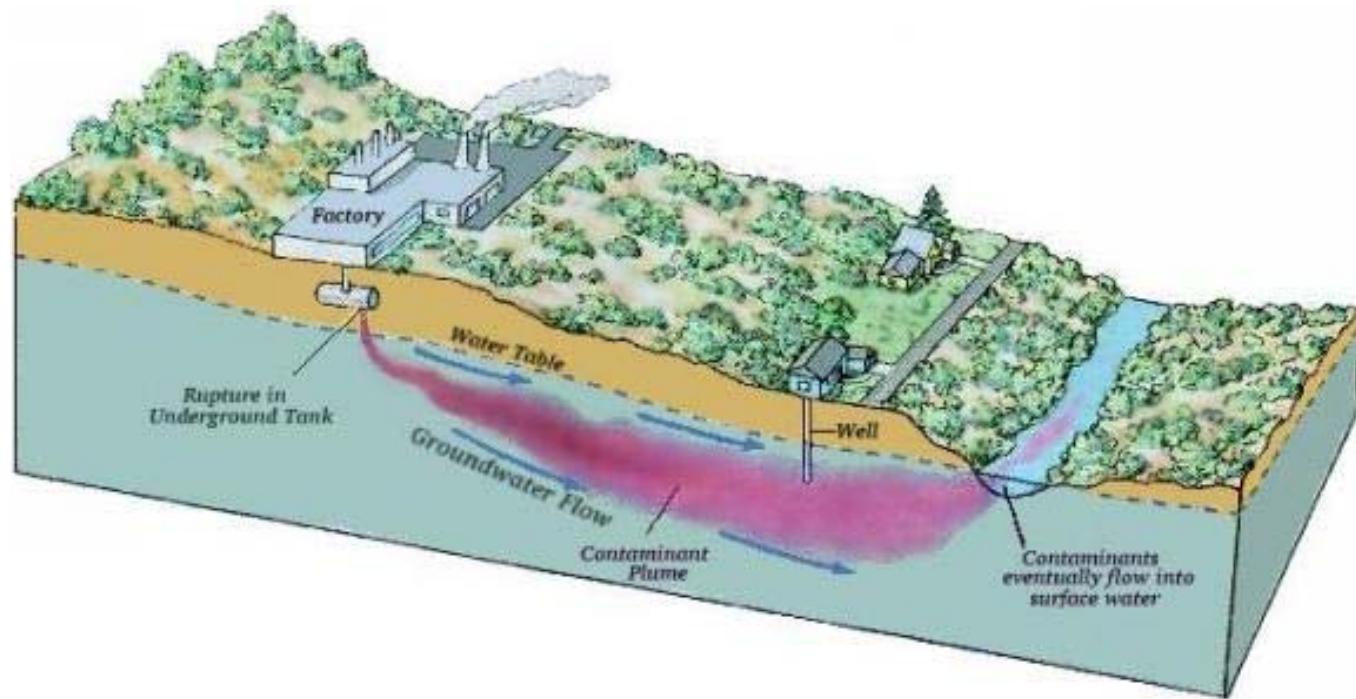


Groundwater Presentation #2



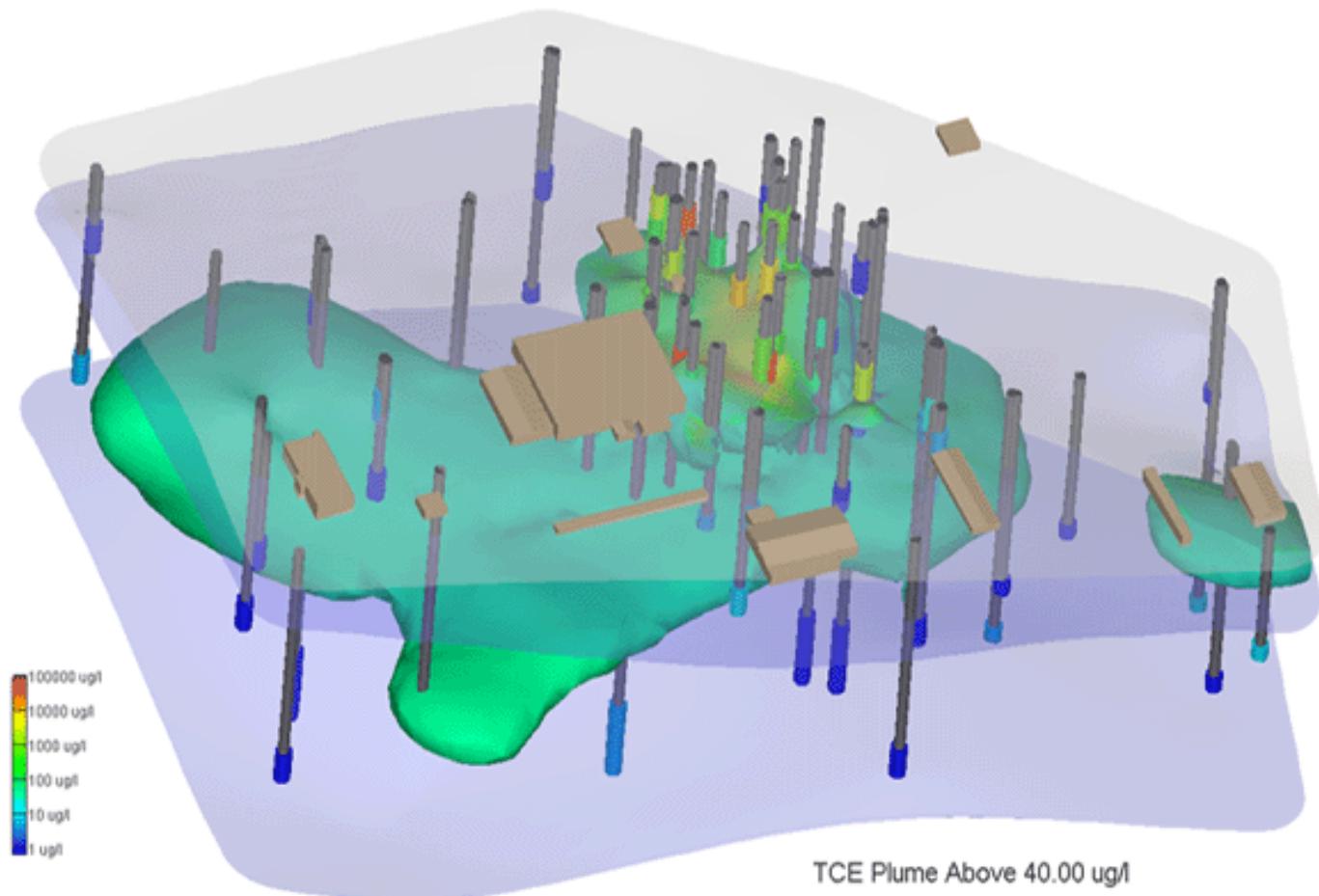
Jennifer Bowman and Dr. Natalie Kruse
Ohio University's Voinovich School of Leadership and Public Affairs
11-18-11

Groundwater plume 2-D



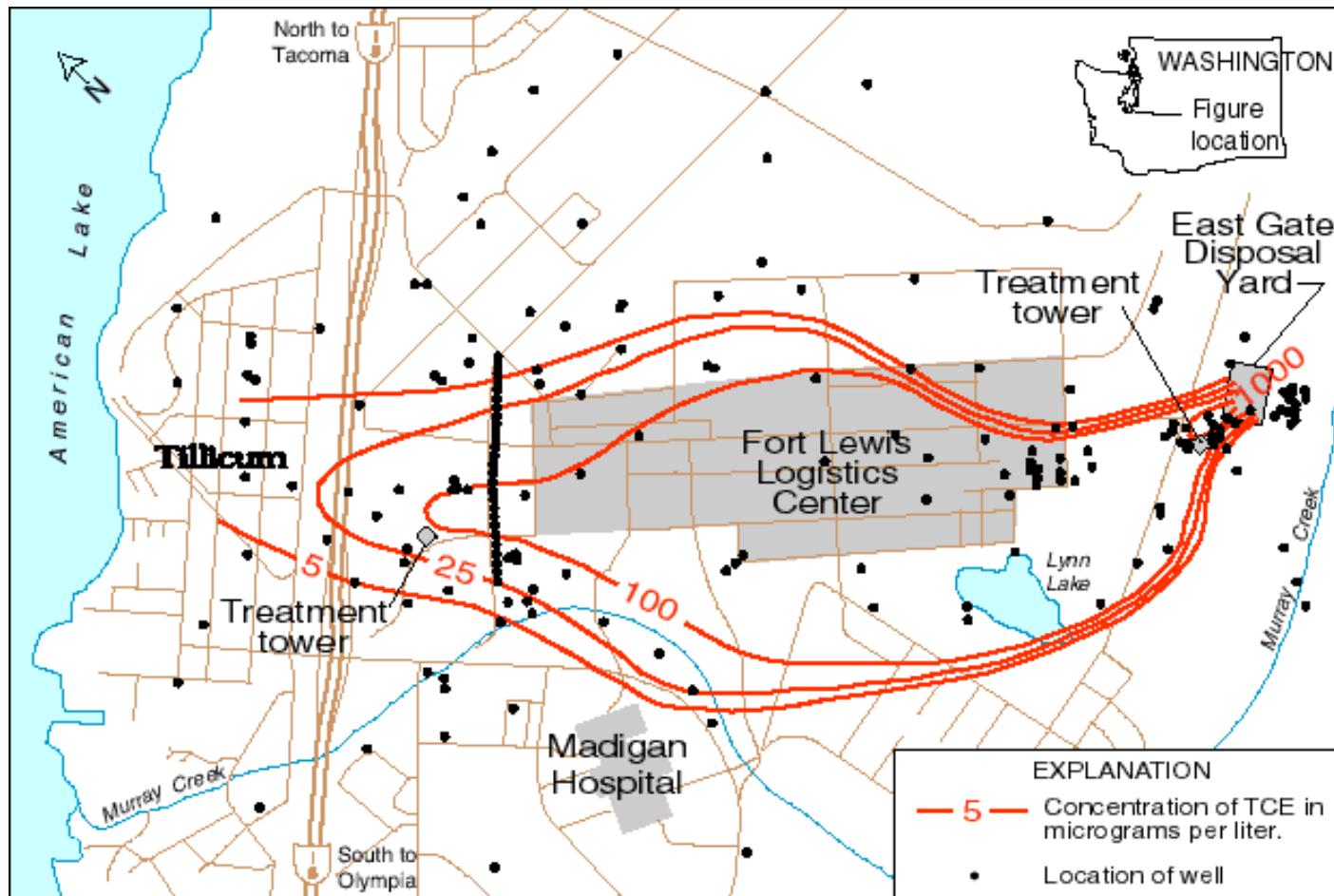
<http://blog.gayleleonard.com/wp-content/uploads/2009/11/groundwaterplume.jpg>

