year.

It is clear that the risk of severe environmental damage due to an oil spill is great. This applies equally to the pipelines and their route as to the tanker traffic. However, this paper will be focused only on the issues around the proposed tanker traffic on the BC Coast.

3 - About the Beauty and Treasure of the BC Coast and the Great Bear Rainforest

Before considering the risks, it is important to consider the beauty and treasure of the BC coast. The author and his wife are intimately familiar with the BC coast from many years of exploring it on board their sailboat S/V Raven Song (see Appendix A). The author recites:

“Raven Song lies at anchor in a pristine bay surrounded by virgin forest of spruce, hemlock and cedar trees in the heart of the Great Bear Rainforest. A small creek gurgles out of the forest at the end of the estuary and winds its way leisurely through the meadows and mudflats toward the sea. We sit in our dinghy and I row slowly into the estuary, following the creek. Pink salmon are milling around in the brackish waters, and some have started to make their way upstream. We are waiting for the appearance of the Spirit Bear that supposedly visits this estuary. To see a Spirit Bear would be the highlight of the whole summer cruise. These bears, also called Kermode Bears, are part of the black bear family, but have a white coat. They are extremely unique and rare. There are fewer Spirit Bears in the world than there are Panda bears. We sit and wait. We observe; we listen; we take in the smells of nature. We enjoy watching a group of ravens in the trees at the edge of the forest and take delight in a unique concert of raven vocalizations, especially since our boat’s name is Raven Song. Some bald eagles are also here. All the species are waiting for the salmon to start their spawning and dying and to provide a buffet for the waiting guests. So far, we have seen various black bears but no Spirit Bear.

Three days later - our seventh excursion into this same estuary: Meanwhile, we have gathered up enough courage to leave our dinghy and walk onto the grass flats. We are standing above the creek on a high bank and survey almost the whole estuary. We are still waiting and almost ready to quit and move on. --- There, we can almost not believe our eyes! The long awaited Spirit Bear suddenly walks out of the forest. He leisurely ambles along the creek shore down to the outer edge of the estuary. Then he crosses over to the other side – our side. Now he walks up towards us through the mudflats and grassy patches. We don’t move, but he has seen us and keeps coming closer. Our hearts are racing. Finally he stops, stands motionless and stares directly at us. Such a beauty of a bear! His black eyes and black nose stand out from his clean, white fur. Our waiting has been fully rewarded. We hardly dare to breathe. Now he turns away and moves on past us deeper into the estuary, where he climbs over a fallen tree and disappears into the forest behind a curtain of tree branches heavily hung with Methuselah’s beard.”

The above is just one example of how a visitor can enjoy the beauty of the BC Coast. Annually, many Canadian and foreign visitors have similar experiences on the BC Coast while they visit with their own vessels or through one of the long established tourism organizations. The author’s personal adventures have included many wonderful moments experiencing this pristine natural environment, including:

- black bear mothers with up to three cubs, grizzly bear mothers with their cubs, wolves, river otters, minks;

- bald eagles, ravens, the rare tufted puffins, many other varieties of sea birds and waders;
- humpback whales feeding and breaching and playing at the surface (including in Caamano Sound - directly on the proposed tanker route);
- gray whales, minke whales, pods of resident orcas, transient orcas, Pacific white-sided dolphins, Dall's porpoises;
- sea lions on their haul-out rocks and in their breeding colonies, harbor seals, sea otters feeding and resting rafted up in large groups;
- the rich and colourful underwater life of sea stars, sea anemones, sea urchins, nudibranchs, kelp forests;
- the rich seafood selection, including salmon, rockfish, ling cod, sable fish, halibut, flounder, crabs, prawns, clams and oysters.

In addition to the rich animal world, there are the spectacular mountains, the dense, moss draped old-growth forests, the giant cedars, Douglas firs and Sitka spruce, the rocky shorelines and the white sand beaches.

