

# Voices From the Crowd: Luck Helped Avert Disaster

By Don B. Hennig

Very lucky twice in 90 days, what is number three?

The Columbia River Gorge, the river itself, and the 600' wide and 48' deep navigation channel are essential to the people, economies and environment of three states. Over 30 million people, 10 million jobs and 250,000 square miles. Almost a quarter of the nation's wheat is barged down the Columbia each year. And much, much more.

Two recent events would have been national news events, if not for extreme good luck. In the oil train event in Clatskanie, OR, only 10 feet (one track width) and the fact that the oil train was stationary (talk about luck!) avoided catastrophe. The LNG event in Plymouth, WA, and Hermiston, OR is ongoing.

Because the Plymouth LNG tanks are relatively small "peaking" tanks, in a remote area, (sorry locals) and well bermed, (surrounded by a liquid spill containment wall), a "worst case" outcome in Plymouth is likely better than a "best case" outcome had the Clatskanie oil train been one track closer or even slightly moving.

The Pacific Northwest's first case of extreme good luck is described (1/21/14, r.davis@oregonian.com) in the Oregonian.

*A massive 300-ton engine being delivered to a Portland General Electric power plant near Clatskanie fell off a truck and struck a loaded crude oil rail car Tuesday morning, causing only minor damage. The luck part!*

*No injuries were reported. The steel tank car didn't rupture or explode. No oil spilled. Bakkan tanker "crude" can be more volatile or explosive than gasoline.*

*The accident, which happened 160 feet from the Columbia River, underscored the risks posed by oil trains in Oregon. Regulators were caught flatfooted by the arrival of trains carrying dozens of cars filled with potentially explosive North Dakota crude oil in 2013. Last year, 110 oil trains traveled through Portland en route to the Columbia Pacific Bio-Refinery, which exports up to 600,000 barrels to West Coast refineries each month.*

*The engine, which is 20 feet tall, 50 feet long and 13 feet wide, was inching along on a specialized heavy-load trailer when it "literally tipped*

*off the truck and went plop," said Steve Corson, a PGE spokesman. The engine landed on empty train tracks, but left a dent in a tanker of crude oil sitting stationary on adjacent tracks. If the train was moving at all, or even stationary on the nearer track, a "dent" in the oil tanker rail caused by a falling 300 ton metal object translates to a rupture, friction, and an explosion likely much worse than the July 2013 Lac-Megantic, Canada event that killed 47.*

*The Clatskanie train was waiting to unload to much larger terminal tanks.*

*It was almost "Good Bye Clatskanie."*

With an LNG "spill" or other "LNG event", the danger comes both from chemical (or rapid combustion) events and mechanical "explosions". LNG is methane or natural gas which has been compressed and cooled until the gas becomes liquid. Liquefied Natural Gas. When a "super cooled" or cryogenic liquid like LNG is exposed to the environment in a "tank spill," two things will always happen. The liquid LNG will rapidly become gaseous (plume formation) by absorbing energy from everything it contacts; the ground, air, structures, paving and the "worst case contact" is with water. Because water provides large amounts of energy efficiently. Or ignition occurs immediately. See "flame heat adsorption" below.

Berms don't contain gas plumes or explosions.

An LNG spill onto a body of water is a dramatic event. Google "Sandia Labs LNG Fire Tests."

An LNG tanker fatally engulfed by an ignited spill plume, in the navigation channel, is truly a "worst case event."

An LNG gas plume is a cold, dense, invisible (unless water vapor is present to condense), "cloud" which will "flow" out in all directions circumferentially in still air or move downwind until an ignition source is encountered.

An LNG plume from a large tank source, if not immediately ignited by cause of the leak, can "flow for miles." Like across a river, or a bay.

The effects of ignition of a miles long LNG plume are unknown and difficult to imagine. A cubic foot of LNG rapidly expands to over 600 cubic of gas without combustion. Rapid gas creation from rapid absorption of energy creates a mechanical "explosion."

Exposure of a large LNG spill pool in the containment berm to flame from a tank ignition creates an unknown and extreme condition of combination of combustion explosion and mechanical (rapid change of state) explosion.

For LNG "events" we have not yet experienced the first "big one."

Mr. Peter Hanson, LNG export industry spokesperson, (4/2/14, Oregonian p. A2, "Blast...", t.sickenger@oregonian), boasts that the LNG in the berm around "shrapnel ruptured" LNG tank (what caused the explosion that generated the shrapnel?), "did not catch fire - let alone explode." He was lucky. Williams Northwest Pipeline, a partner to Hanson's Oregon LNG, was just lucky. We were all just lucky...again.

The LNG industry does not have a "stellar safety record." This is propaganda. Google "LNG Tanker Adrift, Maritime News." Hanson crows, "real certified experts" (his experts) have evaluated vapor dispersal issues and that the company expected federal approval." He is referring to the Federal Energy Regulatory Commission (FERC) the industry watchdog turned lapdog.

Current reports from an industry "team of experts" brought to Plymouth that, "Gas gas is still leaking... as the puncture repeatedly freezes over, then thaws." is not encouraging. Both events occurred literally within shouting distance of the Columbia River shoreline...and the economic lifeline of three states.

Most VERY big events are "VERY rare" (Hanson), and most big "events" start with small events. This is called "cascade failure" and "cascade failure" is a common root cause of many of largest industrial accidents. Google "Cascade Failure."

It is not the rarity of an event, Mr. Hanson, it is the severity of the outcomes of an event that deserves our attention. And concern. And action.

*Don Hennig is a 40 year Professional Engineer who investigated and performed calculations for New York State Public Utility Commission addressing LNG Facility Safety Issues. Including Cryogenic Tank Integrity and Plume Dispersal Issues. Hennig personally investigated an LNG fire at Brooklyn Union Gas Plant in 1973. He lives in Gales Creek, OR.*

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