Groundwater plume 3-D



http://www.ctech.com/images/Products/Standard/standard_pic3.gif

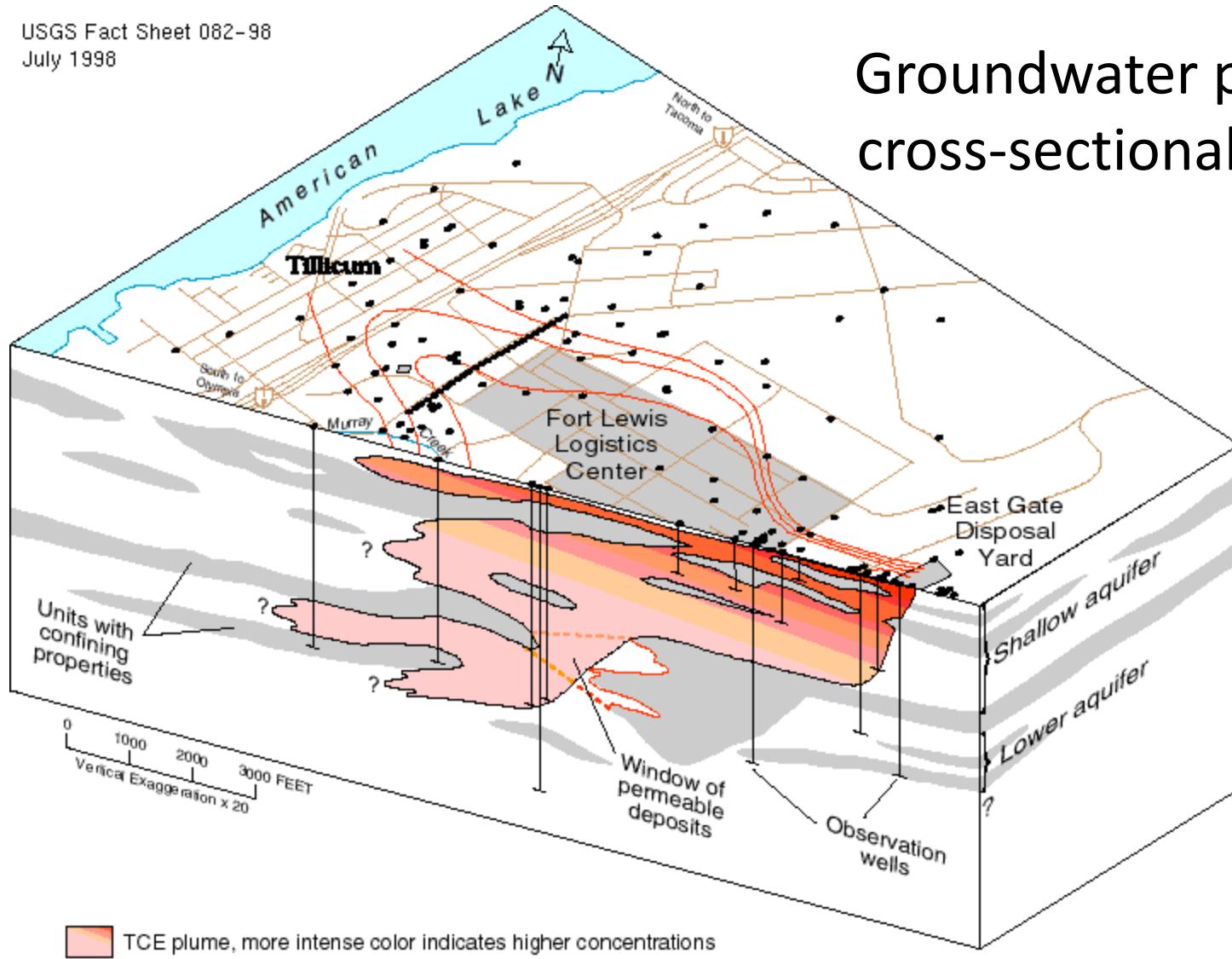
Groundwater plume birds-eye view



Plume isoconcentrations from Woodward-Clyde, 1997, Final Fort Lewis Logistics Center Remedial Action Monitoring First Annual Report: Seattle, Woodward-Clyde, [about 100] p.

Figure 1. The TCE plume flows from southeast to northwest under the Logistics Center Superfund site.

Groundwater plume cross-sectional view



Geology modified from Ebasco Environmental, 1994, Fort Lewis Logistics Center Lower Aquifer Study, Final Addendum to Final Technical Memorandum: Bellevue, Wash., Ebasco Services, Inc., [about 200] p.

Figure 2. Part of the TCE plume flows from the shallow aquifer through a permeable window in the confining layer and into the lower aquifer.

RCRA

Resource Conservation and Recovery Act

- system to safely manage solid and hazardous waste
- 1. Description of current conditions
- 2. Assessment
- 3. Investigation
- 4. Cleanup alternatives
- 5. Corrective actions



Types of remedial action

Combinations of:

- Removal
- Containment
- Treatment



http://blog.oregonlive.com/environment_impact/2009/09/alkalilake.jpg

Removal soil removal



<http://www.morleyskips.co.uk/wp-content/uploads/2009/08/contaminated-soil-removal.jpg>

Containment Landfill capping

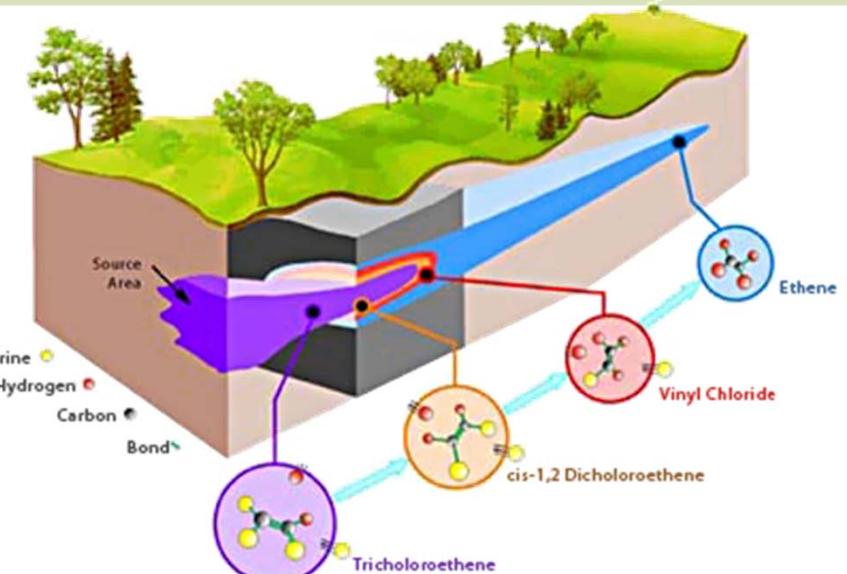


Treatment

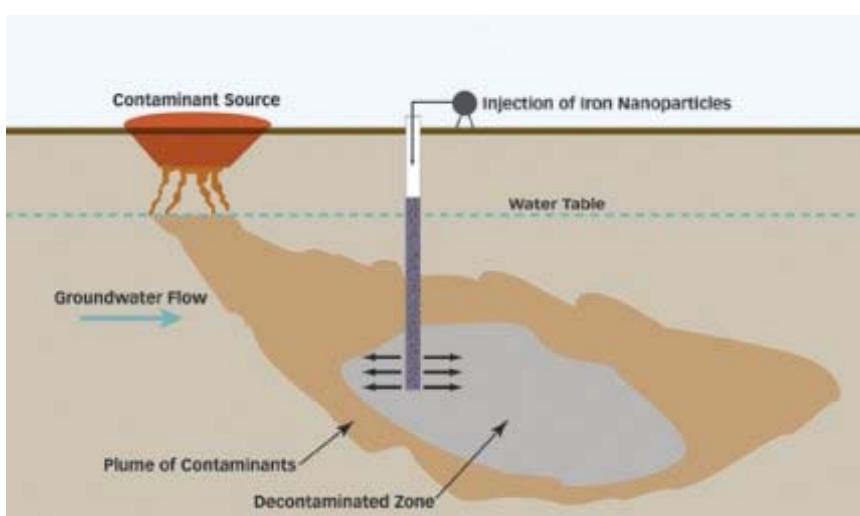
Injection well, treatment facility, bioremediation



