

12 June 2017

Public Utility Commission of Oregon  
201 High St SE, Suite 100  
Salem, Oregon 97301-3398  
Sent via email to: scott.gibbens@state.or.us

Re: City of Portland comments on Oregon PUC Docket No. UP 349 – PGE Port Westward tank sale to Global Partners’ oil-by-rail and ethanol terminal.

Dear Chair Hardie, Commissioner Bloom, and Commissioner Decker,

Multnomah County requests that the Public Utility Commission of Oregon (PUC) deny Portland General Electric (PGE) request, Docket No. UP 349, to sell large tanks and other facilities at Port Westward, Oregon, to Cascade Kelly Holdings LLC, doing business as Columbia Pacific Bio-Refinery, a company owned by Global Partners LP (Global). The sale is not in the public interest because it will increase the risk of a major oil train disaster in Oregon, the results of which could include damage to life, property, and/or the environment.

The proposed agreement between PGE and Global is designed to facilitate increased crude-by-rail and ethanol export activities at Port Westward, Oregon. The sale agreement between PGE and Global clearly states that Global would use its newly acquired tank farm for the “receipt, storage and distribution of ethanol and crude oil.” By purchasing PGE’s tanks, Global would enjoy increased crude oil storage and transport capacity in close proximity to the rail loop and dock that Global has used to ship crude oil in the past. Though Global is not currently shipping crude oil at Port Westward due to low oil prices, the tank sale and agreement will facilitate future increases in oil-by-rail activity.

Any increase in the transloading of oil at the Port Westward Facility will increase oil-by-rail traffic through Multnomah County. Oil destined for this facility will pass through the Columbia Gorge and through the communities of Multnomah County, including downtown Portland. Oil-by-rail activity poses a direct threat to Multnomah County residents, and it is Multnomah County’s policy to oppose any project that has the potential to increase oil-by-rail traffic through Multnomah County. The derailment, explosion, and fire in Mosier Oregon just over a year ago demonstrate the dramatic impact and real risks that this industry poses to Oregon.

Multnomah County conducted a risk assessment of crude oil-by-rail shipment through the county (attached), which shows that more than 25% of Multnomah County’s population lives within one-half mile of rail lines that are used by oil-by-rail trains. In addition, 108 schools, 100 child care centers, and \$25 billion dollars of improved property lay within the one-half mile area surrounding oil-by-rail lines. Not only does oil-by-rail pose a threat to public health and safety generally, increased transport of crude is an environmental justice issue in Multnomah County. A demographic analysis of the 0.5-mile evacuation zone shows people of color are overrepresented in these corridors. It is also concerning to note that one-half mile is what is recommended by the Oregon Fire Marshall as the evacuation area from

Multnomah County Comment PUC Docket No. UP 349

a crude-by-rail fire, but a fire would release a toxic plume placing people's health at grave risk for much greater distances.

Expanding fossil fuel infrastructure will also take the state and the region in the wrong direction. Global is permitted by DEQ to ship up to two loaded oil trains each day through Portland, roughly half the capacity of the highly controversial Tesoro Savage oil-by-rail terminal proposed in Vancouver, Washington. When fully operational the shipment of crude oil through this facility is likely to contribute to the burning of over 180,000 gallons of crude oil each day. To put this in perspective, Multnomah County contributes to 15.8 million metric tons of carbon each year community wide. This project will contribute between 28 and 30.5 million metric tons of carbon globally each year, up to 2 times the entire emissions generated in Multnomah County. Multnomah County and the City of Portland recently committed to a full phase out of fossil fuel use by the year 2050. To achieve that goal new investment in fossil fuel infrastructure must be stopped, and investments in renewable energy resources are needed. By extending the life of this facility the PUC would be taking the State of Oregon in the wrong direction. Instead this facility should be decommissioned and put back to into productive economic use for future-facing Oregon industries.

In addition to the human health and safety and environmental concerns associated with oil-by-rail, the potential impacts on the Columbia Gorge are simply not worth the risk. The Columbia Gorge is a sacred space for Native American people, and is cherished by people across Oregon and Washington. Recreation and tourism in Gorge contributes half a billion dollars annually to the Oregon economy. The value of this resource cannot be overstated, and the risk of desecrating this space to continue to grow an industry that must be phased out to address climate change does not make financial, ecological, or moral sense for the State of Oregon.

