

**Washington Physicians for Social Responsibility**  
***Policy Position Opposing the Siting of Crude***  
***Oil Terminals within Population Centers***

Oil tanks for storage and shipment are part of the rapidly expanding crude oil by rail network in the NW. While both Washington's State Marine and Rail Transportation Study, Department of Ecology (DOE) and the public have been giving a great deal of attention to the expansion of and risks from oil by rail, almost no attention has been given to the proposed storage tanks at the loading/export ports (Vancouver and Hoquiam). The October 1, 2014 preliminary findings from the above-mentioned DOE study, established by Governor Inslee, do not address the issue of oil storage tanks and their presence in communities.

Three companies have plans to build facilities to receive, store and ship crude oil from Hoquiam. US Development (aka Grays Harbor Rail Terminals, LLC) plans are the newest entry into the permitting mix. They have developed detailed plans for a 42,000,000-gallon tank farm (eight tanks) and their proposal has received an initial Determination of Significance by the co-leads, the City of Hoquiam and the DOE. Two other firms are poised to submit their EIS plans to the city. Imperium proposes a 30,240,000-gallon tank farm and Westway proposes an 42,000,000-gallon tank farm.

All three sites are on land controlled by the Port of Grays Harbor within the city, and are located along the north shore of the harbor. The US Development site would locate eight 125,000-barrel tanks within about 1,900 feet of the Hoquiam High School, 1,500 feet from their outdoor playfield, and only slightly farther away from both the middle and elementary schools. (map, Appendix 1)

The two other projects are just south of the city commercial center, but adjacent to each other. The proposed Imperium project would locate nine 80,000-barrel tanks immediately adjacent to an existing biodiesel production facility and tank farm. Adjacent to the biodiesel site would be the proposed Westway project with five 200,000-barrel tanks. Existing storage tanks on the Westway site include four tanks utilized for other liquid products including ethanol.

Various commercial buildings and offices are located just across a city street that borders the north boundary of this massive complex of existing and proposed storage tanks.

## ***Fires and explosions: two potential causes***

1. Tank Explosions: Crude by rail through Washington is projected to come primarily from the Bakken oil fields in North Dakota. This crude has a large component of light hydrocarbons making it highly volatile. There is an inherent risk of fire and explosions when handling, transporting and refining crude oil, and explosions in tanks of various sizes and at many locations are common and well documented throughout the industry. While many of these explosions have been caused by employee lapses in judgement while working on smaller tanks or at well-drilling sites, some have occurred in large tanks from events inherent in the risks from equipment and technology for the industry. In other words, major explosive accidents at large facilities have occurred. This is probably one of the reasons that facilities for refining and storing these highly combustible substances are commonly sited away from population centers (consider the major petroleum sites in Washington near Anacortes, well away from the city).

Case Study: Buncefield fire, December 11, 2005 in Herfordshire, England. The Herfordshire Oil Storage Terminal was the fifth largest oil-products storage facility in the United Kingdom. The official inquiry by the British Health and Safety Executive reported that while the tank was filling from a pipeline, a switch that should have detected that the tank was full and shut off the supply, failed to operate. The switch failure should have triggered an alarm, but it too failed. Hundreds of liters of petrol spilled down the side of the tank through the roof vents onto the ground. The overflow resulted in the rapid formation of a rich fuel and air vapor cloud, triggering a so-called fuel-air explosion. The explosion was presumed to have been ignited by an electric generator or the depot's pumping system.

The first and largest explosion, tank 912, led to further explosions involving multiple other tanks, a domino effect from tanks adjacent to each other. The British Geological Survey monitored the event which measured 2.4 on the Richter scale. Although the oil terminal was distant from population centers, the blasts destroyed a warehouse more than a half a mile from the site. A school sustained serious damage and windows were blown out of St. Albans Abbey, both about five miles from the blast. Cars in nearby streets caught fire.

Emergency services at peak times consisted of 25 fire engines, 20 support vehicles and 180 fire fighters. From the time of the first explosion, 6:00 am on December 11, it took until 4:30 pm on December 12 to extinguish most of the

tanks. By mid-day on December 13, two days later, all but three fires had been extinguished but the largest tank was still burning. (Appendix 2)

A massive cloud of dense smoke engulfed the surrounding area and had reached the English Channel by the time the fire was out. It was visible seventy miles away, threatened air quality in the vicinity and resulted in several hospitalizations for respiratory problems.