<http://www.verdagroupllc.com/images/products/Raytheon%20GWTP2.jpg>



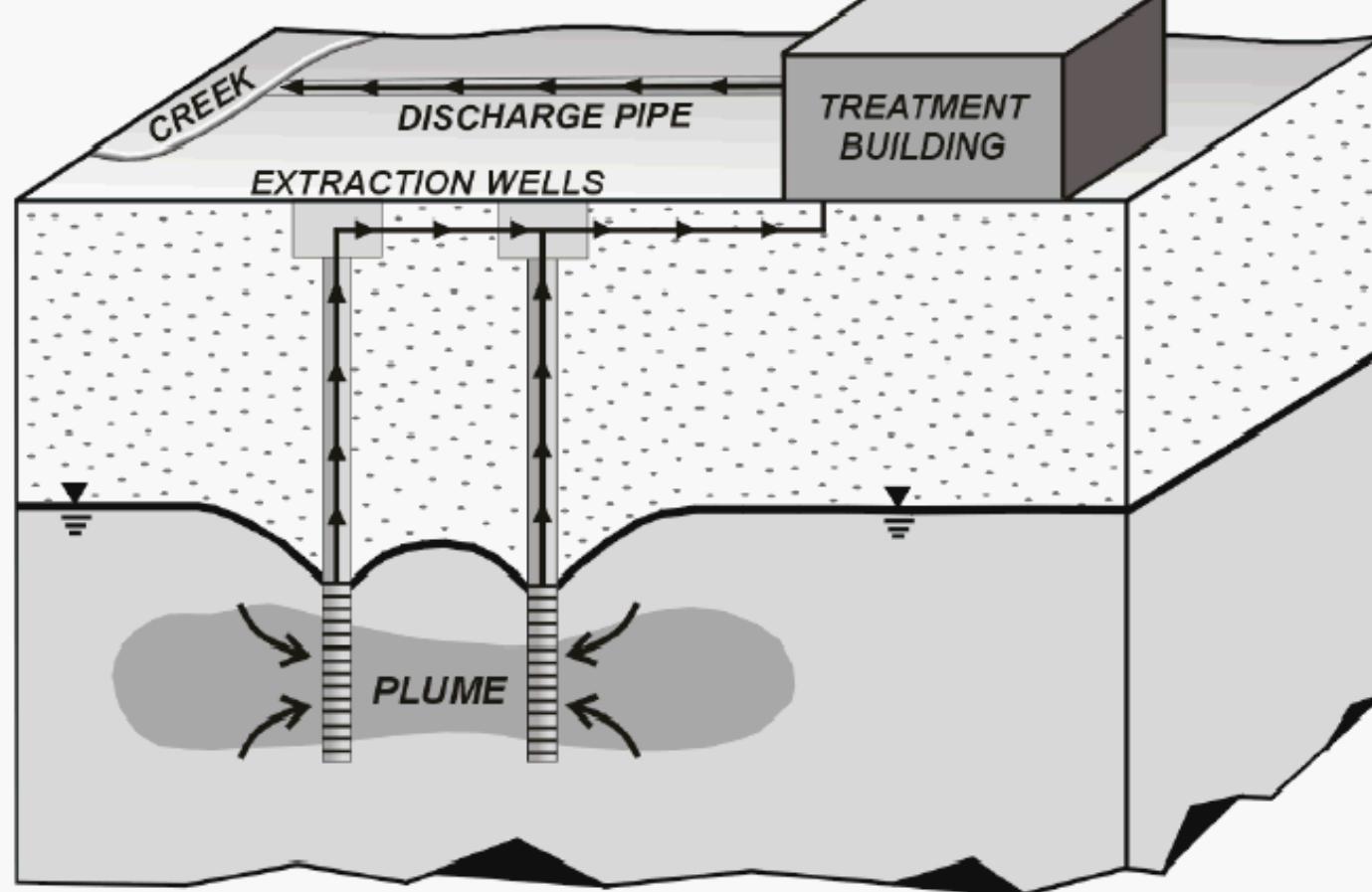
<http://www.ecf.utoronto.ca/~kokkinak/bioremediation.png>



http://www.phschool.com/science/science_news/articles/images/special_treatment_01.jpg

