



State of Oregon Department of Environmental Quality
**Fuel Tank Seismic Stability
Chapter 340**

Division 300

Draft Fuel Tank Seismic Stability Rules

[340-300-0000](#)

1. Context

- a. A Cascadia Subduction Zone earthquake impacting the large capacity fuel handling facilities in Oregon could create widespread environmental damage, endanger health and safety of surrounding communities and place impossible demands on state's emergency response capabilities.
- b. The 2022 Oregon legislature adopted Senate Bill 1567 enacted as chapter 99 of Oregon Laws 2022. The law authorizes the Environmental Quality Commissions to adopt requirements for seismic vulnerability assessments and risk mitigation implementation program for large capacity liquid fuels terminals in Columbia, Lane and Multnomah counties.

[340-300-0001](#)

Purpose and Applicability

1. The purpose of these rules is to establish:

- a. The process and criteria for facility-wide Seismic Vulnerability Assessments including vulnerability to shaking related to the Cascadia Subduction Zone and post-earthquake secondary effects performed by the facilities and submitted to DEQ for approval.
- b. The process and criteria for Risk Mitigation Implementation Plans designed by facilities to minimize risk to people and environment and submitted to DEQ for approval.
- c. Fees for Seismic Vulnerability Assessments reviews.
- d. Fees for Risk Mitigation Implementation Plans reviews.
- e. The process, criteria, and schedule for Risk Mitigation Implementation Plans implementation.
- f. Fees for ongoing implementation compliance.
- g. Post-implementation reporting requirements.

2. The owners and operators of bulk oils and liquid fuels terminals or industrial facilities with at least 2-million-gallon fuel storage capacity located in Columbia, Multnomah and Lane counties must:

- a. Prepare and submit to DEQ the facility-wide Seismic Vulnerability Assessment.
- b. prepare and submit to DEQ facility-wide Risk Mitigation Implementation Plans designed to:

- (i) mitigate earthquake-induced damage to facilities (e.g., liquefaction risks, etc.).
 - (ii) safeguard against major damage, collapse, fire or major fuel spill.
 - (iii) address potential of structures to maintain operation or safely shut down
 - (iv) provide risk mitigation implementation plans and timeline.
 - (v) provide periodic reports of the ongoing implementation of mitigation measures.
- c. implement the risk minimization measures described in Risk Mitigation Implementation Plans when approved by DEQ.
- d. prepare and submit to DEQ post-implementation reports addressing residual risk.

Statutory Authority: [SB 1567 \(2022\)](#) ; [Oregon Laws 2022 Chapter 99](#) ; [ORS 468](#)

340-300-0002

Definitions and Acronyms as used in this Division:

1. "Assessment team" means a multidisciplinary team consisting of a: project manager, on-site team leader, structural inspection professional(s), structural analyst, electrical inspection professional(s), mechanical inspection professional(s), corrosion specialist, cathodic protection specialist, geotechnical analyst, and any other specialist needed.
2. "Building Codes" means the State of Oregon Building Codes Division in effect on September 1, 2023 and their mandated standards, performance objectives and performance criteria for evaluation and retrofit:
 - a. for existing building structures as outlined in ASCE 41;
 - b. for any new building structures as outlined in ASCE 7;
 - c. for tanks as outlined ASCE 7 and reference documents such as API650;
 - d. for piping and piping racks as outlined in ASCE 7;
 - e. for secondary containment structures;
 - f. for piers, wharves and other waterfront structures as outlined in ASCE 7Prior codes are not acceptable.
3. "Confidential business information" means information as described in [19 CFR 201.6](#)
4. "DEQ" means the Oregon Department of Environmental Quality.
5. "Design level earthquake" a theoretical ground shaking event used in building codes to check the resilience of a structure. It is impossible to create a completely earthquake-proof structure. A structure may be engineered to withstand a design earthquake or at least behave in a predictable way should a design level earthquake occur. A combination of magnitude and distance together with other source and site parameters are used in deterministic seismic hazard analysis.
6. "Deterministic seismic hazard analysis" means ground shaking hazard is assessed by identifying a specific reasonable (not worst case) earthquake event scenario or a "design level earthquake" – one for which the combination of magnitude and distance together with other pertinent source and site parameters provide large levels of ground shaking. Because of variability, the results of a deterministic analysis are presented in terms of percentile.
7. "Earthquake hazard" or "seismic hazard" means ground shaking and its secondary effects such as fires, landslides, tsunamis, ground failures, etc.
8. "Equity" means environmental justice considerations as addressed by the Oregon Environmental Justice Council and 2022 [House Bill 4077](#).
9. "Facility" means the entire bulk oils and liquid fuels terminal including any above-ground or underground tanks, pipes, foundations of structures, buildings, structures, ancillary components, spill containment structures, transloading facilities, wharves, piers, moorings

and retaining structures, loading racks, control equipment and any other structures within the property line or properties operated together.

