Nevada Division of Environmental Protection

Bureau of Corrective Actions CEM Workshop for Remediation and Leaking Underground Storage Tank Cases

April 22 and 24, 2025

Presented by

The NDEP Bureau of Corrective Actions

Nevada Department of CONSERVATION & NATURAL RESOURCES

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

Welcome and Introductions

Jeff Collins

Path to Closure Guidance…10+ years and counting…I’m getting old.

Applicable Regulations

Nevada Administrative Code (NAC):

- 445A.226-227 – Action Levels for Contaminated Sites
- 445A.345-348 – Notification of Release of Hazardous Substances
- 445C.010-390 – Environmental Requirements; Cleanup of Discharged Petroleum
- 459.970-97295 – Certification of Certain Consultants and Contractors
- 459.9921-999 – Storage Tanks

NAC 445A.227 Changes

NAC 445A.2272 – Soil Action Levels:

- Replaced references to the IRIS database with references to the EPA RSL Tables
- IRIS process is complicated and relies on extensive knowledge of toxicology, exposure assessment, and many calculations
- In practice, BCA and CEMs use the EPA RSL Tables

NAC 445A.2272 Contamination of soil: Establishment of action levels. (NRS 445A.425)

1. For the purposes of NAC 445A.22695 to 445A.2271, inclusive, the action level for soil must be established at the following levels:

(a) The background concentration or volume of a hazardous substance, hazardous waste or a regulated substance set forth in:

(1) The permit issued to the owner or operator by the Division; or

(2) A study approved by the Division.

(b) The presence of a hazardous substance, hazardous waste or a regulated substance in the soil at an appropriate level of concentration that is based on the protection of the waters of the State, public health and safety for all identified routes of exposure and the environment. The appropriate level of concentration must be determined by the Division using the ~~[Integrated Risk Information System, adopted by the Environmental Protection Agency, as it existed on October 3, 1996,]~~ ***United States Environmental Protection Agency approved standards and methodology for development of Regional Screening Levels adopted by reference in NAC 445A.2272 (3),*** or any other equivalent method or peer-reviewed source of information chosen by the Division.

2. Except as otherwise provided in this subsection, if more than one action level for soil may be established using the criteria set forth in paragraph (b) of subsection 1, the most restrictive action level must be used. In no case may the action level be more restrictive than the background concentration of the hazardous substance, hazardous waste or regulated substance.

3. The State Environmental Commission hereby adopts by reference the ~~[Integrated Risk Information System, adopted by the Environmental Protection Agency, as it existed on October 3, 1996. A copy of the system is available on-line through the Internet and may be obtained from an Integrated Risk Information System Representative at (301) 496-6531, free of charge.]~~ ***United States Environmental Protection Agency, "Regional Screening Level (RSL) Tables and associated User's Guide." A copy of the RSL Tables and User's Guide is available free of charge at the United States Environmental Protection Agency Risk Assessment, Regional Screening Levels website at the Internet address https://www.epa.gov/risk/regional-screening-levels-rsls.***

(Added to NAC by Environmental Comm'n, eff. 10-3-96; A by R189-08, 8-25-2009)

NAC 445A.227 Changes

NAC 445A.22735 – Groundwater Action Levels:

- Replaced references to the IRIS database with references to the EPA RSL Tables
- Default action levels are still MCLs, where established

NAC 445A.22735 Contamination of groundwater: Establishment of action levels. (NRS 445A.425)

1. For the purposes of NAC 445A.22725, 445A.2273 and 445A.2274, the action level for groundwater must be established ~~[at]~~ *for* the following ~~[levels]~~:

(a) The presence of 1/2 inch or more of a petroleum substance that is free-floating on the surface of the water of an aquifer, using a measurement accuracy of *0*.01 feet.

(b) The presence of a hazardous substance, hazardous waste or a regulated substance in groundwater at a level of concentration equal to the maximum contaminant level for that substance or waste established pursuant to the ~~[Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq., and 40 C.F.R. Part 141, as those sections existed on October 3, 1996.]~~ ***United States Environmental Protection Agency, "National Primary Drinking Water Regulations" adopted by reference in NAC 445A.22735 (4).***

(c) A level of concentration equal to the background concentration of a hazardous substance, hazardous waste or a regulated substance, if that level of concentration is greater than the maximum contaminant level established pursuant to paragraph (b).

(d) If a maximum contaminant level has not been established for a hazardous substance, hazardous waste or a regulated substance, a level of concentration equal to:

(1) The background concentration of the waste or substance; or

(2) An appropriate level of concentration that is based on the protection of public health and safety and the environment. The appropriate level of concentration must be determined by the Division using the ~~[Integrated Risk Information System,]~~ ***United States Environmental Protection Agency, "Regional Screening Level (RSL) Tables and associated User's Guide,"*** adopted by reference in NAC 445A.2272, or an equivalent method approved by the Division.

NAC 445A.227 Changes

NAC 445A.22725 and 2273:

- No changes to the requirement for corrective action or groundwater exemption closure process
- Bottom line: bringing regulations in line with current practice

EPA RSLs and New RC Tables

- https://www.epa.gov/risk/regional-screening-levels-rsls
- The Generic Tables are populated by applying the IRIS process to specific contaminants, and calculating conservative values based on worst-case scenario exposure
- Generally use the tables developed with a target cancer risk (TR) of 1E-6 and a target hazard quotient (THQ) of 1.0
- The most restrictive level becomes the default reportable concentration (RC) and screening level
- This is NOT necessarily the ultimate clean up goal. A less restrictive level may be established following exposure assessment
- Adoption allows for action levels to be established through a more rigorous site-specific exposure analysis

EPA RSLs and New RC Tables

The most restrictive soil RSL becomes the default reportable concentration (RC) and screening level. Example:

Contaminant		Screening Levels											Protection of Groundwater SSLs		
Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tap Water (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
Acephate	30560-19-1	1.9E+01	n	2.5E+02	n					6.0E+00	n		1.3E-03	n	
Acetaldehyde	75-07-0	1.1E+01	c**	4.9E+01	c**	1.3E+00	c**	5.6E+00	c**	2.6E+00	c**		5.2E-04	c**	
Acetochlor	34256-82-1	1.3E+03	n	1.6E+04	n					3.5E+02	n		2.8E-01	n	
Acetone	67-64-1	7.0E+04	n	1.1E+06	nms					1.8E+04	n		3.7E+00	n	
Acetone Cyanohydrin	75-86-5	2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n						
Acetonitrile	75-05-8	8.1E+02	n	3.4E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	n	
Acetophenone	98-86-2	7.8E+03	ns	1.2E+05	nms					1.9E+03	n		5.8E-01	n	
Acetylaminofluorene, 2-	53-96-3	1.4E-01	c	6.0E-01	c	2.2E-03	c	9.4E-03	c	1.6E-02	c		7.5E-05	c	
Acrolein	107-02-8	1.4E-01	n	6.0E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.4E-06	n	
Acrylamide	79-06-1	2.4E-01	c	4.6E+00	c	1.0E-02	c	1.2E-01	c	5.0E-02	c		1.1E-05	c	
Acrylic Acid	79-10-7	2.0E+01	n	8.3E+01	n	2.1E-01	n	8.8E-01	n	4.2E-01	n		8.5E-05	n	
Acrylonitrile	107-13-1	2.5E-01	c*	1.1E+00	c*	4.1E-02	c*	1.8E-01	c*	5.2E-02	c*		1.1E-05	c*	
Adiponitrile	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n						
Alachlor	15972-60-8	9.7E+00	c*	4.1E+01	c					1.1E+00	c	2.0E+00	8.7E-04	c	1.6E-03
Aldicarb	116-06-3	6.3E+01	n	8.2E+02	n					2.0E+01	n	3.0E+00	4.9E-03	n	7.5E-04
Aldicarb Sulfone	1646-88-4	6.3E+01	n	8.2E+02	n					2.0E+01	n	2.0E+00	4.4E-03	n	4.4E-04
Aldicarb sulfoxide	1646-87-3											4.0E+00			8.8E-04
Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	5.7E-04	c	2.5E-03	c	9.2E-04	c		1.5E-04	c	

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The most restrictive soil RSL becomes the default reportable concentration (RC) and screening level. Example:

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Acephate	30560-19-1	1.9E+01	n	2.5E+02	n					6.0E+00	n		1.3E-03	n	
Acetaldehyde	75-07-0	1.1E+01	c**	4.9E+01	c**	1.3E+00	c**	5.6E+00	c**	2.6E+00	c**		5.2E-04	c**	
Acetochlor	34256-82-1	1.3E+03	n	1.6E+04	n					3.5E+02	n		2.8E-01	n	
Acetone	67-64-1	7.0E+04	n	1.1E+06	nms					1.8E+04	n		3.7E+00	n	
Acetone Cyanohydrin	75-86-5	2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n						
Acetonitrile	75-05-8	8.1E+02	n	3.4E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	n	
Acetophenone	98-86-2	7.8E+03	ns	1.2E+05	nms					1.9E+03	n		5.8E-01	n	
Acetylaminofluorene, 2-	53-96-3	1.4E-01	c	6.0E-01	c	2.2E-03	c	9.4E-03	c	1.6E-02	c		7.5E-05	c	
Acrolein	107-02-8	1.4E-01	n	6.0E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.4E-06	n	
Acrylamide	79-06-1	2.4E-01	c	4.6E+00	c	1.0E-02	c	1.2E-01	c	5.0E-02	c		1.1E-05	c	
Acrylic Acid	79-10-7	2.0E+01	n	8.3E+01	n	2.1E-01	n	8.8E-01	n	4.2E-01	n		8.5E-05	n	
Acrylonitrile	107-13-1	2.5E-01	c*	1.1E+00	c*	4.1E-02	c*	1.8E-01	c*	5.2E-02	c*		1.1E-05	c*	
Adiponitrile	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n						
Alachlor	15972-60-8	9.7E+00	c*	4.1E+01	c					1.1E+00	c	2.0E+00	8.7E-04	c	1.6E-03
Aldicarb	116-06-3	6.3E+01	n	8.2E+02	n					2.0E+01	n	3.0E+00	4.9E-03	n	7.5E-04
Aldicarb Sulfone	1646-88-4	6.3E+01	n	8.2E+02	n					2.0E+01	n	2.0E+00	4.4E-03	n	4.4E-04
Aldicarb sulfoxide	1646-87-3											4.0E+00			8.8E-04
Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	5.7E-04	c	2.5E-03	c	9.2E-04	c		1.5E-04	c	

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Acetochlor	34256-82-1	1.3E+03	n	1.6E+04	n					3.5E+02	n		2.8E-01	n	
Acetone	67-64-1	7.0E+04	n	1.1E+06	nms					1.8E+04	n		3.7E+00	n	
Acetone Cyanohydrin	75-86-5	2.8E+06	nr	1.2E+07	nm	2.1E+00	n	8.8E+00	n						
Acetonitrile	75-05-8	8.1E+02	n	3.4E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	n	
Acetophenone	98-86-2	7.8E+03	ns	1.2E+05	nms					1.9E+03	n		5.8E-01	n	
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Acrolein	107-02-8	1.4E-01	n	6.0E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.4E-06	n	
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Acrylonitrile	107-13-1	2.5E-01	c*	1.1E+00	c*	4.1E-02	c*	1.8E-01	c*	5.2E-02	c*		1.1E-05	c*	
Adiponitrile	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n						
Alachlor	15972-60-8	9.7E+00	c*	4.1E+01	c					1.1E+00	c	2.0E+00	8.7E-04	c	1.6E-03
Aldicarb	116-06-3	6.3E+01	n	8.2E+02	n					2.0E+01	n	3.0E+00	4.9E-03	n	7.5E-04
Aldicarb Sulfone	1646-88-4	6.3E+01	n	8.2E+02	n					2.0E+01	n	2.0E+00	4.4E-03	n	4.4E-04
Aldicarb sulfoxide	1646-87-3											4.0E+00			8.8E-04
Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	5.7E-04	c	2.5E-03	c	9.2E-04	c		1.5E-04	c	

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Acetaldehyde	75-07-0	1.1E+01	c**	4.9E+01	c**	1.3E+00	c**	5.6E+00	c**	2.6E+00	c**		5.2E-04	c**	
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Acetonitrile	75-05-8	8.1E+02	n	3.4E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	n	
Acetophenone	98-86-2	7.8E+03	ns	1.2E+05	nms					1.9E+03	n		5.8E-01	n	
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Acrolein	107-02-8	1.4E-01	n	6.0E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.4E-06	n	
Acrylamide	79-06-1	2.4E-01	c	4.6E+00	c	1.0E-02	c	1.2E-01	c	5.0E-02	c		1.1E-05	c	
Acrylic Acid	79-10-7	2.0E+01	n	8.3E+01	n	2.1E-01	n	8.8E-01	n	4.2E-01	n		8.5E-05	n	
Acrylonitrile	107-13-1	2.5E-01	c*	1.1E+00	c*	4.1E-02	c*	1.8E-01	c*	5.2E-02	c*		1.1E-05	c*	
Adiponitrile	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n						
Alachlor	15972-60-8	9.7E+00	c*	4.1E+01	c					1.1E+00	c	2.0E+00	8.7E-04	c	1.6E-03
Aldicarb	116-06-3	6.3E+01	n	8.2E+02	n					2.0E+01	n	3.0E+00	4.9E-03	n	7.5E-04
Aldicarb Sulfone	1646-88-4	6.3E+01	n	8.2E+02	n					2.0E+01	n	2.0E+00	4.4E-03	n	4.4E-04
Aldicarb sulfoxide	1646-87-3											4.0E+00			8.8E-04
Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	5.7E-04	c	2.5E-03	c	9.2E-04	c		1.5E-04	c	

EPA RSLs and New RC Tables

- New RC Tables: https://ndep.nv.gov/environmental-cleanup/site-cleanup-program/site-cleanup-guidance
- This is NOT necessarily the ultimate clean up goal.
- A less restrictive level for soil may be established following exposure assessment (usually the Residential Soil or Industrial Soil RSL)

EPA RSLs and New RC Tables

NDEP Guidelines for Discovery Events (Soil RCs)			
Appendix A1 - Reportable Concentrations for Common Soil Contaminants			Version: 4/7/2025
Analyte	CAS No.	Reporatable Concentration (mg/kg)[1]	Basis
Total Petroleum Hydrocarbons[2]			
Total Petroleum Hydrocarbons	–	100	NDEP Derived Concentration
Common VOCs[3]			
Benzene	71-43-2	0.00023	Risk-based SSL
Toluene	108-88-3	0.69	MCL-based SSL
Ethylbenzene	100-41-4	0.0017	Risk-based SSL
Xylenes	1330-20-7	0.19	Risk-based SSL
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.0032	Risk-based SSL
Diisopropyl Ether (DIPE)	108-20-3	0.37	Risk-based SSL
Ethyl Tertiary Butyl Ether (ETBE)	637-92-3	0.017	Risk-based SSL
Tert-Butyl Acetate (TBA)	540-88-5	0.00076	Risk-based SSL
Tetrachloroethylene (PCE)	127-18-4	0.0023	MCL-based SSL
Trichloroethylene (TCE)	79-01-6	0.0002	Risk-based SSL
Dichloroethylene, cis-1,2- (cis-1,2-DCE)	156-59-2	0.0074	Risk-based SSL
Dichloroethylene, trans-1,2- (trans-1,2-DCE)	156-60-5	0.021	Risk-based SSL
Vinyl Chloride	75-01-4	0.0000065	Risk-based SSL
Carbon Tetrachloride	56-23-5	0.00018	Risk-based SSL
PAHs			
Benz[a]anthracene	56-55-3	0.011	Risk-based SSL
Benzo[a]pyrene	50-32-8	0.029	Risk-based SSL
Naphthalene	91-20-3	0.00038	Risk-based SSL
Metals[4]			
Arsenic, Inorganic	7440-38-2	0.0015	Risk-based SSL
Chromium, Total	7440-47-3	180,000	MCL-based SSL
Cobalt	7440-48-4	0.27	Risk-based SSL
Copper	7440-50-8	28	Risk-based SSL
Lead and Compounds	7439-92-1	9.0	MCL-based SSL
Manganese (Non-diet)	7439-96-5	28	Risk-based SSL
Mercury (elemental)	7439-97-6	0.033	Risk-based SSL
Selenium	7782-49-2	0.26	MCL-based SSL
Silver	7440-22-4	0.80	Risk-based SSL
Zinc and Compounds	7440-66-6	370	Risk-based SSL

Reportable Quantities

Most common reportable quantities:

- 3 cubic yards of soil impacted
- 25 gallons of petroleum product released
- Any contamination in groundwater above reportable concentrations (MCLs)

Reportable Quantities

Less common reportable trigger:

- 40 CFR 302.4 – CERCLA-listed hazardous substances and reportable quantities
- In rare instances, reporting may be triggered by estimating the amount of hazardous substance released, particularly for those substances with low reportable quantities, such as mercury (1 lb. RQ)

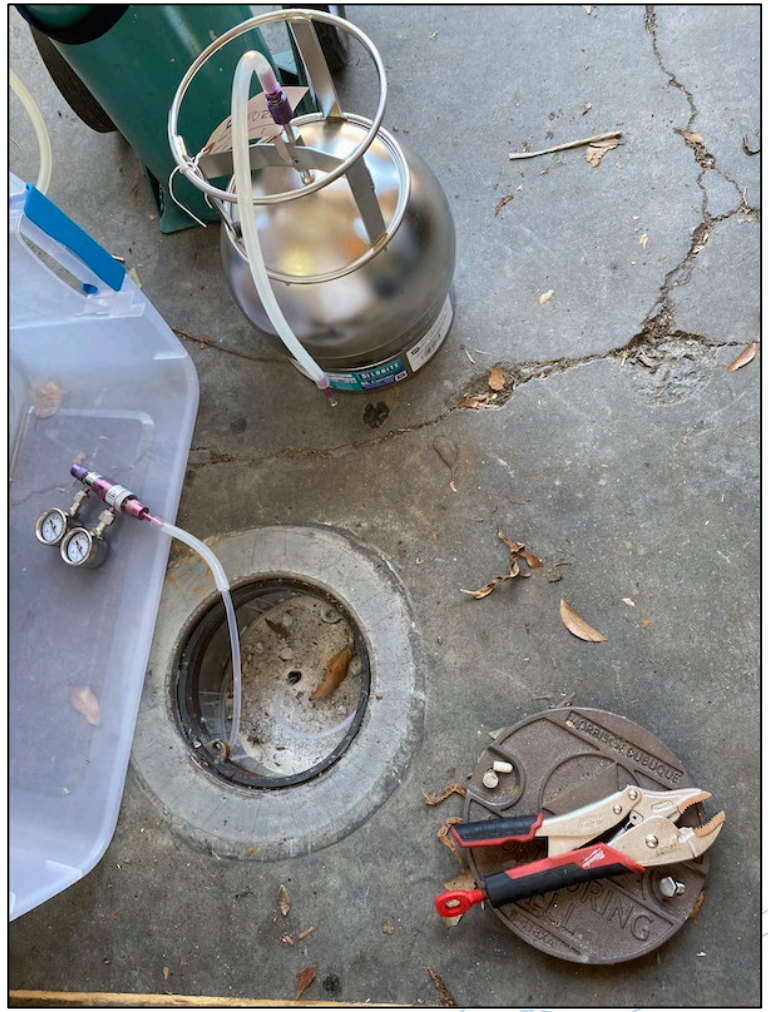
TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES
[ALL COMMENTS/NOTES ARE LOCATED AT THE END OF THE TABLE.]