Had this event occurred near a population center, it is assumed there would have been many injuries and deaths. The Health Protection Agency advised that prevention of accidents of such magnitude was the only reasonable answer; no reasonable emergency response capability could be expected to be readily available or effective or financially feasible to maintain permanently, given the magnitude of the fire.

Industry literature is replete with incidents that have involved loss of containment from storage tanks. The Buncefield Standards Task Group, established to study the causes of the explosion, reported that tank overflows “should not be considered as rare events. Data have been compiled by a reputable operator in the USA indicating that overfilling occurs once in every 3,300 filling operations.”

## 2. Cascadia Subduction Zone Earthquake and Tsunami:

The Port of Grays Harbor resides within the potential zone of impact from a tsunami. The US Development Company engineering study addresses the structural requirements for its eight proposed tanks to withstand an earthquake. The engineering report does not address the structural requirements to withstand a subsequent tsunami. USGS Professional Paper 1661-B, Local Tsunami Hazards in the Pacific Northwest from Cascadia Subduction Zone Earthquakes, reports the following: “Comparing the results in this study at specific sites where previous inundation models have been formulated, the range in tsunami amplitude offshore Grays Harbor WA, 2 to 7 meters, is slightly lower compared to the offshore amplitudes predicted by Preuss and Hebenstreit (7-8 meters)”.

Considering that US Development Company’s geologic studies show that soils in the tank farm area up to depths of 150 feet or more consist of “outwash from alpine glaciation” which means unstable sand, gravels, silts, etc. , and the recommended depth for pilings as support foundations would extend only a few feet into the “dense to very dense” alluvium (not bedrock), we have significant doubt that the foundation structures for these massive storage tanks would withstand a tsunami wave of up to 24 feet. Structural integrity could be further

compromised by the fact that the groundwater depth begins at only 17 feet below the surface, and during the rainy season it is six feet or less.

Should a massive tsunami dislodge one or more oil tanks, the probability of tank rupture is likely, and subsequent fire and explosions would appear to be almost inevitable considering the extensive presence of electrical equipment. Should this unfold, involvement of multiple tanks seems plausible, even inevitable, with the discharge of vast quantities of highly flammable crude oil into the area. The magnitude of a likely explosion and fire would almost certainly be massive, all of this within the City of Hoquiam. The close proximity of the two proposed new crude oil tank farms (Imperium and Westway) coupled with already existing volatile tanks (biodiesel and ethanol), also in proximity, produces an environment where a single triggering event could spread to other tanks in the complex, causing a conflagration mirroring one in Buncefield. Explosions and fires of this magnitude would pose serious risks to adjoining port structures and infrastructure as well as commercial establishments within a few hundred yards of the edge of this complex.

### ***Conclusions:***

The transport of crude by rail through communities and near waterways poses significant risks to the public. These concerns have been raised in many forums. We describe a new and critical concern: proposed crude oil tank farms that by design would be sited within the population center of Hoquiam / Aberdeen, creating permanent, indeterminate risk from fires or explosions. There is also the risk of spillage, accident and fire with any train-to-tank transfer, which could occur at any of the three locations within the city.

We have presented two separate scenarios whereby massive fires and explosions could be triggered. The first, a major accident, has established precedent, and is not based simply on speculation. The second, a tsunami following a subduction earthquake, is also plausible because the entire coast of Washington is under continuous tsunami warning from the state.

Therefore, we believe that siting tank farms in Hoquiam as well as other population centers poses an unacceptable risk to the public health of residents of the area. The close proximity of one massive tank farm to three public schools and to the railroad tank cars bringing oil to the tanks should be of grave concern to residents of Hoquiam.

### ***Policy Position:***

Washington Physicians for Social Responsibility opposes the siting of crude oil tanks and terminals within population centers. Further, we call upon the Washington Department of Ecology and Governor Inslee to deny permits for the proposed terminals on the basis of serious, credible threats to the health and safety of residents of Washington communities (including Vancouver).

We also call upon the WA Department of Health to study the potential health and safety issues related to crude oil storage within and shipment from communities. This seems especially important since local health departments have generally not filled this role to date.

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WPSR Board of Trustees  
Bruce Amundson, MD, President