If allowed to move forward this project would put too much at risk for too little public gain. The majority of the economic benefit from these activities will occur outside the borders of Oregon, while the majority of the risk will be borne by Oregonians. The risks to Oregonians and the environment are real and the potential for another major accident involving oil-by-rail almost inevitable. This project is not in the public benefit and should be rejected by PUC.

Sincerely,

John Wasiutynski



Director

Multnomah County Comment PUC Docket No. UP 349

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501 SE Hawthorne Blvd., 6th Floor □ Portland, Oregon 97216 □ sustainability@multco.us

**BEFORE THE BOARD OF COUNTY COMMISSIONERS  
FOR MULTNOMAH COUNTY, OREGON**

**RESOLUTION NO. 2016-001**

Opposing Oil Shipment by Rail, and Endorsing Comments on the Tesoro Savage Vancouver Energy Distribution Terminal Draft Environmental Impact Statement.

**The Multnomah County Board of Commissioners Finds:**

- a. With the rapid development of the Bakken Oil fields in North Dakota and Canada, and ongoing development of Canadian oil sands, shipments of crude oil by rail have increased dramatically in the Northwest since 2012.
- b. Due to this oil boom Oregon has become a throughway for crude oil traveling by rail.
- c. Up to 12 trains carrying 1,000,000 gallons or more of Bakken crude oil pass through Multnomah County each week.
- d. Risks posed to Multnomah County residents from oil by rail shipments include the potential for oil train explosions, fires, and/or spills as a result of derailment; increased particulate emissions from locomotive exhaust; congestion and collision along roadways and rail lines; and associated health impacts including injury and death.
- e. Nine significant train derailments have occurred in North America since July 2013, one of which resulted in multiple fatalities and injuries.
- f. In case of an oil train fire, the half mile surrounding the incident should be considered for evacuation. Concern about safety is heightened given population proximity to rail lines because 26% of Multnomah County's population lives within a half mile of a rail line that carries crude oil.
- g. A total of 108 schools (pre-school through high school), and 100 childcare facilities are within the half mile evacuation zone.
- h. The area of impact in the case of an oil train fire or explosion is increased because of a toxic plume of smoke from the fire, and because of distress and trauma caused to local residents.
- i. The Tesoro Savage Vancouver Energy Distribution Terminal at the Port of Vancouver, if approved, would be the largest oil by rail terminal in the country, and would transport on average 360,000 barrels of oil per day by rail for transfer onto ocean going vessels.
- j. The Tesoro Savage Vancouver Energy Distribution Terminal, in combination with a total of 13 new or expanded oil facilities proposed in Oregon and Washington, would increase oil by rail traffic to over one million barrels of oil per day on Northwest rails lines, and increase oil transport through Multnomah County.

- k. The potential for oil by rail derailment and spill in the Columbia River corridor poses grave risk to natural and cultural resources, including endangered fish populations.
- l. Because of the rapid rise of oil by rail, local emergency responders capability, equipment, and funding to deal with large scale oil fires is inadequate.

**The Multnomah County Board of Commissioners Resolves:**

- 1. To oppose oil by rail transportation through and within Multnomah County
- 2. To declare that it is the policy of Multnomah County to oppose projects and proposals that have the potential to increase the amount of crude oil being transported by rail through Multnomah County.
- 3. To support the development and review of a comprehensive Health Impact Assessment, at the expense of the initiating entity, prior to approval of any new oil transfer and storage permits by any state, regional, or federal agency.
- 4. To endorse the attached comments to the Tesoro Savage Vancouver Energy Distribution Terminal draft environmental impact statement, and to instruct the Office of Sustainability to submit those comments to the Washington Energy Facility Site Evaluation Council on behalf of the County.
- 5. To accept the findings of the attached risk assessment.

**ADOPTED this 21st day of January, 2016.**



BOARD OF COUNTY COMMISSIONERS  
FOR MULTNOMAH COUNTY, OREGON

*Deborah Kafoury*

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Deborah Kafoury, Chair

REVIEWED:  
JENNY M. MADKOUR, COUNTY ATTORNEY  
FOR MULTNOMAH COUNTY, OREGON

By *Katherine Thomas*  
Katherine Thomas, Assistant County Attorney

# Briefing: Oil-by-Rail Cargo Movement in Multnomah County



Photo by SounderBruce

## PURPOSE

The purpose of this study is to:

- 1) Assess the potential negative impact of an accident involving train car(s) carrying crude oil traveling through populated areas in Multnomah County, and
- 2) Estimate whether the potential negative impact of an accident involving train car(s) carrying crude oil would be disproportionately experienced by environmental justice communities.