Hazardous substance	CASRN [I]	Statutory code [II]	RCRA waste No.	Final RQ [pounds (kg)]
A2213	30558-43-1	4	U394	5000 (2270)
Acenaphthene	83-32-9	2		100 (45.4)
Acenaphthylene	208-96-8	2		5000 (2270)
Acetaldehyde	75-07-0	1,3,4	U001	1000 (454)
Acetaldehyde, chloro-	107-20-0	4	P023	1000 (454)

Soil Gas – Not Regulated, Not Reportable

Soil Gas Data:

- No reportable concentrations or action levels in Nevada for soil gas, subslab gas, or indoor air
- Useful screening tool, but need soil/groundwater data to confirm a reportable release



Who Must Report?

Facility Owners/Operators:

- Required to report releases discovered on their property within one working day of knowledge of the release
- Not the responsibility of the CEM to make the report, unless designated to do so by the facility owner

Who Must Report?

CEMs:

- Required to notify the facility owner/operator within 24 hours of a release discovery
- Immediate reporting of certain releases that represent an "imminent and substantial hazard to human health, public safety or the environment" (NAC 445A.3473). Includes:
  - CERCLA-listed hazardous substances greater than federal RQs
  - A release directly to surface water
  - A release that threatens a vulnerable resource (schools, hospitals, drinking water wellheads, storm drains, etc.)

UST Reportable Events

Suspected Releases

Suspected releases include any indication that a release may have occurred from a storage tank system. Examples include:

- An alarm or failed test from the storage tank's monitoring system or a third-party test.
- Fuel accumulation in a containment area.
- Unusual operating conditions such as erratic operation of dispensing equipment, sudden loss of product, and excessive water in the tank.

A suspected release means a discharge has not been confirmed to have occurred to the environment and more investigation is necessary.

Suspected releases should be reported within 24 hours of discovery to the NDEP to receive direction on release confirmation.

Confirmation of whether or not a release to the environment has occurred must be done within 7-days.

Not reporting a suspected release to NDEP could jeopardize petroleum fund coverage.

UST Reportable Events

Confirmed Releases

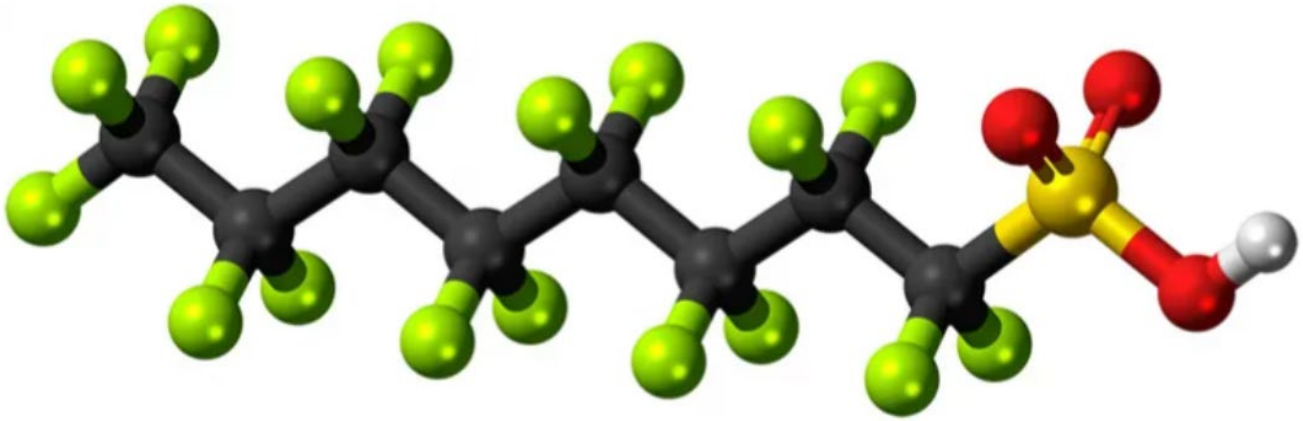
A confirmed release means petroleum from a storage tank has caused a discharge to the environment.

Confirmation of a release to the environment may include:

- Observation of free product on surface water or groundwater.
- Soil or groundwater sampling results that identify petroleum constituents adjacent to or beneath a storage tank system.
- Visual or olfactory indications of a release to soil following the repair or removal of a storage tank system.
- A release below the product level of a single-walled UST

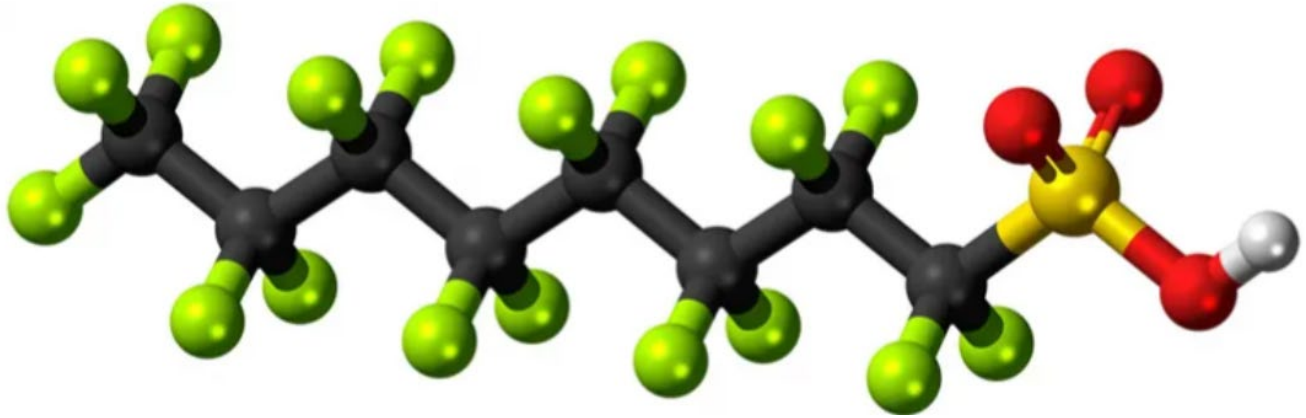
Confirmed releases must be reported within 1 working day of discovery. NDEP maintains a 24 hr., 7-day spill reporting hotline.

PFAS



- Not known to be manufactured in Nevada. Should be considered during a Phase I ESA if a site was known to regularly use AFFF (firefighting foam), conduct plating operations, or a few other industrial uses.
- There are several PFAS that are reportable in soil and/or groundwater. See RSL tables.
- Not recommended to sample if there is no known site use, due to very low detection limits and potential for deposition from off-site source.

PFAS



- Nevada's focus is primarily on drinking water: https://ndep.nv.gov/water/pfas-in-nevada
- BCA is working with the Department of Defense on characterizing contamination from AFFF at several facilities.
- Following EPA guidance, NDEP can use discretion for facilities that did not knowingly use or release PFAS, such as airports and POTW facilities.
- Will open cases as reported and work toward closure on a case-by-case basis. Cannot require action levels lower than background, which is largely unknown.

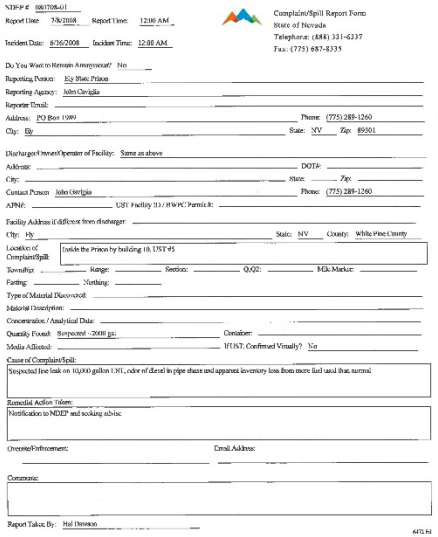
Spill Hotline

Nevada Spill Hotline is a 24-hour/7-day week resource to report releases and other environmental conditions. Reports taken by the Nevada Spill Hotline are routed to the entity (or entities) with the authority or responsibility for oversight or management of the incident at the federal, state or local level.

In addition to notification of discovery events and releases of contamination under Corrective Action's oversight, NDEP Bureau's of Mining Regulation & Reclamation, Safe Drinking Water, and Water Pollution Control incorporate Spill Hotline notification as a condition under certain permits. Other state and municipal entities also rely on the Spill Hotline to serve as a first line of communication with the public or regulated community.

Spill Hotline

- Online form - https://nevadaenvironmentalactivities.ndep.nv.gov/Spill/ReportForm.aspx
- Or call 1-888-331-6337 in state or 1-775-687-9485 out of state



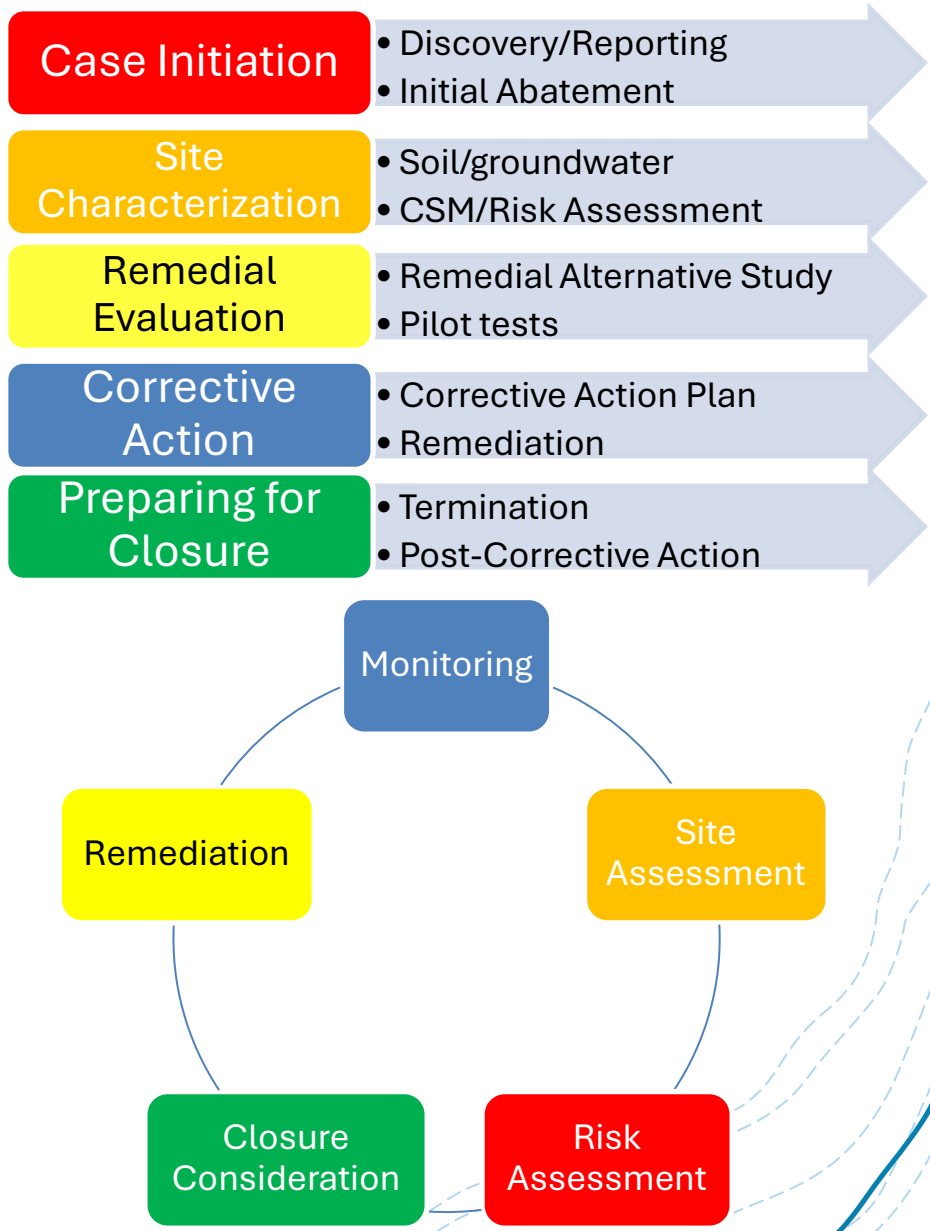
Complaint/Spill Report Form
State of Nevada
Telephone: (888) 331-6337
Fax: (775) 687-8335

Report Date: 7/8/2008 Report Time: 12:00 AM
Incident Date: 6/16/2008 Incident Time: 12:00 AM
Do You Want to Remain Anonymous? No
Reporting Person: Ely State Prison
Reporting Agency: John Cavigila
Reporter Email:
Address: PO Box 1989 Phone: (775) 289-1260
City: Ely State: NV Zip: 89301
Discharger/Owner/Operator of Facility: Same as above
Address: DOT#:
City: State: Zip:
Contact Person: John Cavigila Phone: (775) 289-1260
APN#: UST Facility ID / BWPC Permit #:
Facility Address if different from discharger:
City: Ely State: NV County: White Pine County
Location of Complaint/Spill: Inside the Prison by building 10, UST #5
Town/Rge: Range: Section: QQ2: Mile Marker:
Easting: Northing:
Type of Material Discovered:
Material Description:
Concentration / Analytical Data:
Quantity Found: Suspected ~2000 gal Container:
Media Affected: If UST, Confirmed Visually? No
Cause of Complaint/Spill:
Suspected line leak on 10,000 gallon UST, odor of diesel in pipe chase and apparent inventory loss from more fuel used than normal
Remedial Action Taken:
Notification to NDEP and seeking advice
Owner/Enforcement: Email Address:
Comments:
Report Taken By: Hal Dowson

Nevada Department of CONSERVATION & NATURAL RESOURCES
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

Corrective Action Case Progression

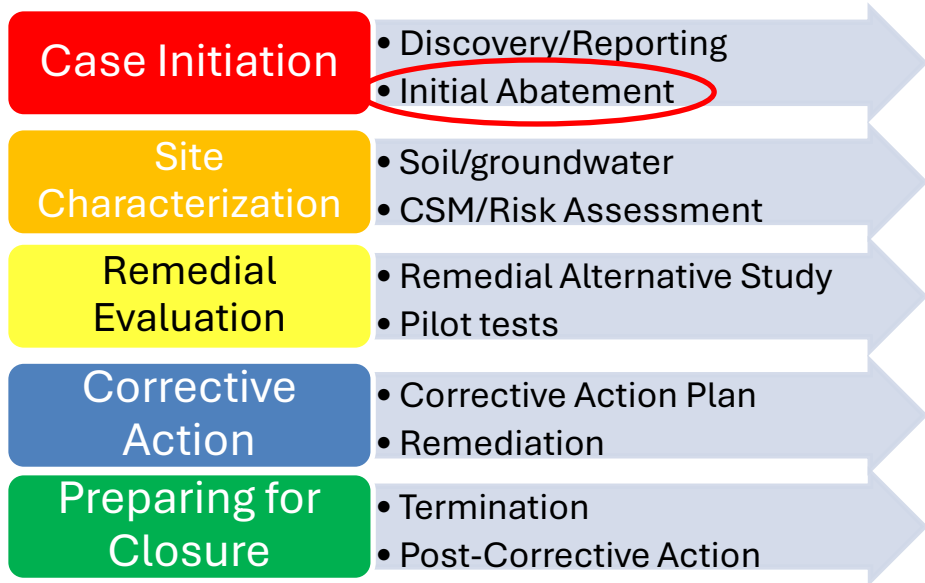
Similar to CERCLA process but smaller scale and shorter timelines

