What Happens When I Have a Release and How Do I Get NFA?

Remediation Presentation
Petroleum Program Outreach
Division of Oil and Public Safety

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Remediation Online Resources

- OPS Regulations and Statutes
  https://www.colorado.gov/pacific/ops/RegulationsStatutes
- OPS Petroleum Program Guidance
  http://www.coworkforce.gov/petroleumguidance/
- OPS REP webpage including list of REPs
  https://www.colorado.gov/pacific/ops/REP

https://www.colorado.gov/pacific/ops/RegulationsStatutes

Regulations & Statutes

The Division of Oil and Public Safety (OPS) develops these ***regulations*** in order to execute the mandates that are found in the statutes.

The Colorado Legislature writes these ***statutes*** which serve as the minimum requirements with which impacted owners and operators are bound to comply.

Click on the appropriate links below to access the regulations and statutes as PDF files or from the listed websites.

Program Name	Regulation Versions		Statute Versions	
Amusement Rides and Devices	PDF	The regulations are available on the Secretary of State's website by clicking on the link below. OPS Regulations	PDF	The statutes are available on the LexisNexis website by clicking on the link below. OPS Statutes
Boilers and Pressure Vessels	PDF		PDF	
Conveyances	PDF		PDF	
Explosives*	PDF		PDF	
Liquefied Petroleum Gas	PDF		PDF	
Petroleum Storage Tanks	PDF			
Retail Hydrogen Fueling	PDF			
Retail Natural Gas	PDF		PDF	

http://www.coworkforce.gov/petroleumguidance/

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Petroleum Program Guidance

Welcome

Welcome to the OPS Petroleum Program Guidance. We are excited to share this dynamic web-based resource with you, a
it provides all of our guidance in one place, which means you no longer have to search through separate PDFs to find the
information you need.

Our goal for this guidance is that it is valuable to you and easy to use, whether you need to know how to operate your tanks, what to do if you have a release or how to get reimbursed for cleanup costs.

Please note: this guidance does not supersede Colorado Petroleum Storage Tank Regulations and Statutes; rather, it describes our expectations for how you will comply with these rules.

Don't see something you need assistance with? Have an idea for a new topic? Click on the button below to share your suggestions or comments with us.

Guidance Feedback

How To Use this Guidance

You can click on topics of interest on the Contents tab on the left side of the screen, use hyperlinks to references, access a glossary of terms and use the search tool in the upper right.

NEW! **Updates to Corrosion Prevention and Release Closure Criteria**

https://www.colorado.gov/pacific/ops/REP

Recognized Environmental Professional

The Recognized Environmental Professional (REP) Program became effective on January 1, 2018, and replaced the Listed Consultant Program.

The purpose of the REP designation is to better align decision-making responsibility between OPS, environmental consultants and responsible parties by identifying environmental consultants who can
demonstrate decision-making experience for the assessment, risk characterization and remediation of releases to the environment.

Prospective REPs must submit a REP application for approval and subsequently pass a regulatory proficiency examination to become REPs.

Approved REPs can be reimbursed at the OPS reasonable cost guideline (RCG) 5.2 task and labor code for a REP senior engineer/scientist at a labor rate of $123 per hour. Companies without an approved REP can only seek reimbursement at the OPS RCG 5.5 task and labor code for a staff engineer/scientist labor rate of $83 per hour.

A list of current REPs can be found on the REP List page.

If you have any questions, please contact:

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Presentation Content

- Release Discovery and Reporting
- Report Submittal Deadlines
- Recognized Environmental Professionals
- Site Characterization Process
- Conceptual Site Model
- Corrective Action Plan Process
- Release Closure Criteria
- O/O Q&A and REP Panel Discussion

Release Definition

OPS Storage Tank Regulations
7 C.C.R. 1101-14

“Release” means any spilling, leaking, emitting, discharging, escaping, leaching or disposing of a regulated substance from a regulated tank system into the environment.

Suspected Releases

- Inconclusive/failed SIR results not overturned in 24 hrs
- Fuel or vapors in soils, basements, utilities, or nearby surface water when the source is not known
- Unusual operating conditions observed
  - erratic behavior of dispensing equipment
  - sudden inventory loss
  - unexplained presence of water in the tank
- Monitoring results, including investigation of an alarm, from a release detection method

Suspected Release Response

- Report to OPS within 24 hours of discovery
  - Call OPS Technical Assistance Line: 303-318-8547
- Perform a system test to determine whether:
  - a leak exists in that portion of the tank that routinely contains product, or the attached delivery piping
  - a breach of secondary containment has occurred
- If the system test indicates a leak or secondary breach,
  - report confirmed release within 24 hours of discovery
  - perform a site check where contamination is most likely to be present based on system test results and contamination

Confirmed Releases

- A failed system test, site check, or other sample analyses with any detections of contaminants
- Fuel is observed outside of the tank system
- Fuel spills/overfills of any volume that is not cleaned up within 24 hours
- Fuel spills or overfills that exceed 25 gallons
- Call 877-518-5608 (CDPHE) if fuel enters a drain

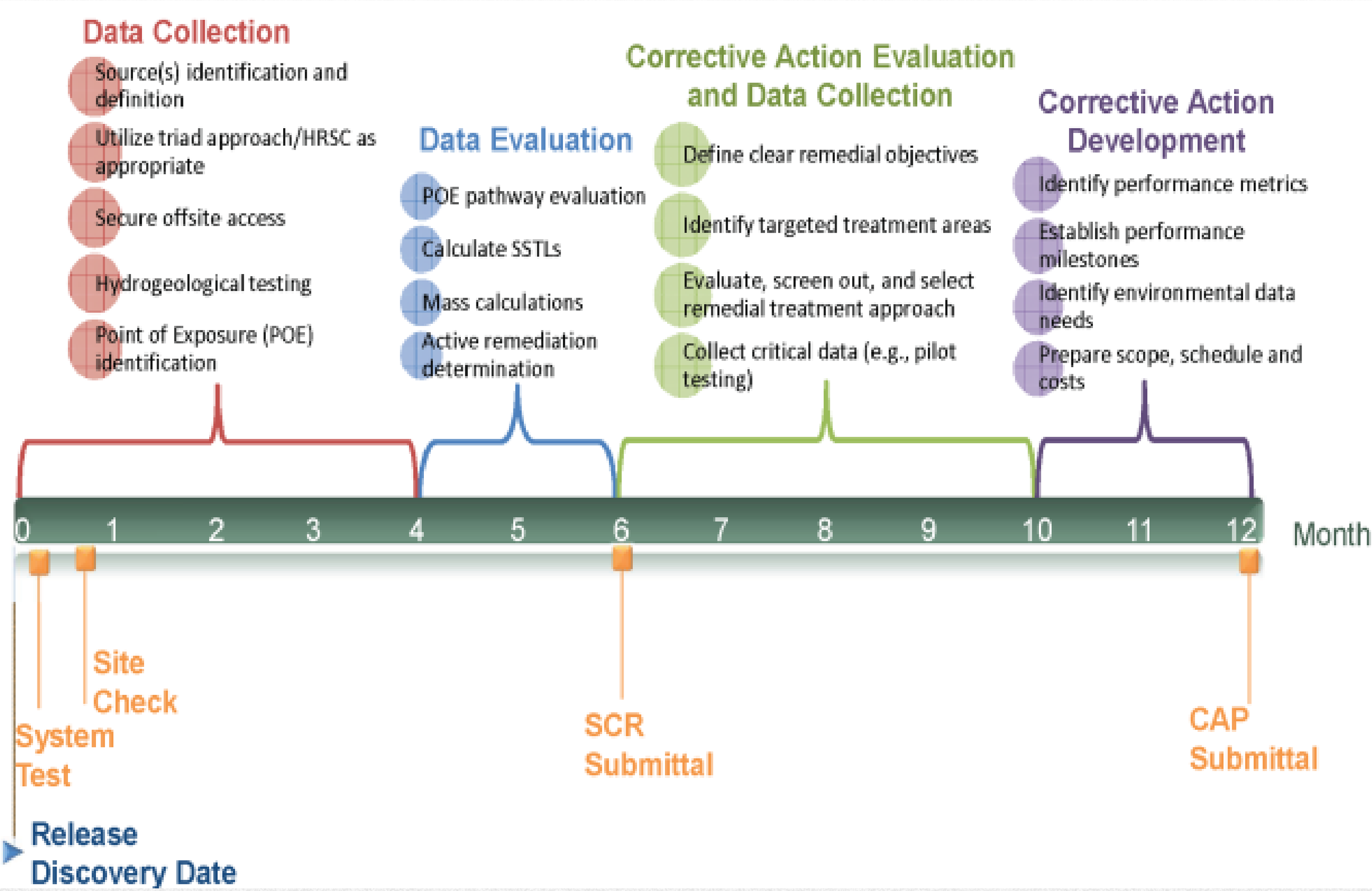
Confirmed Release Response

- Report to OPS within 24 hours of release discovery
  - Call OPS Technical Assistance Line: 303-318-8547
- Submit a Site Characterization Report within 180 days of release discovery
- Submit a Corrective Action Plan, if necessary, within one year of release discovery