Removal and treatment

Pump and Treat



Monitoring

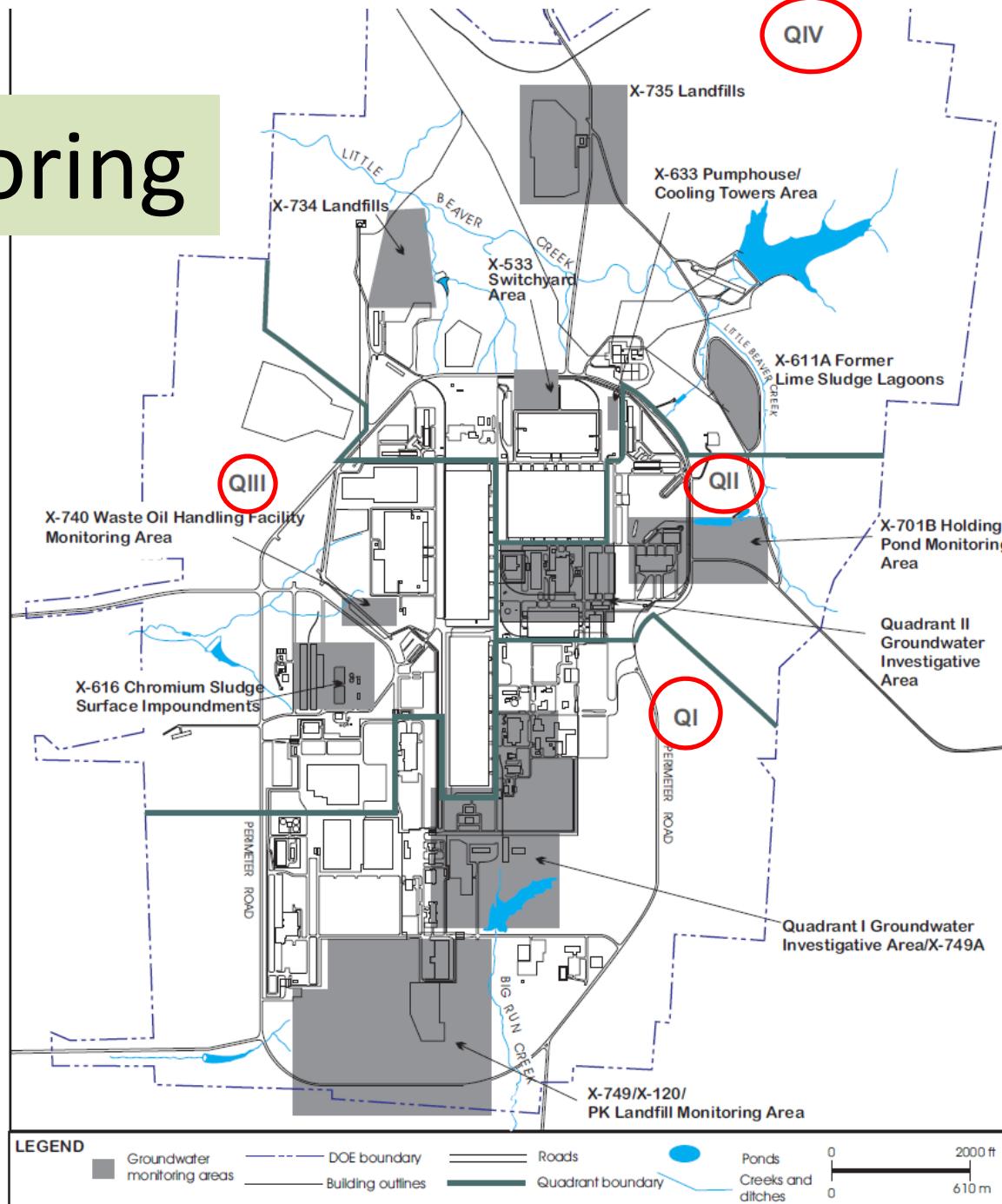
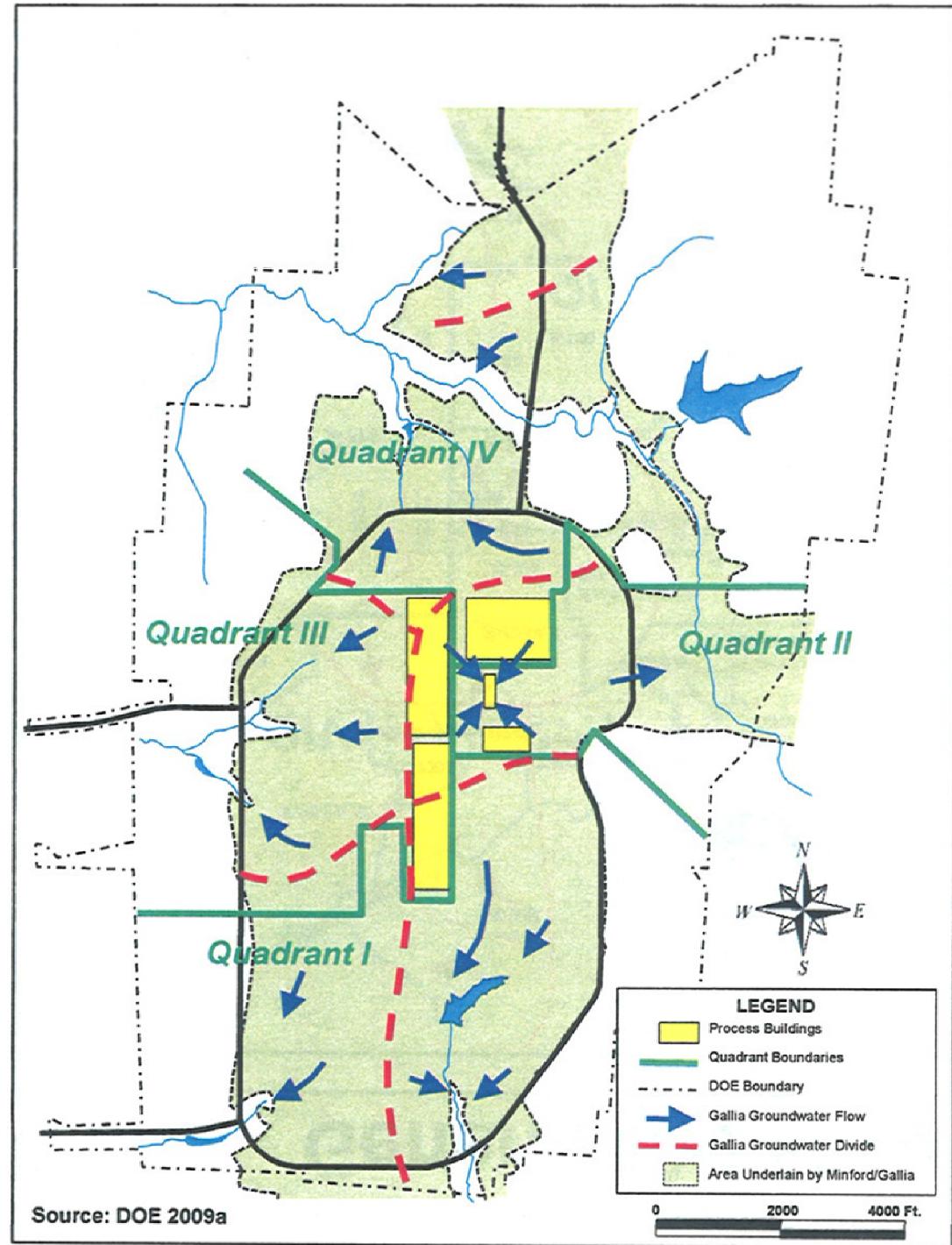


Figure 6.1. Groundwater monitoring areas at PORTS.

Groundwater flow in the Gallia



Plumes Metals

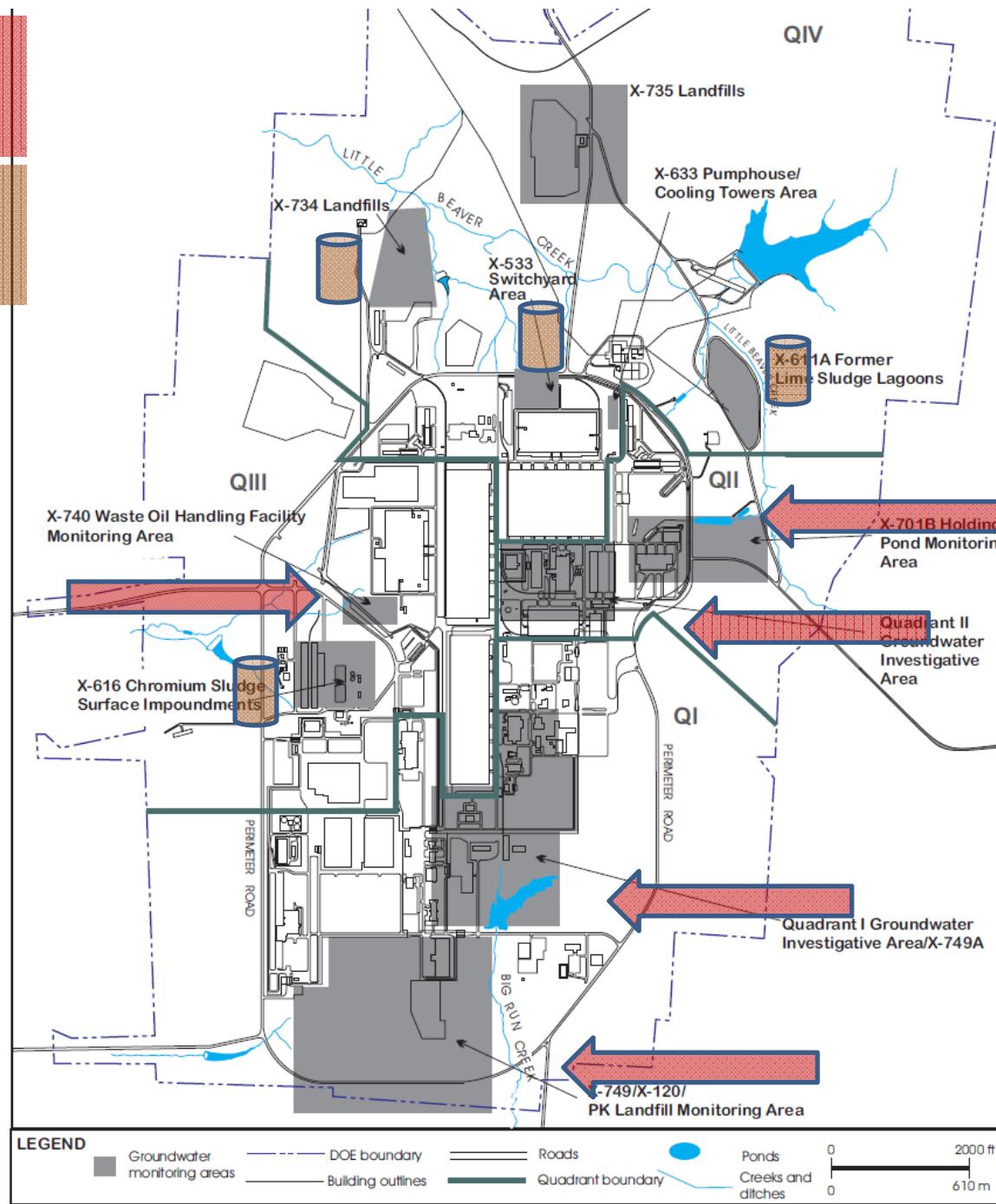


Figure 6.1. Groundwater monitoring areas at PORTS.