In considering the richness and treasure of the BC coast and the whole Northwest Pacific region of North America, we must include the rich culture and traditions of the First Nations. The First Nations people have been living here in harmony with nature for thousands of years. The richness in the marine-based food supply has enabled them to develop a unique culture and art forms that have survived to this day, and are flourishing. Their art forms are considered treasures around the world. First Nations live in various settlements up and down the coast and, to some extent, are still following their traditional food gathering customs.

The pristine natural environment along the BC coast and especially the area of the Great Bear Rainforest, in combination with the distinct human culture of this area, is a treasure that needs to be protected forever, for all Canadians, for all future generations, and for the world.

As a nation, instead of debating whether to allow the destruction of all this with a massively polluting industrial project, we should decide to create a Great Bear Rainforest National Park.

4 - Specific Risks related to Tanker Traffic

Now it is high time to talk about the specific risks arising from the proposed tanker traffic that would eventually lead to a horrible oil spill. Many informed people have expressed the sentiment that it will not be a question of IF, but of WHEN.

4.1 - Tanker Routes through Long and Narrow Channels

All distance measurements that follow are given in nautical miles (NM) – one nautical mile is equivalent to 1.85 kilometers.

Two routes that lead to the open sea from Kitimat have been identified, a northern one and a southern one. The southern route via Caamano Sound is about 94 NM long. The northern route is 110 NM to Browning Entrance. For the northern route, two branches from Browning Entrance to the open sea have been identified, a northern exit via Dixon Entrance and a southern one via Hecate Strait. The northern exit via Dixon Entrance is an additional zig-zag course through shallow areas and reefs of 65 NM to truly open sea in Dixon Entrance. The combined total distance for the northern route with the northern exit is 159 NM. The tanker routes lead through narrow channels with many turns. The narrowest clear channels are less than 1 NM wide. While the channels of the Inside Passage are quite deep, the scariest part of both routes is that they lead through a maze of reefs and shallows to reach the truly open sea, once the inside passage has been left behind.

4.2 - Difficulty of Maneuvering Large Tankers

Three sizes of tankers have been proposed, in tanker-speak: Aframax, Suezmax and VLCC's, or very large crude carriers. On average, these range in length from 220 meters to 340 meters for the VLCC. The proposal also calls for the use of two escort tugs from Kitimat to the open sea, one tethered to the stern of the tanker and one non-tethered. I quote from information published by Enbridge "in order to reduce the risk of grounding by as much as 90%." **Is this not the biggest red flag?** Of course, it is an admission of risk due to the difficulty of maneuvering such large ships within such confined waters!

Even the smallest of the above tankers would be larger than Vancouver's tallest building, the 62-floor Shangri La hotel with 201 meters. A loaded supertanker requires about 2 kilometers to make a complete turn, and it needs about 15 minutes and as much as 8 kilometers to come to a stop. Enbridge talks about operating at reduced speed within the confined waters. However, reduced speed also means reduced maneuverability and especially reduced ability to keep a bearing in severe weather. This brings us to a discussion on weather.

4.3 - Severe Weather

The BC north coast is known for severe weather. A weather chart of March 1, 2011 shows a deep low with developing hurricane force winds approaching the very southerly entrance of Hecate Strait. Another weather chart of October 19, 2000 shows a severe storm approaching the same area. Similar storms occur on a regular basis multiple times every year, especially in the winter months, when the coast is hammered with deep low pressure systems just a few days apart. The highest recorded gusts in Hecate Strait for the months of November through March are 104 knots or 187 km/hr. The term "Hurricane Force" is used for wind strength of 64 knots or greater.

In severe weather, strong winds create large swells in the open sea. When these swells hit the shallowing coastal sea floor, their crests are pushed up to immense heights. This is the established,

legendary reputation of the shallow areas of Hecate Strait, where wave heights can increase to over 10 meters and wave heights of 20 to 30 meters have been recorded. Of particular concern is the rapidity with which seas can increase, often within hours. This applies equally to the northern and the southern route, but is perhaps more severe on the northern route due to the expansive areas of shallow water and the increased wind speed caused by the funneling of the wind between the gradually narrowing space between Haida Gwaii and the mainland.

