



Active Ground Water Remedial Action Performance Monitoring

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Monitoring Overview Based on Remedial Technology and Conceptual Site Model

- Implement a ground water monitoring program based on CSM
- Evaluate data to determine the effectiveness of the remedial actions
- Re-evaluate remedial action technology





Ground Water Monitoring Network

Performance monitoring wells should be located:

- Source area
- Plume & plume fringe area
- Upgradient of receptors (sentinel wells)





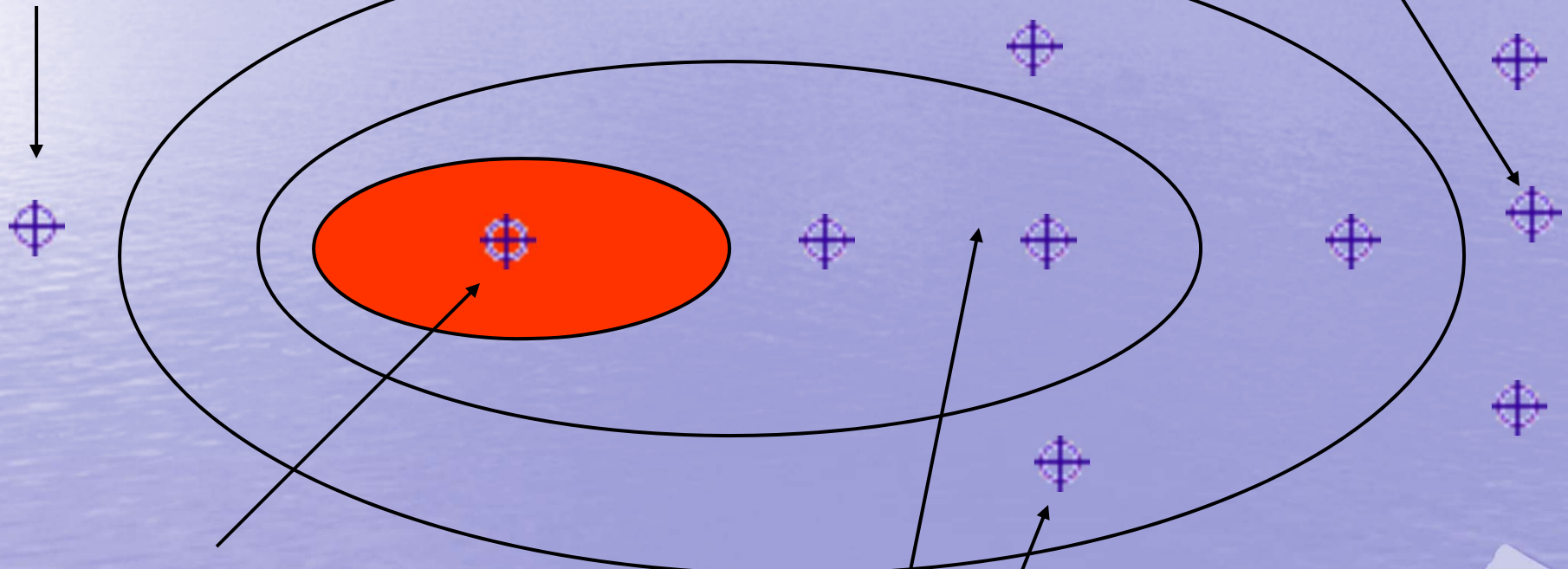
Ground Water Monitoring Network

Ground Water Flow



Background Well

Sentinel Wells



Source Well

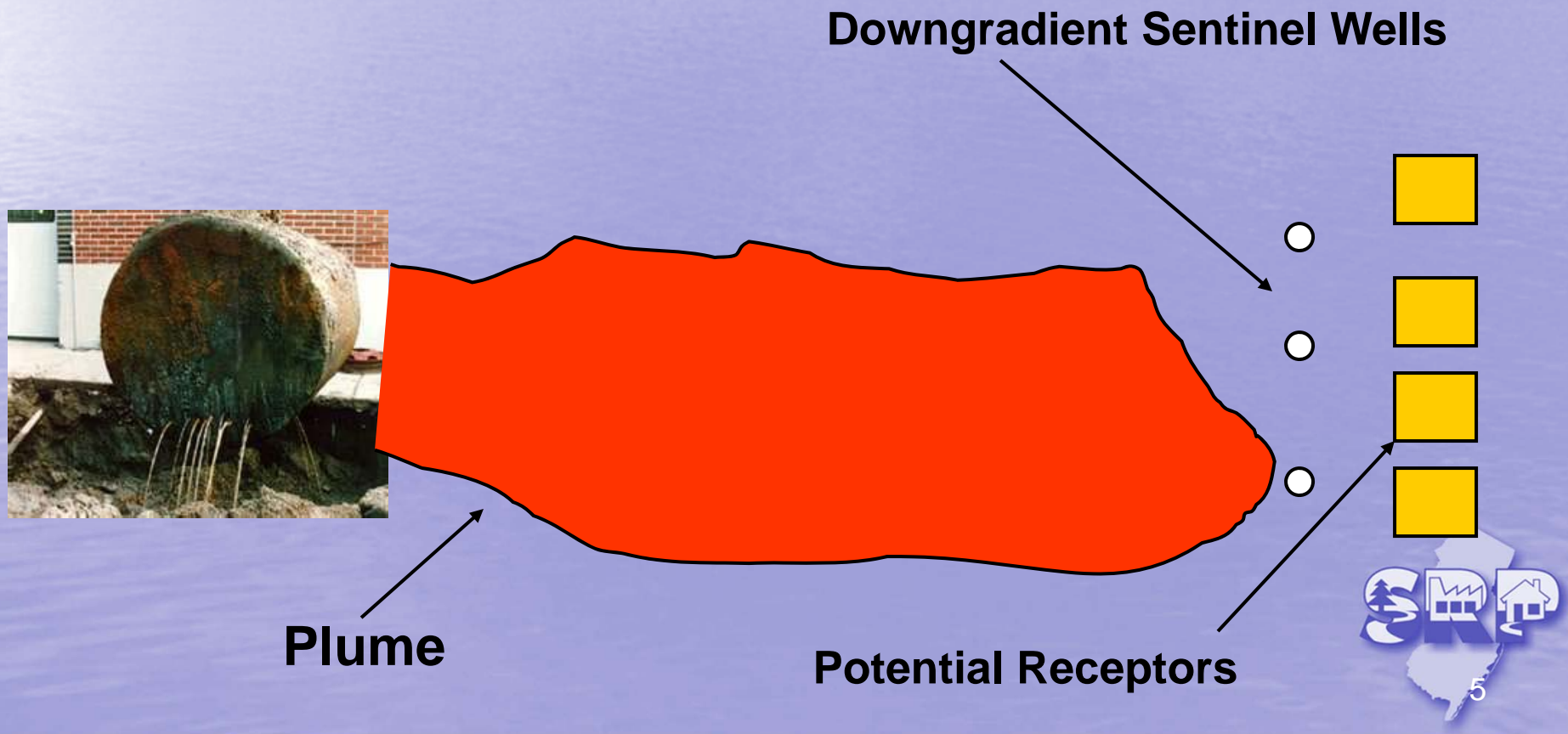
Plume Wells





Ground Water Monitoring Network Sentinel Wells

- Downgradient Sentinel Wells (map view)



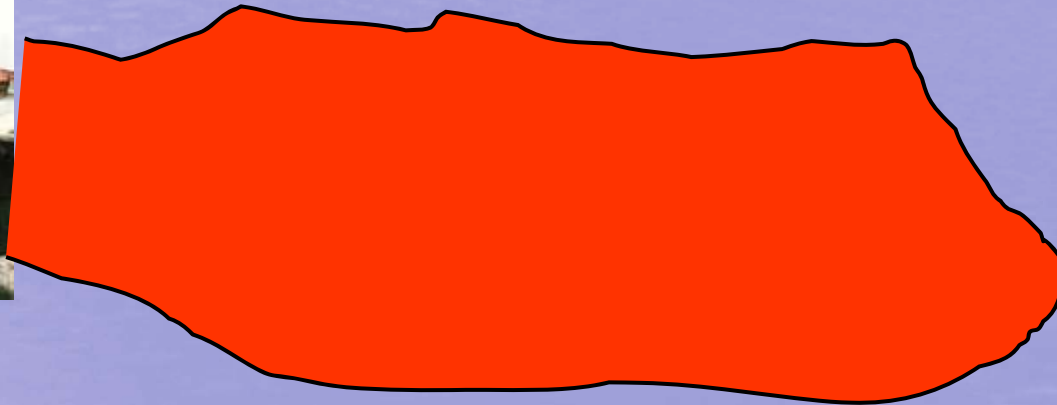


Ground Water Monitoring Network Sentinel Wells

- Lateral Sentinel Wells (map view)