Remedial Actions –Quadrant I

- Quadrant I
 - x-749/x-120 plume
 - PK landfill (x-749B)
 - Quadrant I groundwater investigative area

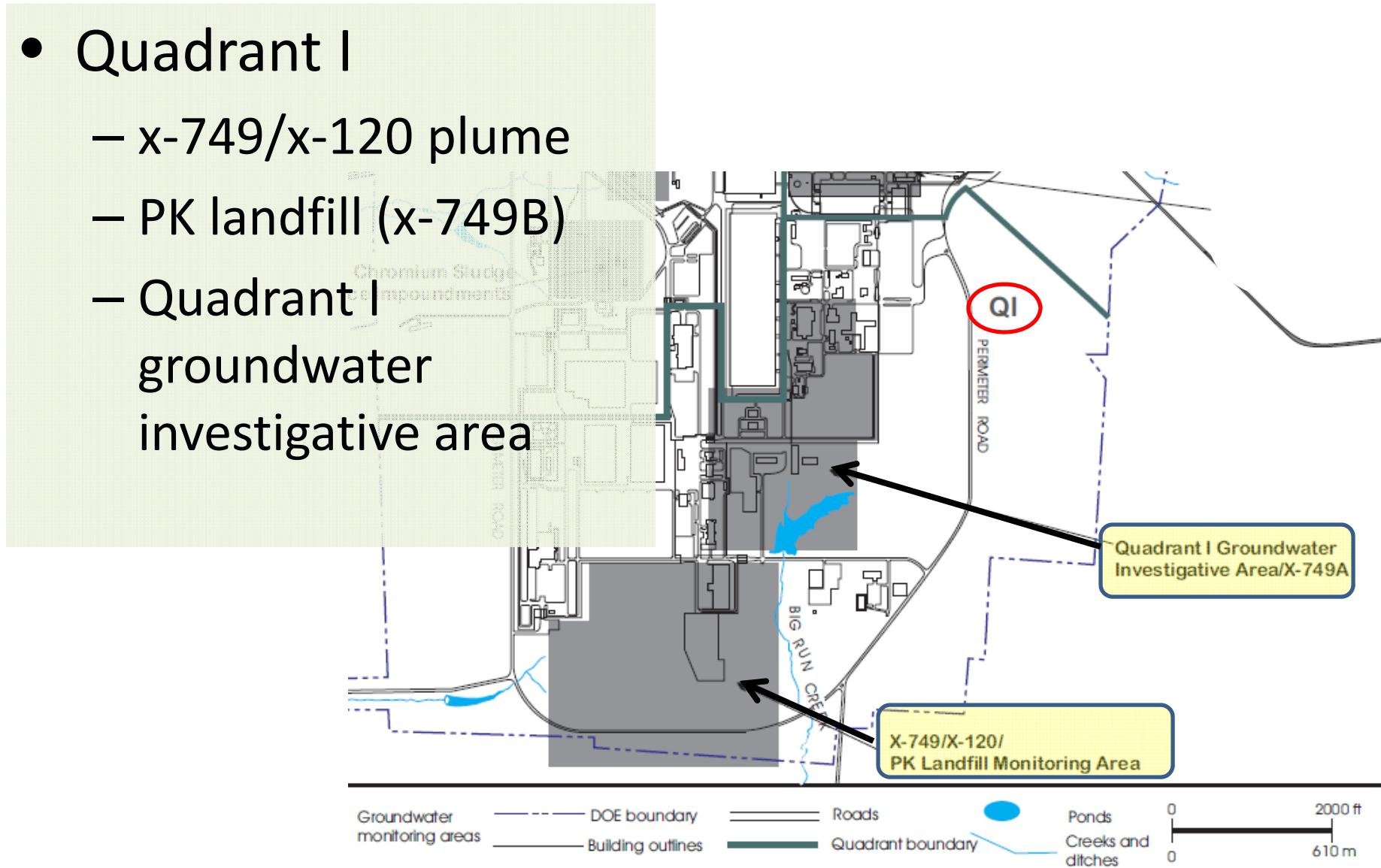
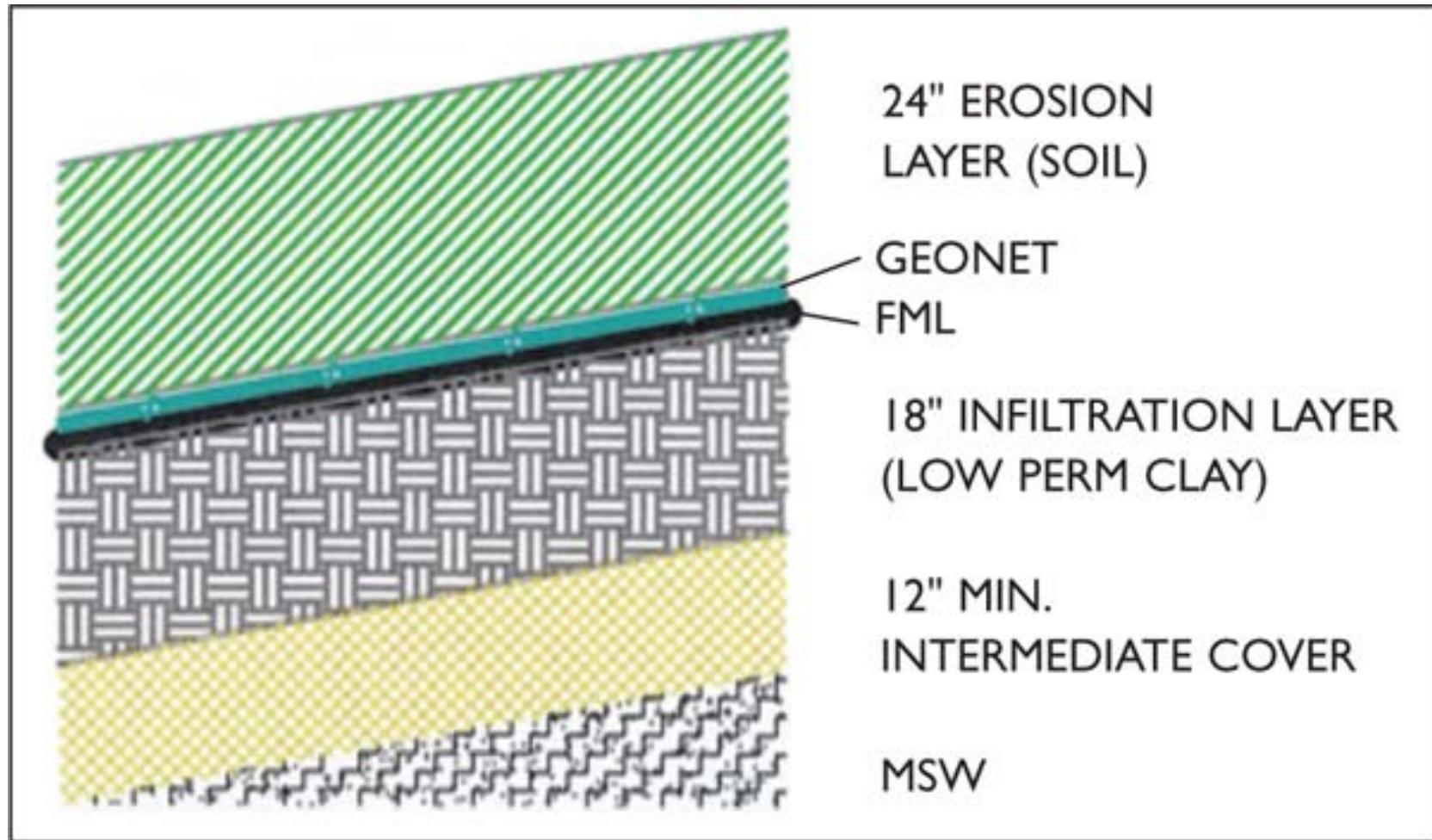


Figure 6.1. Groundwater monitoring areas at PORTS.

RCRA Subtitle D Cap

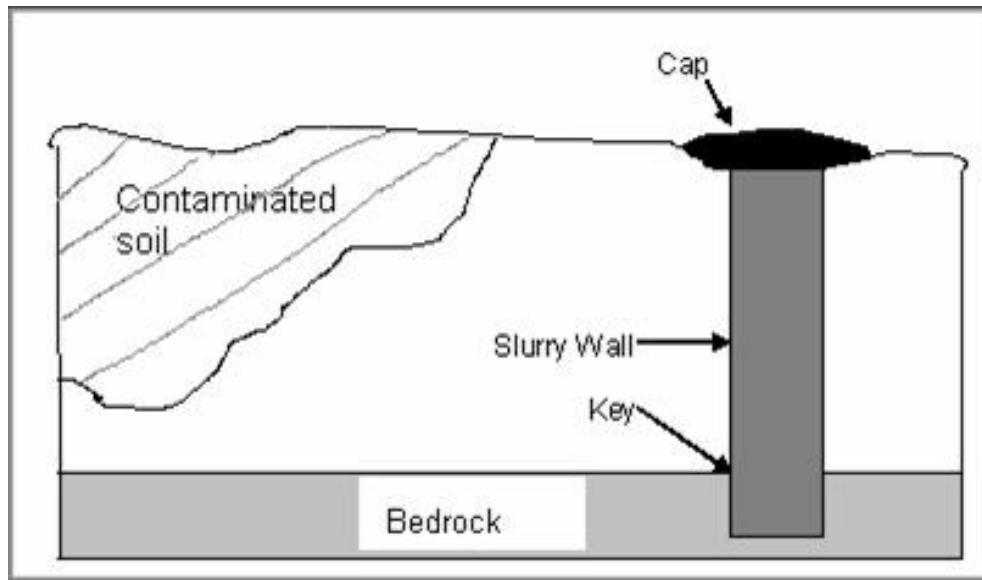


Phytoremediation



<http://ideonexus.com/2008/05/02/let-the-phytoremediation-begin/>

Barrier Walls



http://www.eugris.info/content/Content_Digests/ContainmentFD_files213/IMAGE002.JPG



