



Overview of CEI Hub and CSZ Earthquake

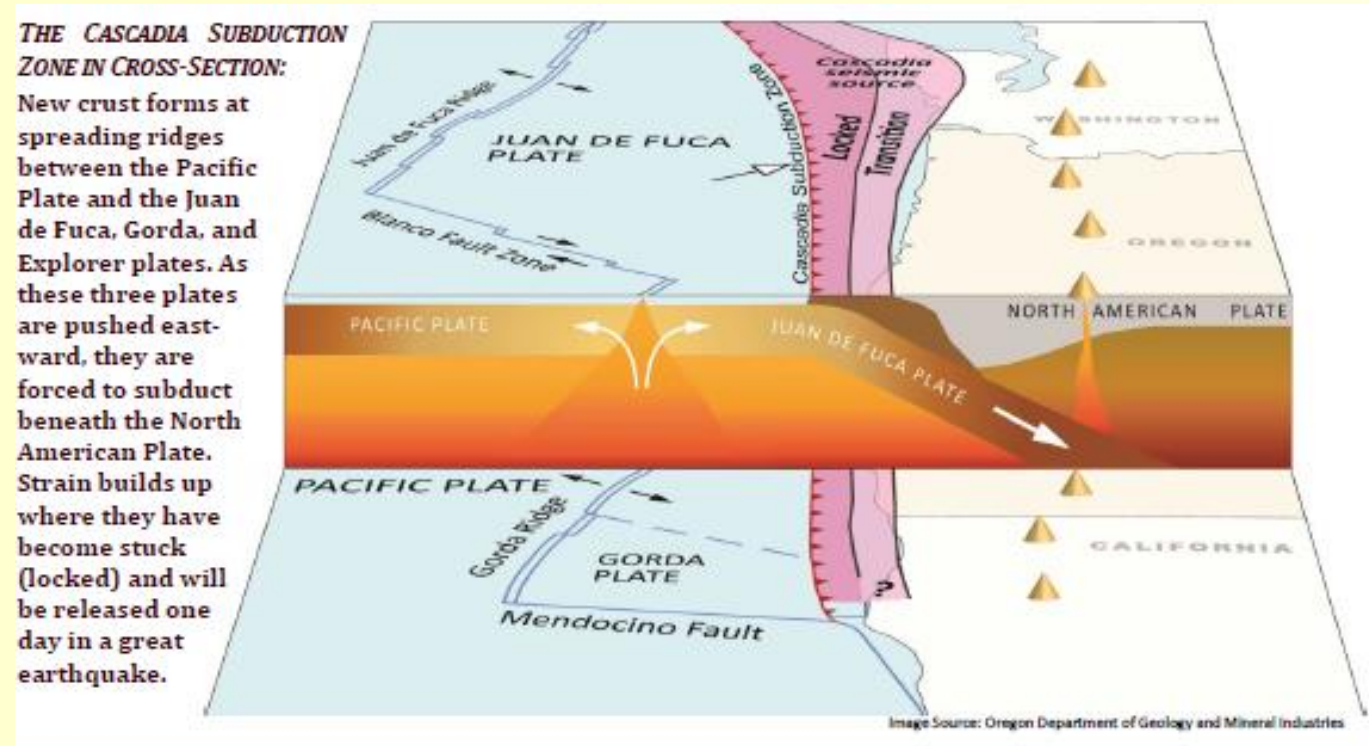
- Discussion of the Cascadia Subduction Zone
- Why this presents a hazard to the CEI Hub