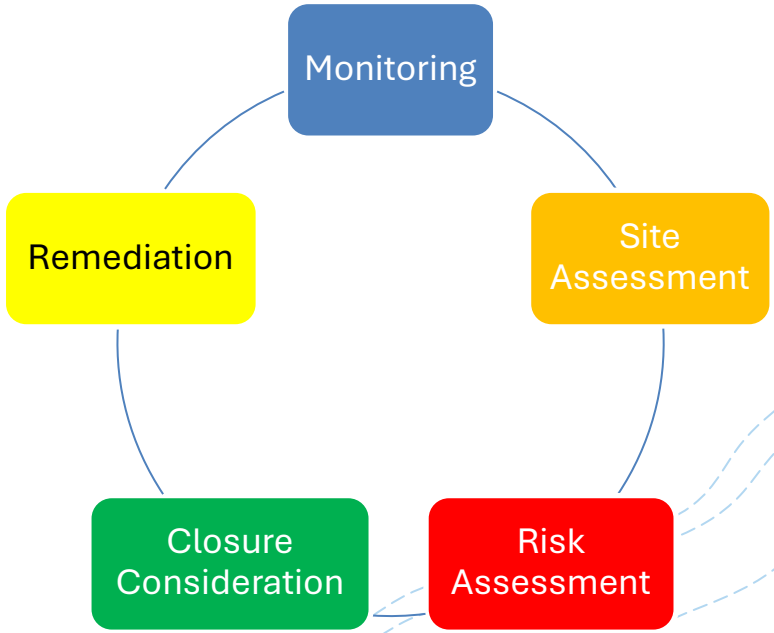


Corrective Action Case Progression

Case Initiation

- NDEP sends “45 Day Letter”
- Initial Abatement
  - Stop Release
  - Repair/remove tanks/equipment
  - Soil excavation
  - Fluid recovery
- Confirmation sampling
- Closure request if all contamination <action levels
- Otherwise, report to include recommendations for further assessment





Corrective Action Case Progression

Site Characterization

- Soil borings with lithology & PID @ 5-foot intervals
- Periodic soil samples to lab:
  - Elevated PID readings
  - Capillary fringe
  - Terminal depth
- Borings to or below groundwater table or at least below extent of soil contamination

Case Initiation	• Discovery/Reporting • Initial Abatement
Site Characterization	• Soil/groundwater • CSM/Risk Assessment
Remedial Evaluation	• Remedial Alternative Study • Pilot tests
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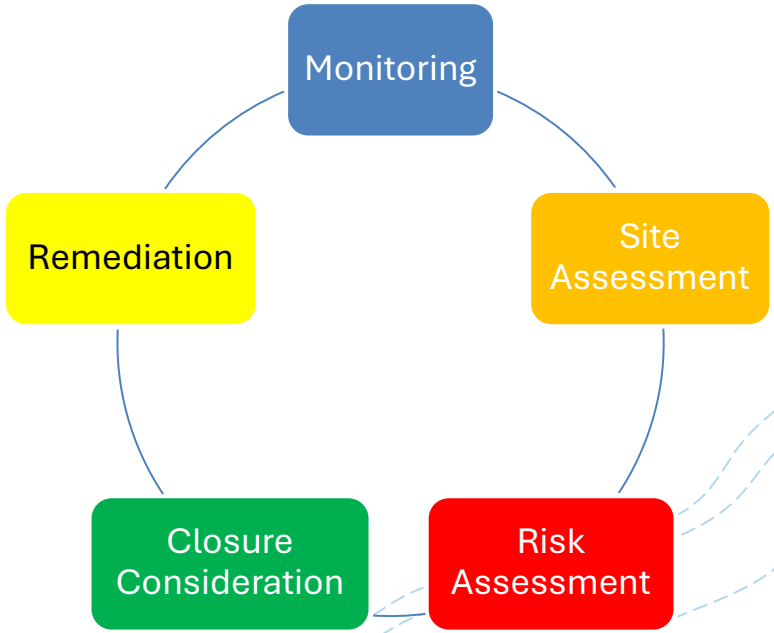
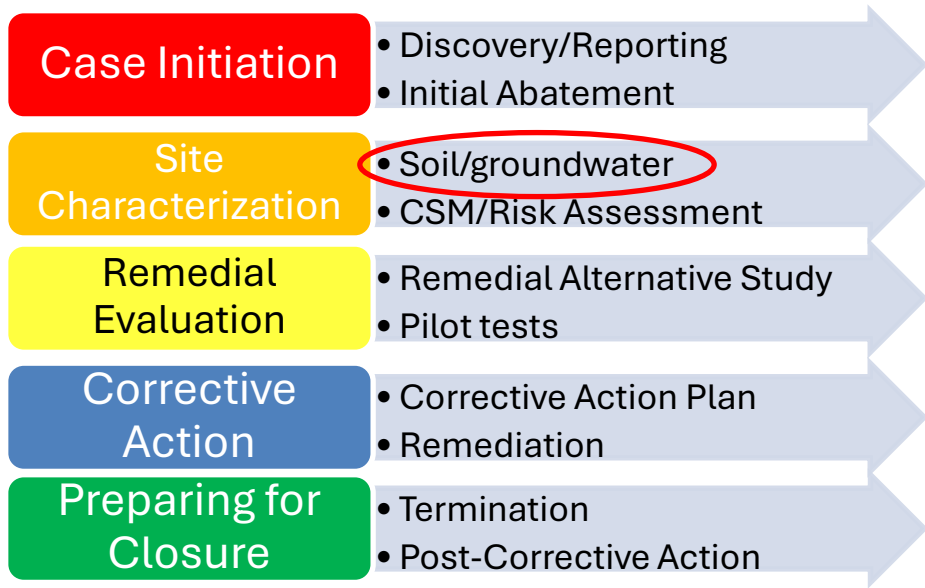
Preparing for Closure	• Termination • Post-Corrective Action



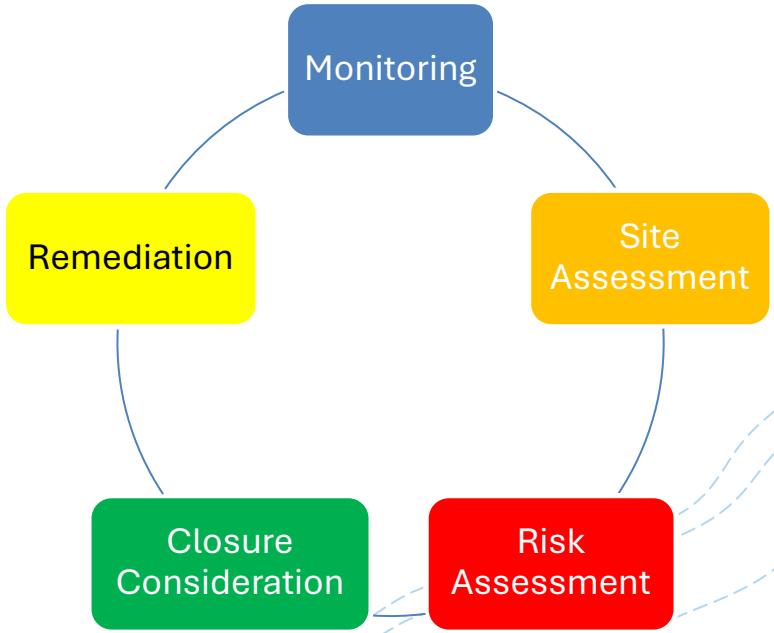
Corrective Action Case Progression



Site Characterization

Groundwater monitoring wells

- Usually screened ~15 feet across water table
- Normally ~5-foot screens for deeper wells
- Submit well logs with:
  - Construction details
  - Lithology
  - PID readings
  - Sampling points
  - Blow counts
  - First encountered water
  - Final static water level



DRILL RIG:	DEPTH TO WATER:	WL AT COMPLETION:
CME 85	21.5	12.5

Depth (Ft)	SAMPLE	BLOWS/FT	Graphic Log	Soil Classification	SOIL DESCRIPTION	Piezometer Schematic
0				FILL	FILL: Sandy lean CLAY, slightly moist, brown	
1						
2						
3				CL	Lean CLAY with sand, stiff, moist, gray	
4						
5		51		ML	SILT with sand, very stiff, dry, light tan	
6					-partially cemented	
7					-uncemented	
8						
9					-moist	
10		51				
11				SM	Silty SAND, very dense, moist, light tan	
12						
13				ML	SILT, very stiff, dry, light tan	
14				CAL	CALICHE, hard, dry, light gray	
15		79		ML	SILT, very stiff, dry, light tan	
16				CAL	CALICHE, hard, dry, light gray	
17						
18						
19						

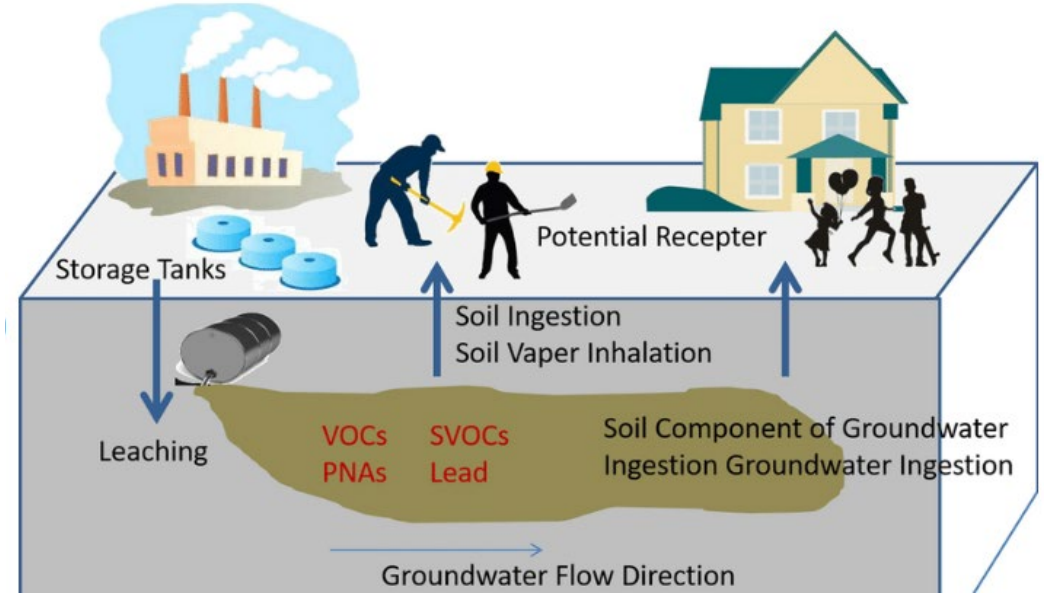
DRILL RIG:	DEPTH TO WATER:	WL AT COMPLETION:
CME 85	21.5	12.5

Depth (Ft)	SAMPLE	BLOWS/FT	Graphic Log	Soil Classification	SOIL DESCRIPTION	Piezometer Schematic
20		61			CALICHE (continued)	
21						
22				SP	SAND, very dense, moist, gray	
23				ML	SILT, very stiff, moist, light gray	
24				CL	Sandy lean CLAY, very stiff, wet, light tan	
25		58		SP	SAND, very dense, wet, gray	
26						
27						
28						
29						
30						
31				CAL	CALICHE, dry, hard, light gray	

Corrective Action Case Progression

Conceptual Site Model

- Summarize data to date
- Communicate extent of contamination in 3-D
- Evaluate exposure pathways



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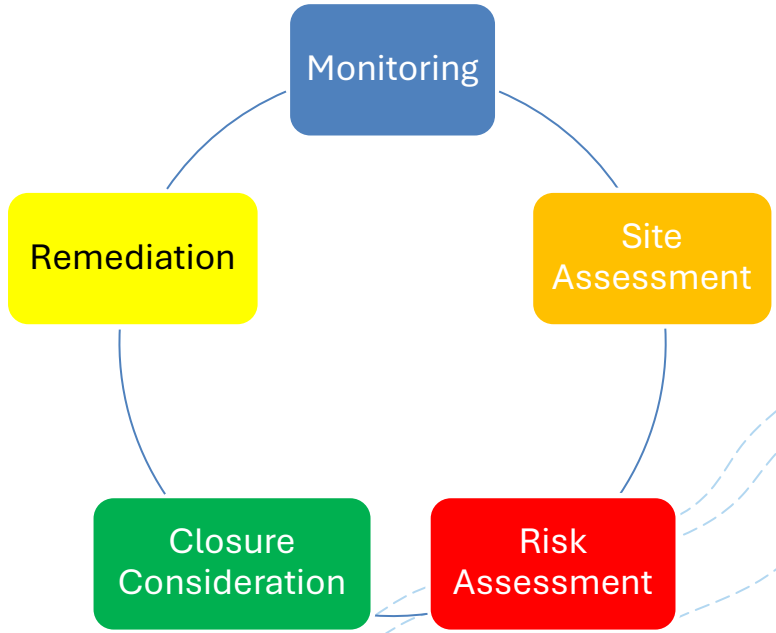
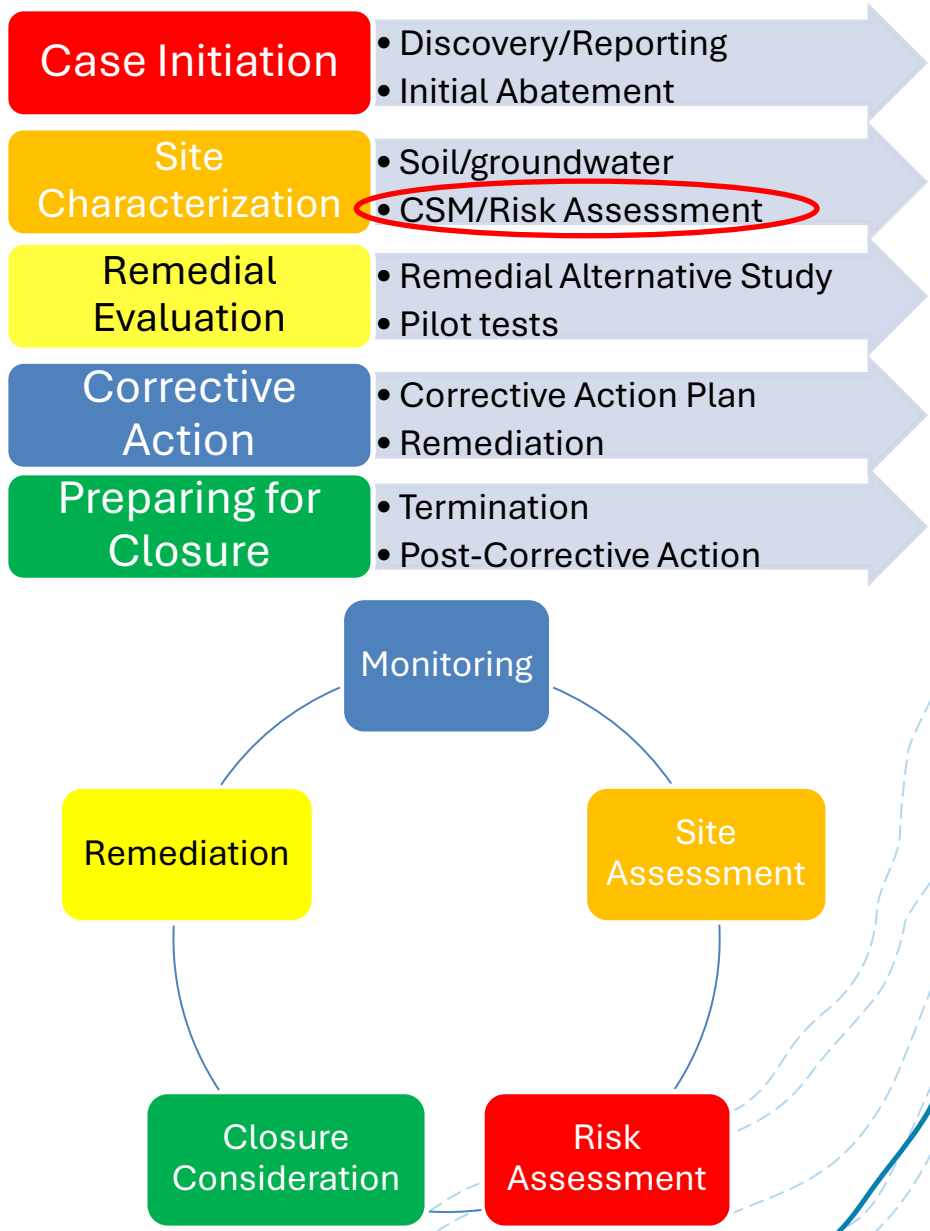


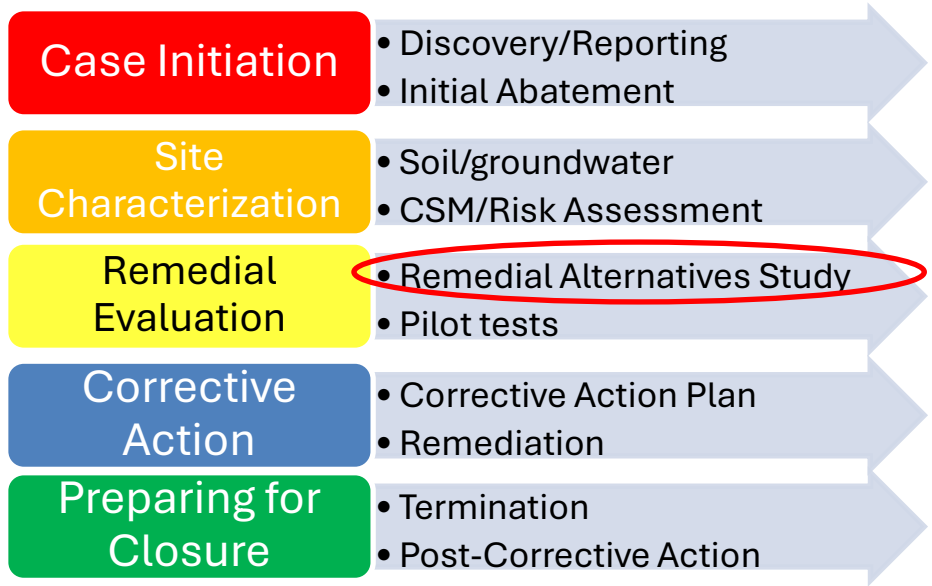
Corrective Action Case Progression

Risk Assessment

- RSLs provide conservative default action levels
- Site-specific evaluations can be conducted that consider complete pathways, such as:
  - Indoor air through vapor intrusion (typically use Johnson & Ettinger Model)
  - Ingestion, inhalation, dermal contact
- Looking for hazard index >1.0 and/or cancer risk >1×10^{-6}