Report Submittal Deadlines

Report	Due Date
System Test	within 10 calendar days of release discovery
Site Check	within 30 calendar days of release discovery
SCR (Site Characterization Report)	within 180 days of release discovery
CAP (Corrective Action Plan)	within 1 year of release discovery
MRR (Monitoring & Remediation Report)	quarterly or semi-annually

Report Submittal Timeline



Steps to Achieve No Further Action (NFA)

- Hire an environmental consultant, preferably a REP
- Submit Site Characterization Report (SCR) within 180 days
- Construct a Conceptual Site Model for the release event
- Submit a Corrective Action Plan (CAP) within one year
- Submit MRRs to track and evaluate cleanup progress
- Submit CAP Mod(s) as needed for next remedial step
- Request NFA after eliminating all exposure pathways

What is a REP?
(Recognized Environmental Professional)

- A REP is an individual who by reason of education, training, and experience is qualified to be the principal decision maker on work related to the assessment, remediation, and closure of petroleum releases
- REPs replaced Listed Consultants January 1, 2018
- Currently 75 REPs (previously 500 Listed Consultants)

REP Program Objectives

Align responsibility

Build trusting relationships

Raise performance expectations

REP Qualifications

- Approval of REP Application
  - Appropriate degree (BS engineering, science)
  - Decision-making experience (>5 years)
  - Total professional experience (>8 years)
  - Professional ethics questions
  - Three references (at least one client)
- Pass REP Exam with >80% score
  - 50 questions on compliance, remediation, and fund

REP Criteria

REP Continuing Education Requirements

- 24 Professional Development Hours (PDHs) over 3 years
- 12 PDHs must be from these two OPS courses:
  - Conceptual Site Model Development (7 hours)
  - Effective Corrective Action Plans (5 hours)
- 12 additional PDHs from external sources
  - Technical webinars, workshops, conferences, courses

A Collaborative Partnership: RP/REP/OPS

GOAL: achieve closure in most timely, cost-effective and technically efficient manner by:

- Effective site characterization and conceptual site model development for strong CAP design basis
- Value-added evaluation and reporting of cleanup progress to move release events forward to closure
- Sound REP decision making with OPS regulatory guidance and cost controls

Partnership Roles

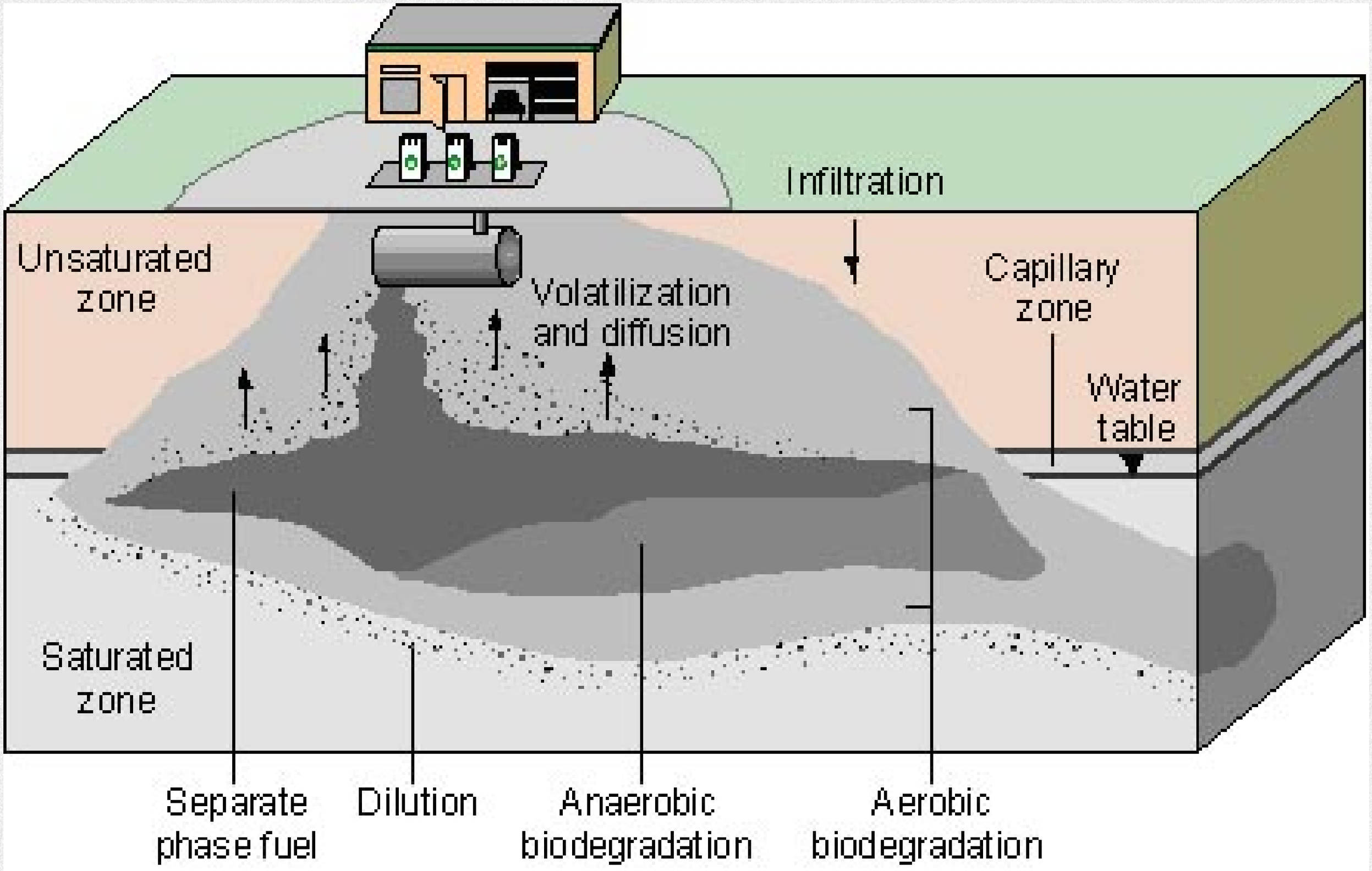
Site Characterization Process

- Define the extent and distribution of contamination
- Collect site-specific hydrogeologic information
- Evaluate all contaminant Exposure Pathways
- Identify impacted/potentially impacted Points of Exposure
- Construct a Conceptual Site Model
- Determine if active remediation is necessary
- Submit SCR w/in 180 days of release discovery

What is a Conceptual Site Model (CSM)?