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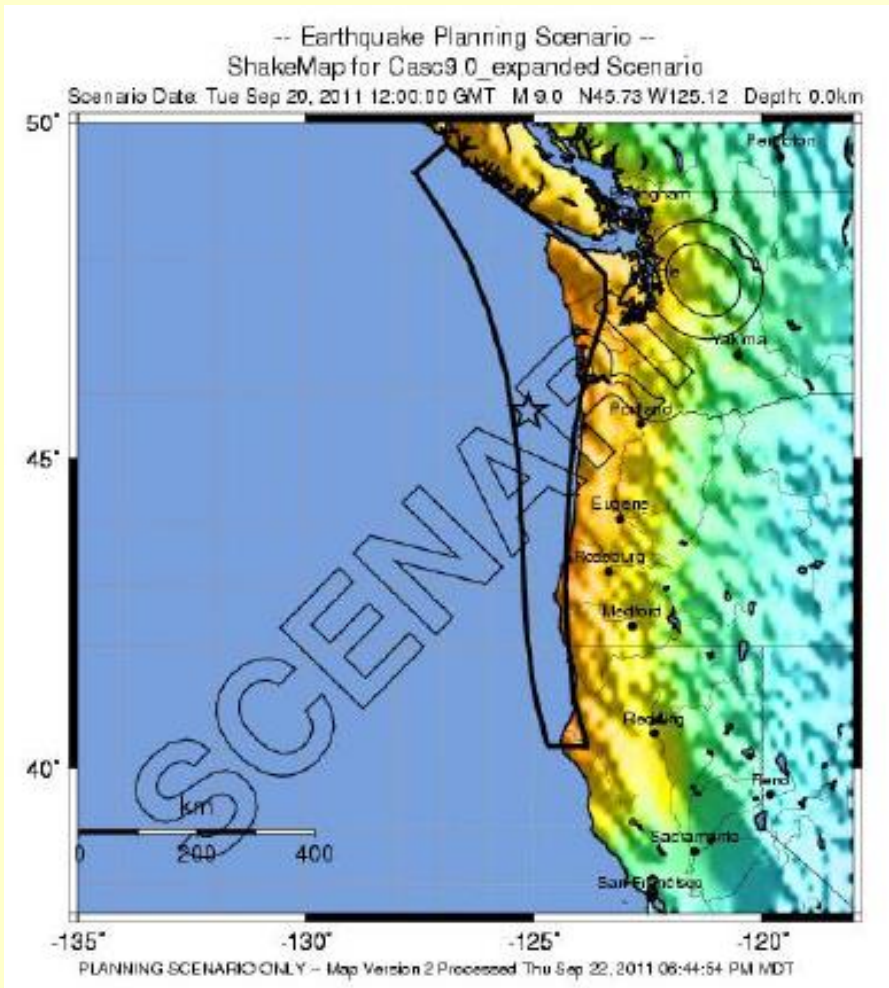


Overview of Cascadia Subduction Zone Earthquake Risk

Juan De Fuca Plate is moving underneath the North America Plate



Source: CREW Cascadia Subduction Zone Earthquakes: Magnitude 9.0 Earthquake Scenario 2013