Imagine coming out from the relatively protected channel into what looks like open sea, only to hit a wall of severe weather and knowing that you still have to follow a zig-zag course of 65 NM maneuvering around unseen obstructions below the water's surface before truly reaching the open sea, as is the case for the northern exit of the northern route.

Let us consider the "protected" channels. On paper, the channels from Kitimat to the entrances from the open sea look relatively protected. They are protected from the ocean swells only, but less protected from strong winds. In the few times the author has been within these channels, he has experienced 50 knot gusts of wind on two occasions. In the winter months, these channels see inflow and outflow winds of up to 50 knots of sustained wind with gusts to 75 knots.

4.4 - Large Tides and Currents

Additional threats arise from tides and currents. The difference between high and low tide in this area of the coast reaches about 21 feet or 6.3 meters on a spring tide, when the height differences are the greatest. Spring tides occur at full moon and at new moon, in other words, every two weeks. Furthermore, the usual semidiurnal tides of the coastal waters go through the cycle of high-to-low twice per day. Because of these large height differences, and the extensive water area within the network of channels of the Inside Passage, large volumes of water flow in and out all the time. These tidal currents, reaching up to five knots near the entrances, add to the difficulty of maneuvering a ship, especially when the ship operates at reduced speed.

4.5 - Reefs and Shoals

Hidden reefs occur far from shore. This is especially the case on the southern route just outside of Caamano Sound. Here a ship must wind its way in a slight zig-zag line between hidden reefs between Dewdney Island and Rennison Island, but must be very careful to stay away from dozens of hidden reefs on both sides of the route. Many of these reefs are underwater mountain peaks that reach up from the deeper surroundings like fangs ready to catch their prey. Once a ship runs into one of these reefs there is a very real danger that it gets stuck on it and cannot be freed with any amount of tug power. Add to this a falling tide and the stress to the unevenly supported hull becomes immense and the ship is in danger of breaking apart in short order in the pounding it may receive from the swells. The Titanic broke into two pieces due to being unevenly supported while sinking. There are pictures on the internet of the containership Rena breaking apart after it ran into a reef in New Zealand in October 2011.

On the northern route, there are fewer reefs but there are extensive areas of shoals. The challenge here is the mere length of the zig-zag route with sufficient depth of the northern exit to Dixon Entrance. Any significant deviation from the route and the tanker is stuck in the sands that extend out from Rose Spit on Haida Gwaii.

4.6 - Pressure to Keep Going

The above factors, including the tanker routes through long and narrow channels, the difficulty of maneuvering large tankers, the severe weather, the large tides and currents, and the reefs and shoals combine to make safe navigation of the proposed tankers a significant challenge. Now add to this the inevitability of significant pressure to keep going. With the proposed rate of about one tanker every second day, year round, such pressure is predictable. This pressure will be derived from hard economic parameters, such as: 1.) the sizing of storage capacity at both ends of the tanker route and the pipeline (more capacity is expensive); 2.) the need to keep the pipeline flowing (shut-downs are expensive); 3.) the need to keep the upgrading and refining processes going (shut-downs are expensive).

Based on these economic pressures, decisions to keep the tankers going may be made in spite of the navigational challenges and in spite of the knowledge that weather conditions may worsen rapidly while underway. This will clearly increase the risk of an accident.

4.7 - Human Error

Now we have arrived at the most significant risk: that of human error. Human error has probably sunk more ships than technical failures. Three examples are relevant, all from relatively recent collective memory:

1. In 1989, the “Exxon Valdez” was run by its officers into Bligh Reef, just outside Valdez, Alaska. Apparently, the captain had prematurely retired to his cabin and was drunk when the accident happened. Bligh Reef lies at the very edge of a five NM wide channel leading out to the even wider Prince William Sound.
2. In 2006, the BC Ferry “Queen of the North” was driven straight into Gil Island. The officers on the bridge failed to make a routine 11 degree course change while navigating at night in the same very confined channels that the tankers would go through.
3. In October, 2011 the container ship “Rena” was run by its officers into Astrolabe Reef near the north end of New Zealand.

