



Ranking procedures, Portland-area stationary industrial air pollutants

“Prioritization Risk Values” reports all DEQ 2016 Emissions Inventories and also includes Level 1 screening assessment estimates for cancer and noncancer risks per chemical at each facility. This was never released to the public but provided to Portland Clean Air from our successful information request, available here:
portlandcleanair.org/files/portland_clean_air/deq_emissions/output_data/Prioritization%20Risk%20Values.xlsx

Source testing is happening now for many industries and those results will be more accurate, possibly changing how industries are ranked.

To determine relative risk, we used DEQ “CAO Facility Call-in Prioritization Details” which scores each industry in Oregon using Prioritization Risk Values, available at:
www.oregon.gov/deq/aq/cao/Documents/CAOFacilityCall-inPrDetails.XLSX

This was entered into a Google map here:
www.google.com/maps/d/drive?state=%7B%22ids%22%3A%5B%221YAqIEB5a_2QFqI7NzdJQVN89rWGM3_MY%22%5D%2C%22action%22%3A%22open%22%2C%22userId%22%3A%22104756617504915800982%22%7D&usp=sharing

All industries were manually removed outside of a chosen county and labeled based on “prioritization risk values” to provide industry health risk ranking by county.

To rank sources that DEQ doesn’t regulate, such as rail yards and airports, we calculated a “normalized risk estimate” using DEQ’s formula as follows:
(noncancer chronic risk) + (noncancer acute risk) + (cancer risk /25) = normalized risk estimate.

Multnomah County:

www.google.com/maps/d/drive?state=%7B%22ids%22%3A%5B%221JZsuvJg1ukHN4dH4CJxUceiFd8FGy1f

www.google.com/maps/d/drive?state=%7B%22ids%22%3A%5B%22120rI99nkU9FDTzu4PGSzmuNKSkdRGJ1p%22%5D%2C%22action%22%3A%22open%22%2C%22userId%22%3A%22104756617504915800982%22%7D&usp=sharing

Washington County:

www.google.com/maps/d/drive?state=%7B%22ids%22%3A%5B%22120rI99nkU9FDTzu4PGSzmuNKSkdRGJ1p%22%5D%2C%22action%22%3A%22open%22%2C%22userId%22%3A%22104756617504915800982%22%7D&usp=sharing

Clackamas County:

www.google.com/maps/d/drive?state=%7B%22ids%22%3A%5B%2219RRAh7D-6IDyoNsArNK92UX8iLqvTydm%22%5D%2C%22action%22%3A%22open%22%2C%22userId%22%3A%22104756617504915800982%22%7D&usp=sharing

The final ranking report for Multnomah County is here:

portlandcleanair.org/files/reports/Portland%20Stack%20and%20Diesel%20Booklet%20Color.pdf

Since this map was made, Owens Brockway took it green glass furnace offline ending hexavalent chromium emissions, its main risk driver. We haven’t recalculated their ranking but now we expect it should be far lower down the list. More info here:
www.oregonlive.com/business/2019/10/glass-bottle-maker-owens-brockway-will-lay-off-97-portland-workers.html

The final ranking report for Washington County is here:

portlandcleanair.org/files/HAW%20ranking.pdf

Washington County was altered to exclude Bonita Packaging which went out of business and sold its machinery to another industry who is far less dangerous to human health. DEQ lacks jurisdiction on airports so did not include Hillsboro Airport in its reporting. We did. When we made the Washington County Google map we listed Hillsboro Airport as the most dangerous air polluter using EPA NEI 2014, released Feb. 2018 available at:
http://portlandcleanair.org/files/data/emis_sum_fac_7439.xlsx

Union Pacific Albina Rail Yard and Brooklyn Rail Yard Health Risk Calculations

Albina Rail Yard

We used the 2014 EPA National Air Toxics Assessment (NATA) data released August 22nd 2018. EPA 2017 NATA is expected to be released as early as 2021. We used 2014 NATA emissions by facility (ZIP)(1 pg, 48 MB)

Located at:

<https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results>

Albina Rail Yard

We used the PM2.5 data "from certain diesel engines" which is slightly less than the PM10 amount. Albina rail yard is listed as 2.72561 tons converts to 5451.22 pounds

If you assume the following related to Diesel Particulate Matter (DPM):

- Mass emission rate = 5,451.22 lb DPM/yr
- *Level 1 Screening Dispersion factor for point source release = $0.0033 \text{ [(ug DPM/m}^3\text{)/(lb DPM/yr)]}$
- Cancer RBC for DPM based on CA OEHHA IUR** = $(1 \text{ Excess Cancer Risk})/(0.003 \text{ [ug DPM/m}^3\text{)})$

Then the calculations are:

$5,451.22 \text{ [lb DPM/yr]} \times (0.0033 \text{ [(ug DPM/m}^3\text{)/(lb DPM/yr)]}) = 17.989 \text{ [ug DPM/m}^3\text{]}$

$(17.989 \text{ [ug DPM/m}^3\text{)}) \times (1 \text{ Excess Cancer Risk})/(0.003 \text{ [ug DPM/m}^3\text{)}) =$

5,996.33 Excess Cancer Risk

* This assumes all DPM released from a single stack 5 meters in height, and the exposure location is 50 meters away; these assumptions are likely not valid for accurately estimating DPM emissions from this source, but were used for relative ranking.