## BASIS FOR ASSESSMENT

Oil-by-rail poses risks to the public because of the following factors:

- Transport by rail of hazardous materials such as crude oil and natural gas have increased 340 percent since 2012.<sup>1</sup>
- Most oil is currently carried in outdated tank cars prone to puncture, spills, and fires in train accidents.<sup>2</sup>
- Bakken crude is more volatile and flammable than most other crude oil.<sup>3</sup>
- Nine significant train derailments have occurred in North America since July 2013, one of which resulted in multiple fatalities and injuries.
- Impact from a major incident involving an oil train will extend beyond the immediately impacted area due to a toxic smoke plume, and stress and trauma to the population.
- The rapid increase of oil by rail has eclipsed the response capabilities of the local emergency responders and funding for those capabilities has not kept pace.<sup>4</sup>



Office of Sustainability

January 2016

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## BACKGROUND

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With the rapid development of the Bakken oil fields in North Dakota and Canada, and ongoing development of Canadian oil sands, shipments of crude oil-by-rail (OBR) have increased dramatically in the Northwest since 2012.<sup>5</sup> Due to this oil boom Oregon has become a throughway for crude oil traveling by rail destined for transfer terminals or refineries in Oregon, California, and Washington States. The total volume of OBR shipments transiting through the County is unknown. An emergency order issued by the U.S. Department of Transportation, however, requires that the carriers with a train containing more than 1,000,000 gallons of Bakken crude report to the State Emergency Response Commission. Currently, BNSF Railway and Portland and Western Railways both meet the criteria for Multnomah County. BNSF has 0 - 9 trains per week meeting the threshold while Portland and Western has 0 - 3 trains per week meeting the threshold.

Expansion of oil transfer and distribution terminals, if approved, will increase OBR shipments through Multnomah County. Currently, Port Westward, near Clatskanie, Oregon, is receiving 120,000 barrels of crude each day for reloading onto ocean going vessels. The proposed Vancouver Energy oil terminal at the Port of Vancouver, WA would ship up to 360,000 barrels of crude oil each day. If all of the 13 proposed or expanded oil facilities are built in Oregon and Washington, over one million barrels of oil will be shipped daily over Northwest rails lines.<sup>6</sup>

The dramatic increase in OBR shipments present safety concerns. Although overall incidents of rail cargo accidents is low, since 2010 there have been 11 fires, 6 explosions, and 9 evacuations in North America due to incidents involving OBR (Table 1 details several high profile OBR accidents). The number of reported OBR related incidents in the United States rose to 144 in 2014 from just one in 2009.<sup>7</sup> Several high profile derailments, spills, and explosions have raised widespread concern about the risks of moving crude by rail. An accident in Lac-Mégantic, a small town in Quebec, killed 47 people in the summer of 2013.<sup>8</sup> New federal rules, which take full effect in 2018, will require enhanced safety for rail cars carrying crude oil, including replacement or retrofit of outdated tanker cars, but those rules will not be fully implemented until May 1, 2025<sup>9</sup> and would not fully obviate the low probability but high impact potential of an accident.

DATE & LOCATION	DESCRIPTION
7/5/13 Lac-Mégantic, Quebec, Canada	An unattended freight train transporting petroleum crude oil rolled down a descending grade and subsequently 63 cars derailed. The subsequent fires, along with other effects of the accident, resulted in the confirmed deaths of 47 individuals. Extensive damage to the town center and the evacuation of approximately 2,000 people.
10/19/13 Gainford, Alberta, Canada	9 tank cars of propane and 4 tank cars of crude oil derailed. About 100 residents were evacuated. 3 propane cars burned, but the oil cars pushed away and did not burn.
11/7/13 Aliceville, Alabama	26 cars derailed, resulting in 11 cars impinged by a crude oil pool fire. An undetermined amount of petroleum crude oil escaped from derailed cars and found its way into wetlands area nearby the derailment site.
12/30/13 Castleton, North Dakota	A separation derailment resulted in the derailment of 21 cars of petroleum crude oil. 18 cars ruptured, and an estimated 400,000 gallons of petroleum crude oil was released. The ruptured tank cars ignited, causing a significant fire. Approximately 1,400 people were evacuated.
1/7/14 Plaster Rock, New Brunswick, Canada	17 cars of a mixed train hauling crude oil, propane, and other goods derailed. 5 cars carrying crude oil caught fire and exploded. 45 homes were evacuated but no injuries were reported.
4/30/14 Lynchburg, VA	105 tank cars loaded with petroleum crude oil derailed. Seventeen cars derailed, and one breached. A fire ensued. 350 evacuated from immediate area. Three cars came to rest in James River, spilling up to 30,000 gallons of oil into river.

