



Fuel Tank Seismic Stability Program Report to Legislature

Submitted to: Oregon Legislature

November 2024



This document was prepared by
Oregon Department of Environmental Quality
Fuel Tank Seismic Stability Program
700 NE Multnomah Street, Suite 600
Portland, Oregon, 97232
Contact: Abby Boudouris
Phone: 971-803-2462
abby.boudouris@deq.oregon.gov
<https://www.oregon.gov/deq/>



Translation or other formats

[Español](#) | [한국어](#) | [繁體中文](#) | [Русский](#) | [Tiếng Việt](#) | [العربية](#)

800-452-4011 | TTY: 711 | deqinfo@deq.oregon.gov

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities. Visit DEQ's [Civil Rights and Environmental Justice page](#).

Executive Summary

The Fuel Tank Seismic Stability Program, created by the Oregon Legislature in 2022 (Senate Bill 1567), is implemented by DEQ's Land Quality Division. This spill prevention program aims to evaluate and improve the earthquake resilience of large-capacity oil and fuel storage facilities. The law requires seismic vulnerability assessment and risk minimization at fuel storage and distribution facilities with storage capacity over two million gallons in Columbia, Lane, and Multnomah counties. The program safeguards public health, life safety and the environment from fuel releases and fires caused by earthquakes. The Environmental Quality Commission adopted rules on Sept. 15, 2023 and established the process for facilities to develop and submit Seismic Vulnerability Assessments and Risk Mitigation Implementation Plans, including submittal deadlines, approval criteria, fees, implementation timelines and reporting requirements to DEQ. Oregon Administrative Rules Chapter 340, Division 300, was adopted in consultation with the Department of Geology and Mineral Industries and the Oregon Department of Energy.



This report consists of three parts. As required by SB 1567 (2022), Part 1 describes the information DEQ received from the facilities by the June 1, 2024, deadline. All facilities regulated by the program took steps to comply with the law. Sixteen facilities submitted Seismic Vulnerability Assessments. The submittals are at different levels of completeness with some ready for geotechnical engineering review while others are deemed incomplete and will move into the geotechnical review stage once additional information is provided.

SB 1567 (2022) also directed DEQ to provide policy recommendations about expanding requirements to additional areas of the state based on the risk of an earthquake or tsunami occurring in those areas. Given the early stage of the program, Part 2 of the report describes policy options instead of recommendations. Based on the available data, DEQ identified options to lower the regulatory threshold of storage capacity to one million gallons and to expand to the entire state. If implemented, those options would add one to three facilities to the current program. Further study of above-ground fuel storage facilities and regulatory status is recommended to identify other gaps and opportunities.

Part 3 of this report contains appendices with the graphics of data used to prepare this report.

Table of Contents

Executive Summary3

Table of Contents.....4

Background.....5

1. Information Received by DEQ by June 1, 20247

2. Policy Options10

3. Appendices12

Background

In 2022, the Oregon Legislature passed SB 1567 to address risks associated with Oregon's aging fuel storage infrastructure's vulnerability to a future Cascadia Subduction Zone earthquake. Some of the over 600 fuel tanks located at the Critical Energy Infrastructure Hub along the Willamette River are more than 100 years old and rest on unstable river fill that will face liquefaction in a major earthquake. Frontline communities in North Portland would be hit first and hardest, but a major disaster would impact the entire state of Oregon. The bill directed the Oregon Department of Environmental Quality to develop a program to regulate seismic resilience of large capacity fuel storage and distribution facilities located in Columbia, Lane and Multnomah counties.

The purpose of the SB 1567 ([ORS 468B.510 - 525](#)) is to protect public health, life safety and environmental safety against fires and the release of fuel products caused by earthquakes and to establish the process and criteria for Seismic Vulnerability Assessments and Risk Mitigation Implementation Plans submitted by facilities for DEQ's approval.