○ ← Potable Supply Well

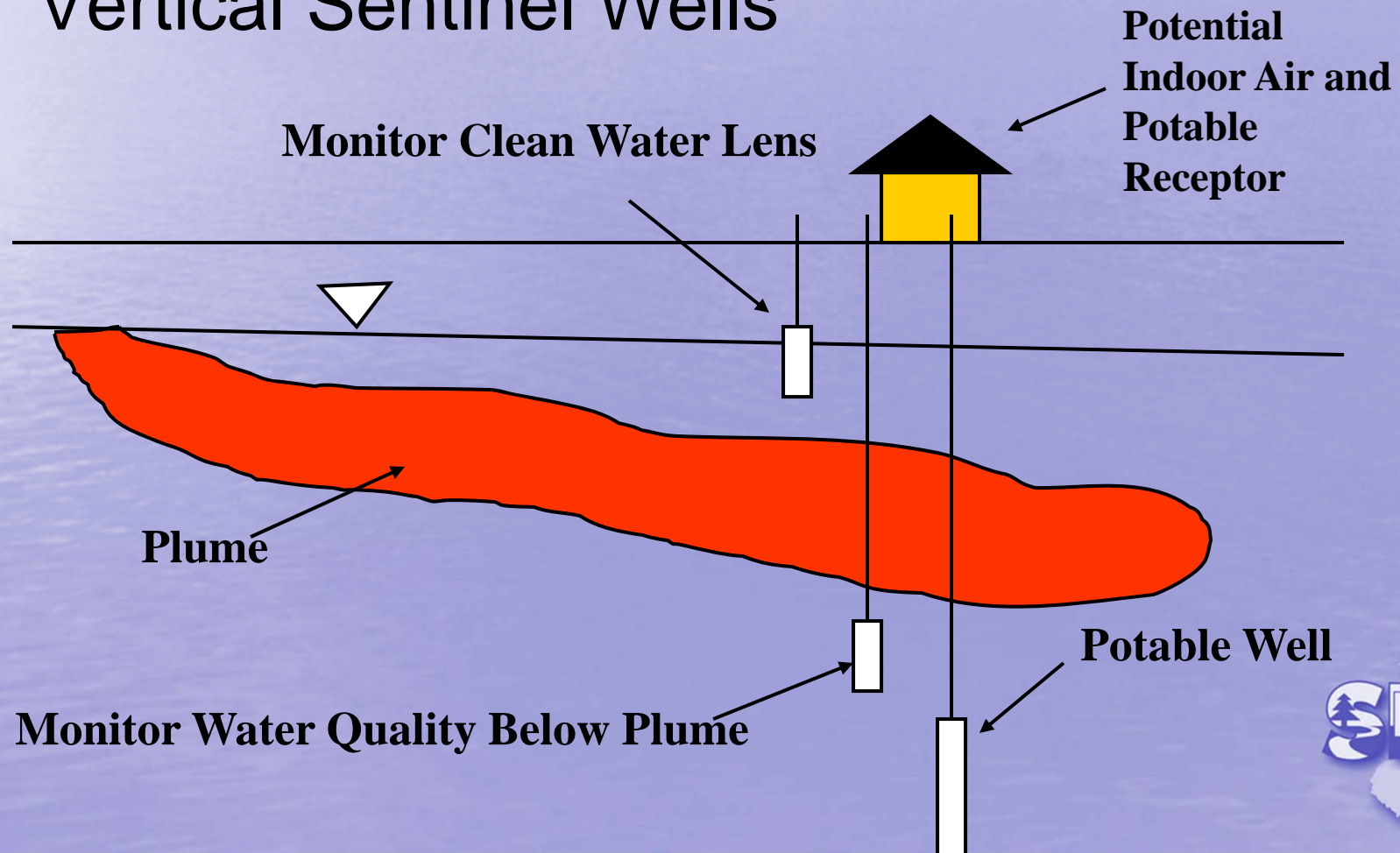
○ ← Lateral Sentinel Well





Ground Water Monitoring Network Sentinel Wells

- Vertical Sentinel Wells





Ground Water Monitoring Network

Use the monitoring network to evaluate:

- Hydraulic capture zone
- Removal of contaminant mass
- The long-term performance of the remedy
- Protection of receptors





Data Trend Evaluation

Various statistical tests available:

- Wilcoxon Rank-Sum (Mann Whitney-U)
- Linear Regression
- Mann-Kendall Trend Test
- Theil-Sen Trend Line
- www.epa.gov/osw/hazard/correctiveaction/resources/guidance





Remediation Technology Evaluation

What do the data show?

Did the remedial action achieve the objectives?

- Effective source control
- Decrease in dissolved contaminant concentrations
- No threat to receptors





Technology Evaluation

Remedy is effective

OR

Data indicate adjustments are
needed





Apply for Remedial Action Permit

- After one year....
 - Is system operational and functional?
 - Does the system meet remediation goals?
 - Is the ground water monitoring program adequate?
 - Is a revised monitoring program required?
 - On track for natural attenuation?





Questions??