In each of the above three cases, driving the ship into a reef or island was sheer stupidity, and should have been absolutely avoided given the modern navigational aids and systems. Each case also resulted in a catastrophic event. The one with the most severe environmental impact was, of course, the oil spill from the Exxon Valdez of up to 750,000 barrels into the pristine waters of Prince William Sound.

Transport Canada has already approved the proposed tanker routes through their Technical Review Process on the basis of technical factors and the calculation of probabilities of failure, but the possibility of human error has been left out of the picture entirely. The above three accidents, all due to human

error, have clearly trumped all calculations of probabilities. These incidents fit the definition of what engineers and insurance actuaries call Low Probability / High Consequence Events. The term “Low Probability” applies only if human error is left out of the equation.

Accidents are often the result of unforeseen events, which may be individually associated with various risk factors, occurring and coming together at the most inopportune time. These situations add to the challenges faced by the people involved and increase the likelihood of human error occurring at the same time.

This is exactly what will happen on the BC coast if the Enbridge Northern Gateway is allowed to go ahead. As many people have already said, if the project is allowed to go ahead, a significant oil spill is not a question of IF, but WHEN.

This assertion becomes especially valid if we consider the facts from a survey of the European Maritime Accident Review. In the heavily monitored and regulated waters around the European Union, there have been no less than 2,430 ship accidents that involved sinking, collision, grounding, fire, explosion and other significant accidents since 2005. Of these, 106 accidents involved tankers running aground and 155 involved tanker collisions.

5 - Potential Impacts Arising from a Diluted Bitumen Spill

5.1 – Geographic Extent of Diluted Bitumen Spill

What would be the impacts of a large oil spill on the BC Coast? The consequences may be far greater than what was the case with the Exxon Valdez. The Exxon Valdez was smaller than the largest of the proposed tankers. It had a capacity of 1.5 million barrels, of which up to half was spilled. The other half was pumped out of the stricken ship into barges or other tankers. This kind of recovery operation is only possible when the weather conditions are not severe and other ships can approach close enough. The Exxon Valdez grounding happened in the relatively protected waters of Prince William Sound. If a similar grounding happens in severe weather to one of the tankers near the exit into Hecate Strait such a pump-out operation may not be possible because other ships and barges may not be able to approach safely in the high swells. Furthermore, help will be much farther away because of the remoteness of the area. Consequently, the amount of oil spilled may be far larger.

The Exxon Valdez spill was bad enough. When one superimposes the map of the affected area from the Exxon Valdez spill onto the BC coast, it becomes evident that everything from mid Vancouver Island to the BC north coast, all of Haida Gwaii, and about half-way up Southeast Alaska would be affected. This is a patch of coastline with a length of 520 NM. The diluted bitumen may also disperse even wider due to strong currents and wind. Haida Gwaii is an island archipelago adjacent to Hecate Strait that has also been called the Galapagos of the Pacific Northwest because of its richness in marine life. It is also the site of Gwaii Hanas, a National Park and the site of the former Haida village of Ninstints, a UNESCO World Heritage Site.

5.2 – Environmental Impact of Diluted Bitumen Spill

First and foremost, a spill would lead to the destruction of the extensive marine life and fish habitat and would severely impact the whole food chain from the smallest microorganisms to the largest marine and land mammals and countless bird species. Fisheries would be impacted and some may be destroyed altogether. In 2009, on the 20th anniversary of the Exxon Valdez disaster, the author listened to a presentation at the Vancouver Aquarium by Dr. Riki Ott, a marine toxicologist, author, and former commercial fisher in Prince William Sound. She was one of the first people on the scene of the Exxon Valdez oil spill. She told us what she experienced and what the impacts were. Two things from that presentation remain in the author's memory vividly. The first is that even 20 years after the disaster, when you dig a hole into the sand of a beach, you can see a sheen of oil on the water that seeps in from the sides of the hole. The second is that the lucrative herring fishery has not returned yet.