Table 1: Recent oil train incidents in the United States and Canada<sup>10</sup>

Risks posed to Multnomah County residents from OBR include the potential for oil train explosions or spills as a result of derailment or rupture; increased particulate emissions from locomotive exhaust; congestion and collision along roadways and rail lines; and associated health impacts including injury and death.

Fires involving crude oil and/or fuel oil have several challenging aspects worth noting. Oil fires must be suppressed using specialized foam, and also release a noxious plume of toxic smoke. Only 10% of fire agencies in the State of Oregon are trained and equipped to respond with foam for an oil fire and 81% do not have the proper equipment to respond to a crude oil incident.<sup>11</sup> In addition, and depending on wind speed and direction, the plume from an oil train fire can greatly increase the area impacted by such an incident. For example, the Casselton, ND explosion and ensuing toxic cloud led to a five mile evacuation zone to the south and east of the incident.<sup>12</sup>

Concern about safety is also heightened because of population proximity to rail lines. A Multnomah County Health Department analysis (The Human Health Effects of Rail Transport of Coal Through Multnomah County, Oregon, February 2013) found that a large portion of the County's population lives near rail lines. The demographics of this study also suggested that people of color make up a larger portion of the population in areas near rail lines than they do in the County as a whole, raising environmental justice concerns with OBR transport.

Because of the novelty and rapid increase of OBR shipments in Multnomah County, combined with the proximity of rail lines to population centers and the risk to public safety, the Multnomah County Office of Sustainability undertook this assessment. The Multnomah County Office of Emergency Management and Multnomah County Health Department also provided important data and review. In addition, Oregon Physicians for Social Responsibility raised concerns to Multnomah County on the potential risk posed by oil trains to the public.

## FINDINGS

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Accidents involving rail cargo are relatively rare given the total volume of cargo shipped by rail. Accidents do occur, however. During the last decade, overall rail accidents have declined, along with accidents involving the transport of hazardous materials. According to the Federal Railroad Administration, the number of derailments on long-haul tracks in the United States has declined by around 21 percent since 2009 (to 2014). Of that decline in overall derailments, however, the number of accidents related to fire or violent rupture nearly doubled from 20 in 2009 to 38 in 2014.<sup>13</sup>

Since 2012 there have been 27 rail accidents in Multnomah County representing 34% of all rail accidents statewide during the same period. Statewide, derailments account for 85% of total accidents, while side collisions and fire/violent-rupture account for 5% of total accidents (see appendix A for more details).<sup>14</sup> The severity of an incident involving OBR depends on a complex mix of factors. These factors include the type of accident (derailment, spill, fire and/or explosion), the number of rail cars involved, the location of the incident, and the time of day and weather conditions when the incident occurs. The likelihood of a major accident from an oil train derailment, fire, and/or explosion is small, but the impact from such an incident would be high.

Additive factors combine to raise the overall level of concern for OBR shipments through Multnomah County. These factors include the especially volatile nature of the crude being transported, lagging federal safety rules for rail cars, the insufficient local emergency response capability, and the proximity of OBR shipments to heavily populated areas.

The Oregon Office of the State Fire Marshall recommends that in the event of a large oil train incident/spill, initial downwind evacuation should be at least 1,000 feet (300 meters). Further, if the tank or car is involved in a fire, officials should isolate and consider evacuation for 0.5-mile (800 meters) in all directions.<sup>15</sup> The impacts of the incident are likely to be felt over a much wider area, however, with toxic smoke from the plume impacting downwind communities.