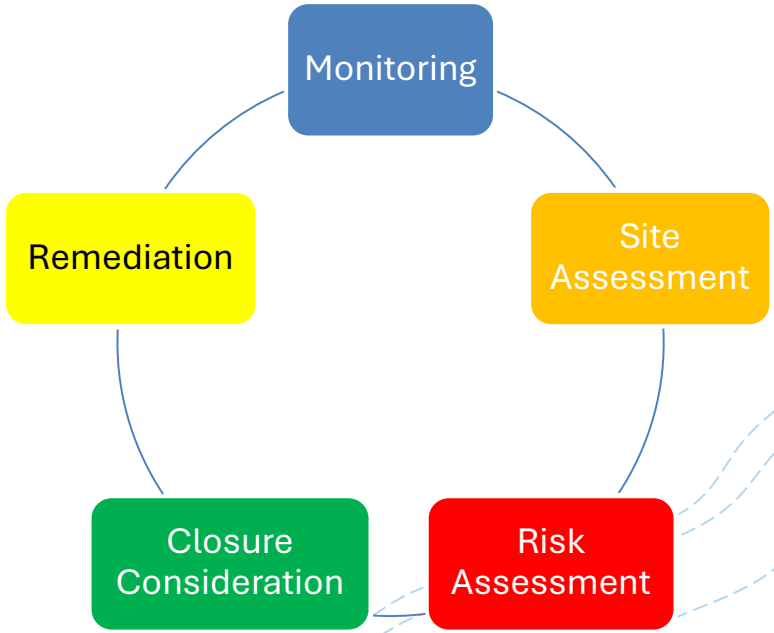


Corrective Action Case Progression



Remedial Alternatives Study

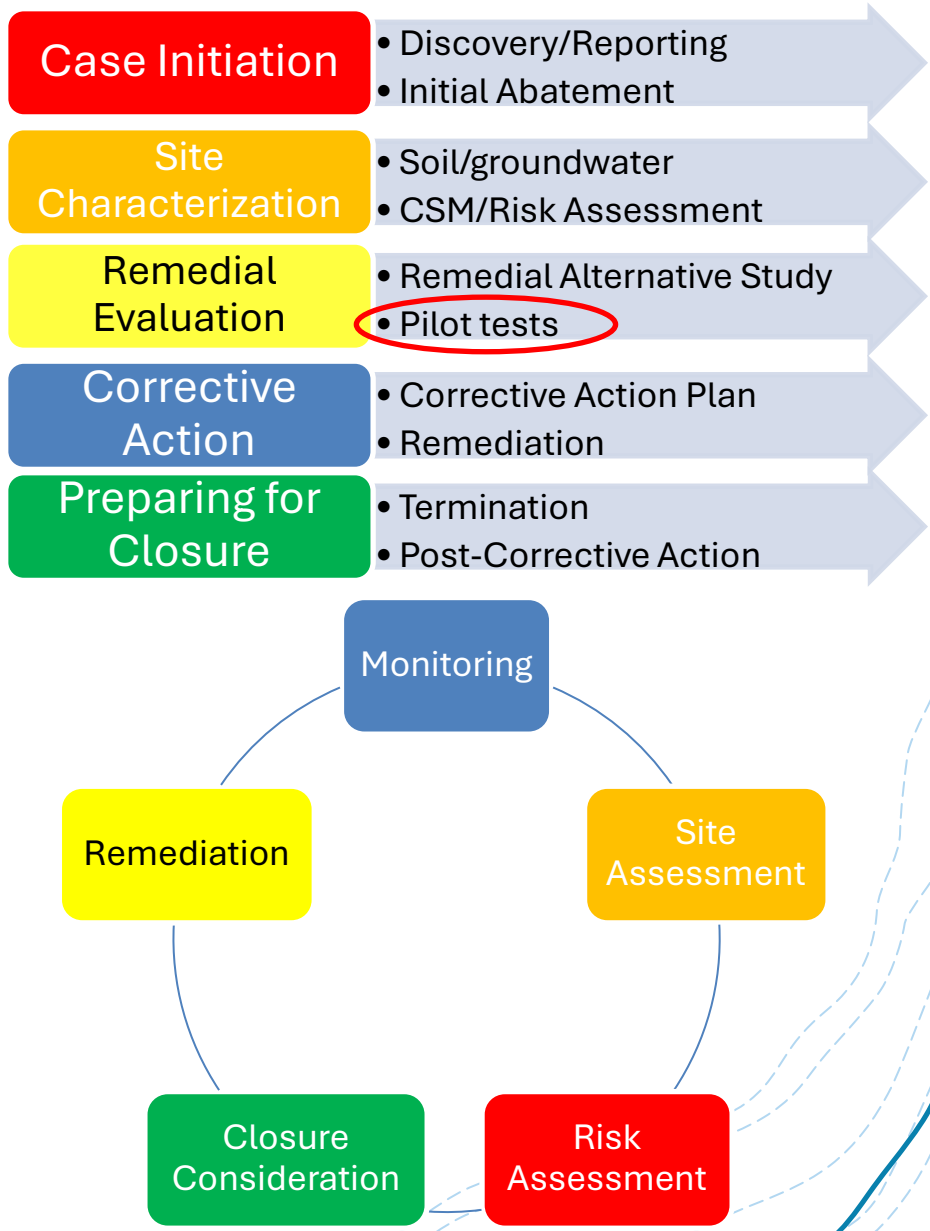
- Evaluate at least 3 alternatives:
  - Cost
  - Effectiveness
  - Timeline
  - Implementability
- May be part of Corrective Action Plan



Corrective Action Case Progression

Pilot Tests

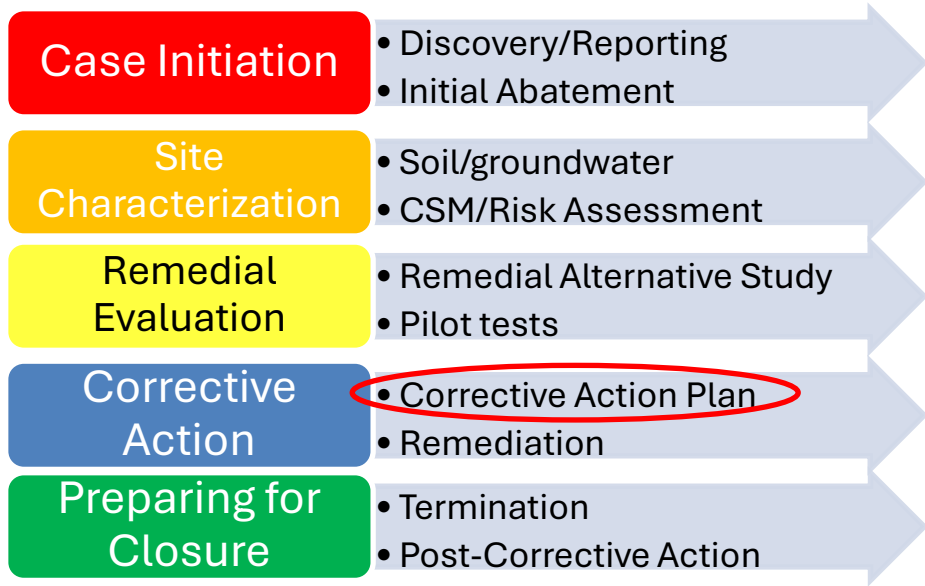
- Work plan for concurrence
- Assess feasibility
- Inform final design
- Should include performance monitoring wells

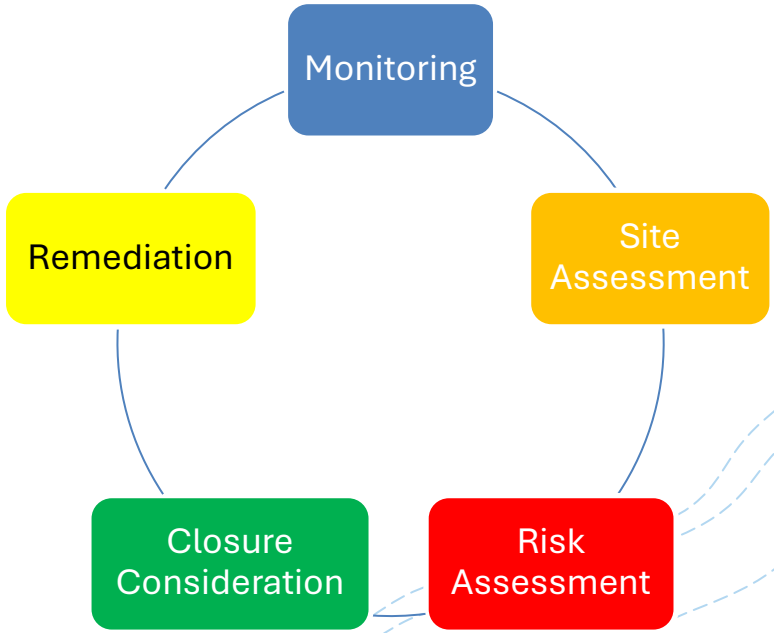


Corrective Action Case Progression

Corrective Action Plan

- Remedial Action Objectives
- Recommended technology
- Preliminary designs
- Proposed timeline and budget
- Following approval:
  - Final designs
  - Start-up plan
  - O&M manual
  - Performance monitoring plan
  - As-builts





Corrective Action Case Progression

Remediation

- Soil excavation: work plan, CAP, initial abatement
- Post excavation sampling

Case Initiation	• Discovery/Reporting • Initial Abatement
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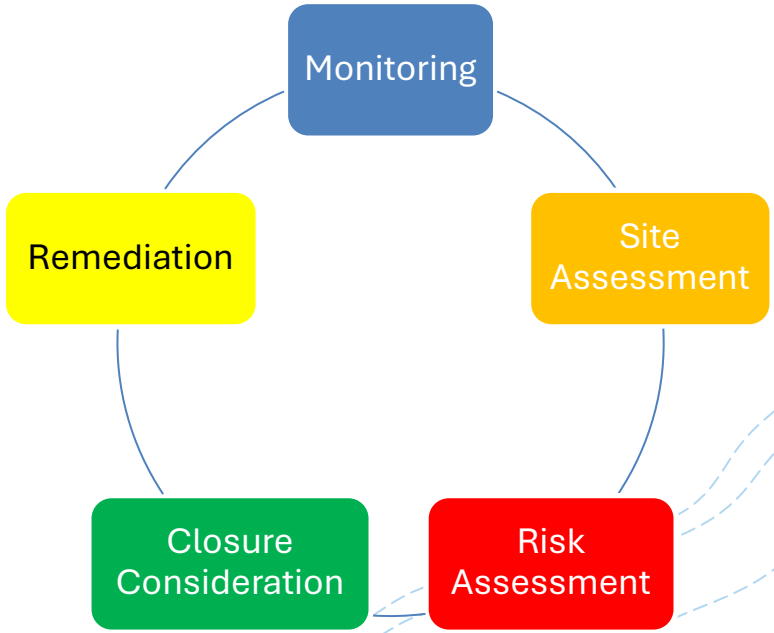
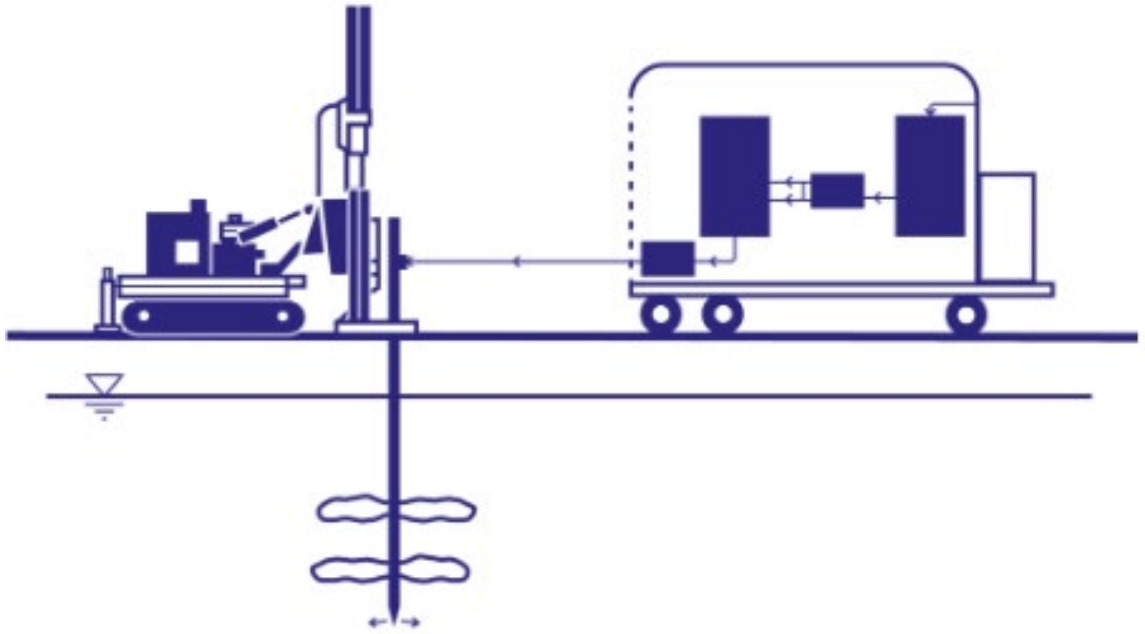


Corrective Action Case Progression

Remediation

- In situ treatment: CAP, implementation design, performance monitoring plan



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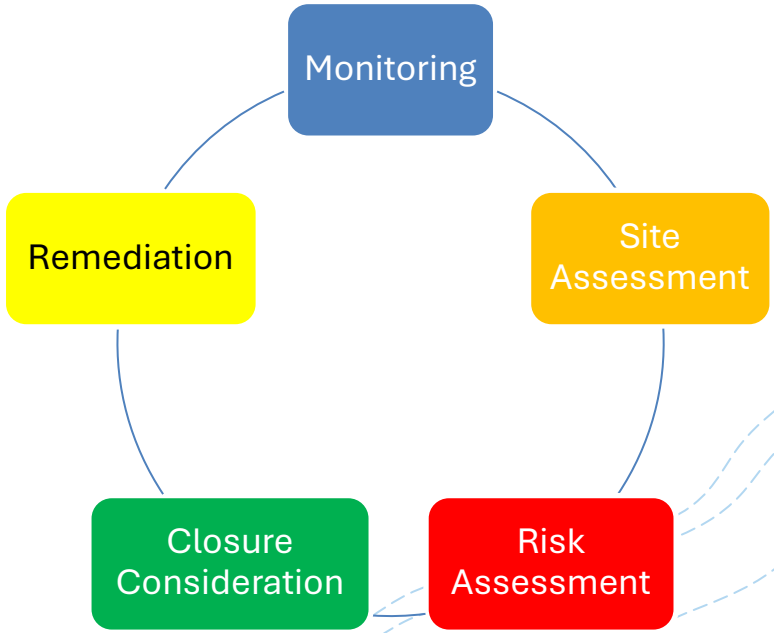

Corrective Action Case Progression

Remediation

- Extraction System: CAP, final design, startup plan, performance monitoring plan, O & M manual

