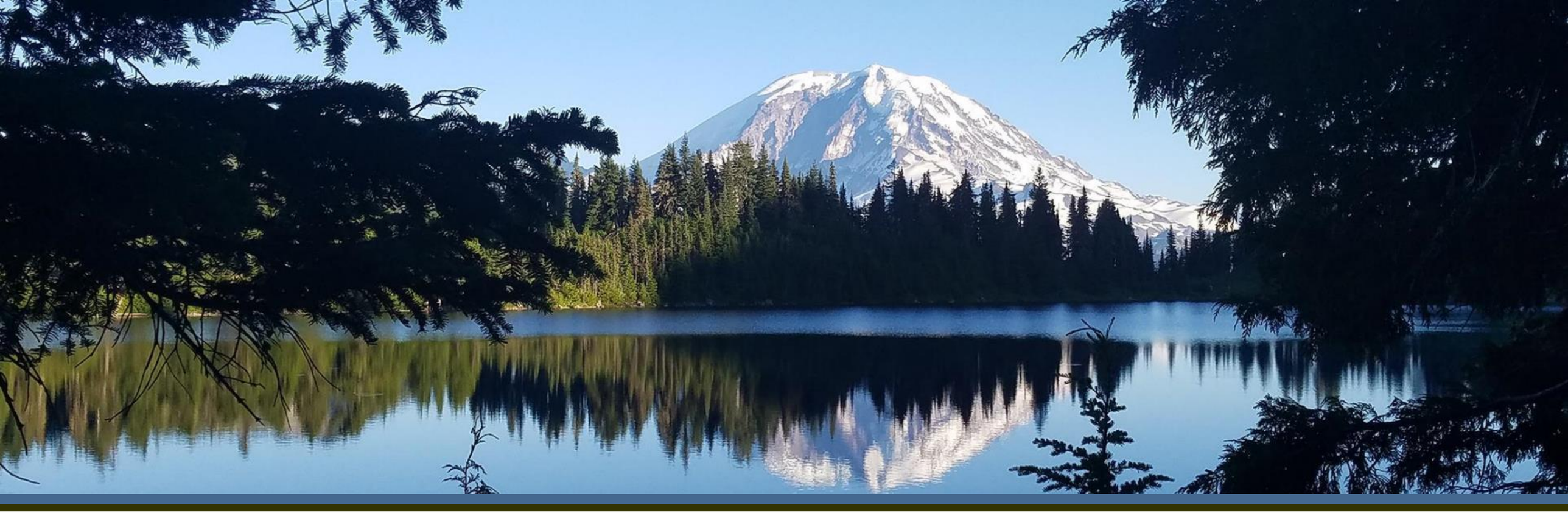

Washington Oil Spill Prevention

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Spills Facilities Engineer

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DEPARTMENT OF ECOLOGY
State of Washington

WA-SPILLS

Washington Ecology-Spills

- Spill Prevention
  - Manuals and Inspections
- Preparedness
  - Manuals and Drills
- Response
  - Oil-spill responders (firemen)
- Statewide Resources
  - Modeling, Investigations, Enforcement

Strategy=Zero oil spills

Washington Laws RCW 90.48 & 88.46

Oil Transfer Regulations

- WA-173-180 Facility Standards
- WA-173-182 Oil Spill Contingency Plans
- WA-173-184 Vessel Oil Transfer Advance notice and Containment
- WA-173-186 Oil Spill Continency Plans - Railroad

Strategy=Zero oil spills

Regulation WA-173-180

Various Facility Classes

- Class 1 – Largest facilities
- Class 2 – Trucking
  ‘Over-the-water’ transfers
- Class 3 – Large Commercial vessels
- Class 4 – Small Commercial vessels

Does not include recreational vessels

Strategy=Zero oil spills

Regulation WA-173-180

Class 1 Facilities

- Manuals – 5-year review period:
  - Operation Manual
  - Prevention Plan – SPCC plan
  - Safe & Effective Document
  - Training & Certification

Strategy=Zero oil spills

Regulation WA 173-180

Class 2 Facilities

- Manuals – 5-yr review period;
  - Operation Manual
  - Response plan
  - Training & Certification

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JUBITZ
8A

Regulation WA 173-180

Class 3 & 4 Facilities

- Class 3

  Only Transfer Inspections
- Class 4;

  Only Annual Inspections

Strategy=Zero oil spills

SDS
WHITE SALMON

WEED PUMP-A-HEAD

Regulation WA 173-182

WA 173-182

- Contingency plans;

  Northwest Area Contingency Plan

  https://www.rrt10nwac.com

  - Includes Geographic Response Plans (GRP's)
  - Incident Command System (ICS)

Regulation WA 173-184

WA 173-184 Vessel Oil Transfer Advance Notice and Containment

- Advance Notice of Oil Transfer (ANT)

What are we missing?

Seismic

Secondary Containment Permeability

Seismic

Oil Tank Failure Modes

- Liquefaction.
- Floating roofs sinking.
- Tanks rupturing.
- Subsequent Fires.
- Tsunami – moved tanks

Seismic

Japan had significant seismic damage from events 2003 & 2011

Seismic

How are seismic events mitigated here?

- Newer tanks are designed per API 650 & building codes. – last 50 yrs
- Corrosion – all tanks are inspected externally every 5-yrs and internally every 20 yrs per API 653
- However, older tanks are grandfathered. Many have never been designed for seismic.

Seismic

Solutions – new State Regulations

- WAC 173-180-330

  Do the engineering calculations showing that it meets current API 650 seismic design & piping flexibility standards.

  OR

  Install flexible connections

  OR

  Strengthen the foundations

Seismic

Seismic-implementation time

- WAC 173-180-330

  10-years from the regulation – 2033

  Or

  Next internal inspection

What else are we missing?

Permeability

- Why is permeability an issue?

Permeability

Permeability New regulations

- WAC 173-180-630(10)(g)

  Washington doesn't prescribe a permeability rate or mandate liners be used.

  - Take your worst-case spill
  - Evaluate your soils
  - Determine how fast it would take to clean it up – before it hits the Waters of the State (Groundwater)

  And

  - Depth of the footing

Low Permeability Solution Reference Table

Hydraulic Conductivity	Pervious				Semi-Pervious				Impervious				
K (cm/s)	100	10	1	0.1	0.01	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}	10^{-9}	10^{-10}

Name	Description	Hydraulic Conductivity
Geosynthetic Clay Liner	Bentonite blanket sandwiched between woven geotextile with non-woven geotextile backing or between two woven geotextiles	$1.0x10^{-9}$ to $6.9x\ 10^{-9}$ cm/s
Soil Amendments	Fill of certain soil type	See reference scales for soils.
LLDPE Geomembrane	Linear low-density polyethylene liner	Roughly $1x10^{-15}$ cm/s, depending on manufacturer
HDPE Geomembrane	High density polyethylene geomembrane liner	Roughly $1x10^{-11}$ to $1x10^{-13}$ cm/s, depending on manufacturer
Polymers	Mix soil with various polymers to decrease permeability	Depends on polymer dosing, requires testing to determine appropriate dose.
Concrete	Concrete	Roughly $1x10^{-10}$ cm/s, depends on maturity, type, and quality

Any questions?

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