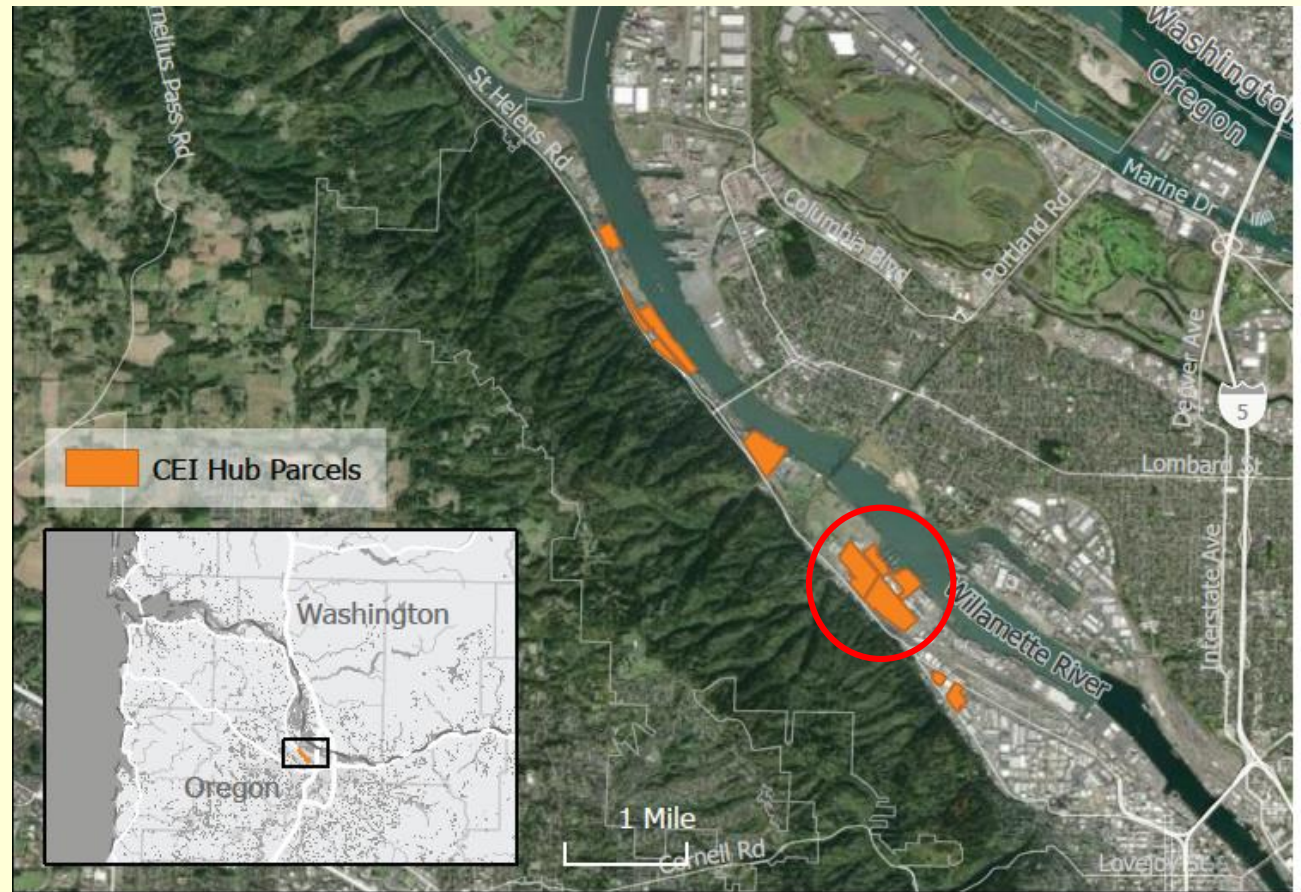


- Damage Expected:
 - On the Oregon Coast will be extremely strong
 - Tsunamis expected along whole Oregon Coast
 - Up to Longview on Columbia River
 - Regionwide infrastructure damage
 - This threat was only discovered in late 1980's
 - First Seismic Building codes introduced in 1993
 - Intense shaking damage to Portland CEI Hub
 - Widespread damage from shaking alone expected to entire region from 2-5 minutes of shaking