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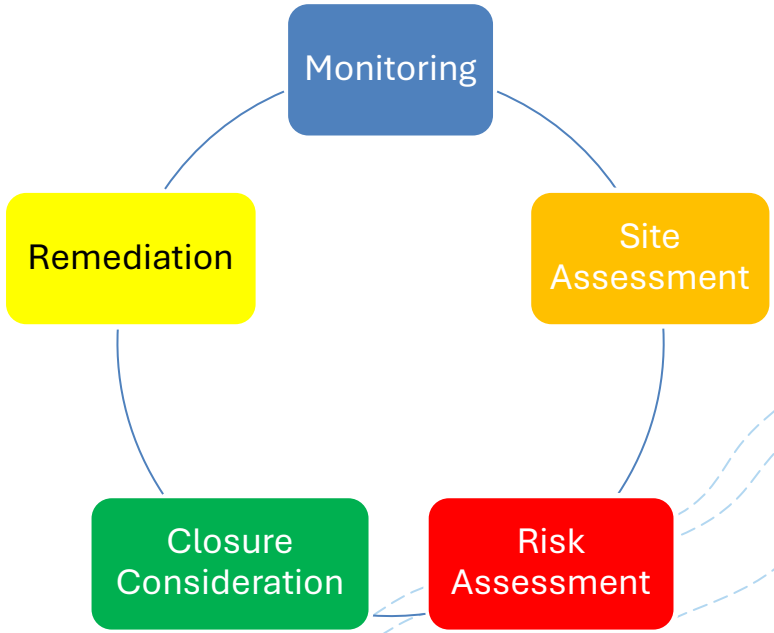
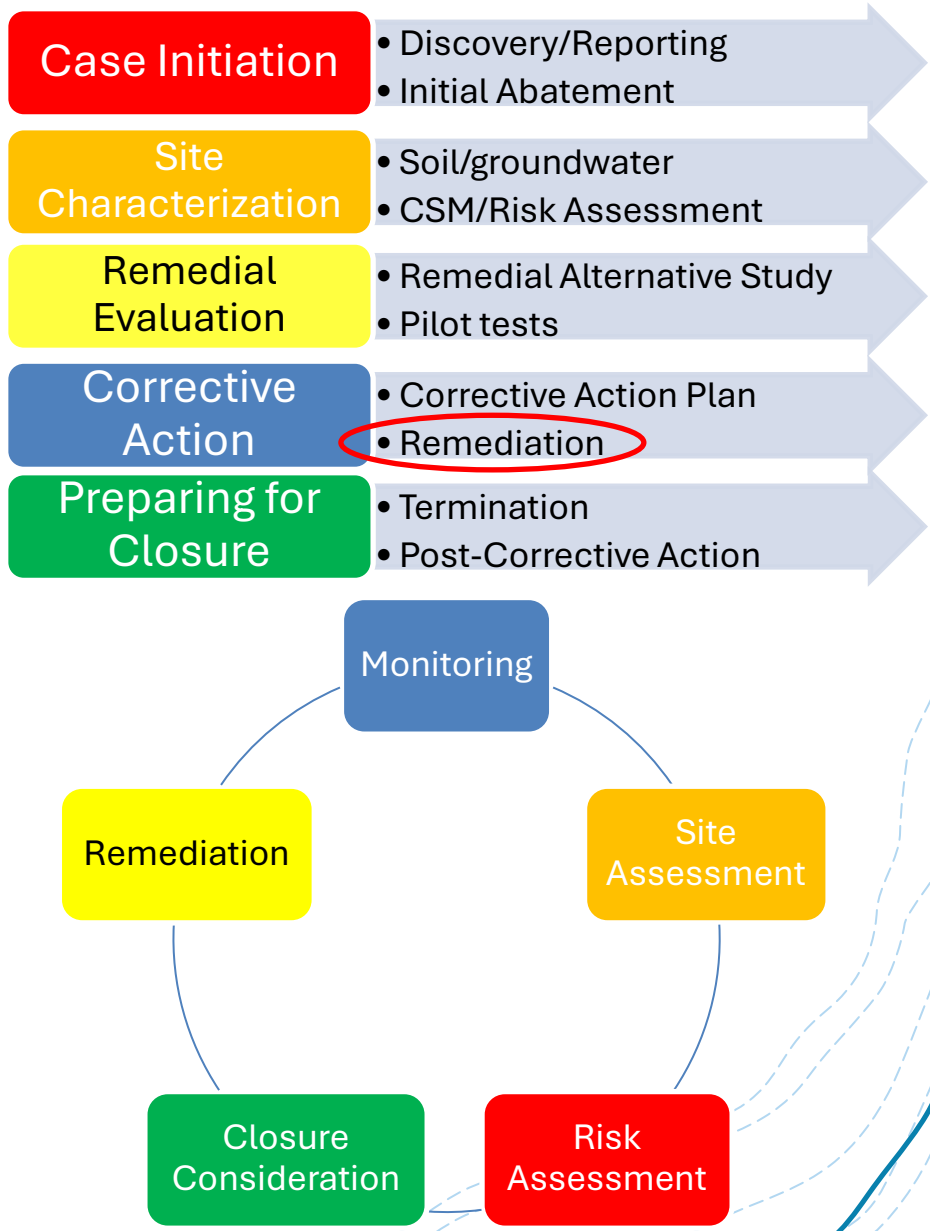


Corrective Action Case Progression

Remediation

- Permits:
  - Underground Injection Control (>6 months)
  - Discharge to storm drain (NPDES) (>6 months)
  - Discharge vapors to air (varies depending on authority, might be county)

  - Not a permit, but power drops can take months to years

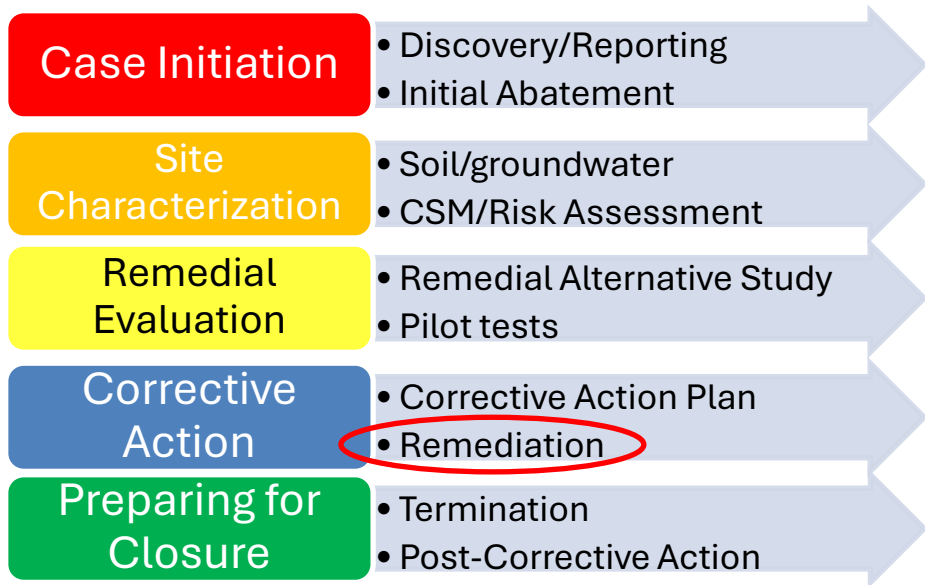


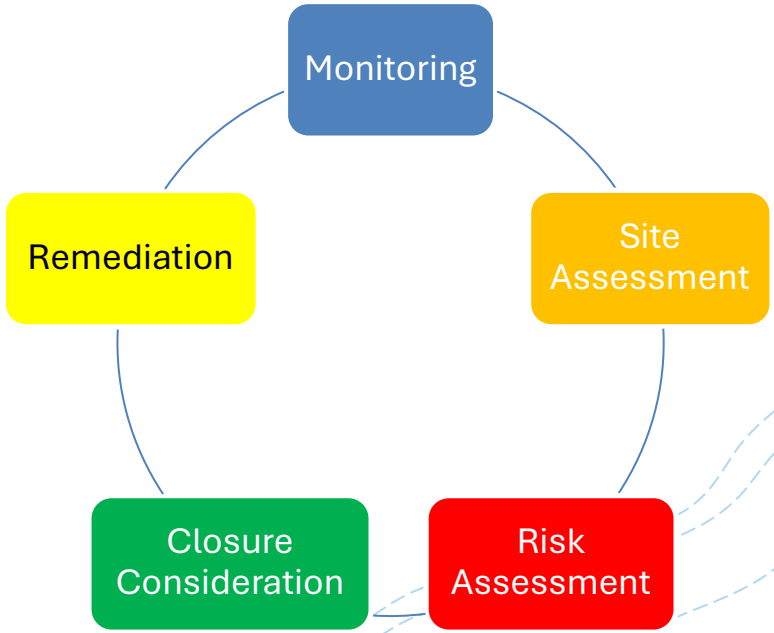
Corrective Action Case Progression

Remediation

Active extraction systems:

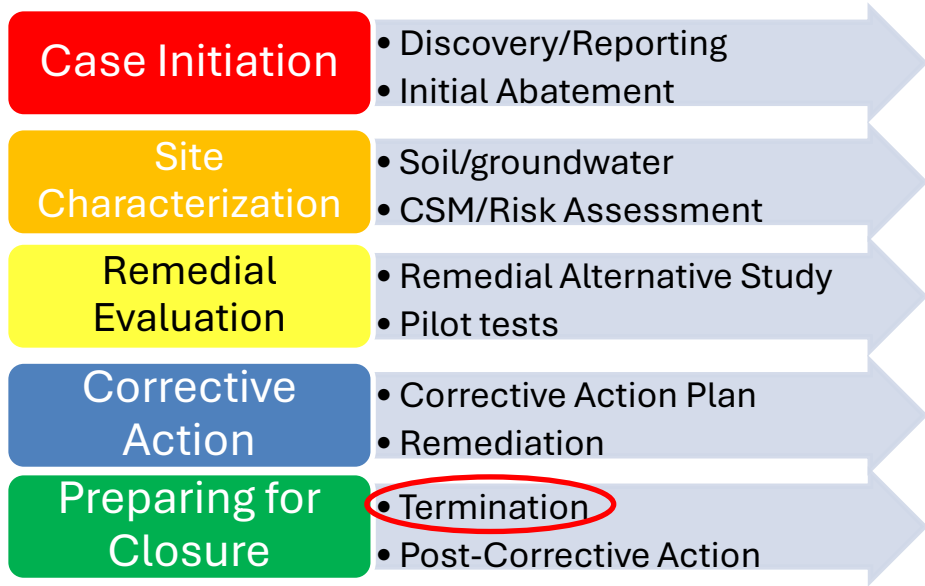
- Inform case officer right away if system goes down for non-routine repair
- Request NDEP permission before major changes to operating parameters or duration
- “Pulsing” may be considered toward the end of remediation, but request this





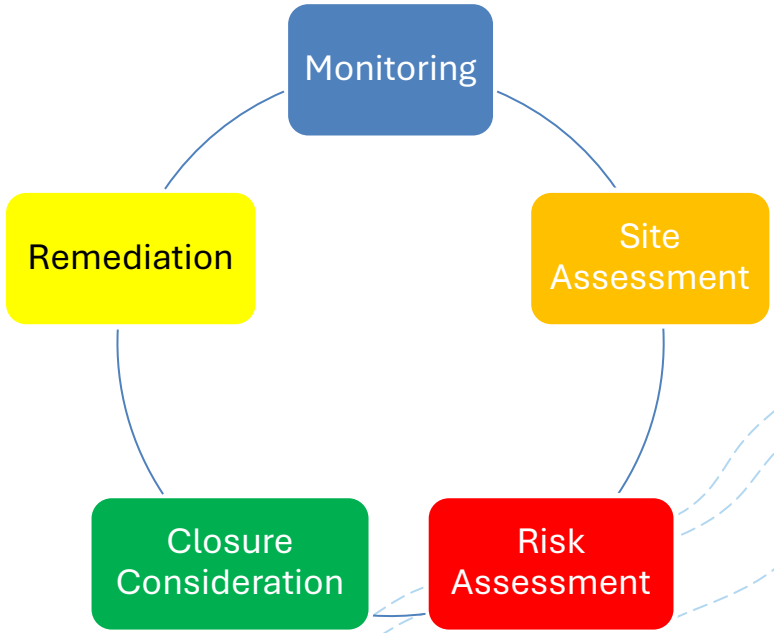
Corrective Action Case Progression

Terminating Remediation



NAC 445A.22745:

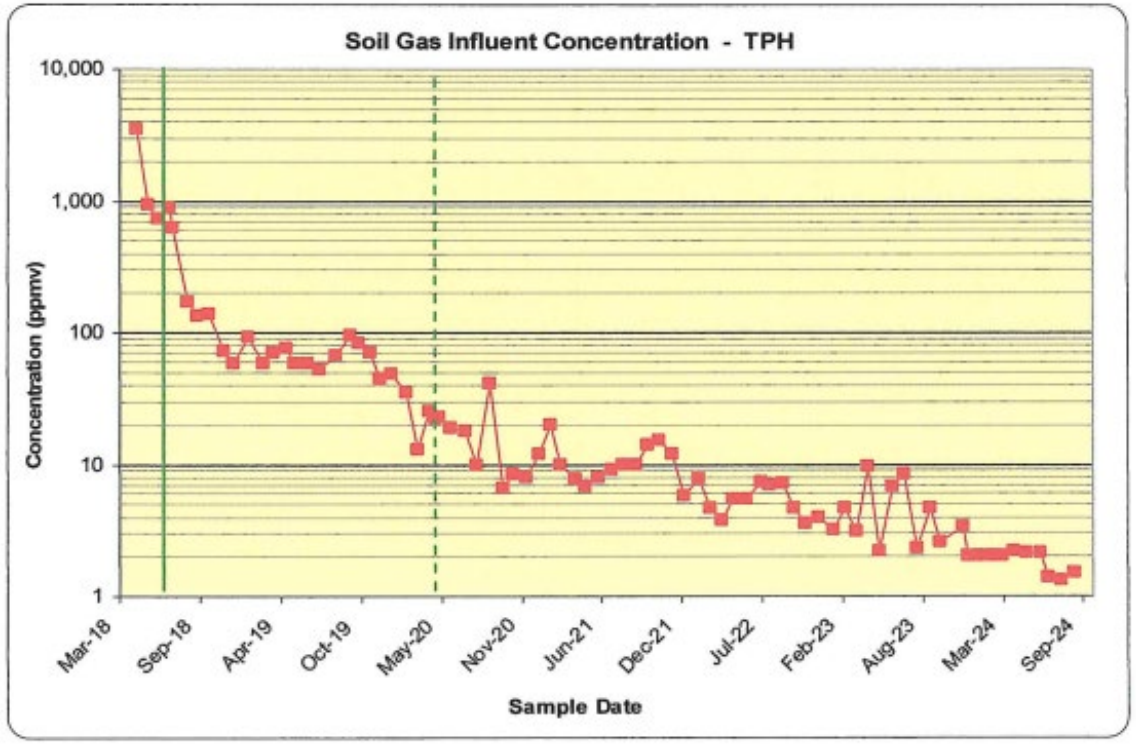
- (1)(a) Concentrations are <action levels consistently in all wells
- (1)(b) Conditions for termination as approved in a CAP are met
- (1)(c) “Asymptotic Conditions” are met after remediating for >1 year



Corrective Action Case Progression

Asymptotic Conditions

- For systems with measured mass extraction:



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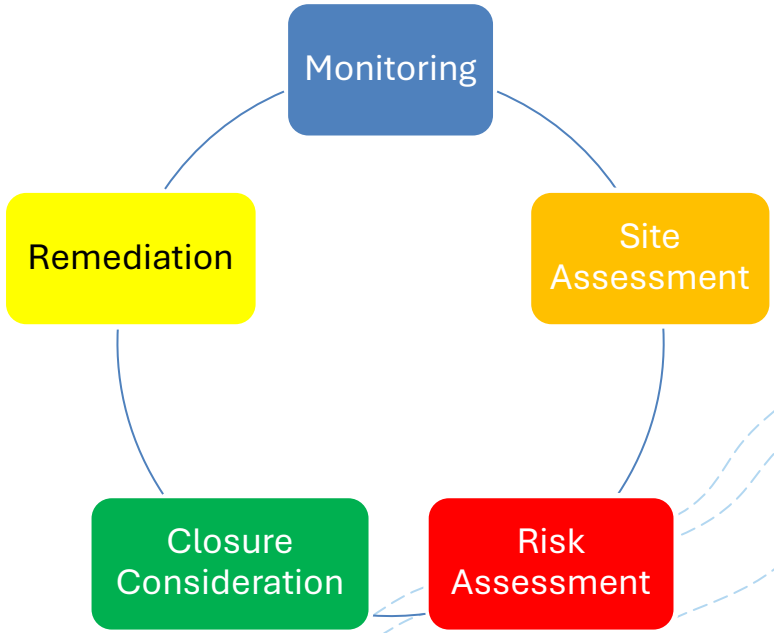

Corrective Action Case Progression

Asymptotic Conditions

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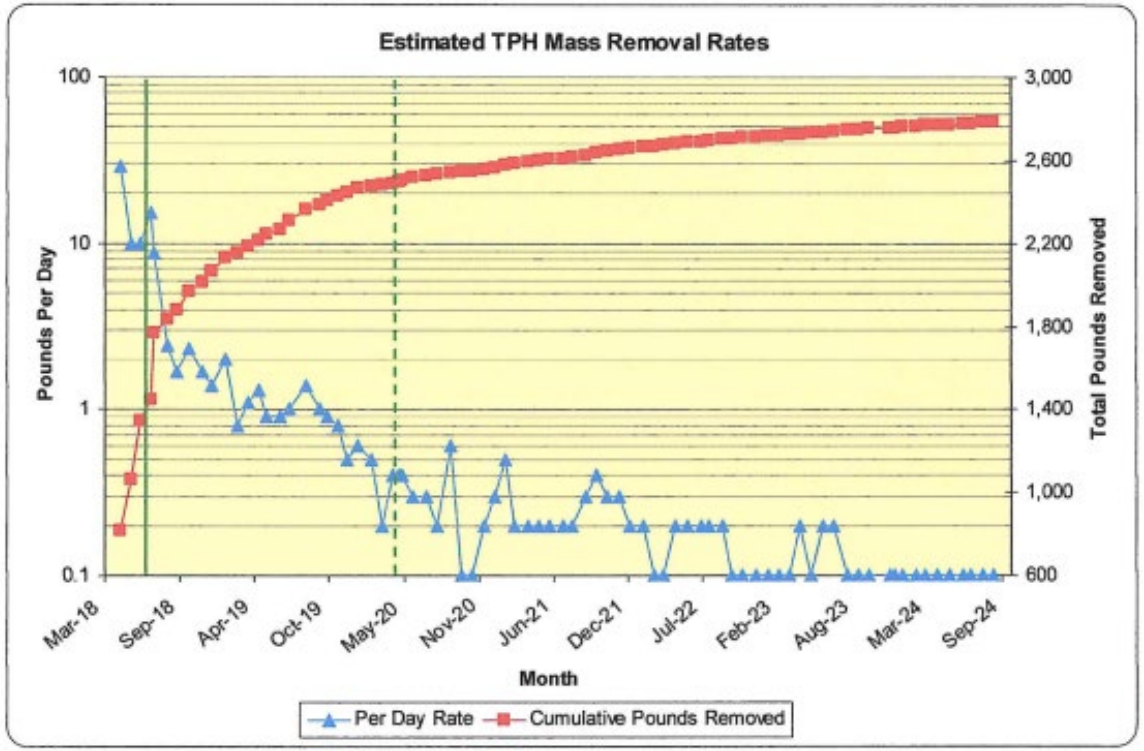

