DEQ
Montana Department of Environmental Quality

Petroleum Tank Cleanup Section (PTCS)

Evolving Closure Review Process
Petroleum Releases
2008-2018

Consultants Meeting, Fall 2018
October 19, 10:00 a.m. – 1:30 p.m.
Room 111, Metcalf Building, 1520 E 6th Ave., Helena

Closure Review Process for Petroleum Releases

- Thoroughness, Organization & Documentation of Data & Results Investigation, Cleanup, Monitoring Reports
- DEQ's risked-based screening levels (RBSLs)
- Residual Petroleum-impacted Soil
- Groundwater Plumes

Risked-Based Screening Levels (RBSLs)

Montana Risk-Based Corrective Action (RBCA) Guidance for Petroleum Releases

- Periodic review for changes: 2000 to 2018
  - Calculation Methods
  - Input Parameters
  - Toxicity Information
- Updated RBSLs – most recently May 2018

Result: Closure of some old Releases with residual petroleum impacts

Residual Petroleum-impacted Soil

- Site-specific Soil sampling – use confirmation soil data to eliminate risks
- Direct Contact Risks – Tier-2 adjusted RBSLs; RBCA Guidance
- Leaching-to-Groundwater Risks –
  - Tier-2 adjusted RBSLs; usually lack data required by RBCA Guidance
  - Monitoring well placement: demonstrate lack of leaching from soil based on laboratory analytical data for GW

Groundwater Plumes

- Monitoring well placement must evaluate source area(s), residual petroleum-impacted soil (demonstrate lack of leaching risk), and other receptors
- Sampling protocols – use DEQ's GW Sampling Guidance
- Analytical protocols – use DEQ's RBCA Guidance
- Attenuation trends in petroleum analytes

Groundwater Plumes – Lead Scavengers

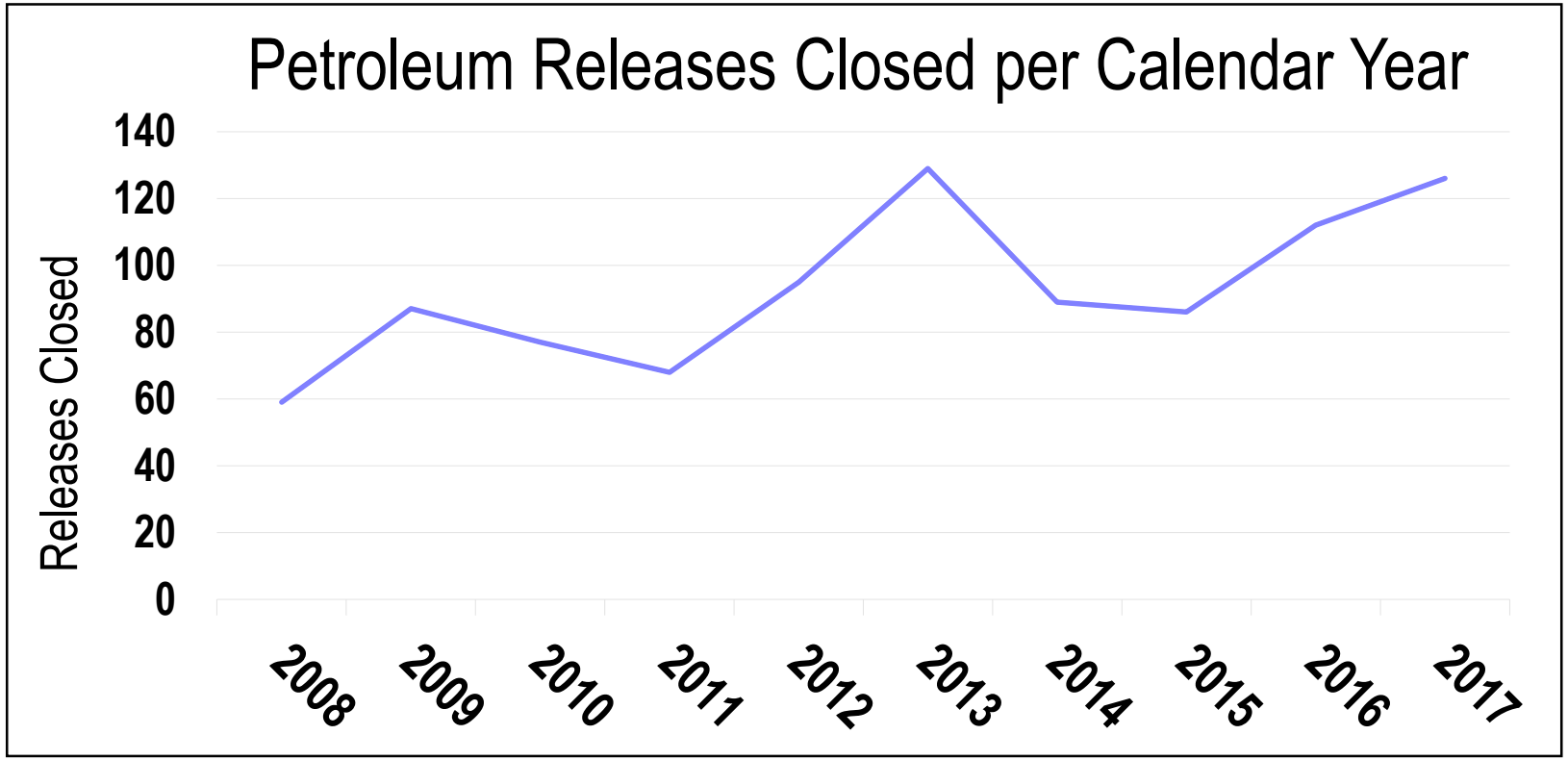
Component of gasoline 1920s – 1980s; banned 1996