Introduction to the Critical Energy Infrastructure (CEI) Hub

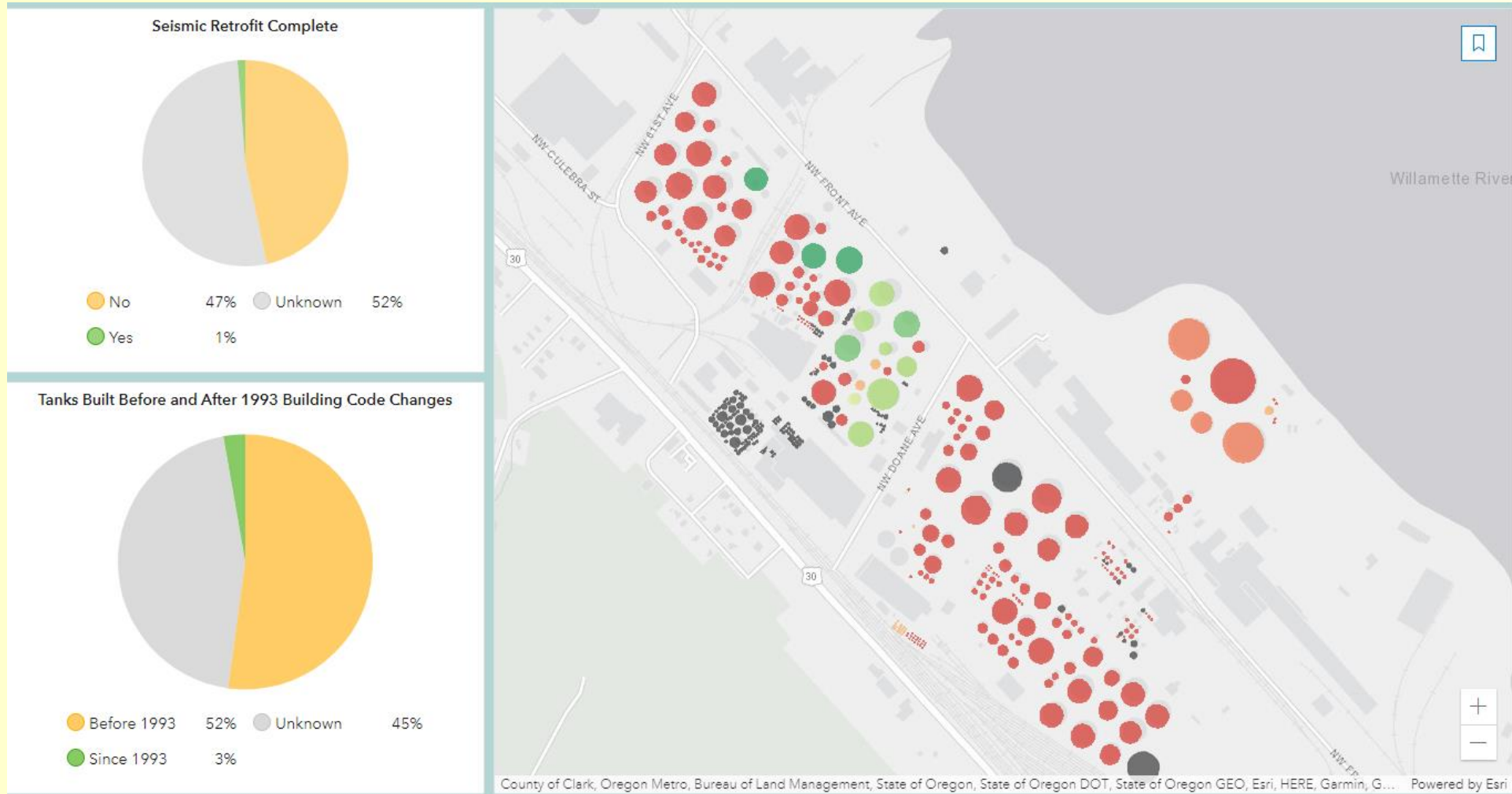
- Situated near Downtown Portland
- 6 mile zone previously wetlands & Lakes
- Filled in with dredge spoils (poor soils) is likely to cause liquefaction
- 17 Tank Farms in the CEI Hub
- 350 Million Gallons of all types of refined oil and crude oil
- 3 pipelines, 537 Tanks
- <2% of tanks built since 1993
- This is 90% of Oregon's Oil Supply