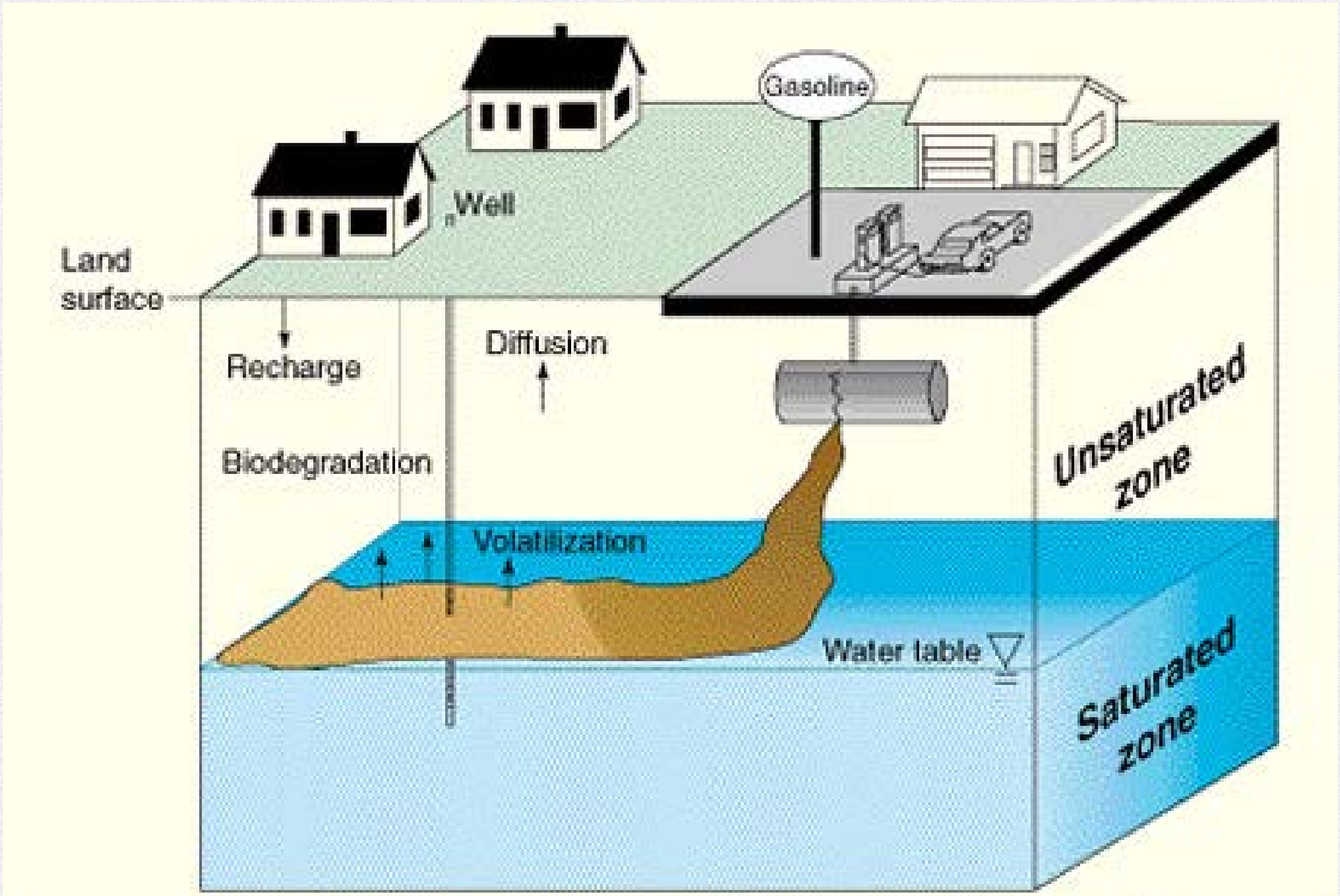
- A written and illustrative description of the release site
- Defines subsurface distribution of contamination
- Identifies targeted treatment areas requiring cleanup
- Primary communication tool for all stakeholders
- Updated when new information/data are obtained

Conceptual Site Model



What are we protecting?

Human health and the environment by identifying Points of Exposure and evaluating Exposure Pathways



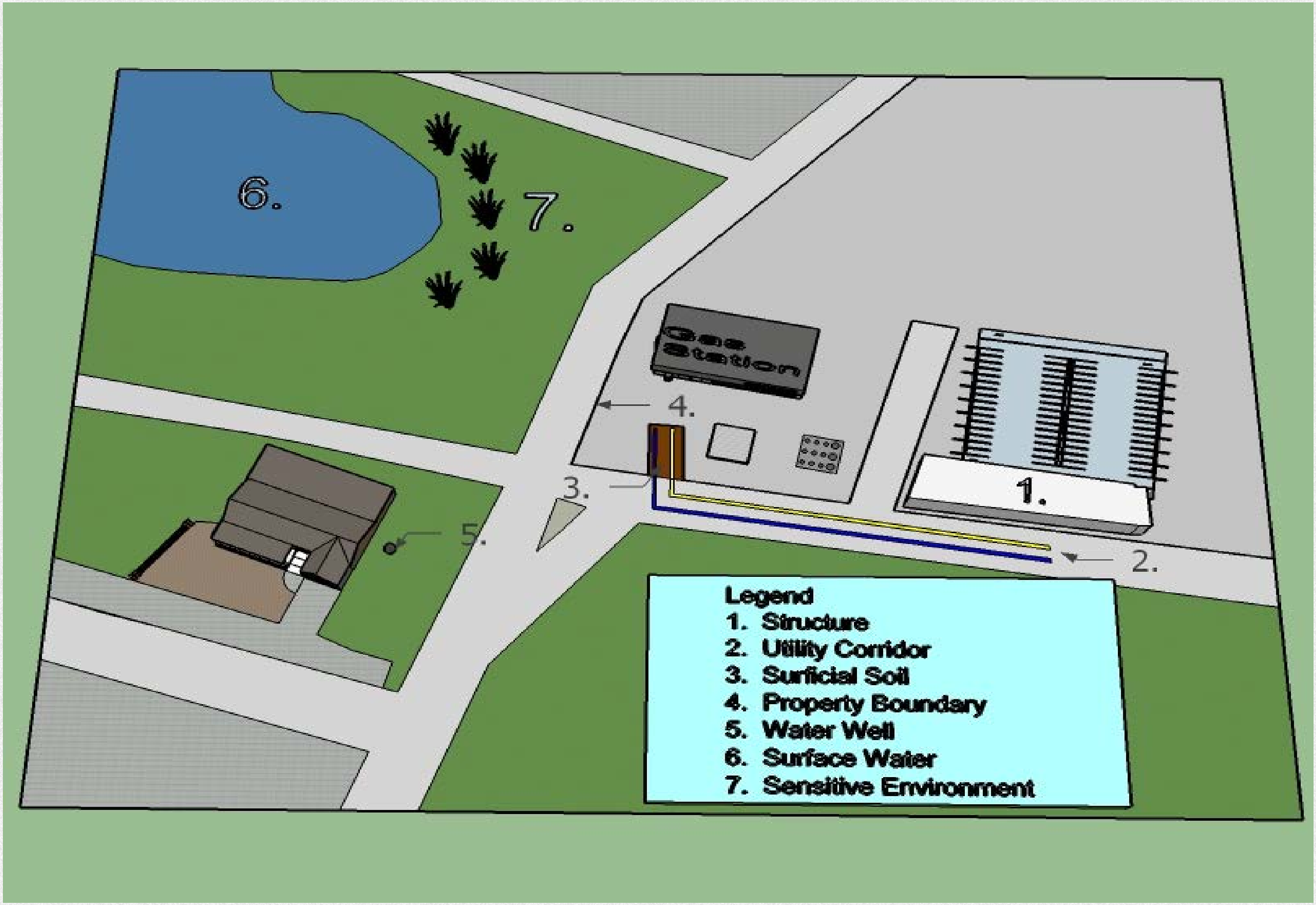
What is a Point of Exposure (POE)?

The location where a person or sensitive environment is exposed to a contaminant of concern (COC)

The 7 Points of Exposure (exposure mechanisms)