http://www.wrscompass.com/userfiles/images/slurry%20wall%20w%20logo%20copy_1.jpg



http://www.cenews.com/userfiles/image/issue-images/2006_10_PCSBolsa.jpg

Hydrogen Release Compound Injection

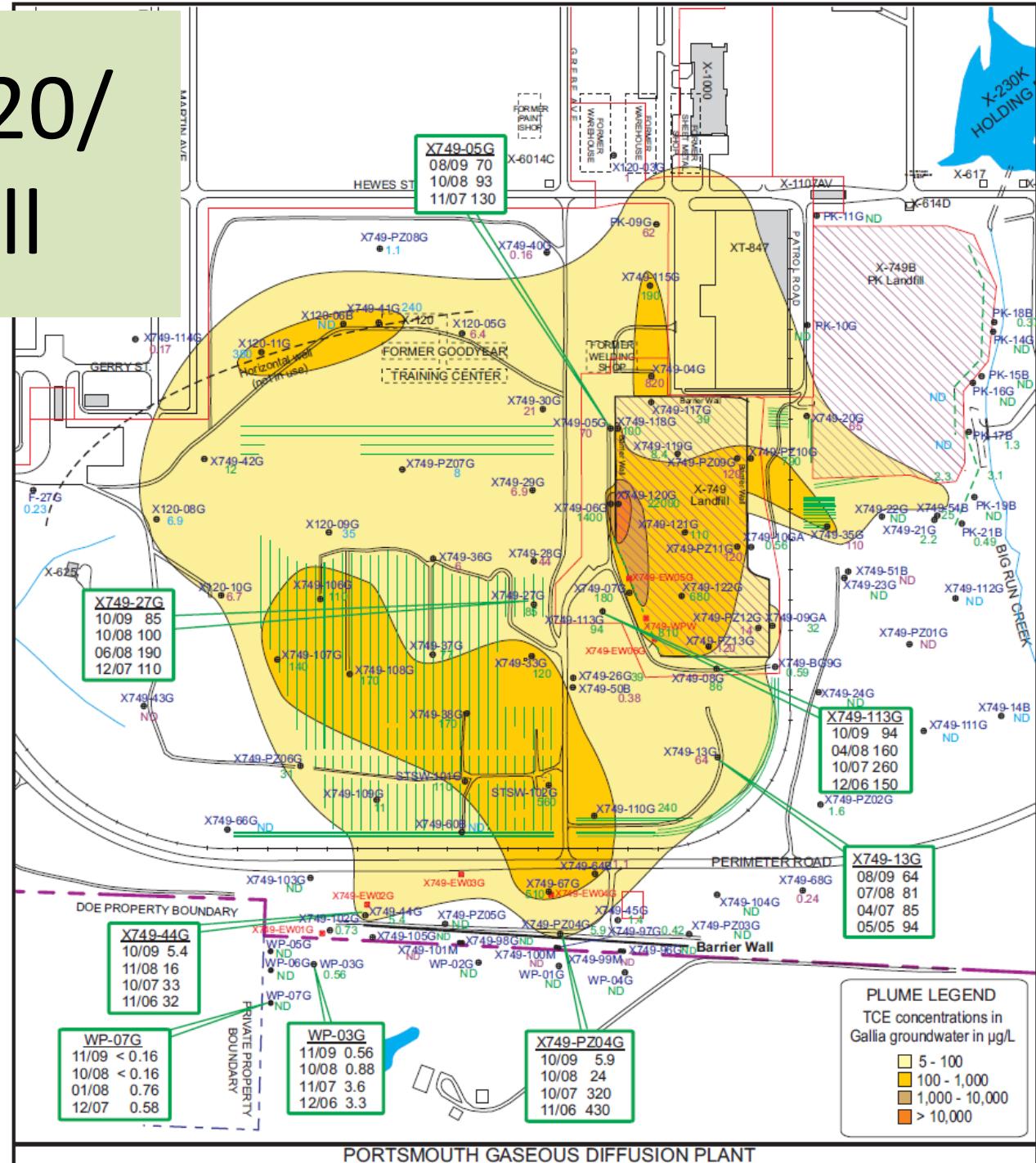


<http://www.dec.state.ak.us/spar/csp/images/kenai/rivterr/rivterr4.jpg>



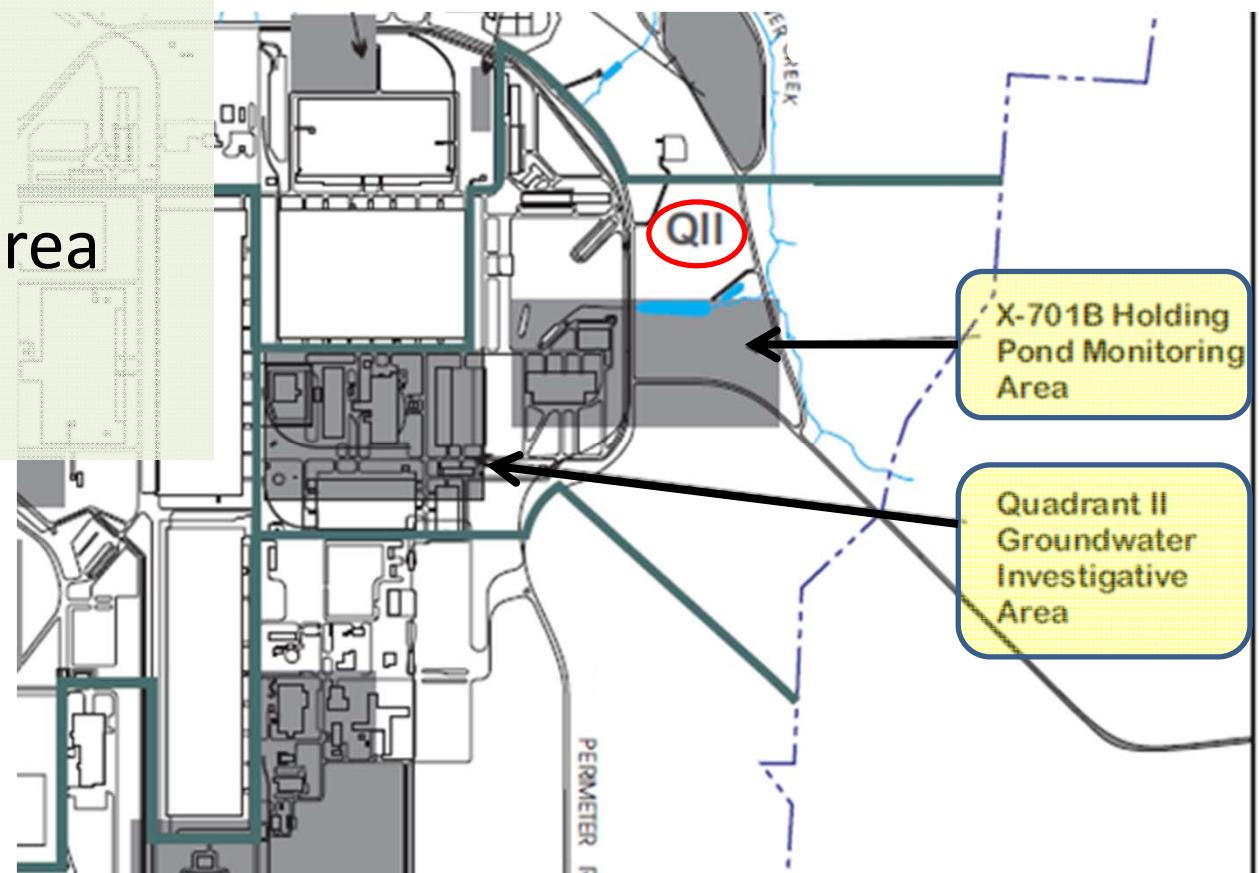
<http://regenesis.com/images/products/HRC2.jpg>