Source: Created by ECONorthwest

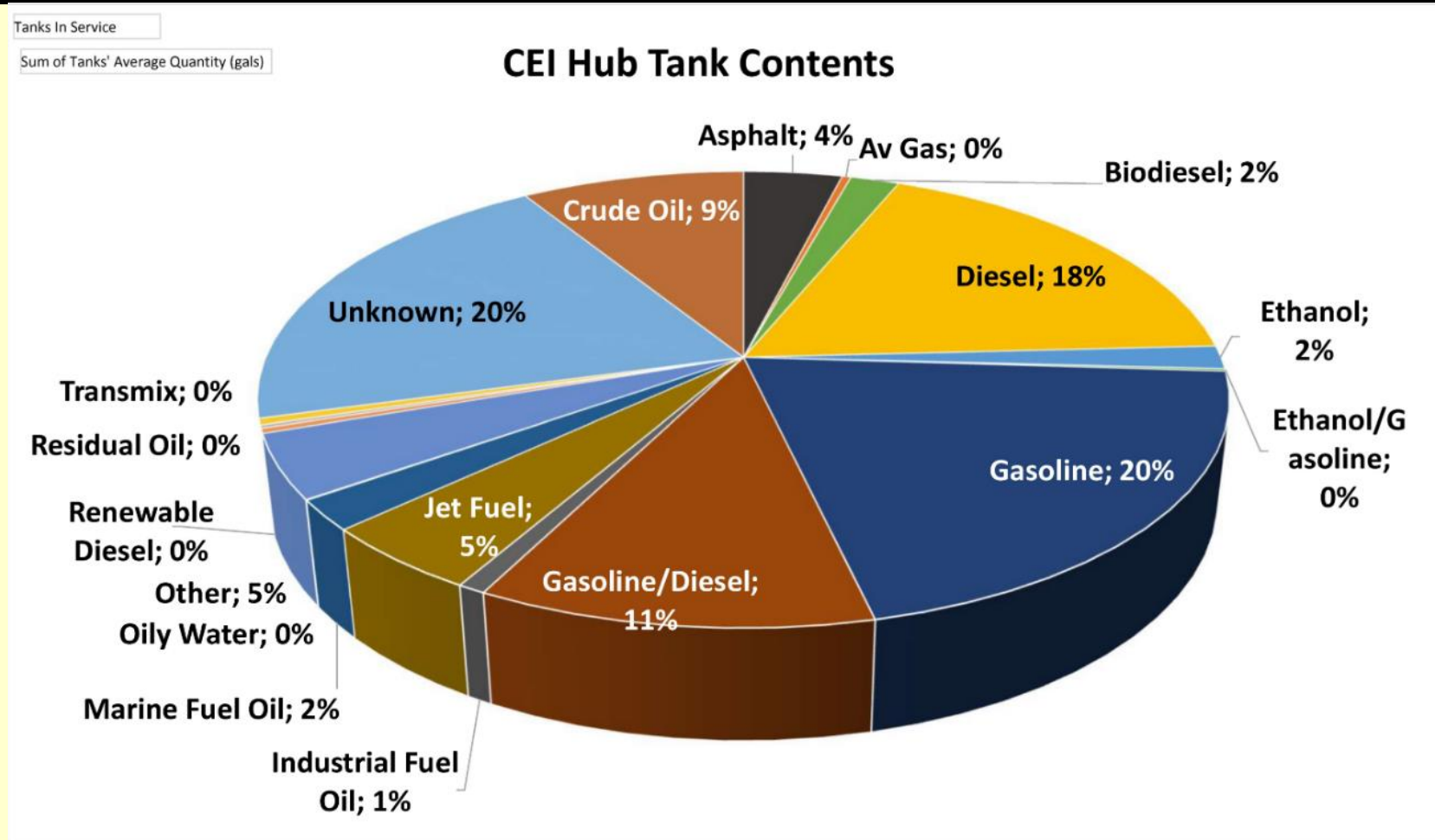


CEI Hub Detail of Willbridge Area



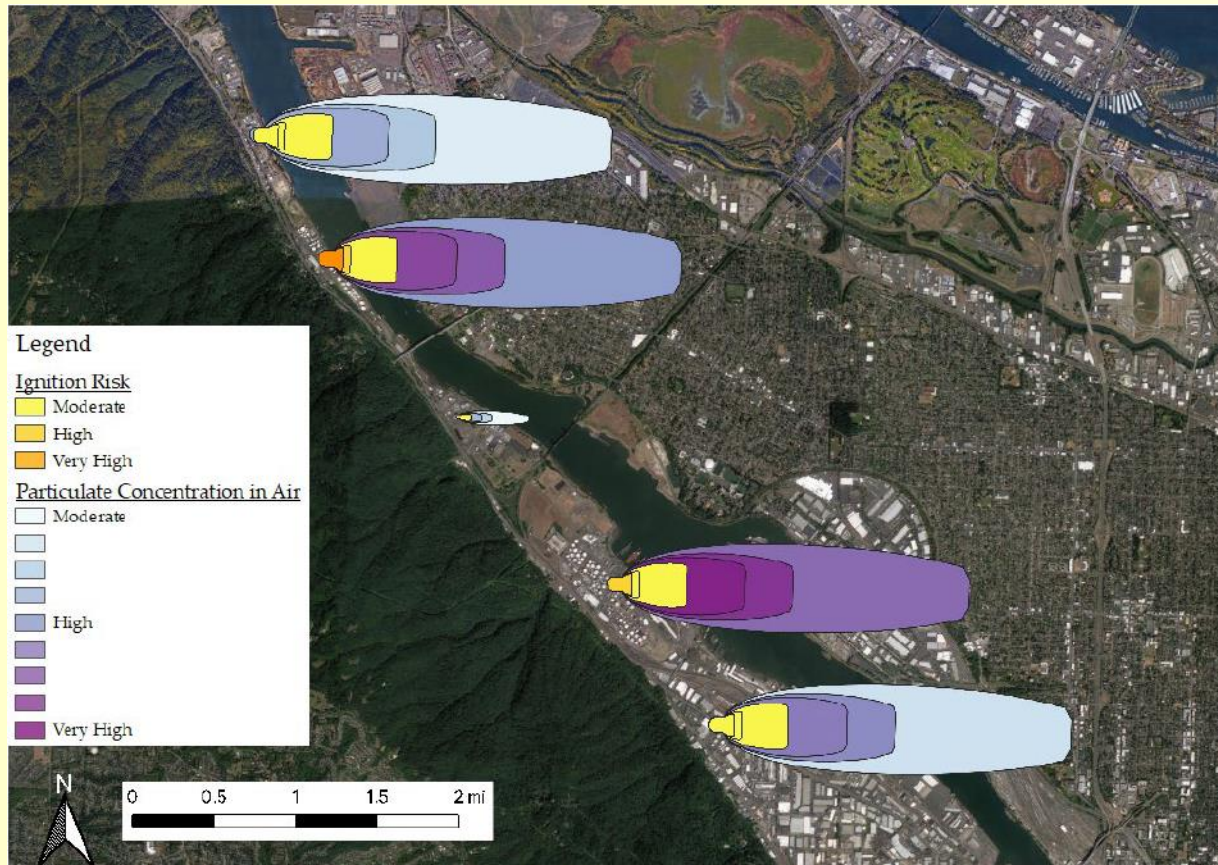


CEI Hub Tank Contents