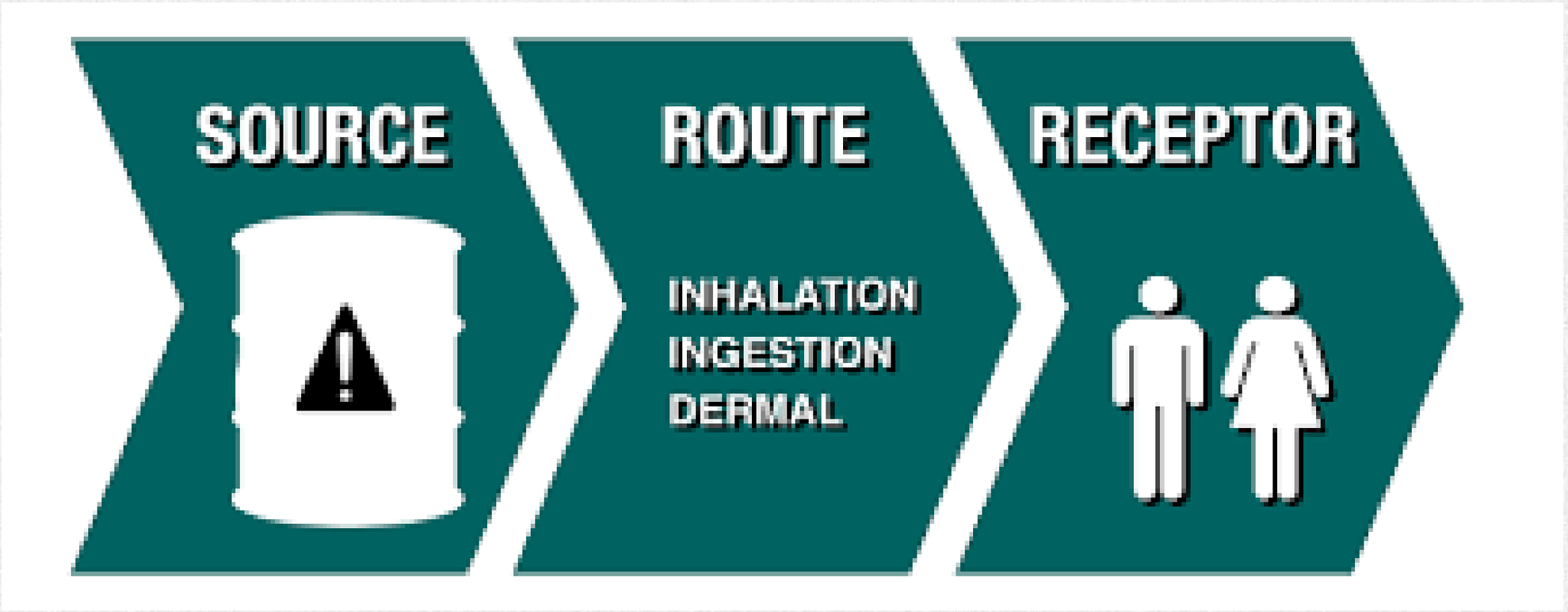
1. Property boundaries (potential offsite exposures)
2. Surficial soils (dermal contact, inhalation, ingestion)
3. Subsurface utilities (inhalation, dermal contact)
4. Structures (inhalation)
5. Water supply wells (ingestion, dermal contact, inhalation)
6. Surface water (dermal contact, ingestion)
7. Sensitive environments (e.g., parks, wetlands)

The 7 Points of Exposure (POEs)



What is an Exposure Pathway?

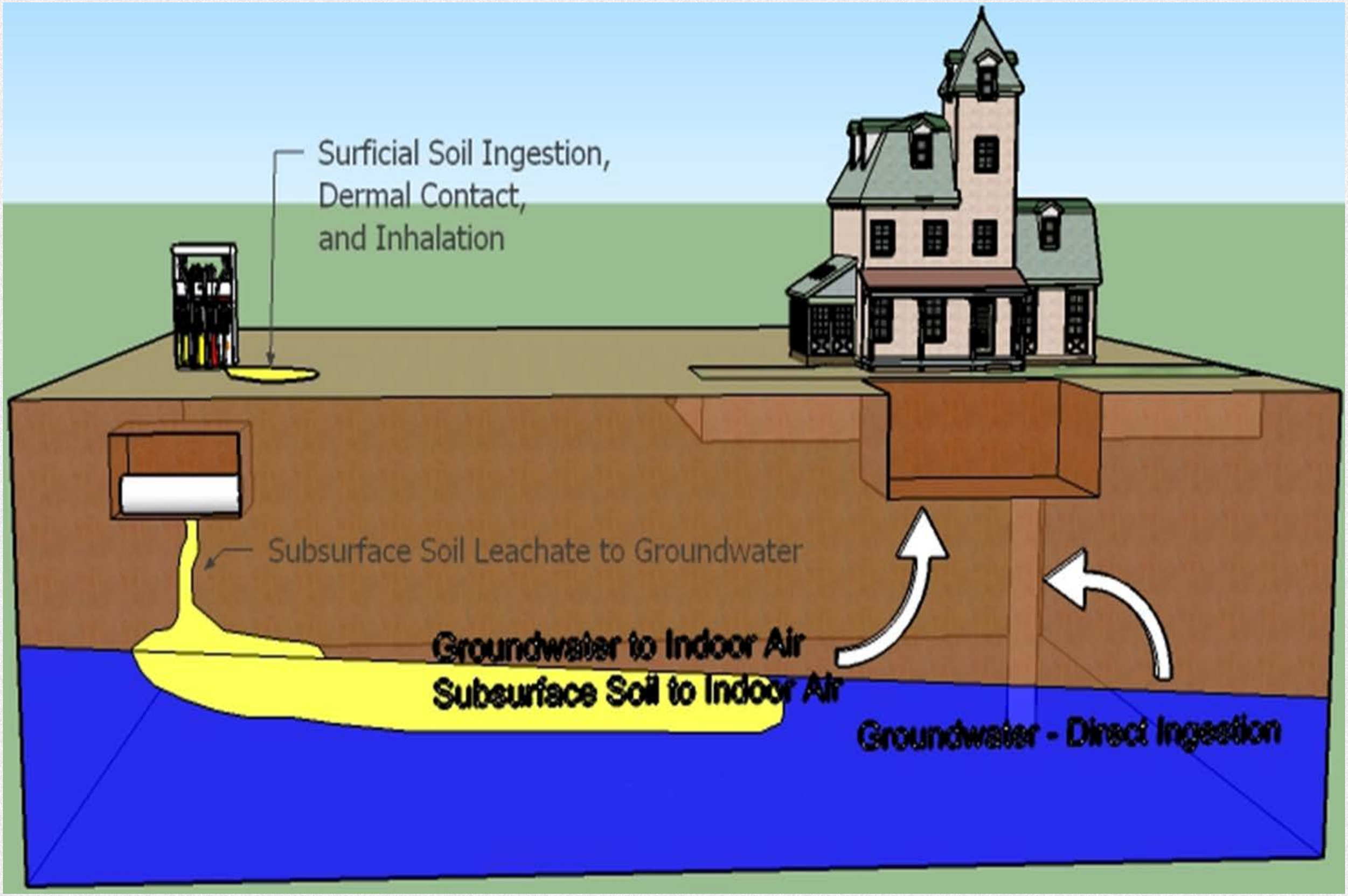
The route that a contaminant takes from a contaminant source area to a point of exposure to receptors



The 5 Exposure Pathways

1. **Surficial Soil** (ground surface to 3 feet deep)
2. **Subsurface Soil Leachate to Groundwater** (below 3 feet)
3. **Subsurface Soil to Indoor Air**
4. **Groundwater to Indoor Air**
5. **Groundwater Ingestion**