An analysis of 2010 Census data showed that 26% of residents in Multnomah County live within a half-mile of rail lines that carries OBR. The same analysis revealed that 108 schools are also located within a half-mile of OBR rail lines, as well as 100 child care facilities within the evacuation zone.

Not only does OBR pose a threat to public health and safety generally, increased transport of crude is an environmental justice issue in Multnomah County. A demographic analysis of the 0.5-mile evacuation zone shows that Black/

African Americans in Multnomah County are 1.8 times more likely to live in the evacuation zone as compared to Whites. Pacific Islanders in Multnomah County are 1.48 times more likely to live in the evacuation zone as compared to Whites. In addition, there is a significantly higher proportion of Multnomah County's Pacific Islander population located in

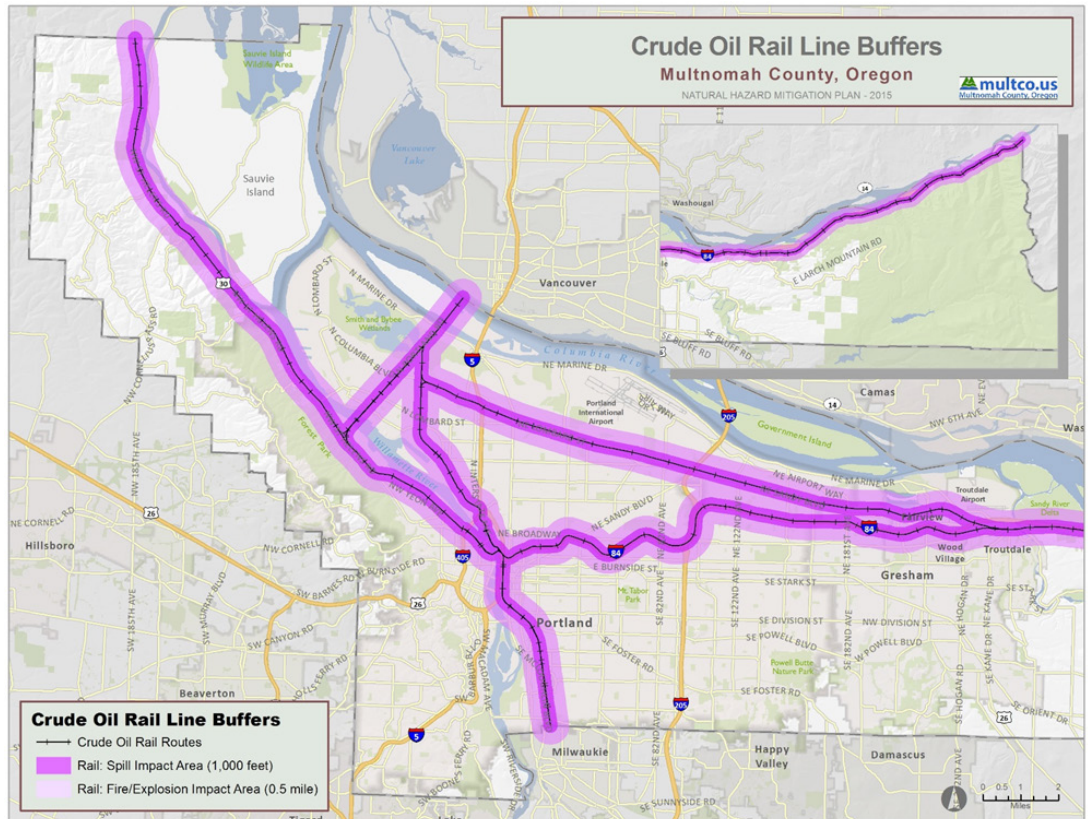


Figure 1: Oil-By-Rail Line Impact Buffers in Multnomah County

the evacuation zone as compared to Whites. Conversely, Asians are significantly underrepresented in the evacuation zones, and no meaningful difference between Latinos and Whites. Overall, people of color represent a greater percentage people in the evacuation zone (26.2%) versus general population (23.5%).

In addition to the human health impacts of OBR incidents, significant physical assets are also located with the evacuation zone. An analysis conducted by the Multnomah County Office of Emergency Management found that over \$25 billion dollars in infrastructure is located within a half-mile of OBR tracks.

Table 2 on the following page shows the approximate number of parcels/buildings and improved value.