DEQ convened a Rules Advisory Committee in a year-long rulemaking process to develop the proposed program. The 13 members of the committee represented perspectives of the industry, emergency response, government, neighborhoods and communities. To support the rulemaking DEQ contracted with an engineering consulting company and Portland State University's Institute for Sustainable Solutions. Haley and Aldrich prepared the [Report on Engineering Research](#) which summarized the review of the engineering code, standards and regulations to support the rulemaking. PSU reviewed relevant policies in other jurisdictions, states and countries such as California Accidental Release Prevention, Marine Oil Terminal Engineering and Maintenance Standards, Japan's Law Framework and the European Union Seveso III Directive. The PSU [Report](#) also included an environmental justice study conducted explicitly for this rulemaking. In addition, the rulemaking included DEQ consultation with the Oregon Department of Geology and Mineral Resources, the Oregon Department of Energy and the Washington State Department of Ecology.

During program development some significant issues were identified as beyond the scope of the law or rule making. These included seismic resilience expectations for new facilities built on properties not subject to SB1567, allowable uses of the Seismic Risk Mitigation Fund, financial responsibility requirements (e.g. risk bonding) and releases of other hazardous materials due to earthquake.

The rulemaking resulted in the adoption of OAR 340-300 by the Environmental Quality Commission in September 2023. Facilities have two options to comply: 1) meet stringent design standards for new facility construction or 2) modify existing systems or spill containment such that the Maximum Allowable Uncontained Spill is no more than 42 gallons. DEQ's review and approval process, fees, implementation criteria and reporting requirements are also included in the rules. Under these requirements new regulated fuel storage facilities must be designed to the highest safety factor in the codes, specifically the American Society of Civil Engineers Standard 7-22, Risk Category IV. That level is

designated for structures that pose a substantial hazard to the community in the event of failure.

The Seismic Vulnerability Assessment required in OAR 340-300-0003 consists of Geotechnical, Structural and Safety Assessments. The assessments characterize site conditions, all structures where failure can cause a spill, and fire control and containment systems.

OAR 340-300-0004 defines the Risk Mitigation Implementation Plan requirements. Risk Mitigation Implementation Plans must be submitted to DEQ 180 days after the Seismic Vulnerability Assessment is approved. The plan must propose risk mitigation measures to address vulnerabilities identified in the Seismic Vulnerability Assessment and provide an implementation timeline. All risk minimizing actions must be implemented within 10 years of the plan's approval.

This report responds to direction provided by the legislature in SB 1567 (2022). Specifically, Section 15 provides:

“No later than November 1, 2024, the Department of Environmental Quality shall provide a report, including recommendations for legislation, to the interim committees of the Legislative Assembly related to energy, in the manner provided under ORS 192.245. The report required under this section must include:

(1) A summary of information received by the department under section 2 of this 2022 Act; and

(2) Policy recommendations for making the provisions of sections 2 to 6 of this 2022 Act applicable to additional regions of this state, based on the risk to each additional region from an earthquake or tsunami.”

1. Information Received by DEQ by June 1, 2024

Sixteen facilities that submitted the required Seismic Vulnerability Assessment reports by the statutory deadline are listed in Table 1 below. One additional facility, Vigor Industrial, LLC located in Multnomah County, signed an enforceable Mutual Agreement and Final Order with DEQ to close oil storage operations instead of working through the regulatory process.

DEQ contracted with Moffatt & Nichol, an engineering consulting group headquartered in California, to provide specialty engineering support to DEQ. DEQ and Moffatt & Nichol compared the reports to the requirements described in OAR 340-300-0003, to determine if any given assessment provided enough information to proceed with a formal geotechnical engineering review. These initial efforts showed that three out of sixteen assessments provided enough information and can proceed to the next step of geotechnical review.

DEQ classified the submittals into three categories: Early Action, Geotechnical Evaluation and Incomplete, summarized below.

In October DEQ sent letters to each facility describing the findings and any deficiencies to be addressed before the facility's reports could move on to the next step of the detailed geotechnical review. Facilities are expected to reply to DEQ's initial comments by December 6, 2024, including specific plans and schedules for submitting revised assessments. DEQ is working to complete technical comment, revisions and approvals of all Seismic Vulnerability Assessments in the first half of 2025. Risk Mitigation Implementation Plans will be due 180 days after each facility assessment is approved. Those plans will go through a similar technical review process as well as a public comment and hearing process before DEQ approval.