The 5 Exposure Pathways



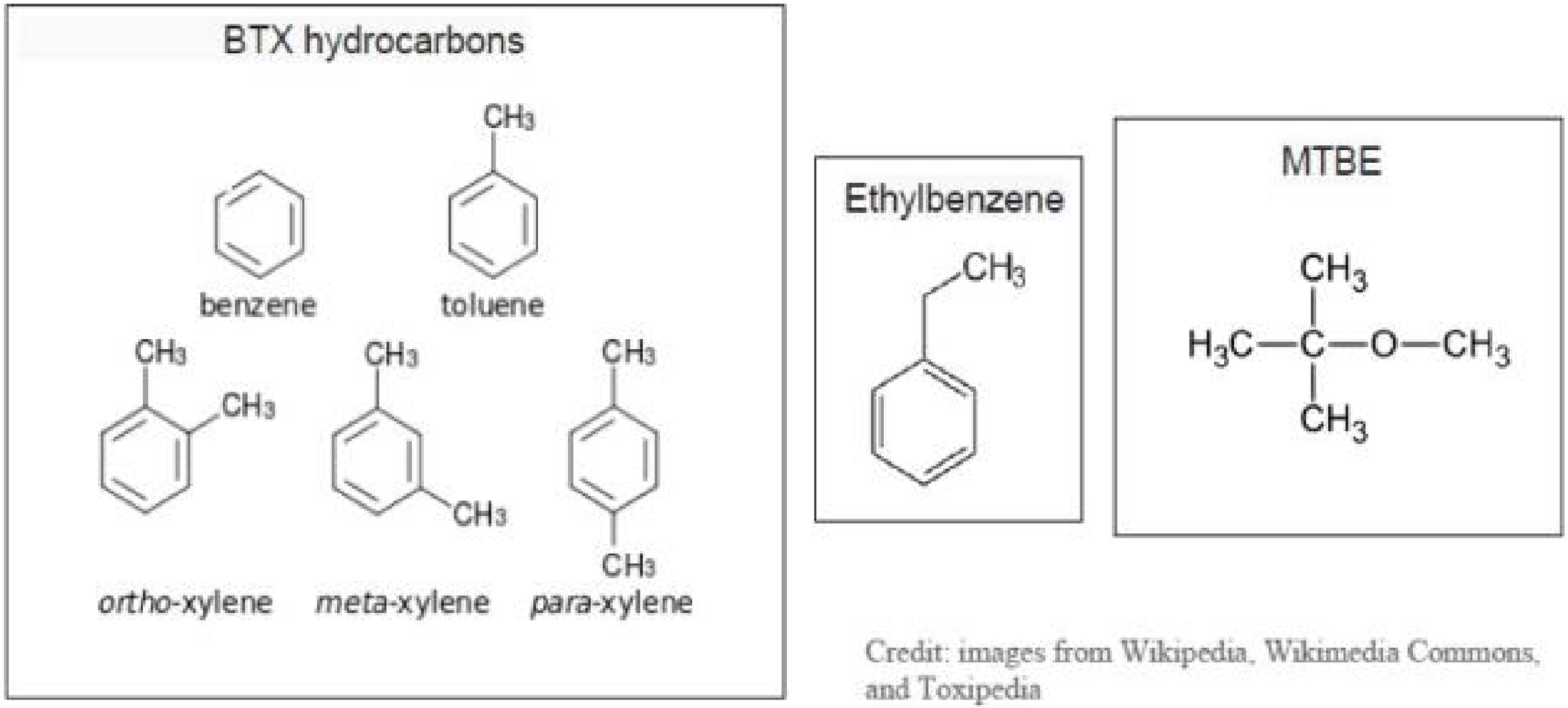
When is Remediation Required?

When any exposure pathway is complete (open) based on exceedences of contaminant numeric standards, which include:

- Tier I risk-based screening levels (RBSLs)
- Tier II site-specific target levels (SSTLs) from modeling results

Primary Contaminants of Concern

- Benzene, toluene, ethylbenzene, xylenes (BTEX)
- Methyl tertiary-butyl ether (MTBE)



Credit: images from Wikipedia, Wikimedia Commons, and Toxipedia

Risk-Based Screening Levels for Primary Contaminants of Concern

Media	Surficial Soil [mg/kg]	Subsurface Soil [mg/kg]	Soil Vapor [µg/m³]	Ground water [mg/l]
Complete Exposure Pathway	Ingestion Dermal Inhalation	Leachate to Groundwater Ingestion	Indoor Air Inhalation	Groundwater Ingestion
Benzene	2.8	0.26	2,900	0.005
Toluene	4,000	140	N/A	1.0
Ethylbenzene	2,100	190	N/A	0.7
Xylenes	10,000	260	N/A	1.4
Methyl tertiary-butyl ether	N/A	N/A	N/A	0.020

Secondary Contaminants of Concern

- Total volatile petroleum hydrocarbons (TVPH)
  - TVPH = gasoline range
- Total extractable petroleum hydrocarbons (TEPH)
  - TEPH = diesel range
- Currently no cleanup standard for TVPH or TEPH; only a soil definition standard of 500 mg/kg

Corrective Action Plan (CAP) Process

- Identify areas requiring cleanup based on the site characterization and conceptual site model
- Evaluate, screen out, and select the most appropriate cleanup technology to address contaminant concerns
- Establish performance metrics, milestones, and endpoints to monitor and evaluate cleanup progress
- Submit Corrective Action Plan w/in a year of discovery
- Implement approved CAP and submit periodic MRRs until all exposure pathways have been eliminated
- Request NFA

OPS CAP Guidance: CAP Preparation

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Corrective Action

A CAP (corrective action plan) is required when the results of an SCR (site characterization report) identify that remediation is necessary to abate the concerns associated with a release. The CAP section of this guidance is divided into three sections: CAP Preparation, CAP Technologies, and CAP Implementation.

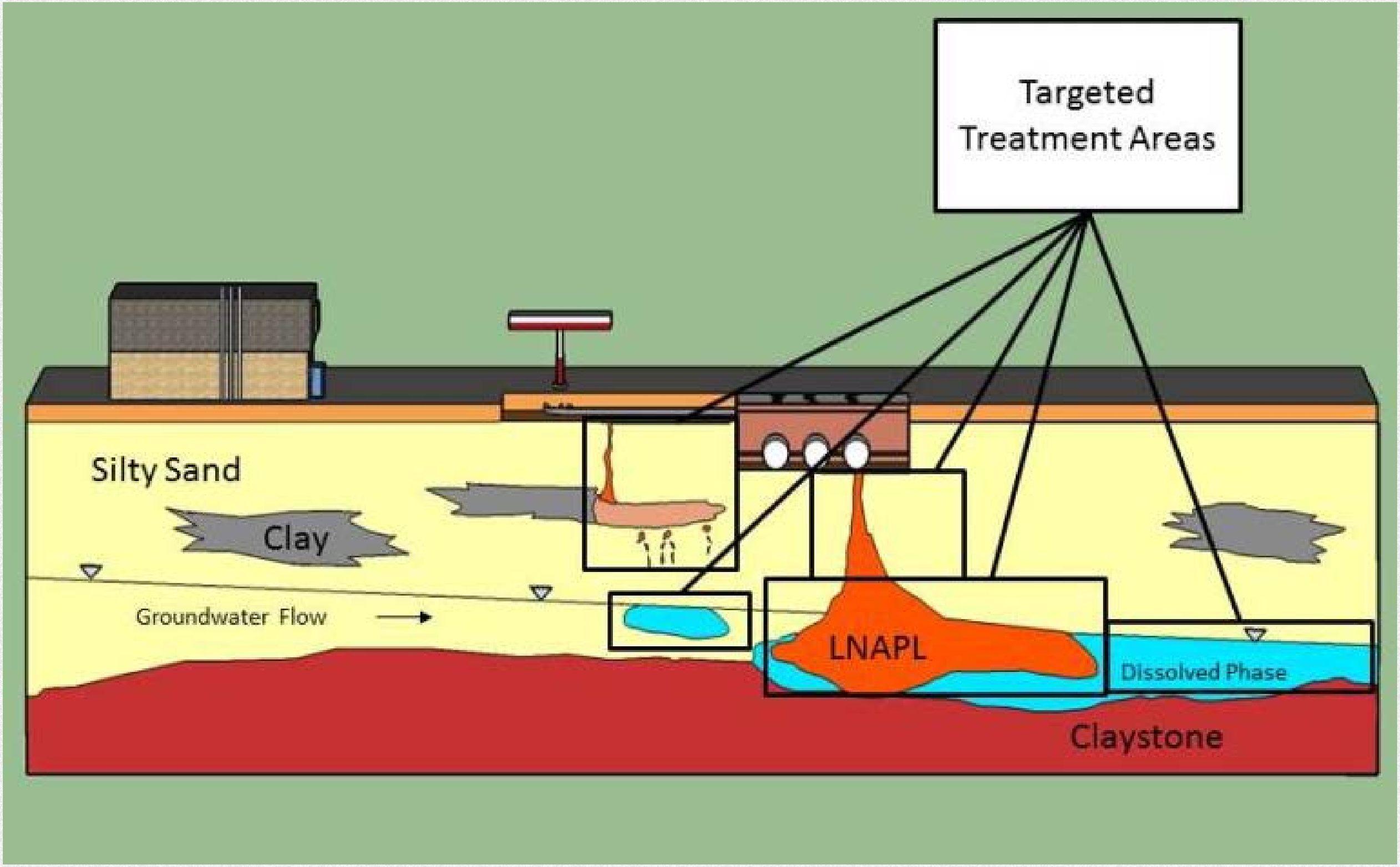
CAP Preparation

- **Identify Contaminant Concerns**
- Define Remedial Goals and Objectives
- Identify Targeted Treatment Areas
- Evaluate, Screen Out, and Select the Remedial Technology or Treatment Train
- Treatment Train or Combined Remedy Consideration
- **Performance Metric, Remedial Milestone and Endpoint Identification**
- Identify Groundwater Monitoring Network and Sampling Frequency
- **Identify Monitoring and Remediation Reporting Frequency**
- CAP Submittal