# SUMMARY OF FINDINGS

- Up to 12 trains a week carry 1,000,000 gallons of crude oil through Multnomah County.
- Smaller shipments of crude oil are not reported on, but do pass through Multnomah County regularly.
- More than a quarter of the Multnomah County population lives within the half-mile “evacuation zone” around the oil transport route.
- 108 schools and a 100 child care facilities are within the evacuation zone.
- People of color are more likely to live within a half-mile of a rail line.
- Over \$25 billion dollars of improved property is within a half-mile of rail lines in Multnomah County.
- The potential negative impacts of an oil train accident are heightened due to the volatility of the oil and the special equipment needed to extinguish it.
- Proposed new or expanded oil facilities in the NW will increase volumes of OBR transiting through Multnomah County.
- The lifting of the US oil export ban in 2015 is likely to increase pressure for new or expanded oil facilities in the Northwest.
- Emergency responders do not have adequate equipment to respond to a large scale OBR event.
- New safety requirements for rail cars carrying crude oil won’t be fully implemented until 2025.

This briefing is not intended as a comprehensive analysis of all potential risks posed by OBR. Nor does this briefing capture potential benefit from increased OBR activity, for example new jobs. Further study and analysis is needed to create a comprehensive assessment. It is the finding of this briefing, however, that potential for serious and grave injury to life and property in Multnomah County warrants additional public scrutiny up to and including public policy that will protect public health and safety.

LOCATION	0.5-mile buffer		
	Approx. # of Parcels	Approx. # of Buildings	Approx. <sup>16</sup> Improved Value
Fairview	2,118	2,360	\$392,328,560
Gresham	630	1,088	\$727,378,680
Lake Oswego	0	0	\$0
Maywood Park	272	318	\$45,656,950
Portland	65,068	62,035	\$22,319,588,560
Troutdale	968	880	\$264,319,340
Wood Village	605	2,622	\$105,731,230
Unincorporated Area	1,607	811	\$1,937,644,260
<b>MULTNOMAH COUNTY TOTAL</b>	<b>71,268</b>	<b>70,114</b>	<b>\$25,792,647,580</b>

Table 2: Exposure of Improved Property to Crude Oil Rail Hazardous Materials Spill

# APPENDIX A

## Impact Buffer Selection

Oregon Department of Transportation (ODOT) maintains records on which rail lines are used to carry crude oil by rail throughout Oregon. This study used the data provided by ODOT to examine these rail lines in Multnomah County using ArcGIS. A buffer analysis was used to estimate which populations were most likely to be impacted in case of an accident involving rail cars that are carrying crude oil. A buffer of 0.5-miles was used to analyze the area most likely to be impacted in the event of an accident involving crude by rail.

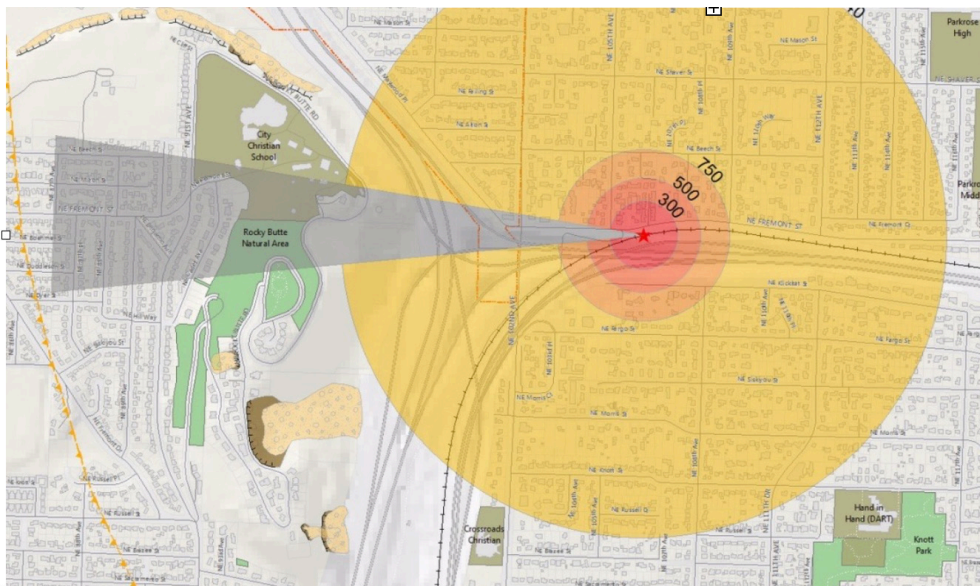


Figure 2: I-84 Crash Zone with plume (PBEM Desktop Exercise - OBR fire)