1.1 Category 1: "Early Action"

Two facilities acted early. These facilities have met both vulnerability assessment and mitigation plan expectations and are proceeding with facility work to mitigate risk of fuel spills.

PDX Fuels, LLC, owns and operates the fuel tanks at the Portland Airport. The facility submitted their assessment and mitigation information for DEQ's review before the June deadline. Plans to replace the existing tanks with new tanks meeting modern seismic resilience requirements have been reviewed for compliance with DEQ requirements. They are available for public comment until December 13, 2024.

Vigor Industrial, LLC, located in Multnomah County, signed an enforceable [Mutual Agreement and Final Order](#) with DEQ on May 31, 2024. In March 2024, Vigor filed a petition challenging the applicability of the Fuel Tank Seismic Stability law to their shipbuilding operations. Subsequently, DEQ and Vigor negotiated the enforceable Order.

The Order requires Vigor to eliminate four million gallons of oil storage capacity by 2028 instead of going through the Seismic Stability Program. This agreement avoids the delay and uncertainty of litigation and achieves major risk reductions over four years. Vigor must submit progress reports to DEQ every other month from July 2024 to July 2028, and DEQ will conduct inspections of the facility to confirm compliance.

1.2 Category 2: “Geotechnical Evaluation”

Three facilities, Phillips 66, McCall Oil and Chemical Corporation, and Portland General Electric submitted the Seismic Vulnerability Assessment reports based on data existing at the site or available in prior geotechnical reports.

McCall Oil and Chemical Corporation located in Multnomah County submitted the geotechnical assessment and checklist. The submittal from Phillips 66, located in Multnomah County includes a Geotechnical Assessment Report developed for the facility and the completed geotechnical checklist. DEQ is proceeding with the detailed review of the geotechnical assessment report for these facilities.

Portland General Electric located in Columbia County submitted a seismic assessment report evaluating geotechnical conditions at the site based on the available data from prior geotechnical reports. Portland General Electric’s report indicates that five existing tanks are already empty and decommissioned and that PGE plans to cease using diesel fuel entirely in 2026, after which they plan to decommission the remaining three tanks. DEQ approved the PGE assessment in October 2024 based on the proposal to cease fuel storage entirely. PGE has 180 days (April 2025) to submit a risk Mitigation Implementation Plan detailing the steps and schedule for decommissioning the remaining storage tanks and related equipment.

1.3 Category 3: “Incomplete”

The reports submitted by Cascade Kelly Holdings LLC, Chevron Fuels Willbridge terminal, Kinder Morgan Liquids Willbridge terminal, Kinder Morgan Liquids Linnton terminal, Owens Corning Roofing and Asphalt LLC, Seaport Midstream Partners LLC, Kinder Morgan Eugene terminal, Shore Terminals LLC, Triton West LLC, and Zenith Energy Terminals considered incomplete need additional information to proceed with technical reviews. These facilities submitted facility-wide assessments presenting findings from a qualitative risk assessment based on visual inspections, experience from prior strong earthquakes and identified geohazards. They classified each component or component group as low/high or low/moderate/high risk categories. They proposed an action plan for these depending on the risk category; for example, high-risk categories are proposed to be mitigated, moderate-risk categories are proposed to be further assessed with low-risk categories requiring no further action. This approach is preferred over the structural analyses of each component with the current design criteria. Such an approach could be considered as a screening method to prioritize mitigations. However, DEQ anticipates deferring this decision until the completion of geotechnical evaluations using the DEQ-designed checklists provided to all facilities.

The Columbia Pacific Biorefinery facility provided a plan for future inspections only, and NW Natural Corporation submitted a tank inspection report only without the geotechnical evaluation.