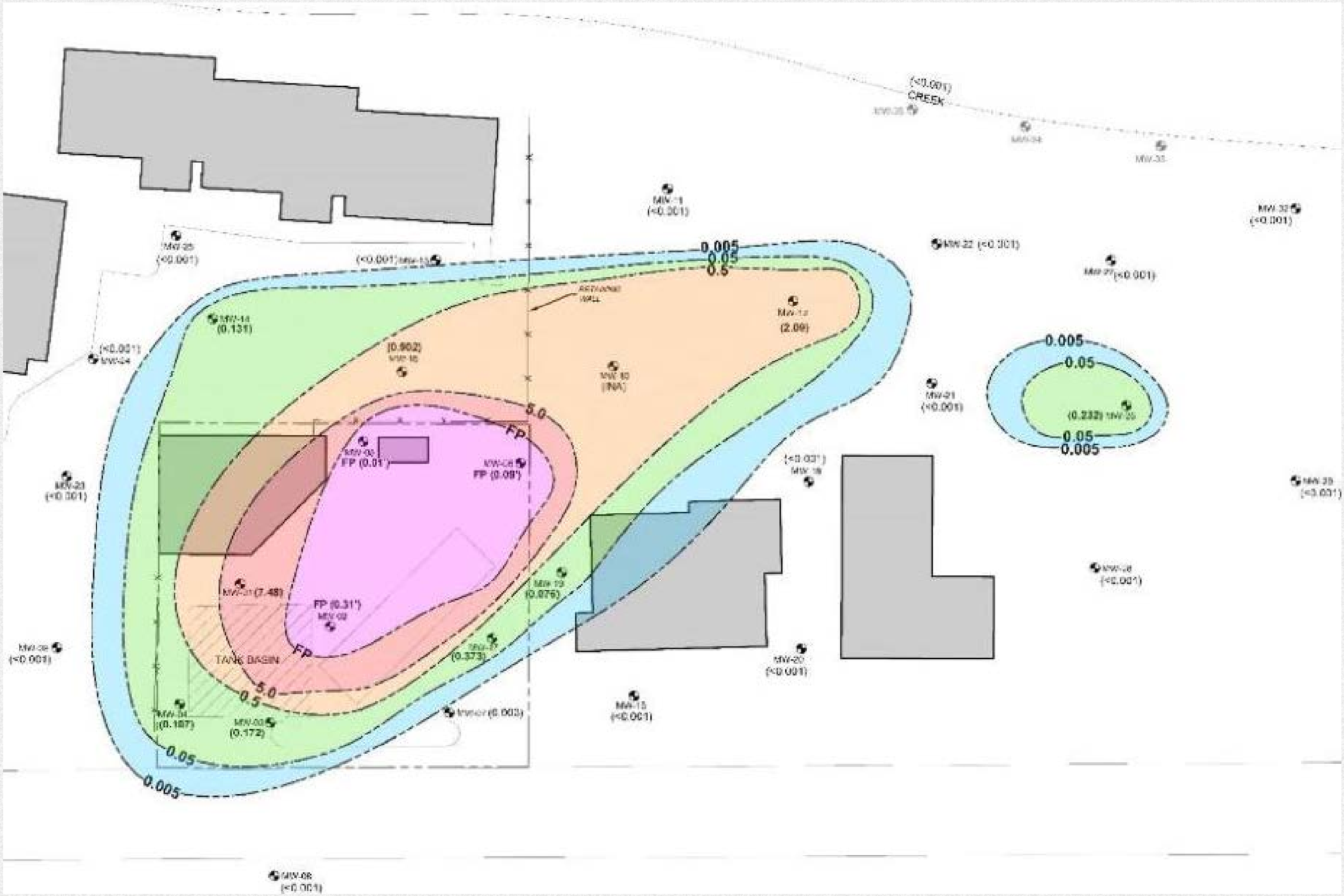
CAP Technologies

The purpose of this section is to provide an overview of remedial technologies that are applicable to petroleum release sites. The selected remedial technology, or technology treatment train for a CAP, should align with the remedial objectives for addressing site-specific contaminant concerns identified within the conceptual site model (CSM). The table below summarizes remedial technologies to consider during the CAP technology selection process. These are the technologies that OPS has the most experience with and represent the majority of approved applications within the state's program to date.

Identify Targeted Treatment Areas



Identify Targeted Treatment Areas



Evaluate/Screen Out Cleanup Technologies

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Specific remedial technology descriptions are provided below with their associated critical data needs, advantages, limitations, and remedial performance metrics.

The ITRC has identified corrective action technologies specifically for LNAPL, and mitigation technologies specifically for PVI. Please refer to those documents for additional information on LNAPL remediation and PVI mitigation.

- **Excavation**
- **Air Sparge/Soil Vapor Extraction (AS/SVE)**
- **Biosparge/Biovent**
- **Multi-Phase Extraction (MPE)**
- **In Situ Chemical Oxidation (ISCO)**
- **Activated Carbon**
- **Surfactant-Enhanced Subsurface Remediation (SESR)**
- **Enhanced Biodegradation**
- **Thermal Desorption (TD)**
- **Enhanced Fluid Recovery (EFR)**
- **Monitored Natural Attenuation (MNA) and Natural Source Zone Depletion (NSZD)**

CAP Implementation

Upon OPS approval, implement the selected remedial technology or sequenced treatment train. Components of a CAP implementation should include system installation, system start-up and optimization, system O&M (operation and maintenance) and remedial performance data and end point evaluation.

- System Installation
- Start-up and Optimization
- O&M
- Performance Metric Evaluation
- Remedial Milestone Evaluation
- Remedial Performance Data Evaluation
- Evaluate Remedial Objectives

Select Cleanup Technology

Overview of Remedial Technologies		
Technology	Technology Description	Applicable Lithology
Excavation	Contaminant mass is physically removed and properly treated or disposed.	F + C
Air Sparge/Soil Vapor Extraction (AS/SVE)	AS injects air into the saturated zone to volatilize contaminants and SVE induces a vacuum to remove vapors from the vadose zone. AS or SVE can be used individually if site conditions are appropriate.	C
Biosparging and Bioventing	Air or oxygen is injected at low flow rates into the unsaturated zone (bioventing) or saturated zone (biosparging) to stimulate contaminant biodegradation.	F + C
Multi-Phase Extraction	An induced vacuum removes LNAPL, groundwater and vapor from the subsurface. A single pump or dual pump system may be employed and a fixed or mobile system may be designed depending on the complexity and magnitude of the environmental impact.	F + C
In-Situ Chemical Oxidation (ISCO)	A chemical oxidant (e.g., H_2O_2, $NaSO_4$, O_3), typically with amendments, is introduced into the subsurface to convert contaminants into innocuous byproducts.	C
Activated Carbon	Activated carbon, typically with bio-nutrients and/or oxidants, is introduced in the subsurface to adsorb contaminant mass (trap) and enable biological degradation processes to occur (treat).	C
Surfactant-enhanced Subsurface Remediation (SESR)	A surfactant is injected to increase LNAPL solubilization and mobility to enable recovery of dissolved phase and LNAPL via extraction wells.	C
Enhanced Biodegradation	Electron acceptors (i.e., oxygen, nitrate, sulfate) or nutrients (i.e., trace elements) are added to improve biodegradation rates within the saturated zone.	F + C
Thermal Desorption	Energy is used to heat soil, pore space, and groundwater to volatilize contaminant mass and reduce the viscosity and interfacial tension of LNAPL to enable recovery of liquid and vapor contaminants via extraction wells.	F + C
Enhanced Fluid Recovery (EFR)	LNAPL is hydraulically recovered by a vacuum-enhanced process.	C
Monitored Natural Attenuation (MNA) and Natural Source Zone Depletion (NSZD)	Contaminant mass is naturally degraded or depleted over time by physical, chemical, or biological processes.	F + C

Monitoring and Remediation Reports (MRRs)

Semi-Annual reports to update cleanup progress including:

- Groundwater monitoring data
- Operation and maintenance data for remedial systems
- Confirmation soil sample results
- Updated conceptual site model
- Status of contaminant exposure pathways
- Data gaps and how to address them
- Next step(s) to move release toward closure

Maximum Extent Practicable (MEP)