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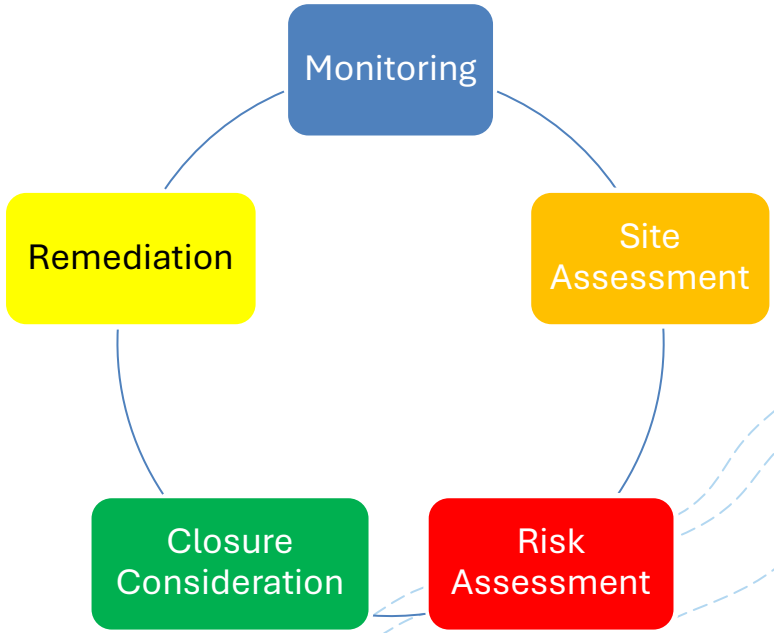
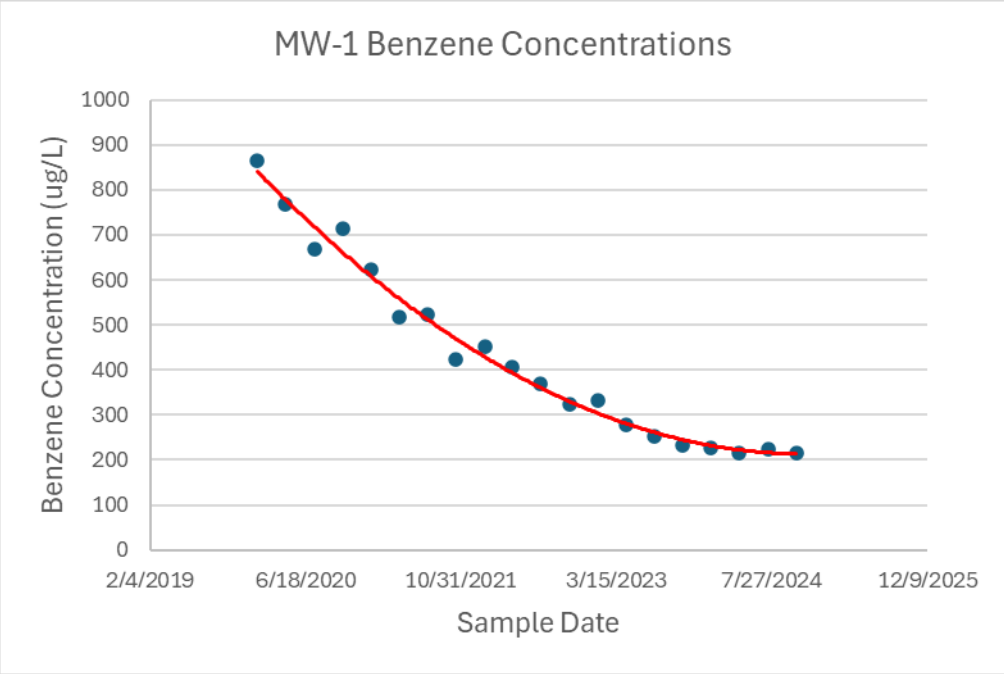


Corrective Action Case Progression

Asymptotic Conditions

- For systems without mass extraction:



$$C = Cf + Coe^{-kt}$$

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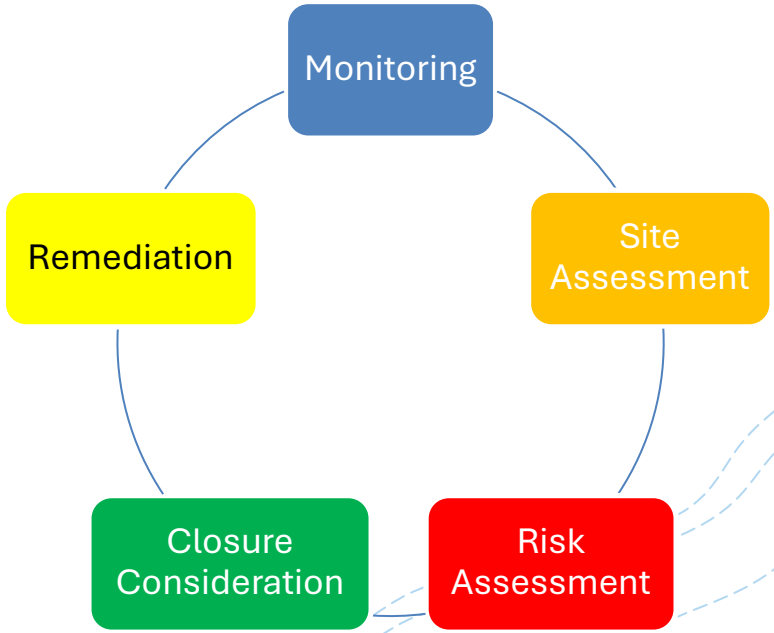
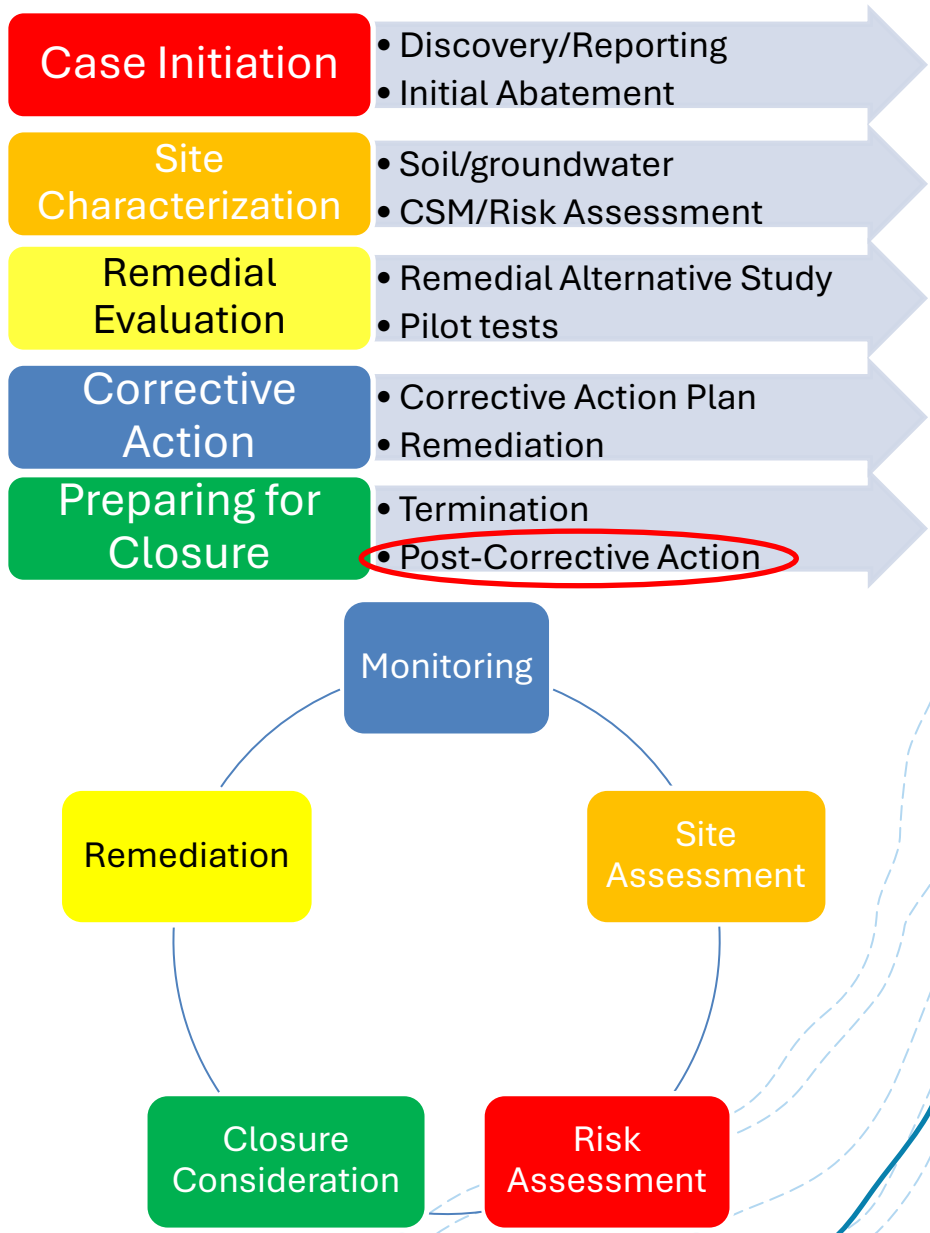


Corrective Action Case Progression

Post Remediation Monitoring

- NAC 445A.22745(2): "contaminated groundwater is monitored for not less than 1 year." "The Division shall determine the frequency." Not more frequently than monthly.
- Quarterly is typical. Looking for unexpected rebound or changing risk conditions.
- Remediation system is typically kept onsite and operable in case restart is required.
- Prepare for closure request.



Corrective Action Case Progression

Periodic and Iterative Phases

Most groundwater cases require quarterly monitoring and sampling until the preliminary decision to close

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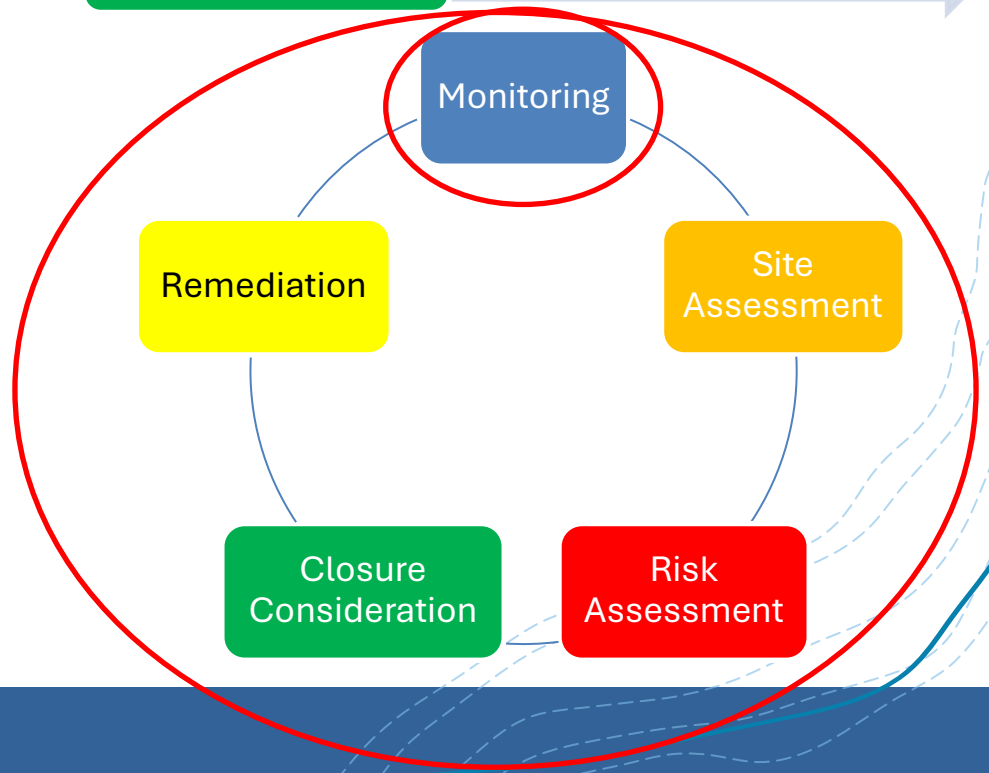
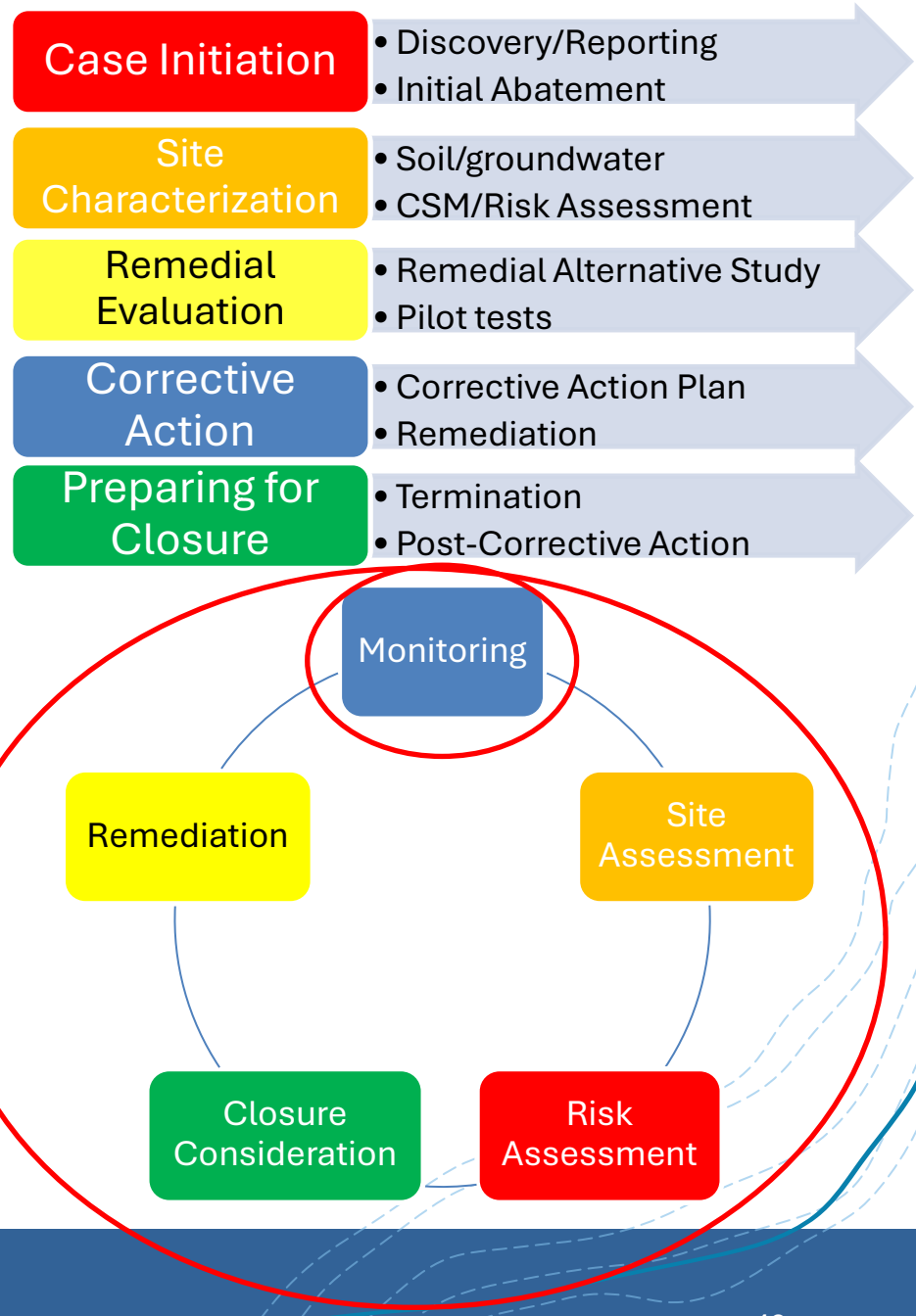


Corrective Action Case Progression

Groundwater Monitoring – Remediation Reports

At a minimum include:

- Well construction detail table
- Summary table of current conditions
- Historic tables for each well
- Mann-Kendall trends for wells >action level with at least 4 quarters of data
- Water table elevation and gradient maps and plume maps with concentration contours
- Summary of remedial activities – mass extraction rates
- Lab reports



Thank You!
Questions?