Table 1. Facilities with Seismic Vulnerability Assessment reports submitted to DEQ

1	Cascade Kelly Holdings LLC - Columbia Pacific Bio-Refinery	Columbia
2	Chevron American Fuels and Lubricants - Willbridge Terminal	Multnomah
3	Kinder Morgan – Willbridge Terminal	Multnomah
4	Kinder Morgan – Linnton Terminal	Multnomah
5	McCall Oil & Chemical Corporation – McCall Terminal	Multnomah
6	NW Natural – Portland LNG Facility	Multnomah
7	Owens Corning Trumbull Asphalt Plant	Multnomah
8	Pacific Terminal Services – Portland Terminal	Multnomah
9	PDX Fuel Company, LLC – Portland International Fuel Facility	Multnomah
10	Phillips 66 Pipeline LLC - Phillips 66 Terminal	Multnomah
11	Portland General Electric – Beaver Generating Plant (Facility)	Columbia
12	Seaport Midstream Partners, LLC – Portland Terminal	Multnomah
13	Kinder Morgan – Eugene Terminal	Lane
14	Shore Terminals LLC – Portland Terminal	Multnomah
15	Triton West LLC – Shell Portland Terminal	Multnomah
16	Zenith Energy Management – Zenith Portland Terminal	Multnomah

2. Policy Options

The oil storage facilities listed in Table 1 are moving through the process as expected. Of the 16 facilities, PGE's SVA has been approved and the 180 days Risk Mitigation Implementation Plan submittal timeline has started. Fourteen facilities' SVAs are in the DEQ review and comment phase, awaiting approval of the vulnerability assessment, which is expected to be completed by June 2025. The 16th facility, PDX Fuel, is in the public comment process for the risk mitigation work to replace the fuel tanks. Once DEQ approves the plans, those facilities are required to submit Risk Mitigation Implementation Plans in six months – approximately December 2025.

DEQ has not identified technical changes needed to existing statute related to these facilities. The Environmental Quality Commission has the authority through SB 1567 (2022), codified as ORS 468B.510 - 525, to adopt rules to add requirements to minimize harmful impacts or to add design and construction standards. Such needs are not expected to be identified until DEQ receives and evaluates the Risk Mitigation Implementation Plan proposals in 2026.

Currently, DEQ regulates facilities with over two million gallons of liquid fuel or oil storage capacity in three counties - Columbia, Lane and Multnomah Counties. This covers almost all the very large capacity storage facilities in Oregon. The next largest facility in those three counties is the Oregon Air National Guard base next to the Portland Airport is considerably smaller with 662,500 gallons of reported storage capacity.

Two adjustments to the applicability criteria established in SB 1567 could be considered:

2.1 Applicability Criteria Adjustment option A: Include all facilities over 2 million gallons

DEQ is aware of two facilities each with over two million gallons capacity and located on vulnerable land near critical waterways. One is located in Lincoln County (NW Natural Liquified Natural Gas Facility, Newport) and one in Umatilla County (Tidewater Terminal, Umatilla). They are vulnerable to different levels of earthquake shaking but both could fail in a Cascadia event. The Lincoln County facility is vulnerable to tsunamis. To provide the same level of safety across the State, the program could expand to include these two counties.

2.2 Applicability Criteria Adjustment option B: Expand the program to include facilities with storage capacity over one million gallons

Statewide, there is one other known facility with storage capacity over one million gallons located in Coos County (Tyree Oil, North Bend, reported storage capacity: 1,757,000 gallons). This location is immediately adjacent to Coos Bay and presents similar or greater risks to human health, the environment and economic activity so could be considered for inclusion in the DEQ program.

Legislative action would be needed to implement either applicability criteria adjustment option.

2.3 Statewide study of risk from smaller facilities

There are many other fuel storage facilities throughout Oregon that are vulnerable to earthquake damage and would cause significant public health or environmental problems. They are generally located at transportation hubs near communities and waterways and are of similar age as the CEI Hub and may not be built to adequate seismic resilience standards. Spills from these facilities are expected after an earthquake. A statewide analysis of risk from smaller facilities could inform further legislative work to protect public health and the environment from seismic-related spills.