Air Quality Modeling in the CEI Hub after Earthquake



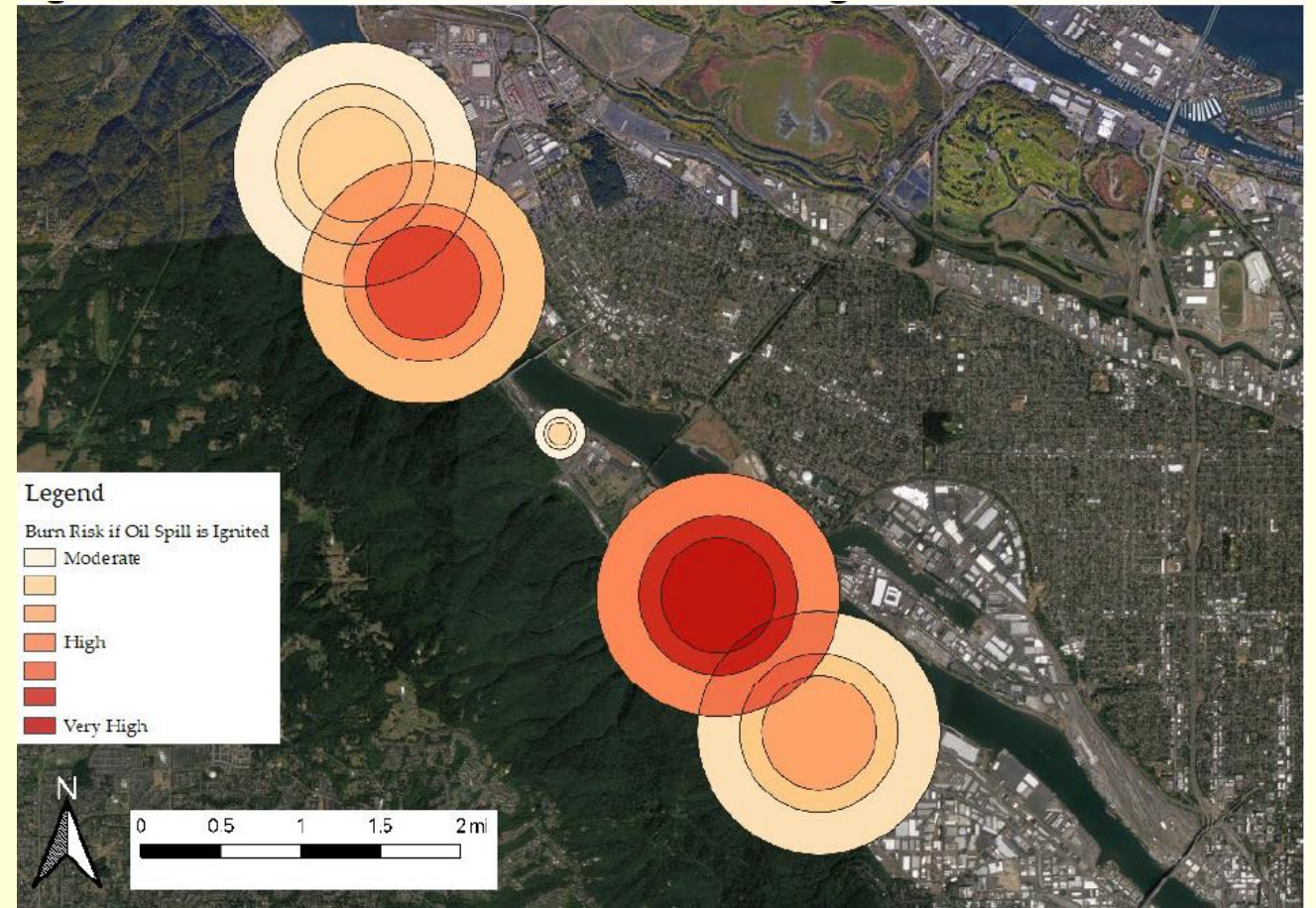
Source: NOAA and EPA ALOHA software, output created by ECONorthwest