Contact information:

Ben Moan: bmoan@ndep.nv.gov – 775-687-9396
Ruby Wood: rwood@ndep.nv.gov – 775-687-9383

Path to Closure

Soil Closures Overview

Groundwater Exemption Requests

Soil Closure Checklists

- Clean Closure
- Analyte-Specific Closure
- A thru K Closure
- ASTM RBCA Closure

Clean Closure

- >100 mg/kg TPH via EPA Method 8015
- Remove the soil, take confirmation samples
- <100 mg/kg TPH via EPA Method 8015

Analyte-Specific Closure

- >100 mg/kg TPH via EPA Method 8015
- Unable to remove all the impacted soil
- Perform additional analysis for VOCs and PAHs via EPA Method 8260 and 8270
- COCs < residential/industrial standards and COCs are < than NAPL Migration standards

A Thru K Closure

- >100 mg/kg TPH via EPA Method 8015
- Unable to remove all the impacted soil
- Perform additional analysis for VOCs and PAHs via EPA Method 8260 and 8270
- COCs > residential/industrial standards and/or COCs are > than NAPL Migration standards
- Perform vadose zone modeling/calculations to demonstrate no impact to groundwater
- Perform an exposure pathway evaluation

ASTM RBCA Closure

- Follow ASTM Method E1739-95
- Establish SSTLs
- Perform an exposure pathway evaluation
- COCs < SSTLs
- NAPL Migration demonstrates no further soil degradation or impact to groundwater

Soil Closure Breakout Session

- “Do I need to Run EPA 8270 to get an Analyte-Specific Closure”
- ‘We can’t get to it”
- Potential to impact groundwater (NAPL Migration)
- Do I need a Soil Management Plan?
- Recommending type of soil closure to receive NFA, Who’s responsibility???
- Interactive Case Studies

Groundwater Exemption Closures

NAC 445A.22725

1. No further action if groundwater concentrations are below MCLs (Clean Closure)

- NDEP is generally looking for 4 consecutive quarters with concentrations below MCLs

2. Owner/operator may request an exemption from further action if the following are met:

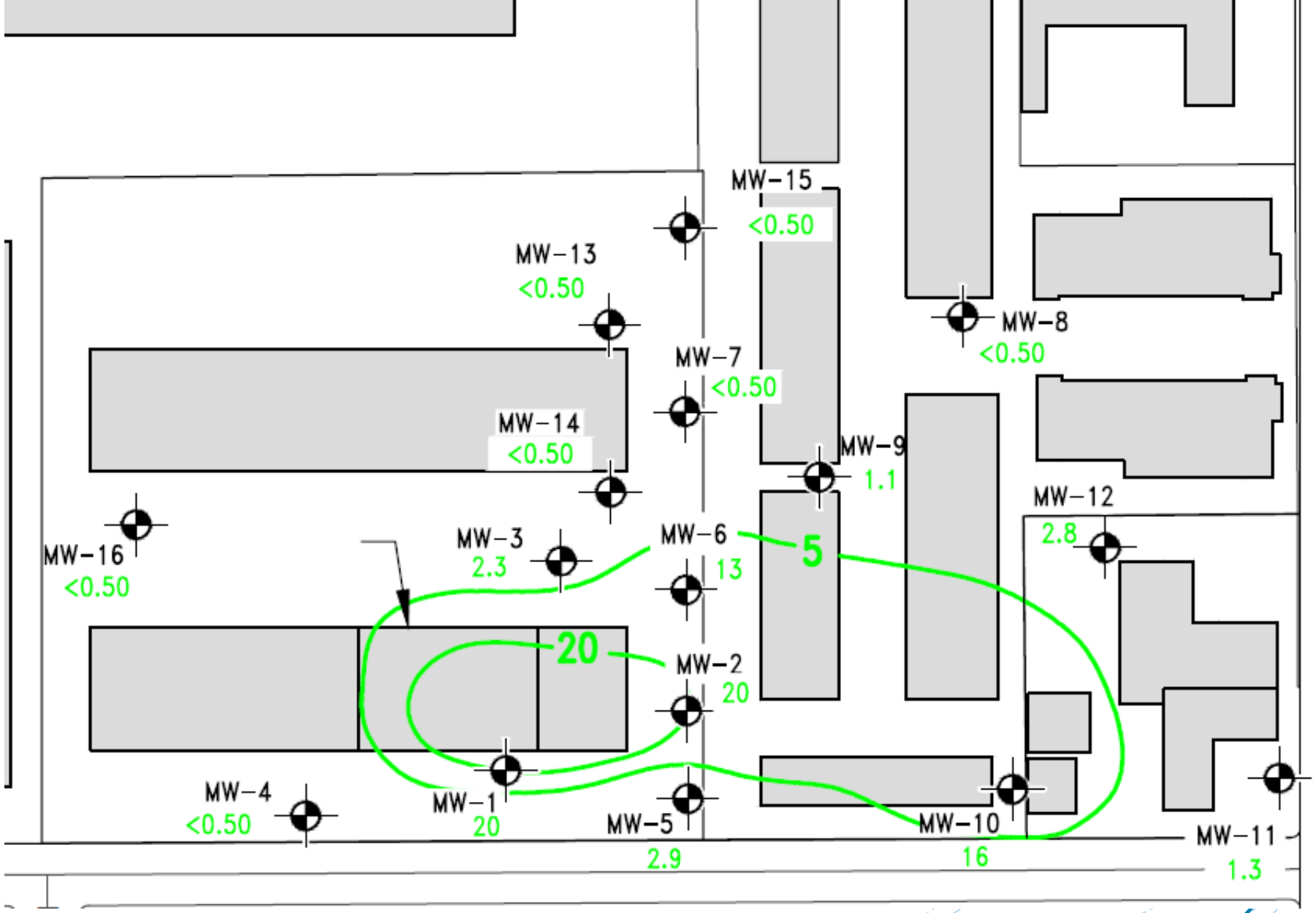
- (a) (1) Each source of contamination is identified and controlled
- (a) (2) The magnitude and extent of groundwater contamination is known
- (a) (3) Data are available from at least 3 years of quarterly monitoring or another period specified by the Division and the data do not show a trend of increasing concentrations

Source Controlled

- Tanks or dry-cleaning equipment repaired/removed
- Soil excavated or remediated
- Source depleted due to natural attenuation processes

Magnitude & Extent Known

Plume is delineated laterally and vertically



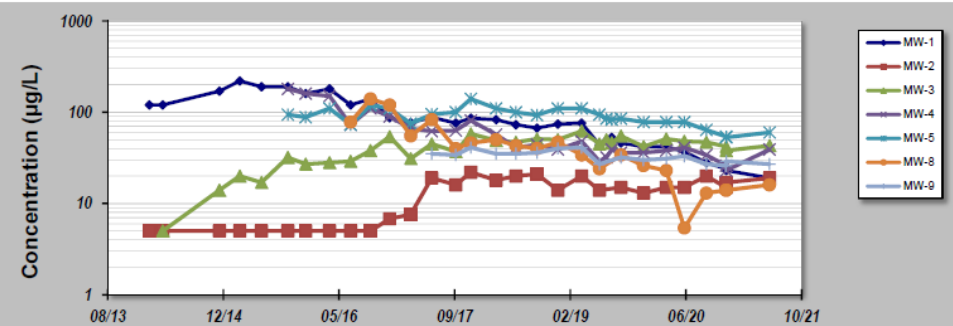
Concentrations Not Increasing

Minimum of 3 years of quarterly sampling data

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:
Facility Name:
Conducted By:
Job ID:
Constituent: PCE
Concentration Units: µg/L

Sampling Point ID:	MW-1	MW-2	MW-3	MW-4	MW-5	MW-8	MW-9
Sampling Event	Sampling Date	PCE CONCENTRATION (µg/L)						
1	2/10/2014	120	5					
2	4/9/2014	120	5	5				
3	12/10/2014	170	5	14				
4	3/8/2015	220	5	20				
5	6/10/2015	190	5	17				
6	10/2/2015	190	5	32	180	94		
7	12/18/2015	160	5	27	160	88		
8	3/30/2016	180	5	28	150	110		
9	6/29/2016	120	5	29	73	73	78	
10	9/23/2016	140	5	38	110	120	140	
11	12/15/2016	87	6.8	54	90	110	120	
12	3/16/2017	77	7.6	31	66	75	55	
13	6/15/2017	88	19	45	62	95	83	35
14	9/27/2017	76	16	37	63	100	40	34
15	12/1/2017	86	22	58	81	140	46	41
16	3/20/2018	83	18	49	57	110	50	35
17	6/14/2018	73	20	47	41	100	43	35
18	9/13/2018	67	21	51	44	93	40	36
19	12/12/2018	74	14	50	39	110	47	40
20	3/25/2019	76	20	62	48	110	34	41
21	6/10/2019	44	14	45	29	94	24	27
22	7/10/2019	49		50	32	85		
23	8/2/2019	53		46	39	83		
24	9/11/2019	46	15	55	36	85	34	32
25	12/17/2019				36		26	30
26	12/18/2019	42	13	42		78		
27	3/25/2020	42	15	51	38	78	23	31
28	6/11/2020	37	15	48	41	78	5.4	33
29	9/14/2020	28	20	47	34	64	13	27
30	12/8/2020							26
31	12/9/2020	24	15	42	26	54	14	
32	12/9/2020	23	17	38	23	53	14	29
33	6/14/2021				39		16	27
34	6/15/2021	19	19	43		60		
35								
Coefficient of Variation:		0.62	0.51	0.34	0.68	0.23	0.77	0.15
Mann-Kendall Statistic (S):		-389	204	181	-242	-155	-161	-67
Confidence Factor:		>99.9%	>99.9%	100.0%	>99.9%	>99.9%	>99.9%	99.8%
Concentration Trend:		Decreasing	Increasing	Increasing	Decreasing	Decreasing	Decreasing	Decreasing



Concentrations Not Increasing

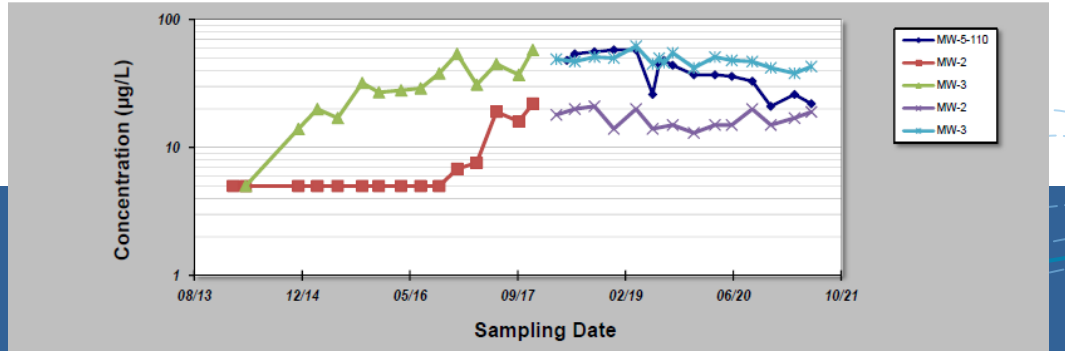
Most recent 3 years most important

More information at Fate & Transport model breakout session, 1:00 PM

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:
Facility Name:
Conducted By:
Job ID:
Constituent: PCE
Concentration Units: µg/L

Sampling Point ID:	MW-5-110	MW-2	MW-3	MW-2	MW-3		
Sampling Event	Sampling Date	PCE CONCENTRATION (µg/L)						
1	2/10/2014		5					
2	4/9/2014		5	5				
3	12/10/2014		5	14				
4	3/8/2015		5	20				
5	6/10/2015		5	17				
6	10/2/2015		5	32				
7	12/18/2015		5	27				
8	3/30/2016		5	28				
9	6/29/2016		5	29				
10	9/23/2016		5	38				
11	12/15/2016		6.8	54				
12	3/16/2017		7.6	31				
13	6/15/2017		19	45				
14	9/27/2017		16	37				
15	12/1/2017		22	58				
16	3/20/2018				18	49		
17	5/8/2018	48						
18	6/14/2018	54			20	47		
19	9/13/2018	56			21	51		
20	12/12/2018	58			14	50		
21	3/25/2019	58			20	62		
22	6/10/2019	26			14	45		
23	7/10/2019	45				50		
24	8/2/2019	48				46		
25	9/11/2019	44			15	55		
26	12/17/2019							
27	12/18/2019	37			13	42		
28	3/25/2020	37			15	51		
29	6/11/2020	36			15	48		
30	9/14/2020	33			20	47		
31	12/8/2020							
32	12/9/2020	21			15	42		
33	3/29/2021	26			17	38		
34	6/14/2021							
35	6/15/2021	22			19	43		
36								
37								
38								
39								
40								
Coefficient of Variation:		0.31	0.72	0.48	0.16	0.12		
Mann-Kendall Statistic (S):		-78	58	69	-3	-44		
Confidence Factor:		>99.9%	99.9%	>99.9%	54.3%	97.4%		
Concentration Trend:		Decreasing	Increasing	Increasing	Stable	Decreasing		



Groundwater Exemption Closures

NAC 445A.22725

2. (b) A demonstration is made which indicates that natural attenuation is sufficient to reduce any concentration of the contamination below action levels or to prevent any migration of the contaminant to a receptor or another point of demonstration established by the Division at concentrations that are greater than action levels, if the demonstration relies upon analytical or numerical models of diffusion and dispersion or any other calculations of physical or chemical processes of retardation or degradation that are approved by the Division.

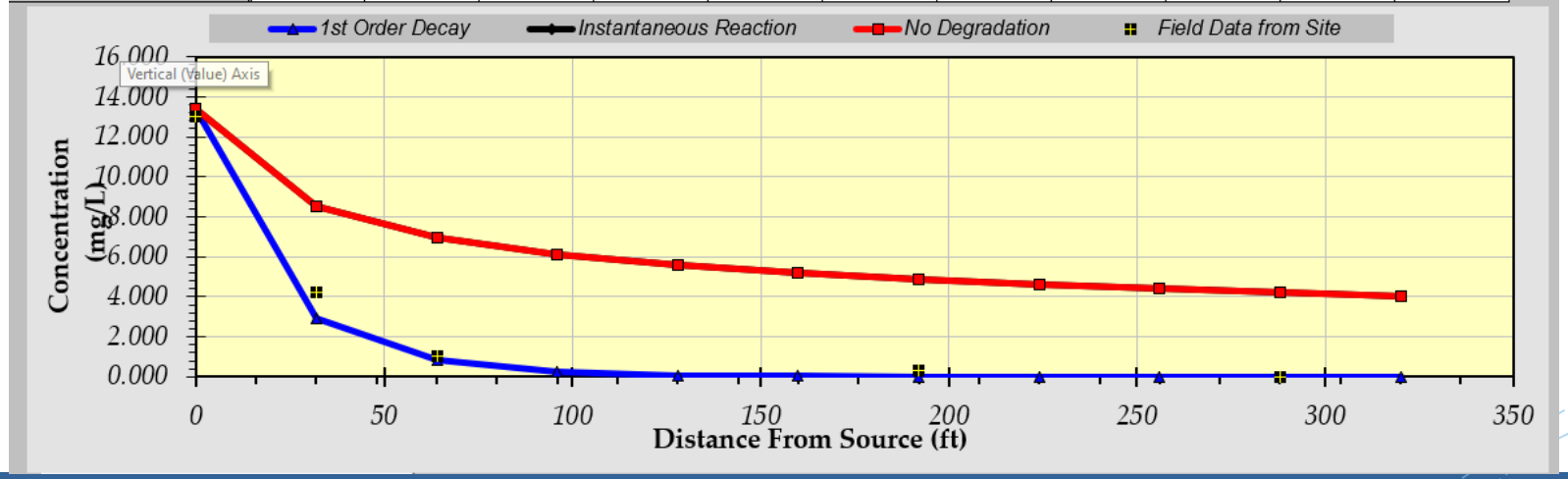
Groundwater Exemption Closures

NAC 445A.22725 (2)(b)

Couple a fate and transport model with a recent sensitive receptor survey

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	32	64	96	128	160	192	224	256	288	320
No Degradation	13.409	8.506	6.929	6.133	5.607	5.214	4.901	4.639	4.409	4.199	3.995
1st Order Decay	13.409	2.900	0.805	0.243	0.076	0.024	0.008	0.002	0.001	0.000	0.000
Inst. Reaction	13.409	8.506	6.929	6.133	5.607	5.214	4.901	4.639	4.409	4.199	3.995
Field Data from Site	13.000	4.200	1.000				0.300			0.001	



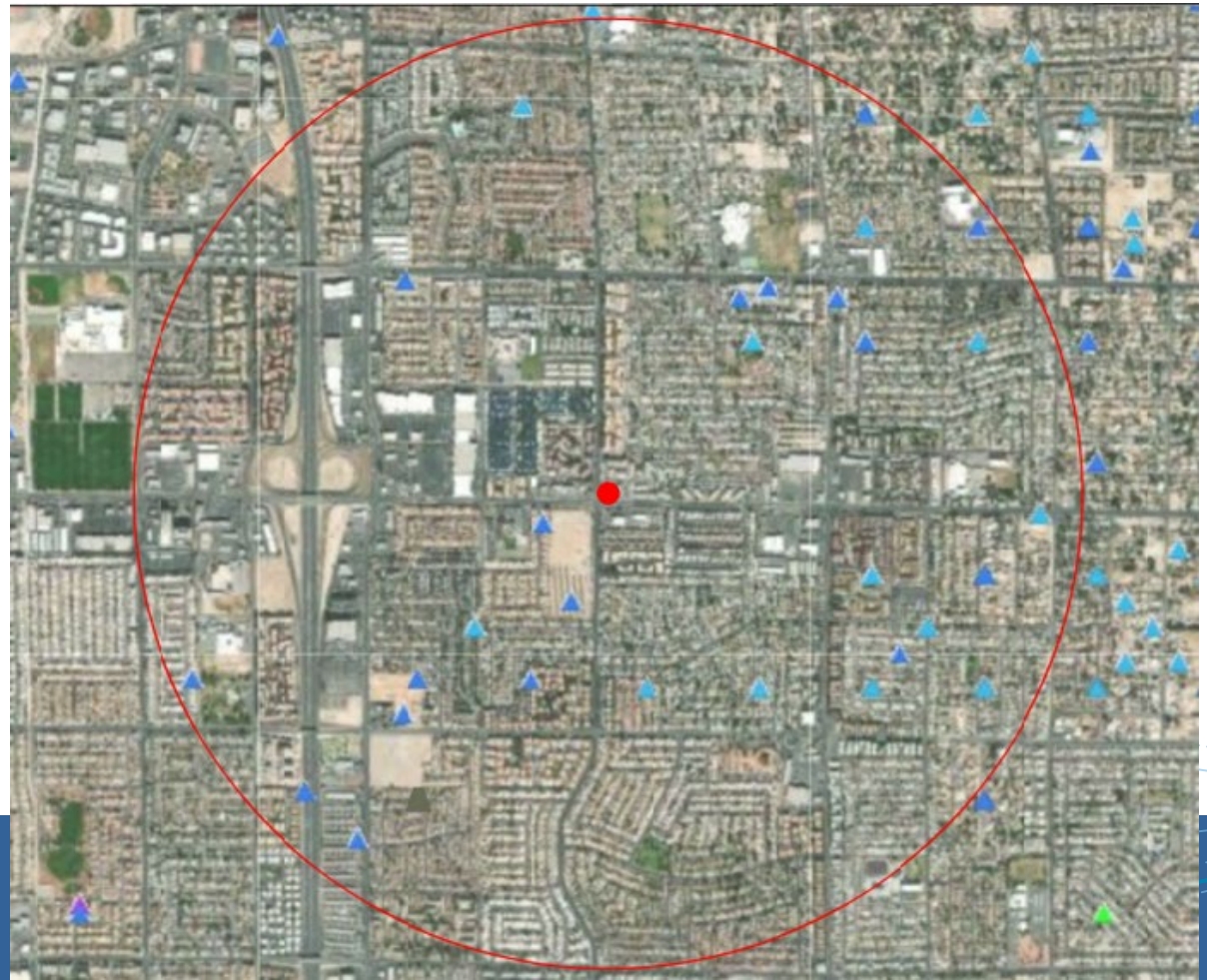
Groundwater Exemption Closures

NAC 445A.22725 (2)(b)

Couple a fate and transport model with a recent sensitive receptor survey

Municipal, domestic, and irrigation supply wells within 1 mile of Release location.