According to the September 2024 Oregon Department of Energy [Oregon Energy Security Plan](#), Cascadia Subduction Zone earthquake vulnerabilities are highest in western parts of Oregon. Central and Eastern Oregon are expected to have lesser earthquake related shaking but are located at population, water body and transportation centers that are still vulnerable to spill related damage. The facilities located in Central and Eastern Oregon likewise rely on aging infrastructure that were constructed to less stringent standards than current requirements, and therefore pose risks.

The Oregon Department of Geology and Mineral Industries created the [Landslide Information Database for Oregon](#), a statewide landslide susceptibility tool that allows the user to explore the statewide and localized landslide susceptibility. Appendix A illustrates that while Central and Eastern Oregon might experience less violent shaking, the localized landslide susceptibility cannot be ignored.

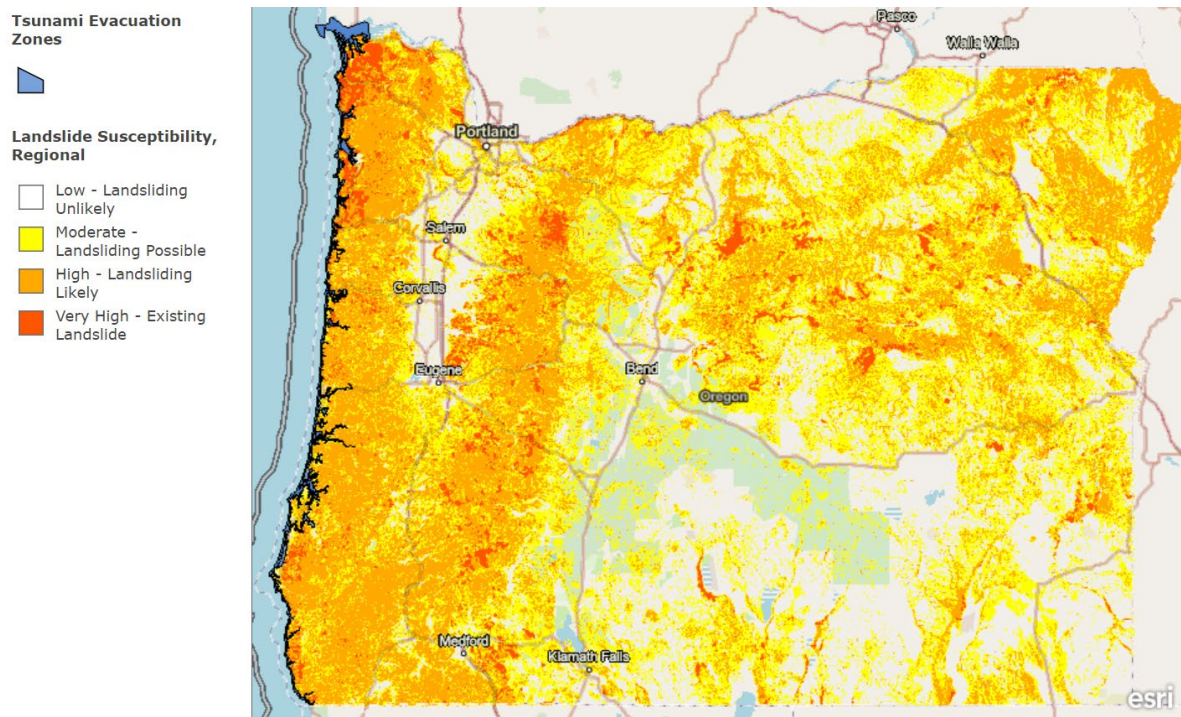
With the most comprehensive data available at this time, there is still much unknown about many of Oregon's fuel storage facilities, their capacity, the age of their tanks and equipment and their seismic code compliance. For example, DEQ is currently aware of 15 fuel storage facilities in Columbia, Lane and Multnomah counties that have unknown construction and seismic resilience parameters. Their distribution by county is shown in Appendix B. The total fuel and oil storage capacities at these facilities are shown in Appendix C.