10. "Facility owner and/or operator" means a person who owns and/or operates a facility.
11. "Fuel" means fuel of any kind that is liquid at atmospheric temperature and pressure or liquified by reducing its temperature and increasing pressure including, but not limited to, petroleum, gasoline, fuel oil, diesel oil, liquified natural gas, propane, oil sludge, oil refuse, biological oils and blends, and oil mixed with wastes other than dredged spoil.
12. "Minimize risk" means to ensure a facility's resilience to earthquake and secondary effects induced damages as to reduce the severity of harm to people and environment in accordance with required performance objective.
13. "Mitigation" means an action that reduces the severity of harm caused by a facility in an event of an earthquake.
14. "Mitigation plan" means a plan that the facility will implement to achieve the required performance level when subject to seismic hazard levels outlined in these rules. The plan must include the implementation schedule of all proposed risk minimizing measures.
15. "Off-site" means the environment outside of facility's property line but in the vicinity of the impact of the residual risk.
16. "Performance level" means a limiting structural damage state associated with performance objective.
17. "Performance objective" means one or more pairings of selected seismic hazard level with required performance levels.
18. "Probabilistic seismic hazard analysis" means the ground shaking hazard assessed in terms of statistical likelihood of occurrence (e.g., 2PE50 = 2% probability of exceedance in 50 years = annual probability of occurrence of 0.0004 = return period of 2475 years). Such analysis reflects the combined effects of multiple potential seismic sources and does not correspond to a single, specific earthquake. The result of such analysis is a hazard curve from which a uniform hazard response spectrum can be constructed.
19. "Residual Risk" means potential risk remaining after all risk mitigation measures identified in the Risk Mitigation Implementation Plan are implemented.
20. "Risk" means exposure to danger that can be determined by probability (how likely is event to occur) and impact (the determination of the consequences of an event).
21. "Risk Mitigation Implementation Plan" means a written document that outlines risk mitigation actions and steps to accomplish the goal of implementing the outlined actions to minimize the risk of damage to a facility and the environment.
22. "Secondary effects" include fires, floods, explosions, spills that occur due to earthquake damage to a facility.
23. "Seismic hazard level" means ground-shaking demands of a specified severity developed either on a deterministic or probabilistic basis.
24. "Seismic vulnerability assessment" means detailed facility-wide site-specific evaluation of the risk of seismically induced damage and secondary effects to all components of a facility and environment when subject to selected seismic hazard level with a goal of identifying risk mitigation measures.
25. "Transfer and process pipeline" means a buried or aboveground pipeline used to carry fuel to or from a tank vessel or transmission pipeline, or to a vessel and the first valve inside secondary containment at the facility, provided that any discharge on the facility side of that first valve will not directly impact waters of the state. A transfer pipeline includes valves, and other appurtenances connected to the pipeline, pumping units, and fabricated assemblies

associated with pumping units. A transfer and process pipeline does not include pipelines carrying ballast or bilge water, transmission pipelines, tank vessels or storage tanks.

Instances where the transfer and process pipelines are not well defined will be determined on a case-by-case basis by the DEQ.

26. "Transloading" means transfer of fuels from one storage location to another or one transportation mode to another.
27. "Qualified Professional" means Professional Engineer registered in Oregon as required in OAR 820-10-1000 and ORS 670.310 & 672.255.

340-300-0003

Seismic Vulnerability Assessment Requirements, Timeline and Approval Criteria

1. A comprehensive Seismic Vulnerability Assessment or series of assessments submitted to DEQ must:

- a. be conducted and verified by the Assessment Team of qualified professionals;
- b. evaluate the ability of the facility to achieve the performance objective;
- c. describe a facility element in terms of construction, age, inspection and maintenance and operations (e.g. aboveground storage tanks, transfer pipelines, spill containment structures, etc.);
- d. summarize currently implemented spill prevention and mitigation measures;
- e. use the Building Codes as defined by OAR 340-300-0002(2) for assessing seismic risk to evaluate the structural integrity, capacity to withstand shaking and secondary effects, seismic designs, performance and retrofit potential of:
 - (i) existing buildings, structures, and ancillary components – compliance with building codes as outlined in definition section of this rule and/or meet the required performance objective;
 - (ii) tanks – ability to withstand the design level earthquake;
 - (iii) spill containment structures;
 - (iv) transloading facilities, including wharves, piers, moorings and retaining structures;
 - (v) loading racks;
 - (vi) control equipment; and
 - (vii) any other structures related to or supporting facilities that constitute the bulk oils or liquid fuels terminal.
- f. evaluate soil's vulnerability to liquefaction, lateral spreading and seismic-induced settlement;
- g. identify measures to reduce spill likelihood (probability);
- h. identify measures to reduce spill impacts (consequences);
- i. evaluate the safety of operating conditions, safe shutdown procedures, potential spills;
- j. evaluate the availability and integrity of automated sprinkler systems and sufficient supplies of firefighting foam and other emergency response equipment located in seismically resilient locations that will be accessible after an earthquake to mitigate the risk of fire and explosions following earthquake;
- k. evaluate the integrity of firewalls surrounding facility to limit fire spreading into surrounding communities; and
- l. evaluate the availability of day and night onsite personnel to maintain operation in the event of an earthquake.