NDEP may request an updated SRS if it's been >10 years since the previous one.

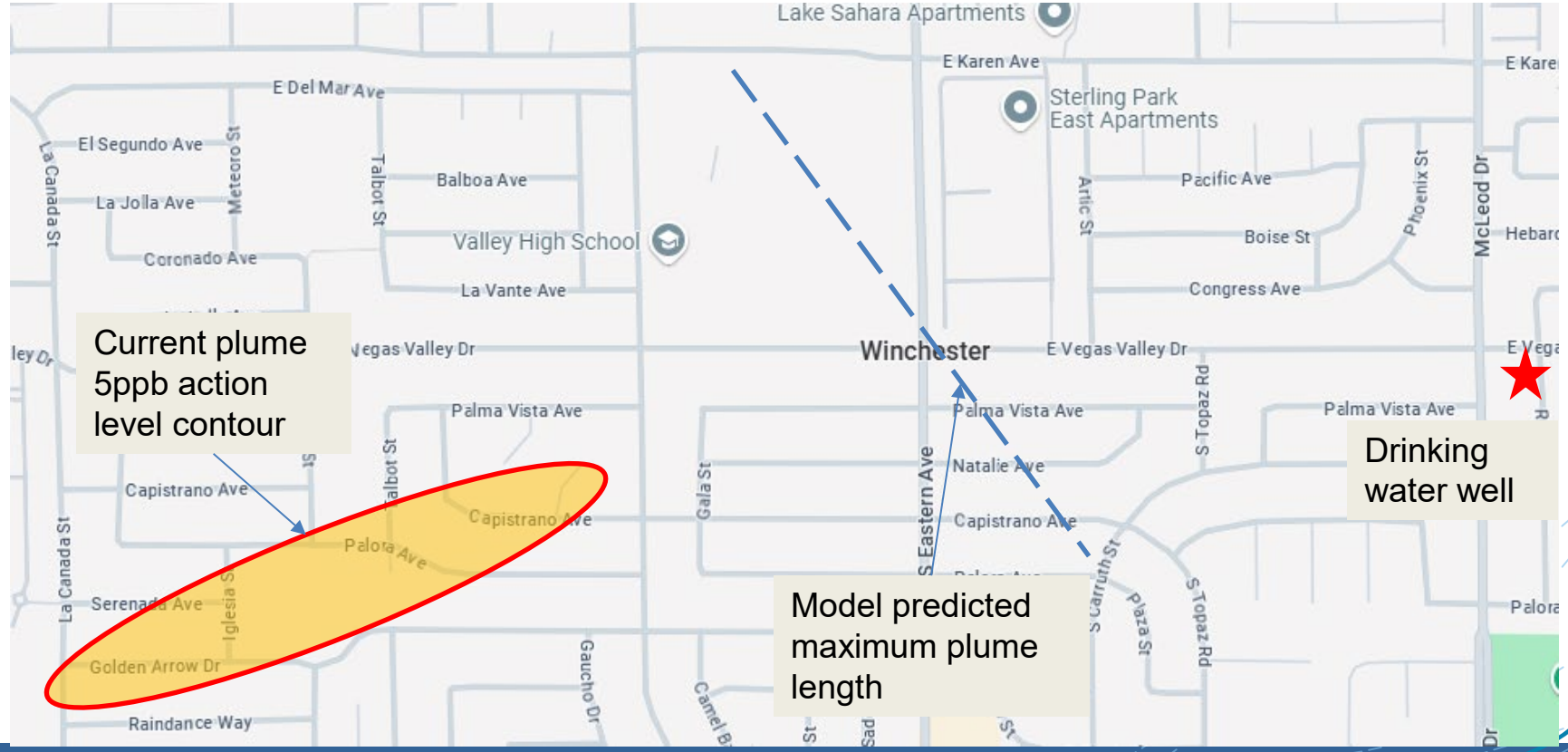


Groundwater Exemption Closures

NAC 445A.22725 (2)(b)

Couple a fate and transport model with a recent sensitive receptor survey

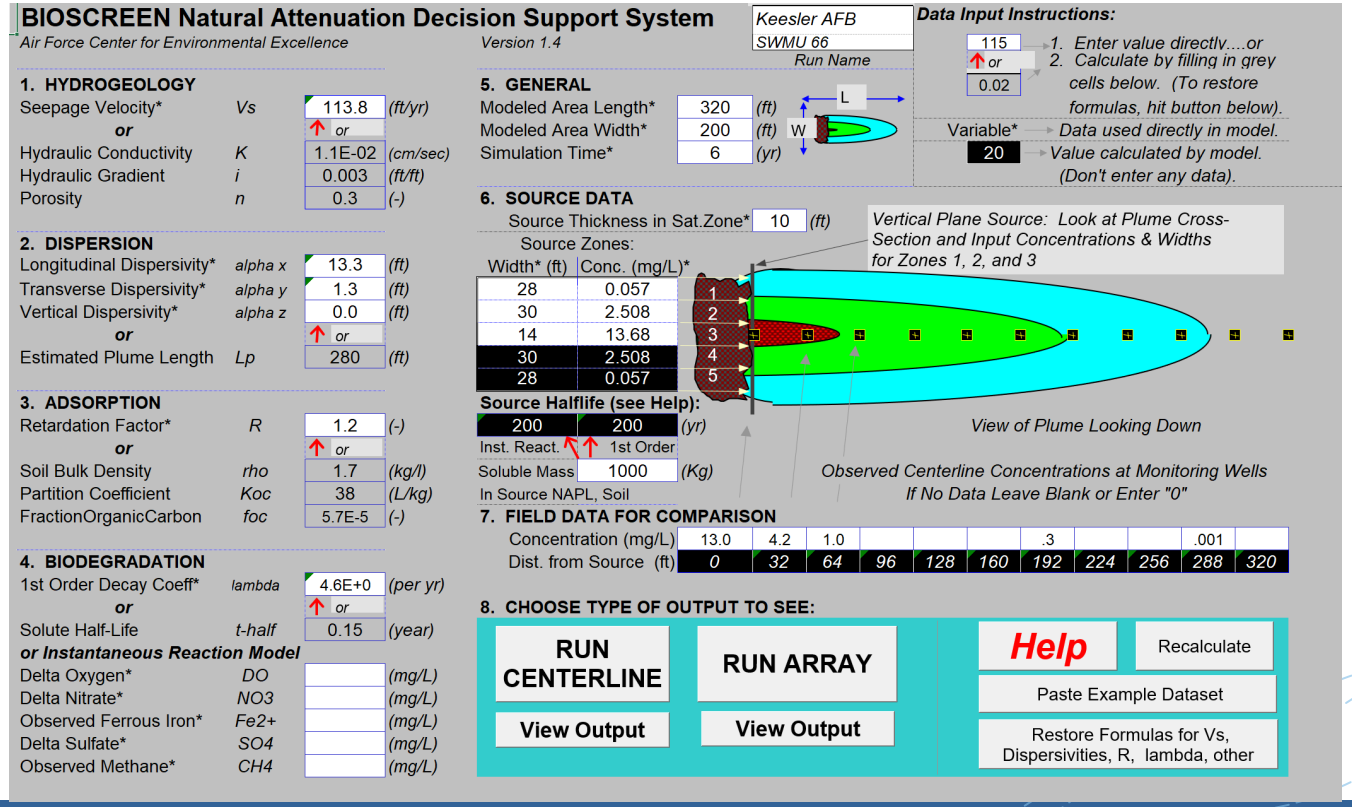
Model prediction coupled with SRS does not predict the plume will reach a sensitive receptor



Groundwater Exemption Closures

NAC 445A.22725 (2)(b)

More information on fate and transport models, particularly calibration, from 1:00 – 1:45 this afternoon



BIOSCREEN Natural Attenuation Decision Support System
Air Force Center for Environmental Excellence — *Version 1.4*

Keesler AFB
SWMU 66
Run Name

Data Input Instructions:
115 or 0.02 — 1. Enter value directly....or 2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
Variable* — Data used directly in model.
20 — Value calculated by model. (Don't enter any data).

1. HYDROGEOLOGY

Seepage Velocity*	Vs	113.8	(ft/yr)
or		or	
Hydraulic Conductivity	K	1.1E-02	(cm/sec)
Hydraulic Gradient	i	0.003	(ft/ft)
Porosity	n	0.3	(-)

2. DISPERSION

Longitudinal Dispersivity*	alpha x	13.3	(ft)
Transverse Dispersivity*	alpha y	1.3	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
or		or	
Estimated Plume Length	Lp	280	(ft)

3. ADSORPTION

Retardation Factor*	R	1.2	(-)
or		or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	38	(L/kg)
FractionOrganicCarbon	foc	5.7E-5	(-)

4. BIODEGRADATION

1st Order Decay Coeff*	lambda	4.6E+0	(per yr)
or		or	
Solute Half-Life	t-half	0.15	(year)
or Instantaneous Reaction Model			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

5. GENERAL

Modeled Area Length*	320	(ft)	L
Modeled Area Width*	200	(ft)	W
Simulation Time*	6	(yr)	

6. SOURCE DATA

Source Thickness in Sat.Zone* 10 (ft)

Source Zones:

	Width* (ft)	Conc. (mg/L)*
1	28	0.057
2	30	2.508
3	14	13.68
4	30	2.508
5	28	0.057

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3

View of Plume Looking Down

Source Halflife (see Help):
200 200 (yr)
Inst. React. or 1st Order
Soluble Mass 1000 (Kg)
In Source NAPL, Soil

Observed Centerline Concentrations at Monitoring Wells If No Data Leave Blank or Enter "0"

7. FIELD DATA FOR COMPARISON

Concentration (mg/L)	13.0	4.2	1.0				.3			.001	
Dist. from Source (ft)	0	32	64	96	128	160	192	224	256	288	320

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — View Output
RUN ARRAY — View Output
Help
Recalculate
Paste Example Dataset
Restore Formulas for Vs, Dispersivities, R, lambda, other

Groundwater Exemption Closures

NAC 445A.22725

2 (c) The groundwater contaminated by the release is not a source of drinking water and is not likely to be a source of drinking water in the future because:

(1) It is not practical to render the water fit for human consumption
- High TDS in shallow groundwater

(2) Legal restrictions require municipal hookup and/or prevent installation of new wells

Closure may require abandonment of existing domestic wells, or at least an offer to well owners to assist in abandoning the wells

Groundwater Exemption Closures

NAC 445A.22725(2)(c)(2)

Examples of existing institutional controls include:

- NAC 534.315(7) indicates if water service is available from an entity presently engaged in furnishing water, it can deny the installation, deepening or replacement of a well for domestic use.

- Washoe County Well Construction Regulations, Section 020.095: Prohibits domestic well drilling, deepening, reconditioning or replacement if water service is available from an entity such as a public utility, a water district or a municipality presently engaged in furnishing water to the inhabitants of the area.

Groundwater Exemption Closures

NAC 445A.22725(2)(c)(2)

Examples of existing institutional controls include:

- Nevada State Engineer Amended Order 1054 (dated April 15, 1992) states: “applications filed after March 23, 1992, pursuant to NRS 534.120 within the designated Las Vegas Artesian Basin will be denied.”
- Clark County Title 30 Unified Development Code 30.52.100 requires that new development on properties within 1,250 feet of a municipal water system connect to that system.
- Others may apply depending on site location.

Groundwater Exemption Closures

NAC 445A.22725(3)

Multiple lines of evidence and other supporting documentation

(a) Evidence of biodegradation
- Microbial analysis
- Stable isotopes
- Redox conditions

(b) Presence of daughter products
- Particularly TCE, cis-1,2,-DCE, etc. for PCE sites

(c) Other factors that consider risk
- Human health risk assessment
- Vapor intrusion evaluation – chlorinated solvent sites (1:45-2:45 today)
- Well capture analysis

Groundwater Exemption Closures

NAC 445A.22725(3)

Multiple lines of evidence and other supporting documentation

Exemption allows for closure with groundwater contamination above action levels (MCLs). The NACs do not list any other maximum contaminant levels. The higher the concentration, the more evidence we'll need to be convinced that the plume is stable to decreasing and doesn't pose a risk.

There are no "magic numbers" to reach. Each request is determined on a case-by-case basis with risk and uncertainty being the driving factors.

Groundwater Exemption Closures

NAC 445A.22725(4)

Demonstration that it is impractical to achieve the site-specific remediation standard

Might require institutional controls to protect human and environmental health

Groundwater Exemption Closures

NAC 445A.22725

Process to request exemption closure:

- Submit required documentation:
  - CSM, fate and transport report, SRS, HHRA, other supporting documents
  - Can be prepared while monitoring continues – e.g. during year of post-remediation monitoring
  - Request letter
- Create request presentation:
  - May be reviewed by BCA supervisors independently or through virtual or in person meeting
- Conduct well abandonment and site restoration prior to receiving NFA

Groundwater Exemption Closures

NAC 445A.22725

Exemption Closure Presentation:

- ~ 25-30 slides
- Tell a story:
  - Extent of contamination at its worst
  - Brief case timeline and history
  - Improvement or stabilization due to remediation or natural attenuation
  - Support with graphs and figures
- Recap how the site meets the conditions of NAC 445A.22725
- Summarize institutional controls
- Note that there is no risk from remaining plume

Soil Management Plans

- Short and simple
- Identify the potentially impacted soil in plan view.
- Identify the applicable range of depths.
- Note that excavated soil may need to be disposed of offsite. Sampling should be done in accordance with disposal profile.
- Prohibition against offsite direct reuse of untreated soil.

Environmental Covenants

- Voluntary on part of property owner.
- NDEP is shifting focus away from an impacted soil volume.
- Tied to the deed to preserve SMP and/or use restrictions.

Environmental Covenants

Conditions which might require an EC:

- Land use restrictions (residential prohibited unless further cleanup is conducted)
- Widespread shallow TPH
- Maintenance of engineered controls (concrete caps)

Conditions for which an EC will probably not be required:

- Active gas stations
- Deep contamination
- Active industrial sites that don't rely on engineered controls for closure

- An SMP may still be required and can be found during Phase I ESAs and tracked in Environmental Activities

GIS Shapefile Requirements

- Two shapefiles are required for internal agency map (institutional control):
  - Polygon shapefile for groundwater contaminant plumes.
  - Point shapefile for groundwater monitoring wells.

- Use NAD83 UTM Zone 11 coordinate system projection.

- In addition to the shapefiles, provide a PDF site figure showing the plume isocontours, wells, and aerial imagery for reference.

Plume Boundary Shapefile

- The plume shapefile may show one or more polygons based on the number of contaminants remaining in groundwater above their respective action level.
- The polygon boundary shall mark the extent of the plume whereby the area within the polygon is above the contaminant action level.
  - Note, the action level for MTBE must be 20 µg/L, even if the site target cleanup level is 200 µg/L.
- Include NDEP-specified attribute table data for each polygon, identifying the site, contaminant, action level, date the polygon was created, and method used to draw the plume boundary.

Fac_ID	J-001500
Site_Name	A Dry Cleaner
Address	123 Anywhere Ln
City	Reno
State	NV
Zip	00000
Contamnt	PCE
ActionLev	5
AL_unit	ug/L
Iso_Date	4/21/2025
Iso_Method	Professional Judgement
Iso_Author	M. Smith

Monitoring Well Shapefile

- Provide a point shapefile identifying the location(s) of monitoring wells where groundwater concentrations exceed one or more contaminants of concern.
- All wells that have contaminant concentrations that exceed an action level should be located within the respective plume boundary when overlaid with the polygon shapefile.
  - It is not necessary to show wells where all constituent concentrations are below action level.
- Include NDEP-specified attribute table data for each well point, including well name, location, contaminant/concentration, elevation, and screen interval.
  - For wells that have multiple constituents with concentrations above the action level, identify each contaminant and respective concentration.
- Well locations must be collected with a GPS that has an accuracy of 3 meters or better. The GPS model used and date the well location points were collected must be identified in the attribute data.

Fac_ID	J-001500
WellName	MW-1
Northing	4380100
Easting	260410
GPS_Type	Trimble R6
Coll_Date	1/1/2020
Contmnt_1	PCE
Conc_1	16
Contmnt_2	TCE
Conc_2	7
Contmnt_3	<Null>
Conc_3	<Null>
Conc_Unit	ug/L
SampleDate	4/21/2025
Elev_Grnd	6282
Elev_GW	6268
Elev_Scrn	6277
Depth_Well	6262

Thank You!
Questions?

Contact information:

Ben Moan: bmoan@ndep.nv.gov – 775-687-9396

Michael Mazziotta: mmazziotta@ndep.nv.gov – 702-668-3909

Mike Cabble: mcabble@ndep.nv.gov – 775-687-9488