The Legislature or the related agencies could conduct a statewide study of above ground fuel storage status in Oregon to identify gaps in regulations.

3. Appendices

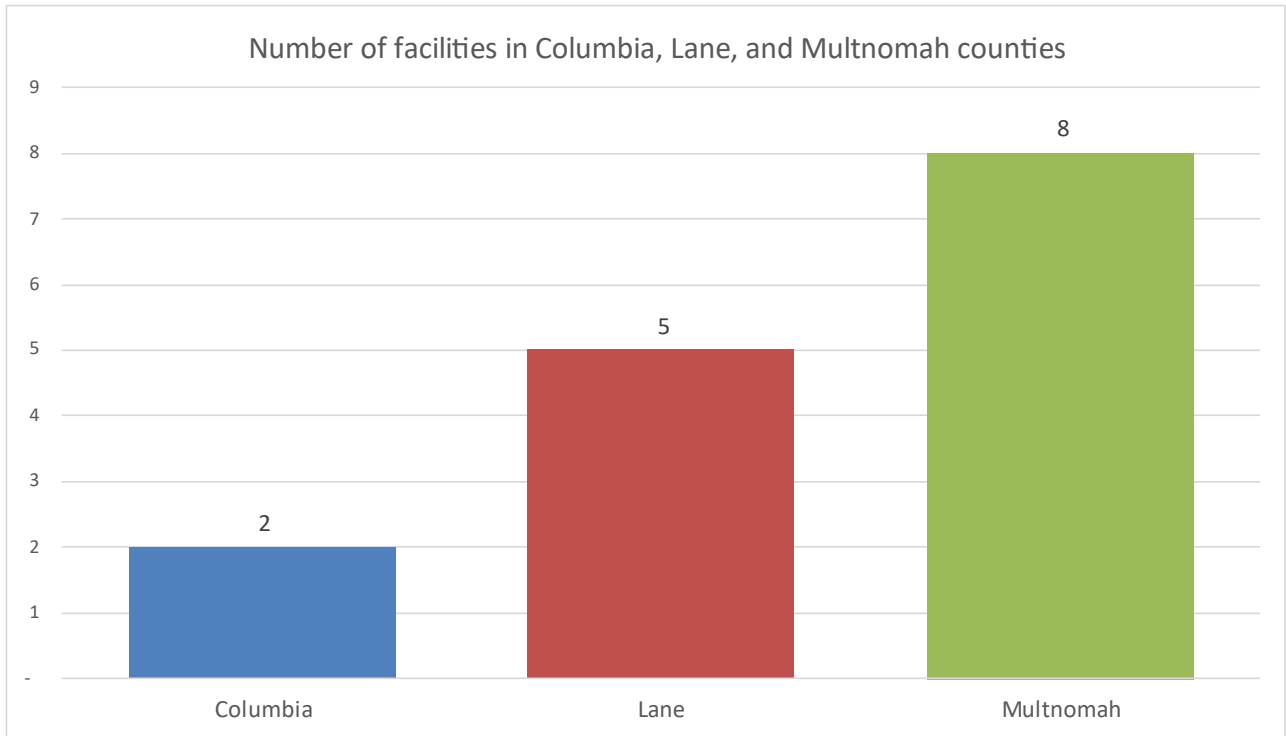
3.1 Appendix A

A map of Oregon showing estimated landslide susceptibility and tsunami evacuation zones, pulled from DOGAMI's Statewide Landslide Information Database for Oregon. The darkest shade of orange represents a very high susceptibility to landslides or where existing landslides have occurred.



3.2 Appendix B

Unregulated facilities in Columbia, Lane and Multnomah counties in the 50,000 – 1 million gallons capacity range. Facilities regulated by the Fuel Tank Seismic Stability program are excluded.



3.3 Appendix C

Total unregulated storage capacity in Columbia, Lane, and Multnomah counties. Facilities regulated by the Fuel Tank Seismic Stability program are excluded.