2. Facility must submit Seismic Vulnerability Assessment updates to DEQ:

- a. upon application for any permits for retrofit or reconstruction of facilities;
- b. when retrofits or significant new construction of any part of the facility occur; and
- c. when notified by DEQ of the availability of new scientific, technical findings, best management practices or industry standards but no more frequently than once every three years.

3. Seismic Vulnerability Assessment timeline:

- a. Facility owners must reply to requests for information from DEQ related to regulated activities including but not limited to property ownership, equipment ownership, equipment design, fuels present, spill prevention and earthquake preparedness.
- b. by June 1, 2024, facility must submit:
 - a. The facility-wide complete assessment final report; or
 - b. The initial assessment report, outlining the summary of work completed and work to be done, including a proposed schedule for completion with justification for an extension.
- c. Within seven calendar days (7), or on a schedule approved by DEQ, after a magnitude five (5.0) earthquake centered within 100 miles of the facility, facility owners must provide DEQ with an interim report on equipment status, equipment damage, and anticipated changes to mitigation plan implementation. Proposed schedules for supplemental reports may be included in the interim report for DEQ approval.

4. Timeline extension request justification may be submitted to the DEQ and must show that:

- a. a good faith effort was made to comply with the June 1, 2024 deadline;
- b. an acceptable basis for schedules is limited to the duration of specific site activities or sequencing of site activities; or
- c. the waiting time for contractor availability conflicts with the June 1, 2024 deadline. Justifications involving contractor availability must be accompanied by three proposals from independent contractors or sub-contractors providing alternate timelines for completion of the required assessments. Expense or preferred contractor availability are not acceptable justifications.

5. Seismic Vulnerability Assessment Modifications must be submitted:

- a. no later than 90 days after DEQ's notification of new scientific or technical findings.
- b. 90-day submittals may include initial assessment analysis and a proposed schedule for assessment completion.

6. A final report that contains an executive summary, introduction, a description, and summary of the observed conditions of the facility, any calculations and results from engineering analysis with noted deficiencies and corresponding remedial actions and appendices including all data and calculations must be submitted to DEQ for review and approval.

340-300-0004

Risk Mitigation Implementation Plan Requirements, Timeline and Approval Criteria

- 1. Risk Mitigation Implementation Plan must be stamped by a qualified professional and propose risk mitigation measures to address vulnerabilities identified in the Seismic Vulnerability Assessment, including:**
 - a. Site conditions;
 - b. on-site impacts of earthquake and secondary effects;
 - c. retrofits, replacement, updates, reconstruction, removal, relocation or other mitigation measures intended to comply with all building codes in effect on September 1, 2023 as defined by OAR 340-300-0002(2) n and/or achieve the performance objective goals;
 - d. individual system components and an individual determination of component structural integrity;
 - e. anticipated exposures to hazardous materials releases and proposed measures to prevent those exposures;
 - f. provisions for piers, wharves, docks, control houses, etc.;
 - g. description of the possible major earthquake induced residual risk scenarios and their probability or the conditions under which they may occur, including a summary of the events which may play a role in triggering each of these scenarios;
 - h. demonstration of the mitigation measures effectiveness to address risk scenarios identified in (g.) including but not limited to their effects on surface water, ground water, and air;
 - i. training and education to employees and surrounding communities;
 - j. connection to the local jurisdiction's requirements;
 - k. site-specific determinations needed and a schedule to complete modifications or construction;
 - l. additional provisions for resilience to ground shaking caused by earthquake and secondary effects hazards at the facility location; and
 - m. potential consequences and resources needed to mitigate the residual risk to employees and surrounding communities after mitigation measures are implemented.
- 2. Risk Mitigation Implementation Plan must be submitted to DEQ no later than 180 calendar days after DEQ's approval of Seismic Vulnerability Assessment.**
- 3. Risk Mitigation Implementation Plan must outline interim mitigation actions that will be completed within 1, 3, & 5 years based on feasibility and order of importance.**
 - a. The proposed schedule must include justification for 1-, 3- and 5-year selections based on magnitude of risk reduction.
 - b. The proposed schedule may consider the duration of specific site activities or sequencing of tasks dependent on previous work.
- 4. All mitigation measures approved by DEQ must be completed within 10 years after the DEQ approves the Risk Mitigation Implementation Plan.**
- 5. Amendments to Risk Mitigation Implementation Plans Implementation may be requested based on permit approval schedules received from other regulatory agencies.**