Various agencies including the federal Department of Transportation's Pipeline and Hazardous Materials Safety Administration have issued initial response guidelines codified in the Emergency Response Guidebook. For an incident involving a single oil tank car (whether truck or train), the primary set of responses is codified under response protocol 128 for petroleum crude oil, or UN hazmat code 1267. That guideline recommends initial evacuation range of 800 meters (approximately 0.5-miles) for a single burning car.<sup>17</sup> The Oregon Office of the State Fire Marshall also recommends that in the event of a large oil train incident/spill, initial down-wind evacuation should be at least 1,000 feet (300 meters). Further, if the tank or car is involved in a fire, officials should isolate and consider evacuation for 0.5-mile (800 meters) in all directions.<sup>18</sup> Therefore, the buffer area that was selected for this analysis is 0.5-mile (fire/explosion area) as the most likely area of impact in case of an emergency and is referred to in this report as the evacuation zone.

The 0.5-miles evacuation zone is a simplified version of what in practice is a highly complex set of potential responses by first responders and other safety personnel. Fire officials have the ability to model the plume based on the actual situation, similar to Figure 2. In practice, the evacuation zones may be much smaller (a single tipped car with no puncture in Seattle led to no evacuation) or much larger.

# Appendix B

## Rail Accident Data Multnomah County / State of Oregon

### ACCIDENTS IN DESCENDING FREQUENCY BY TYPE

Selections: Railroad Group - ALL RAILROADS SELECTED, State - Oregon, County - MULTNOMAH All Regions  
 All Causes / All Types of Accidents / All Track Types  
 January through September 2015

	Total		Total Year Counts			YTD Counts Jan. - Sept.		% Change Over Time		
	ACCS	Pct of Total	2012	2013	2014	2014	2015	2012 to 2014	2013 to 2014	To Sept. 2014 2015
<b>GRAND TOTAL</b>	27	100.0	5	9	10	6	3	100	11.1	-50
01 Derailments	24	88.9	5	6	10	6	3	100	66.7	-50
12 Other Impacts	2	7.4	.	2	.	.	.	.	.	.
09 Obstruction Impact	1	3.7	.	1	.	.	.	.	.	.

Selections: Railroad Group - ALL RAILROADS SELECTED, State - Oregon, County - All Counties, All Regions  
 All Causes / All Types of Accidents / All Track Types  
 January through September 2015

	Total		Total Year Counts			YTD Counts Jan. - Sept.		% Change Over Time		
	ACCS	Pct of Total	2012	2013	2014	2014	2015	2012 to 2014	2013 to 2014	To Sept. 2014 2015
<b>GRAND TOTAL</b>	79	100.0	16	24	24	16	15	50	.	-6.3
01 Derailments	67	84.8	10	20	23	15	14	130	15	-6.7
12 Other Impacts	4	5.1	2	2	.	.	.	.	.	.
09 Obstruction Impact	3	3.8	1	1	.	.	1	.	.	.
04 Side Collision	2	2.5	1	1	.	.	.	.	.	.
11 Fire/Violent Rupture	2	2.5	1	.	1	1	.	.	.	.
13 Other Events	1	1.3	1	.	.	.	.	.	.	.

## Appendix C

### Estimated Population Within Evacuation Zone of Rail Lines Transporting Crude Oil In Multnomah County and Environmental Justice Analysis

Population Group	Multnomah County	% of Total Population	Evacuation Zone (0.5-mile from railway)	% of Total Population in Evacuation Zone
Total Population	735,334	100%	193,425	100%
<b>Age</b>				
Under 18 years	150,683	20.5%	35,889	18.6%
65 years and older	77,423	10.5%	20,860	10.8%
<b>Race</b>				
White	562,421	76.5%	142,685	73.8%
African American/Black	41,401	5.6%	15,675	8.1%
American Indian and Alaskan Native	7,825	1.1%	2,500	1.3%
Asian	47,950	6.5%	11,014	5.7%
Native Hawaiian and Pacific Islander	4,029	0.5%	1,347	0.7%
Other Race	37,865	5.1%	10,646	5.5%
Two or More Races	33,843	4.6%	9,558	4.9%
Non-White	172,913	23.5%	50,740	26.2%
<b>Ethnicity</b>				
Hispanic or Latino	80,138	10.9%	21,462	11.1%

Source: 2010 U.S. Census

**Analysis Note:** Census blocks were selected that intersect a half-mile buffer around rail lines that are identified by Oregon Emergency Management as transporting crude oil. Some of the Census blocks selected have areas that extend further than a half-mile from the rail line so this analysis may over-estimate the number of persons within the evacuation zone.