** The CA OEHHA DPM cancer Inhalation Unit Risk (IUR) is 0.0003 - also expressed as 3.0 E-4. This is an Inhalation Unit Risk (IUR), a risk per unit concentration. The DEQ Level I Screening uses a Risk-Based Concentration (RBC) not an IUR to calculate risk. RBCs are established from the Toxicity Reference Values (TRVs), which are sometimes adjusted to create the RBCs, but not

in the case of DPM risk. To get a DPM TRV based on CA's IUR for DPM, divide the IUR by 10⁻⁶ (1 in a million), which leads to 0.003 ug/m³. The TRV is used, without adjustment, to produce an RBC which is also 0.003 ug/m³.

CA Office of Environmental Health Hazard Assessment Inhalation IUR citations:

<https://oehha.ca.gov/media/downloads/crnrr/appendixa.pdf>

<https://oehha.ca.gov/chemicals/diesel-exhaust-particulate>

Brooklyn Rail Yard

Using the same data and procedure as above:

- Mass emission rate = 1,817.07 lb DPM/yr
- Screening Dispersion factor for point source release = $0.0033 \text{ [(ug DPM/m}^3\text{)/(lb DPM/yr)]}$
- Cancer RBC for DPM based on CA OEHHA IUR = $(1 \text{ Excess Cancer Risk})/(0.003 \text{ [ug DPM/m}^3\text{)})$

Then the calculations are:

$1817.07 \text{ [lb DPM/yr]} \times (0.0033 \text{ [(ug DPM/m}^3\text{)/(lb DPM/yr)]}) = 5.996 \text{ [ug DPM/m}^3\text{]}$

$(5.996 \text{ [ug DPM/m}^3\text{)}) \times (1 \text{ Excess Cancer Risk})/(0.003 \text{ [ug DPM/m}^3\text{)}) =$ **1,998.77 Excess Cancer Risk**

Other factors

Albina rail yard released 14,778 pounds of volatile organic compounds annually. Presumably this due to rail to truck transfers without a thermal oxidizer. This could pose a significant nuisance to neighbors but a minimal health threat.

We understand that Union Pacific has shifted substantial container operations activity from the Albina to the Brooklyn Yard 2011 - 2014. The most recent data, EPA 2014 NATA released in 2018 show Brooklyn rail yard has less than 1/3 of the airborne emissions as Albina rail yard. Brooklyn may be the more significant airborne diesel particulate source now.

Hillsboro Airport Health Risk Calculations

We made a spreadsheet of only the lead emissions from "Prioritization Risk Values." The largest is lead emitter included is Georgia-Pacific Toledo emitting 572.80 pounds of airborne lead annually with a noncancer chronic and acute combined risk of 99.44

per million people. That is a ratio of approximately .173 noncancer health effects risk per million per pound of airborne lead. EPA 2014 NEI released in 2018 reported annual lead emissions for the Hillsboro Airport to be 1,211 pound per year. Using the ratio above, this is **209.5 combined noncancer** health effects per year. This placed Hillsboro Airport as the most dangerous industrial air polluter in Washington County and fourth most dangerous stationary industry in the Portland area.

The increased dispersal means the lead affects a larger area with a low concentration. Because single prop planes fly at 1200 meters, this means lead disperses further than if the lead was emitted from a smokestack close to the ground. Lead, whether inhaled or ingested, is dangerous. The Agency for Toxic Substances & Disease Registry (ATSDR) of the US Department of Health and Human Services reports on its website that "lead can affect almost every organ and system in your body." ATSDR warns that lead targets the nervous system in adults and children, can damage the brain and kidneys, and can cause miscarriages; "children are more sensitive to the health effects of lead than adults. No safe blood lead level in children has been determined."

The increased dispersal means the lead affects a larger area with a low concentration. For more information on the Hillsboro Airport and citations for the information above visit:

portlandcleanair.org/files/HAWAirportFinal.pdf

Portland Clean Air welcomes volunteers and donors to participate. Please email with any questions or visit our website:

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