- Maximum extent practicable means contamination has been cleaned up as much as possible with consideration of:
  - risk reduction
  - feasible cleanup technologies
  - access
  - cost
- Original CAPs must be designed for Tier I or Tier II closure
- Tier III or Tier IV may be considered for releases that can't achieve Tier I or Tier II with consideration given to MEP

Risk-Based Closure Options

Tier I

- **COCs meet Tier I RBSLs with no offsite impact**

Tier II

- **COCs meet Tier II SSTLs with no offsite impacts**

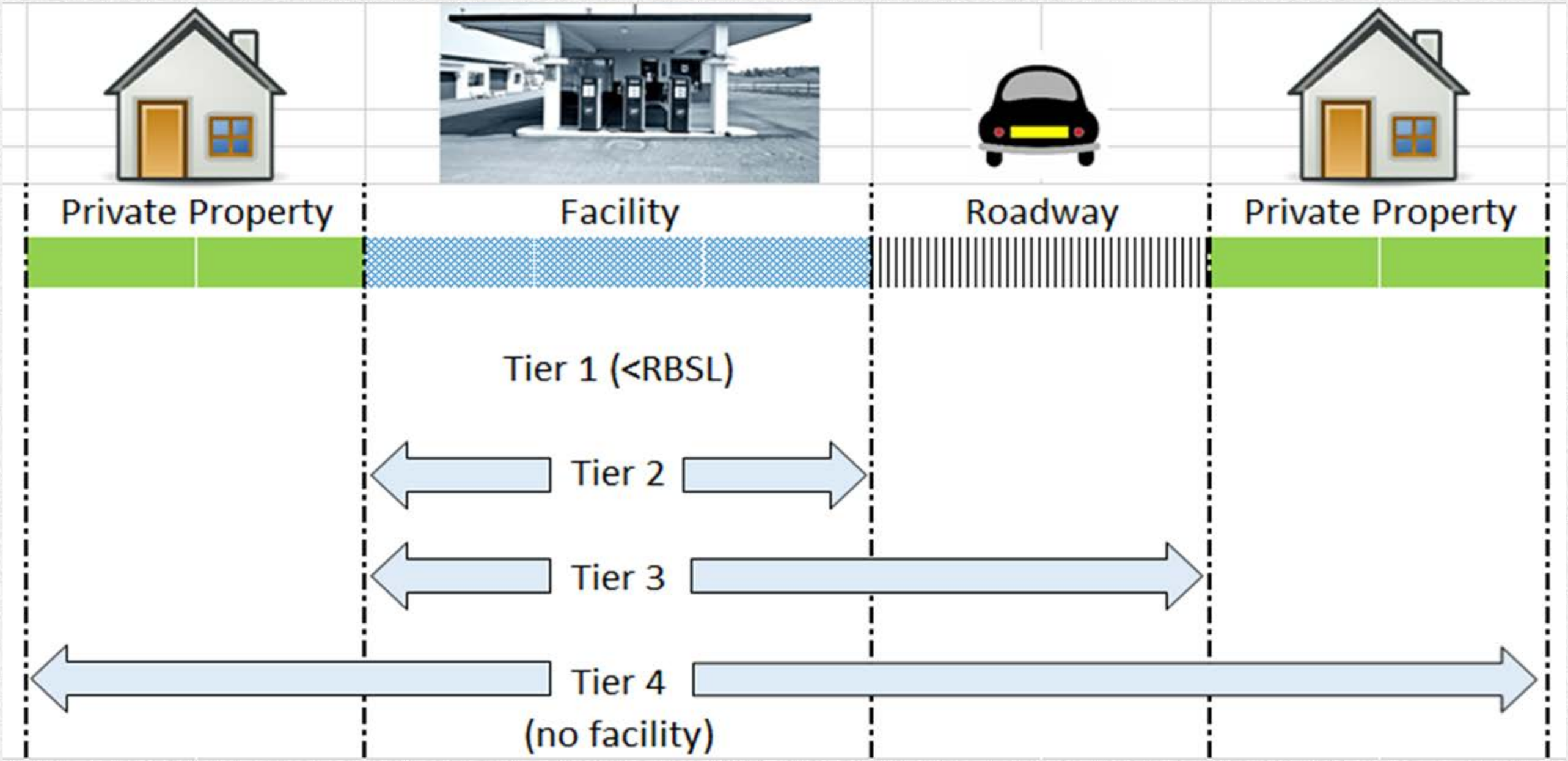
Tier III

- **Offsite impacts under a public roadway**
- **Contamination cleaned up to maximum extent practicable**
- **Exposure evaluation indicates low risk to receptors**

Tier IV

- **Offsite impacts on private property**
- **Contamination cleaned up to maximum extent practicable**
- **Exposure evaluation indicates low risk to receptors**
- **Not an option for facilities with active tank systems**

Risk-Based Closure Options



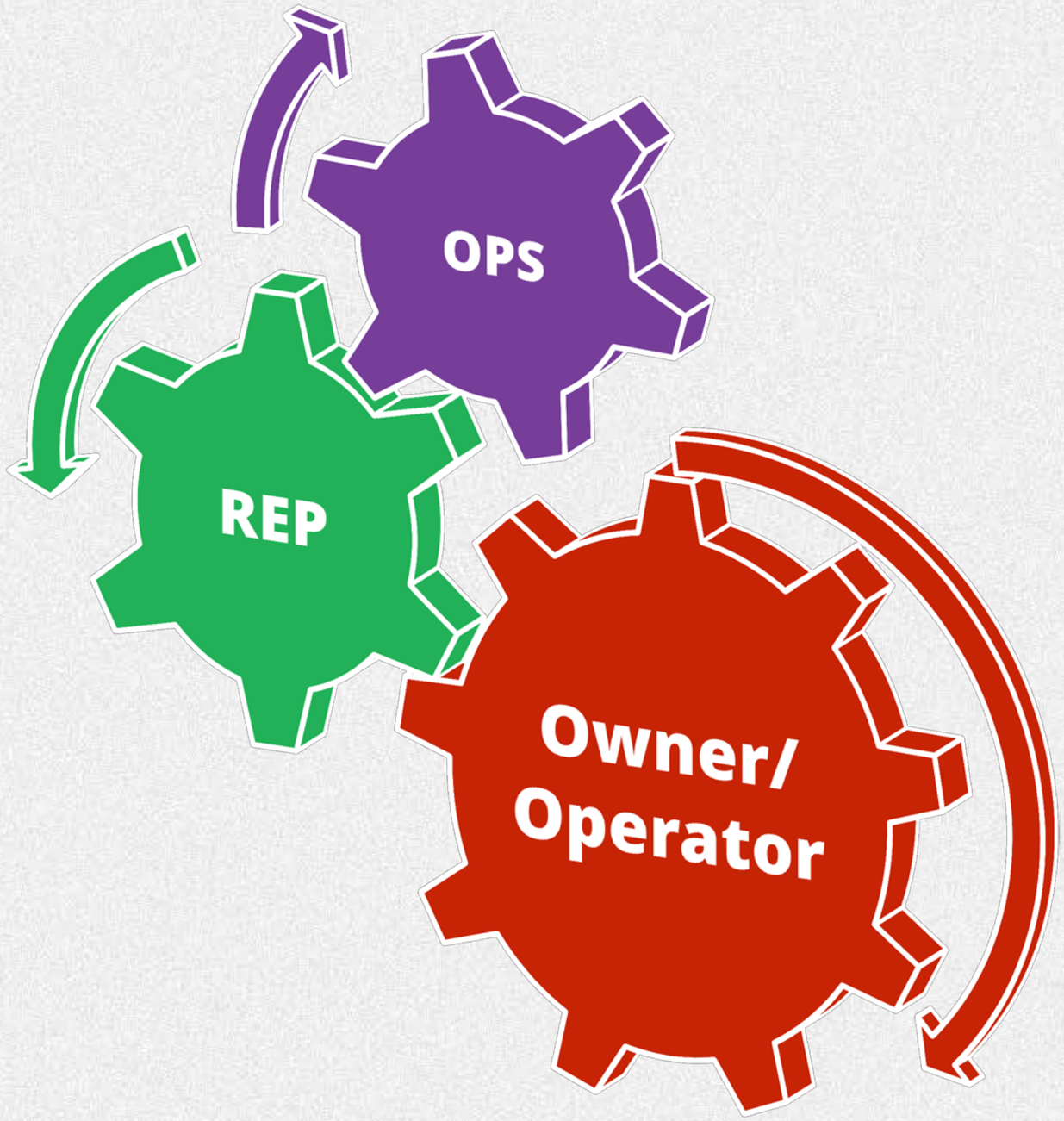
Underground Damage Prevention Safety Commission