- 6. Final performance objective criteria will define allowable damage to infrastructure and restrictions on fuel release and containment.**
- 7. Performance criteria must conform with the building codes in effect on September 1, 2023 as defined by OAR and may be based on the probabilistic or deterministic analysis or on an alternative analysis proposed by facility owner for DEQ's approval.**
- 8. Post-Implementation condition of residual risk must be addressed and submitted to DEQ with the proposed Risk Mitigation Implementation Plan to**
 - a. be used to specify measures to mitigate the effects of residual risk by creating an internal alarm and emergency plan.
 - b. provide relevant information to local authorities for the creation of external alarm and emergency plans.

[340-300-0005](#)

Reporting requirements, test methods and procedures

- 1. Annual Risk Mitigation Implementation Plan implementation status reports must be submitted by June 1st of each year, or on a schedule approved by DEQ in the Risk Mitigation Implementation Plan.**
- 2. DEQ and its contractors may enter regulated facilities and inspect related activities at reasonable hours. DEQ should attempt to provide notice, but notice is not required.**
- 3. DEQ inspections and frequency may include:**
 - a. Periodic onsite special inspections by the geotechnical and structural engineers verifying that design criteria are met.
 - b. Periodic operation and maintenance inspections.
 - c. Special inspections by a qualified Testing Agency with certified personnel as required in Oregon Structural Specialty Code Chapter 17, ASTM (formerly American Society for Testing and Materials, currently ASTM International) E329, etc.).
- 4. A final post-implementation report, or series of final reports, must be submitted 180 calendar days after the implementation completion. The report or reports shall include:**
 - a. engineering specifications for all work performed as actually built; and
 - b. updated description of any residual risk.

[340-300-0006](#)

Program Administration and Compliance Fees

- 1. A facility owner must pay a Seismic Vulnerability Assessment Submittal Fee of \$39,000. The fee must accompany submittal of the Seismic Vulnerability Assessment.**

2. **A facility owner must pay a Risk Mitigation Implementation Plan Submittal Fee of \$36,000. The fee must accompany submittal of a Risk Mitigation Implementation Plan.**
3. **A facility owner must pay an annual compliance fee of \$23,000 by June 1 of each calendar year until the implementation of all risk minimization measures proposed in the Risk Mitigation Implementation Plan is approved by DEQ.**
4. **A facility owner must pay a Risk Mitigation Implementation Plan modification fee of \$5,000 when requesting changes to previously submitted mitigation plans. This fee does not apply to DEQ-required plan modifications.**

340-300-0007

DEQ's Responsibility to Review and approve Seismic Vulnerability Assessments and Risk Mitigation Implementation Plans

1. **DEQ will review the Seismic Vulnerability Assessments and the Risk Mitigation Implementation Plans submitted under 2022 Oregon Laws Chapter 99. The DEQ will approve the Seismic Vulnerability Assessment if the assessment:**
 - a. meets the requirements of 2022 Oregon Laws Chapter 99 and these rules.
2. **The DEQ will approve Risk Mitigation Implementation Plan if the plan:**
 - a. meets the requirements of 2022 Oregon Laws Chapter 99 and these rules and
 - b. if implemented will minimize the human health and safety and environmental safety risk in the event of ground shaking and secondary effects.
3. **A facility must notify DEQ in writing within seven (7) calendar days of any significant change and/or circumstances affecting the Risk Mitigation Implementation Plan or its implementation. DEQ may require the facility to update a Risk Mitigation Implementation Plan because of these changes.**
4. **Before DEQ approves a Seismic Vulnerability Assessment or a Risk Mitigation Implementation Plan required under 2022 Oregon Rules chapter 99, DEQ will provide a copy of the mitigation plan to the Department of Geology and Mineral Industries, the office of the State Fire Marshal, and the Department of Energy for review.**
5. **Before approving a Risk Mitigation Implementation Plan, DEQ will provide a public notice and initiate a public comment period as follows:**
 - a. DEQ will announce the public notice through the Fuel Tank Seismic Stability GovDelivery mailing system.
 - b. DEQ will hold a public comment period open for 30 calendar days. This period may be extended at DEQ's discretion.
 - c. DEQ will post all Risk Mitigation Implementation Plans barring any confidential business information on DEQ's website by the time of public notice.

6. Public hearing

- a. If requested by 10 entities or a group representing 10 entities within the first 20 calendar days of the public comment period, a public hearing will be held. DEQ will extend the public comment period and hold a hearing at least 14 calendar days before the close of the public comment period.
- b. A notice of 30 calendar days will be provided ahead of a public hearing.

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