- Gasoline Components will volatilize quickly
 - Components include Butane, pentane, benzene and toluene
- OSHA's max allowable standards:
 - 300 ppm for 8-hr time weighted avg
 - 550 ppm for 15 min exposure
 - Will exceed these in darker shaded areas
- Wind direction is obviously variable
- EcoNorthwest study was sponsored by Multnomah County and City of Portland



Fire/Explosion Risks for post-earthquake CEI Hub

- Highly variable areas due to wind activity
- Areas include Portland Fire Houses #6 & #22
- High voltage power lines in the area
- Large LNG Facility may have uncontrolled release



Source: NOAA and EPA ALOHA software, output created by ECONorthwest



Energy Hub Considerations from Oregon Dept of Energy

- 90% of Oregon's fuel supply passes through CEI Hub including 100% of PDX Airport fuel. Most fuel will likely be spilled & unusable.
- CEI Hub fuel is supplied by an estimated 70% from pipeline, which will be damaged. An estimated 30% comes from tank ships, but rivers are not expected to be navigable and docks at facilities are expected to fail.
- All infrastructure including electricity, water, sewage, transportation, & communications will likely be offline
- Current DOE/FEMA plans are for oil to be trucked in from Eastern OR, new temporary supply chains will need to be designed.
- Getting fuel to firetrucks, hospitals etc will be challenging, reducing Oregon's ability to recover from the earthquake.



Oregon Senate Bill 1567 (2022)

- Effective June 3, 2022. Requires 17 facilities with fuel storage capacity over two million gallons to assess their seismic vulnerability and improve their infrastructure to better withstand earthquakes
- DEQ is hiring 4 staff (policy analyst, engineer, inspector, and administrative specialist) and contracting for special technical assistance
- DEQ will convene a rule advisory committee and a technical workgroup to develop a proposal for assessment, mitigation, inspection requirements and fees for public comment and rule adoption in mid 2023
- Facilities have until June 2024 to conduct the seismic vulnerability assessment and propose risk mitigation plans
- Sign up for updates at www.oregon.gov/deq/tanks/Pages/seismictanks.aspx, or contact Mike Kortenhof, Fuel Tank Inspection Manager at mike.kortenhof@deq.oregon.gov ; 971-563-0111



References

References used in this presentation:

- EcoNorthwest Report on Impacts of Fuel Releases from CEI Hub
<https://econw.com/projects-collection/2022/2/23/impacts-of-fuel-releases-from-the-cei-hub-1>
- Oregon Fuel Action Plan <https://www.oregon.gov/energy/safety-resiliency/Documents/Oregon-Fuel-Action-Plan.pdf>

Other CEI Hub References:

- OSSPAC CEI Hub Mitigation Strategies:
https://www.oregon.gov/oem/Documents/OSSPAC_CEI-Hub_report_122019.pdf
- Oregon Dept of Geology & Mineral Industries Earthquake Risk Study for Oregon's CEI Hub <https://www.oregongeology.org/earthquakes/CEI-Hub-report.pdf>



Spill Trajectory for 96 Hours





Questions?

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