## Environmental Justice Analysis, Statistical Test for Significance

### Method:

Statistical tests - 2 x 2 Chi-Square tests (White, including Latinos compared to each racial group)

	White	Black/AA	Odds Ratio	Lower CI	Upper CI	Sig. Level
% in 0.5-miles	25.4%	37.86%	1.79	1.76	1.83	p<.0001

	White	Asian	Odds Ratio	Lower CI	Upper CI	Sig. Level
% in 0.5-miles	25.4%	22.97%	0.88	0.86	0.90	p<.0001

	White	Pacific Islander	Odds Ratio	Lower CI	Upper CI	Sig. Level
% in 0.5-miles	25.4%	33.43%	1.48	1.38	1.58	p<.0001

	White	AI / AN	Odds Ratio	Lower CI	Upper CI	Sig. Level
% in 0.5-miles	25.4%	31.95%	1.38	1.32	1.48	p<.0001

	White	Latino	Odds Ratio	Lower CI	Upper CI	Sig. Level
% in 0.5-miles	25.4%	26.78%	1.08	1.06	1.09	p<.0001

**Note:** Though the test is statistically significant, Whites and Latinos are about equally likely to be located in the evacuation zone.

## FOOTNOTES

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- <sup>1</sup> Borrud, Hillary. "ODOT Says Oil Train Shipments on the Rise." Portland Tribune 14 November 2015
- <sup>2</sup> New York State. Transporting Crude Oil in New York State: A Review of Incident Prevention and Response Capacity. Albany New York, 30 April 2014.
- <sup>3</sup> New York State. Transporting Crude Oil in New York State: A Review of Incident Prevention and Response Capacity. Albany New York, 30 April 2014.
- <sup>4</sup> Oregon State Police, Office of State Fire Marshall. Survey Findings and Recommendations on Crude Oil. Salem Oregon, 5 March 2015.
- <sup>5</sup> Port of Portland. Port of Portland Statement Regarding Crude Oil by Rail. Portland, Oregon. 2014.
- <sup>6</sup> Place, Eric De. The Northwest's Pipeline on Rails. Sightline Institute. July 2015.
- <sup>7</sup> Mackrael, Kim. "Gaps in the System: Is Rail Safety on the Right Track?" The Globe and Mail 4 June 2015. Print.
- <sup>8</sup> Place, Eric De. The Northwest's Pipeline on Rails. Sightline Institute. July 2015.
- <sup>9</sup> United States. U.S. Department of Transportation. DOT Announces Final Rule to Strengthen Safe Transportation of Flammable Liquids by Rail. Washington, 1 May 2015.
- <sup>10</sup> Bakken Crude Oil Pamphlet distributed by the NW Area Committee, February 2015
- <sup>11</sup> Oregon State Police, Office of State Fire Marshall. Survey Findings and Recommendations on Crude Oil. Salem Oregon, 5 March 2015.
- <sup>12</sup> Forest Ethics. Crude Injustice on Rails: Race and the Disparate Risk from Oil Trains in California. June 2015.
- <sup>13</sup> Russell Gold and Paul Vieira. Wrecks Hit Tougher Oil Railcars. The Wall Street Journal. March 9, 2015.
- <sup>14</sup> United States Department of Transportation. Federal Railroad Administration Office of Safety Analysis. <http://safetydata.fra.dot.gov/>. Washington, D.C., 2015.
- <sup>15</sup> Office of State Fire Marshall Survey Findings and Recommendations on Crude Oil, January 8, 2015
- <sup>16</sup> Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
- <sup>17</sup> Forest Ethics. Crude Injustice on Rails: Race and the Disparate Risk from Oil Trains in California. June 2015.
- <sup>18</sup> Office of State Fire Marshall Survey Findings and Recommendations on Crude Oil, January 8, 2015