X-749/X-120/ PK landfill

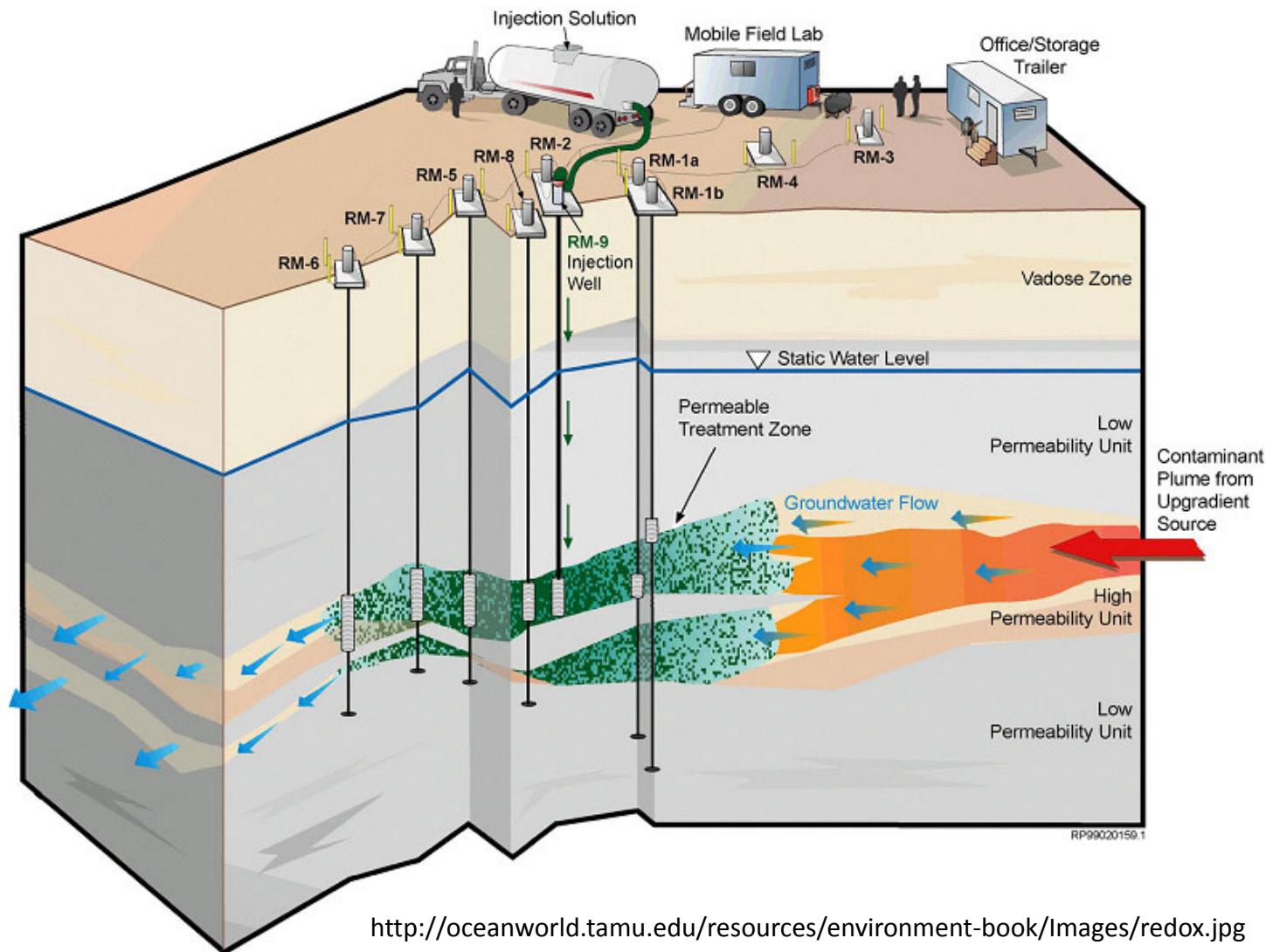


Remedial Actions –Quadrant II

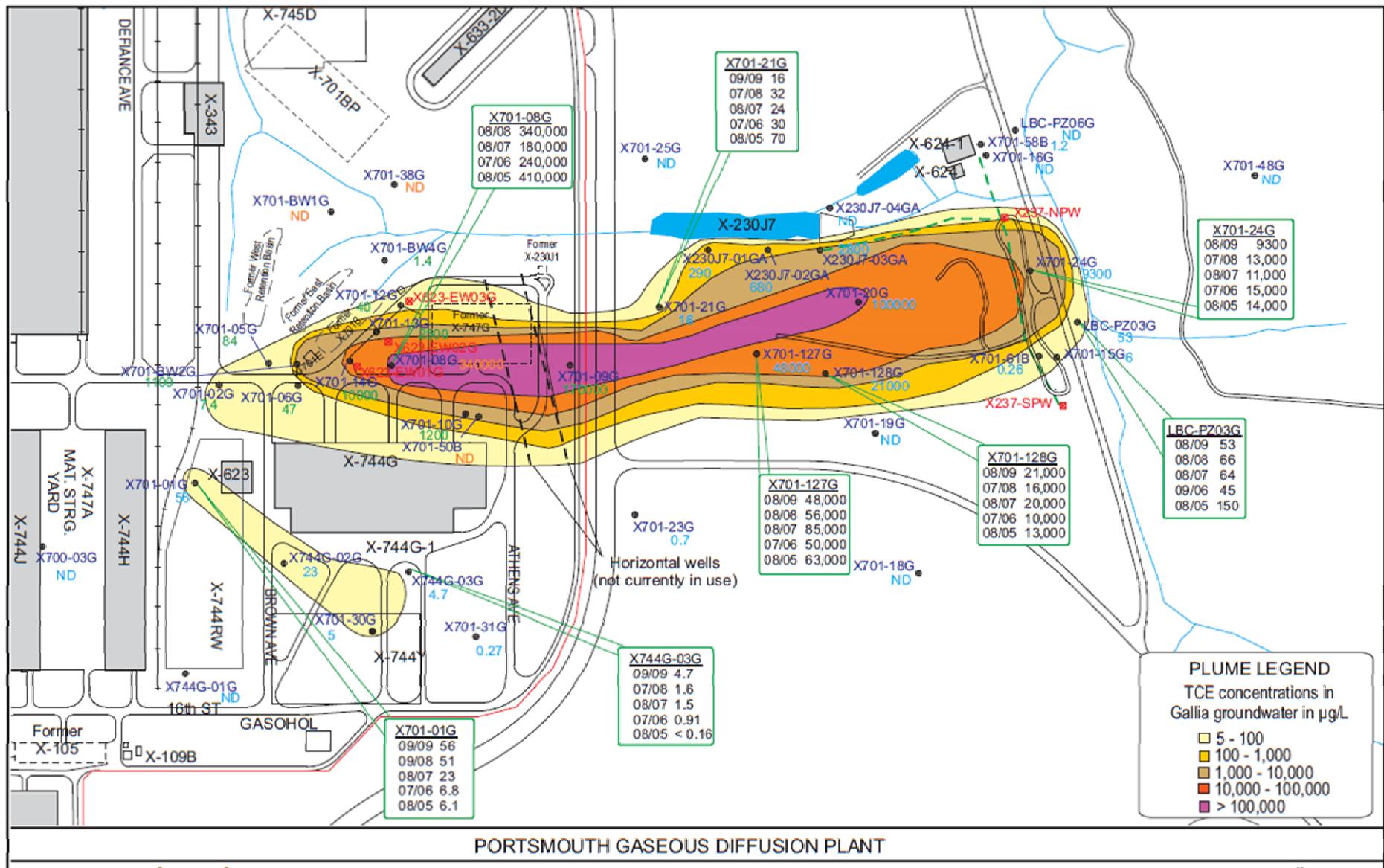
- Quadrant II
 - X-701B holding pond
 - Quadrant II groundwater investigative area