A further consideration is the behavior of diluted bitumen. A large spill of dilbit into the Kalamazoo River in Michigan, in the summer of 2010 from a broken Enbridge pipeline, has shown that much of the bitumen sank to the bottom after the condensate evaporated. It is not clear how the dilbit would behave in the cold Pacific Northwest saltwater. Of course, if it sinks to the bottom it will never be cleaned up.

Other potential impacts include the destruction of a way of life for local settlements, first nations and western, and the destruction of world class tourism businesses up and down the coast. Worst of all would be the destruction of the beauty of this region for all Canadians and visitors.

There are also impacts that would occur even without a large oil spill. The tanker traffic would run right through a rich wildlife habitat for marine mammals, including the commonly-seen humpback whales. Their social life and feeding behavior depends on their long distance under-water communication abilities that would be impeded by ship noise. Collisions with whales would also be unavoidable.

Tankers that sail to Kitimat would arrive loaded with sea water from Asia as ballast. This would be pumped out in preparation for loading diluted bitumen. Surely there would be contamination of the local waters with foreign marine organisms, and possibly with oily residue, from this activity occurring every second day.

6 – The Accident Scenario

6.1 – How Do Accidents Happen?

Risk analysis studies, on the basis of technical matters, have indicated that the probability of a major oil spill from this project is low – **BUT IT IS NOT ZERO.**

Accidents typically happen due to a series of mishaps occurring at a most unfortunate conjunction. Additionally, the added stress and urgency of action leads to a heightened probability of human error

occurring at the same time. Over time, the likelihood is increasing that some scenario, similar to the one described below, will play itself out on the BC coast.

A serious tanker accident on the BC coast may be considered a “Low Probability / High Consequence” event. **However, a low probability is not an argument to downgrade the potential severity of a major oil spill.**

6.2 – The Scenario

Here is a scenario leading to a serious tanker accident that is **hypothetical, but entirely possible**. Assume it is now some years after the proposed Northern Gateway tanker traffic was initiated.

Weather Synopsis

It is late fall and the weather patterns of the North Pacific are such that severe storms are approaching the coast of BC on a regular basis.

In Kitimat, at the Loading Terminal

One of the supertankers, the “Golden Pearl,” is being loaded and departure is scheduled for late afternoon tomorrow. The captain is monitoring the weather situation constantly. A deep low is approaching rapidly, but it is predicted to pass over the coast on its track towards the BC interior late tonight. The captain concludes that he can likely take the tanker out after the passage of this low, late tomorrow, and before the next low arrives.

Meanwhile out in Hecate Strait

A mystery ship is struggling through the building seas. It is a rusty hulk of an old freighter that has been at sea for three and a half months on its way from a remote island in the Andaman Sea, near Sri Lanka. In its hold are refugees who are sick and fear for their lives. They have paid their money and have put their lives in the hands of a people smuggling gang. Their ship, the “Hanuman,” should have approached the coast many weeks earlier. But they had engine and steering system trouble during their journey that slowed them down. The captain is very tired and worried, but he cannot do anything about it. He is even more worried now that his digital charting system has broken down and nobody on board can fix it. He must now make do with only a few outdated small-scale paper charts of the BC coast, that show little detail. He is aware that the weather is worsening, but he is not aware just how serious this can get in the waters of Hecate Strait.

At the Coast Guard Station in Prince Rupert

Officers have recently become aware of the mystery ship coming into BC waters via Hecate Strait from the north. They have seen it on their coastal radar but have not been able to contact it. Radio calls on Channel 16 have not been responded to and the “Hanuman” does not have AIS, the satellite based Automatic Identification System. They have alerted the lighthouse keeper on Bonilla Island, off the west Coast of Banks Island, to keep a lookout for the mystery ship.