- Review complaints of alleged violations of the One Call Law
- Develop best practices

Owner/Operator Q&A

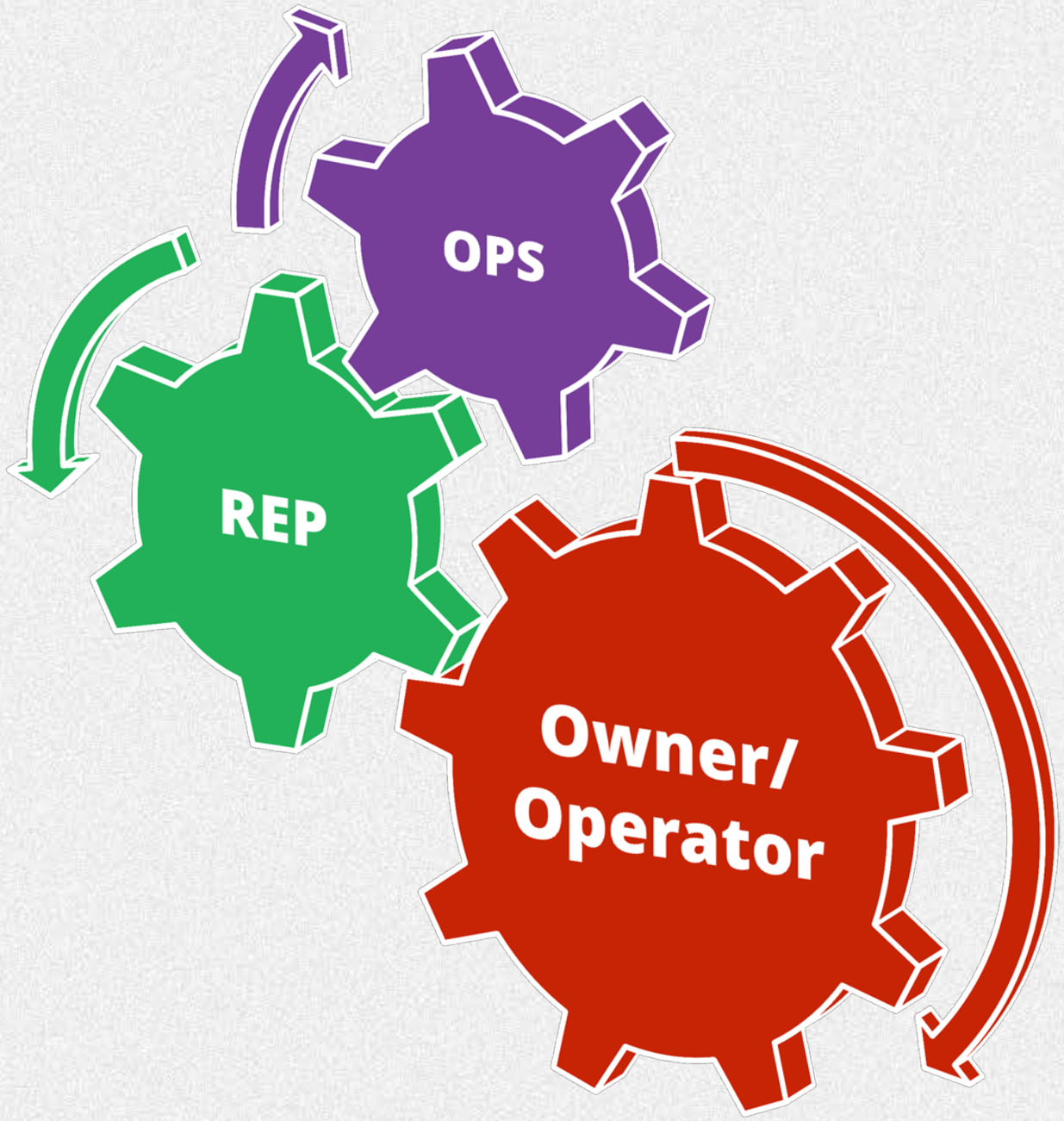
Owner/Operator Experience

How did you find a consultant to address your release event?



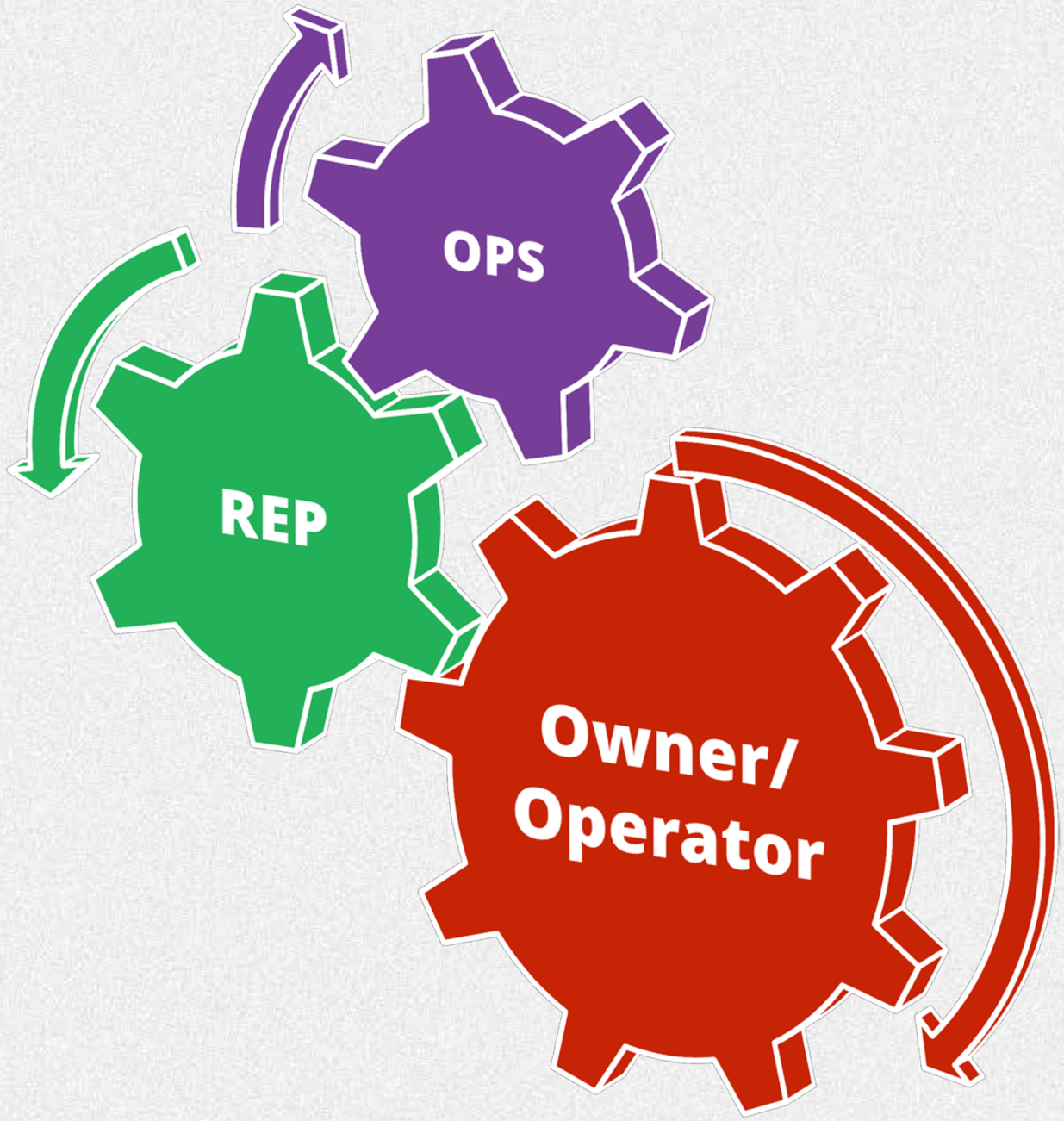
Owner/Operator Experience

What kind of interaction did you have with your consultant and OPS during the assessment and remediation processes?



Owner/Operator Experience

Has your release event reached a No Further Action determination?



REP Panel Discussion

KEYS TO COMPLIANCE

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