Oxidant injection

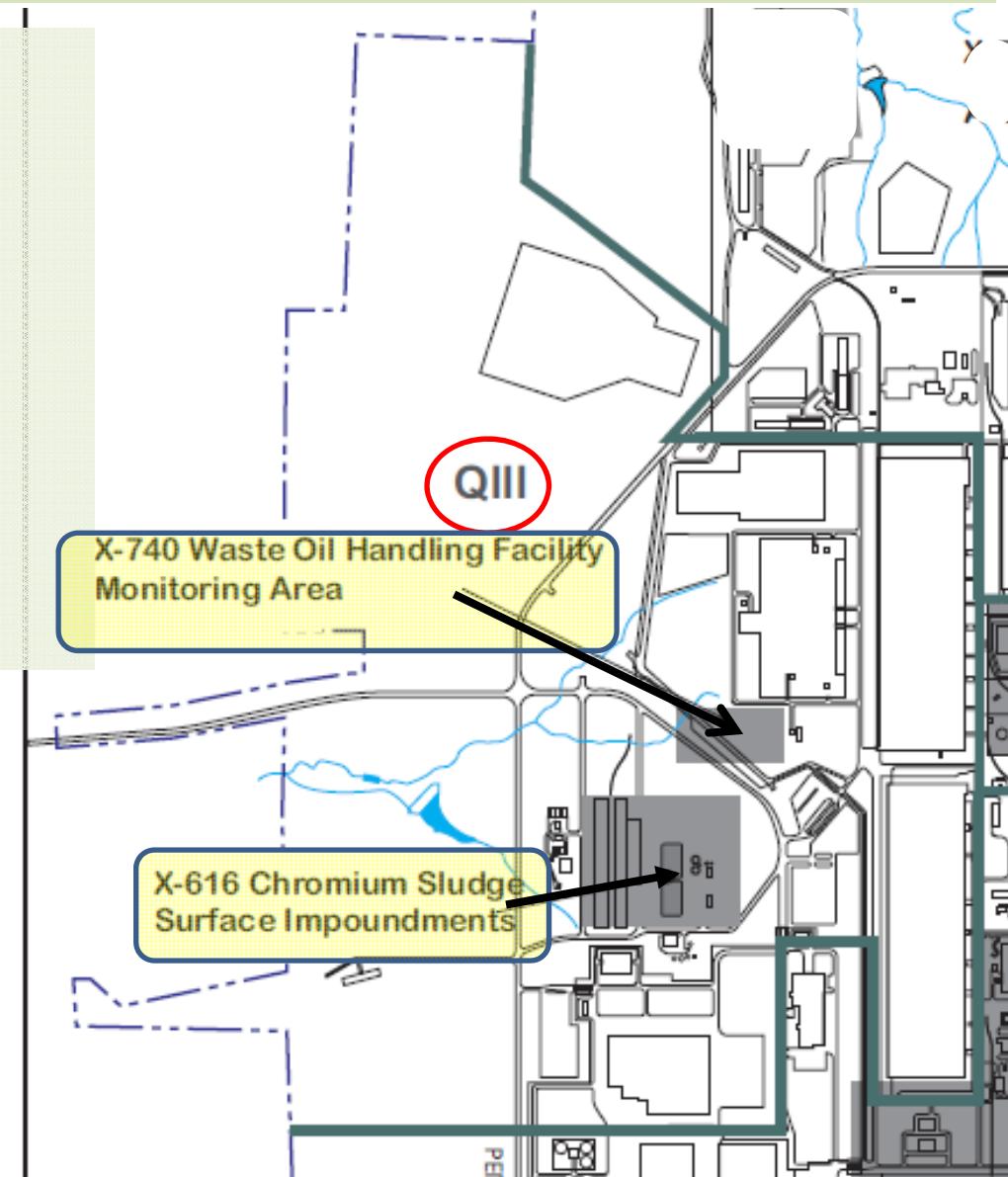


X-701B Holding Pond



Remedial Actions - Quadrant III

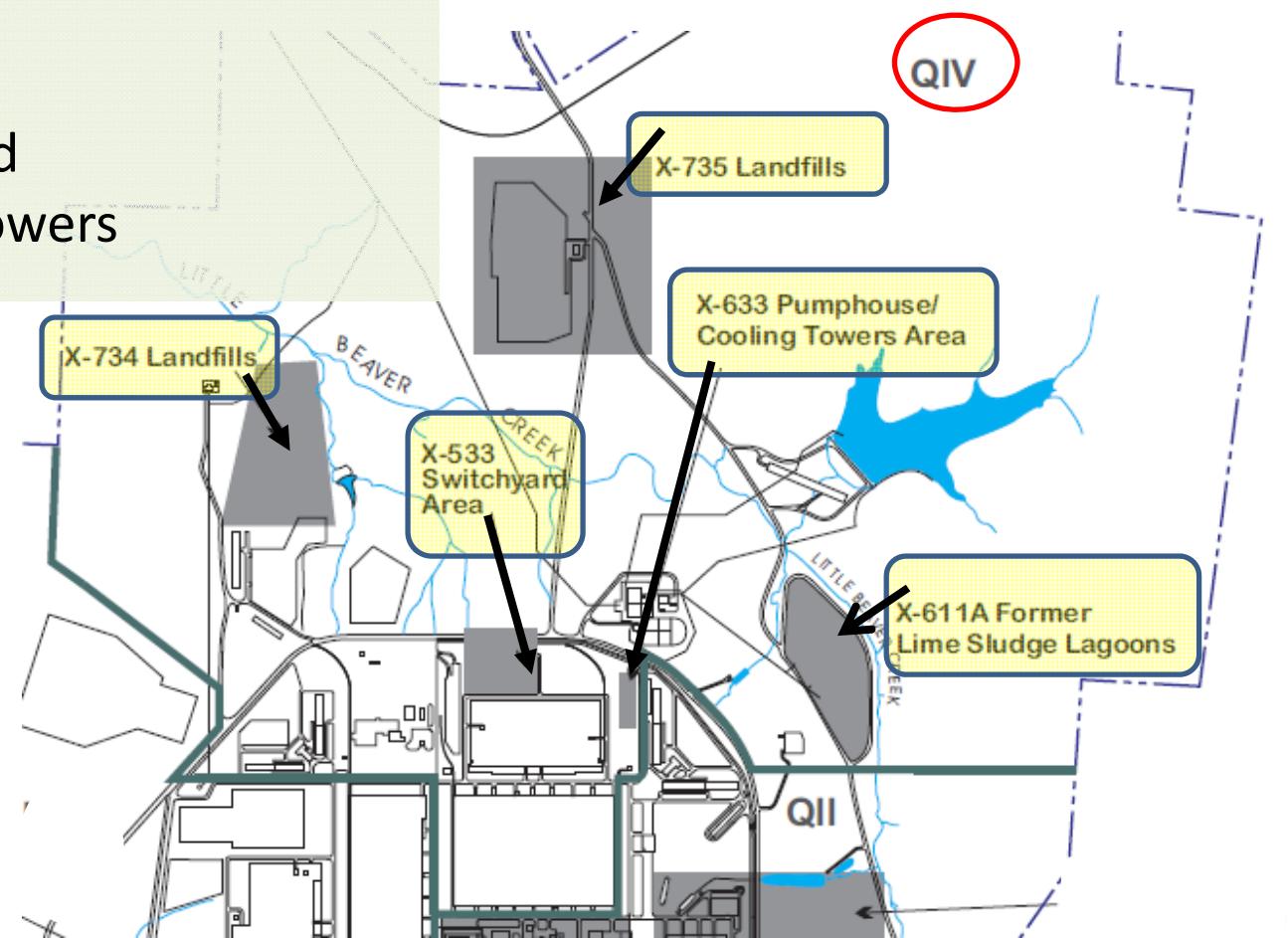
- Quadrant III
 - X-740 Waste Oil Handling Facility
 - X-616 Chromium Sludge Surface Impoundments



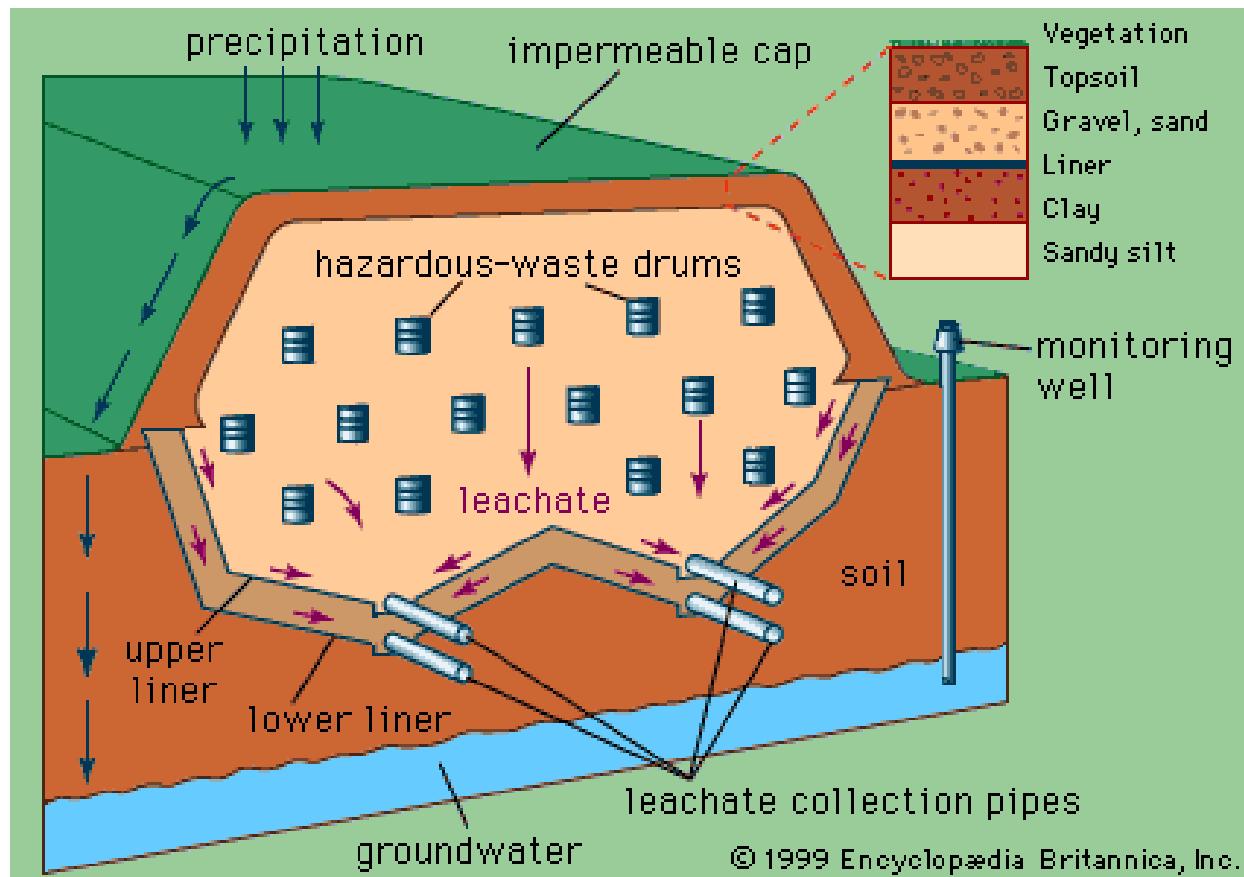
Remedial Actions - Quadrant IV

- Quadrant IV

- X-611A Former Lime Sludge Lagoons
- X-735 Landfills
- X-734 Landfills
- X-533 Switchyard
- X-633 Cooling Towers



Hazardous waste landfill



<http://media-3.web.britannica.com/eb-media/58/23958-004-CE669CED.gif>