At the Coast Guard Maintenance Facility

The maintenance manager is debating what to do about the intermittent outage of their coastal radar installation, the Alpha 3. This station was installed in the vicinity of Caamano Sound, on the tanker route, specifically to assist with safe navigation for the tanker traffic. If the weather was better, he would send a maintenance technician out by helicopter, but now he must be concerned about the safety of the helicopter and is holding off for now.

On The Mystery Ship – The “Hanuman”

It is night now and the storm rages as the low passes over the coast. The seas have become unexpectedly rough. The captain has never seen anything like it. He has slowed the ship down and is struggling to keep steerage through the heaving ocean. He has decided that his only salvation will be to escape the open sea into the inner channels via Caamano Sound.

In Kitimat, on Board the Supertanker - The “Golden Pearl”

The night has passed, and with it the low pressure system. A new low is approaching and the captain is keeping himself informed about the new low. He is confident that he can make it out before it gets too close. After all, his job is to keep the tanker traffic going if at all possible. The two BC coast pilots concur with the decision to head out. The loading has been completed and preparations are made for departure. The tugs are ready and everything looks to be more or less routine, except for the worsening weather.

At the Weather Office of Environment Canada

A new low is approaching the coast. The forecasters are studying it on their computerized weather plotting and analysis system. Unfortunately, no data is coming in from South Nomad, one of the weather buoys out in the ocean. They must work with a slightly incomplete set of data, but the emerging picture is that this low will be more severe than its predecessor. Barometric pressure is dropping more rapidly and the forecasters are considering to call for at least a storm warning. That means winds of 48 to 63 knots, or just one notch below what would be called “hurricane strength” in official marine weather jargon.

On Board the Supertanker – The “Golden Pearl”

The tanker is on its way. One tug is leading the way and the other is following behind, with a hawser tethered to the stern of the “Golden Pearl,” as per prescribed procedure. The captain is following the usual route and plans to cross through Caamano Sound toward the open sea in about 10 hours. He has, by now, done this route a few times and knows all the waypoints and turn points. Besides, he is also accompanied by two pilots, who are experienced with these waters. The ship is well equipped with multiple digital charting systems, GPS receivers, AIS transceivers, VHF radios, radars, depth sounders, and everything that is required to make such a ship as safe as possible. The estimated time to cross Caamano Sound is 3 am. Some hours later, while they are approaching Caamano Sound, the marine weather radio is announcing an upgrade from the existing gale warning to a storm warning.

At the Coast Guard Station Prince Rupert

The officers are getting more and more concerned about the mystery ship. The lighthouse keeper on Bonilla Island never saw it and the coastal radar lost sight of it as it seemed to disappear close behind the southern portion of Banks Island, where Hecate Strait is shallow and where there are reefs and rocks. They might see it if they had the Alpha 3 radar, but this one is out of commission at this time.

On The Mystery Ship – The “Hanuman”

Things have turned for the worse. A large wave has smashed one of the windows on the bridge and saltwater was poured onto an electrical panel. Soon after that, a short circuit has shut down deck lighting and the forward looking search light. The stressed captain hopes that they can make Caamano Sound sometime after midnight.

Around midnight the “Hanuman” has cleared Banks Island and is now in the west of Dewdney Island, close to its shore. Visibility is terrible. The seas are heaving. The captain does not see the white water surrounding a shoal until it is too late. Fortunately, they don’t strike the shoal head-on, but just scrape up against it on their port side. They are freed quickly when the next wave carries them off with an awful screeching and banging noise. Now in deeper water again, the captain can just make out the navigation light on Jacinto Island, near the entrance to Caamano Sound. At the same time he realizes that the rudder does not seem to respond properly to his frantic steering input at the helm.

On the Supertanker – The “Golden Pearl”

The weather has become much worse than expected and it seems to be worsening still. The “Golden Pearl” is steadily and securely entering Caamano Sound. It has just cleared the southern cape of Campania Island and is now buffeted by very strong wind squalls from dead ahead and huge swells that send white water over the bow as the ship is plowing into the waves. The captain now thinks to himself that it would have been better to delay departure. From here they have about 16 nautical miles to the more open seas of Hecate Strait.

Unfortunately, these are the most dangerous miles of the whole route and the captain and the pilots are keenly aware of this. This is the area where the biggest swells can be expected and where their route is flanked by underwater reefs. At least they are going into the weather head-on and can maintain good steerage. They pass the tiny Dupont Island and they can even faintly see the flashing navigation light on the island through the rain squalls.

As they remain glued to their instruments and glance out into the pitch black night occasionally, they suddenly see a faint light to starboard where none is supposed to be. What could it be? Now they all stare out in the light’s direction. The light disappears –and then rises again. All of a sudden they also have a radar echo showing up on the radar screen. It has unexpectedly appeared from behind Dupont Island. “Damn it, this is some kind of a ship!” the captain screams and he signals to the engine room for a reduction in power. At the same time he pulls the steering joystick hard to port, to avoid a collision. He also calls the tethered tug for steering assistance by pulling the stern to starboard. Now this tug swings

out to starboard and begins to pull hard on the hawser that is connected to the bollard on the tanker's stern deck. The tanker responds slowly.

The tug now faces increasingly large swells because it is more fully exposed to the direction from which the swells come in. The strain on the hawser and the bollards becomes excessive whenever a heaving swell pulls hard on the tug. The hawser suddenly parts and the recoil almost sinks the tug. The captain quickly learns that the tug is no longer tethered. The mystery ship is dangerously close and the captain calls for full rudder and full power to make a desperate turn to port. The ship does respond, however only slowly. As it makes the turn, it becomes fully exposed on its starboard side to the swells, which send plumes of white water up on deck and occasionally to the bridge.

So far, the supertanker has successfully avoided a collision with the mystery ship, but it has also given up its intended course through the channel on the north side of Aranzazu Bank. They have altered course by 45 degrees to port. Now they are headed for the vicinity of two potentially dangerous rocks, Cliffe Rock and Evans Rock, to the west of Rennison Island. There is a clear channel between these two underwater obstacles, but it is tight and requires a zig-zag course.

The captain reduces power again in order not to accelerate the tanker too much before entering the channel between the rocks. But, the reduction of power also reduces steerage. Because of the altered course, the ship is now more fully exposed broadside to the force of the severe weather on its starboard side. The effects of wind and the heaving seas, as well as the strong in-flowing tide, work in unison to cause the ship to make more leeway to its port side and the vicinity of Cliffe Rock than comfortable.

The captain realizes that the leeway is too much and increases power again. The tanker responds, but only slowly. The captain calls the tugs to standby on the tanker's port side. The tugs go into position but cannot help while the tanker is making forward motion. Everybody on the bridge is in near panic. They find themselves in the worst nightmare scenario, surrounded by shoals and reefs in a major storm in one of the worst bodies of water the world knows, and on top of that, they find themselves nearly broadside to the severe weather in a tight channel. "Damn that mystery ship. Why did the coast guard not know any better where it might be lurking!"

Cliffe Rock rises from a depth of over one hundred fathoms to just two fathoms under the surface. While the rock can't be seen, the white water surrounding it is clearly visible, even in the dark night. The mighty tanker drifts ever closer. A collision seems unavoidable. The captain cuts power and calls for the tugs to initiate their pushing action. The tugs go into position and race up their engines to screaming. But they cannot make headway against the battering seas. The aft tug is in itself in danger of being crushed between the tanker and the rock and must abandon its position in a hurry. With the loss of the aft tug, the tanker begins to turn and drift with its aft port side toward the rock.

The Supertanker, the "Golden Pearl" is Grounded on Cliffe Rock

The whole tanker crew can hear the awful screeching and banging noise of steel against rock and feel the deceleration that gradually brings the tanker to a standstill against the rock.

At the place of impact, the outer hull of the double hulled tanker has been torn open and the rock is already scraping along the steel plating of the inner hull. The ship is shuddering and groaning. High tide is still a couple of hours away, but everybody on the bridge knows that it will not help to float the tanker off.

A few hours later: High tide has come and gone. The tanker is firmly sitting on Cliffe Rock and it is being battered by the heaving swells of the severe storm. The pressure of the storm and the swells have had the effect of slowly moving the ship more firmly onto the rock. The shallow areas of Cliffe Rock are shorter than the length of the supertanker. This means that, as the tide falls, more of the ship's structure is losing its support and is overhanging the rocky ground. Eventually, the strain on the fully loaded hull is too great and it begins to crack and break up. Diluted bitumen is beginning to flow out, slowly at first. Rescue efforts have been initiated, but it will take hours before any help can get here. As long as the storm is as severe and the swells are as high, no ship can safely approach alongside and there can be no pumping into another hull. The leakage must go on, unchecked for now. The tanker's fate has been sealed and **the environmental disaster is just beginning.**

6.3 - How Realistic is this Scenario?

The scenario outlined above is hypothetical but entirely possible. Many of the individual parts of this scenario have definitely occurred over the years, some as recently as a few weeks ago. Just three examples will suffice:

1. On December 31, 2012, the drilling rig Kulluk grounded off the coast of Kodiak Island in Alaska because the towing operation had to be abandoned in 12 to 14-metre seas and 50-knot wind.
2. In November 2012, the 278-metre container ship, the Hanjin Geneva, ran aground outside of Prince Rupert harbour because the captain and pilot were doing an unusual maneuver in order to avoid a potential collision with a fishing boat.
3. Just two days after the Hanjin Geneva incident, a spokesman for the Canadian Coast Guard announced that the 188-metre bulk cargo ship, the Tern Arrow, lost engine power in heavy seas and 40-knot winds near Laredo Sound, just 25 nautical miles from Caamano Sound. This ship drifted for almost three hours before establishing emergency power and heading to open water.

7 – A Simple Plea to Canadians

Please do not allow Enbridge and the political proponents of the project to gamble with the beauty of our British Columbia coast.

The Government of Canada must decide whether Canada should become a world oil superpower and at the same time become an environmental villain in the eyes of the world.

Please do not let this happen. Thank you.

Appendix A – About Urs Boxler

I would like to assure you that I can speak about the BC coast and its beauty and challenges on the basis of very extensive experience gained in cruising the coast aboard our own sailboat, Raven Song, for many months each year in the past 13 years. During this time we have visited virtually every corner of the BC coast, including most inlets and fjords, all major routes of the Inside Passage, the routes of the proposed supertanker traffic, the Great Bear Rainforest, Haida Gwaii, including its west coast, the west coast of Vancouver Island, and the farthest reaches of the BC north coast, beyond Prince Rupert, as well as a large part of Southeast Alaska. I would like to invite you to visit my web site:

www.ursboxlerphotography.com and select the link “Enjoy our Annual Cruises on Raven Song.” There, you will see a selection of photographs and a detailed chart showing the extent of our cruises.

Based on this extensive experience, the Vancouver Maritime Museum has invited me to lecture about the Pacific Northwest Coast in five different years as part of their annual Ocean Cruising Adventure Lecture Series.

Appendix B - Sources

This paper contains the combined contents from two submissions by Urs Boxler to the Enbridge Northern Gateway Project Joint Review Panel, the Letter of Comment of August, 2012 and the Oral Statement of January, 2013. The many sources of information include websites and other publications of:

- Enbridge Northern Gateway Project Joint Review Panel
- Enbridge Inc.
- Wikipedia
- Raincoast Conservation Foundation
- Pacific Wild
- Living Oceans Society
- Pembina Institute
- Natural Resources Defense Council
- Transport Canada

Appendix C – Chart of Caamano Sound and Ship Routes