Analyze for 1,2-Dichloroethane (DCA) & 1,2-Dibromoethane (EDB)

- Required for any release of gasoline before 1996
- Required for all aviation gas releases – **Lead scavengers remain in use**
- RBSLs updated 2018 – EDB = 0.017 ug/L (0.004 previously)

Groundwater Plumes – RBSL Exceedances

- VPH and EPH fractions (aliphatics & aromatics) exceeding RBSLs
  - Closure requires deed restriction
- Consider Petroleum Mixing-Zone (PMZ) Closure
  - Thorough investigation and compliance monitoring
  - Requires deed restriction for closure



- Releases Closed 2008 – 2017 = 928; ~93 per year
- Confirmed Releases = 4,683; ~980 remain active
- Closure rate may be difficult to maintain; Complexity of some releases

Closure Review Process for Petroleum Releases

Petroleum Tank Releases					
Calendar Interval	Confirmed		Closures		Active at end of period
	interval total	average annual	interval total	average annual	
1985-89	219	44	25	5	194
1990-99	3534	353	2215	222	1513
2000-08	621	69	532	59	1602
2009-18	309	31	935	94	976
Total:	4683		3707		

PTCS Business Process Improvements

expected to promote closure

Future Closures – Review at each Phase of Remediation

- Completion of Investigation Phase (RI & RAA Guidance and RCP)
- Completion of Cleanup Phase
- Completion of Compliance Monitoring Phase

Think Closure –

- Begin early, consider potential route(s) to Closure (include PMZ)
- Identify data gaps
- Maintain contact with DEQ's project manager during WP
- Propose WP modifications to meet WP objectives
- Recommend appropriate work to resolve Release
- Update Release Closure Plan – cumulative summary
- Pathway to Closure of Release

Closure Review Process for Petroleum Releases

Questions?

MT DEQ Petroleum Tank Cleanup Section -- Release Closure Plan (7 Mar 2018)

for the Investigation, Cleanup, Monitoring & Closure of Petroleum Releases

Part 1: Site Summary & Remedial Investigation (RI) Results

reference: MT DEQ Remedial Investigation (RI) Guidance for Petroleum Releases

Consultant:		Date:		DEQ PM:	
Facility Name / Address:					
Facility ID:		**Release:**		WP ID:	

Site Information	Release Cause, Source(s) & Petroleum Types:	
	other releases onsite and nearby:	
	Site Use(s) -- Former, Current & Planned:	
	Surface Conditions & Access:	
	former Petroleum Tank Systems:	
	current Petroleum Tank Systems:	
	Other:	
Subsurface	Stratigraphic sequence - layers & thicknesses:	
	Stratigraphic Continuity - Lateral Variation(s):	
	Groundwater Depth & Flow Direction(s):	
	Aquifer(s) unconfined, confined, perched:	
	Receptor Depth/Location (basements, utilities):	
	Other:	
Extent & Magnitude	Petroleum Types, Age & NAPL Mobility:	
	Surface Soil Impacts (0 to 2 ft bgs):	
	Vadose-Zone Soil Impacts:	
	Smear-Zone Soil Impacts:	
	Groundwater Impacts:	
	Surface Water Impacts:	
	Petroleum Vapor Impacts:	
	Other:	
Reports	RI and Monitoring Reports & Dates:	
	Pilot Tests & Results:	
	Results from Cleanup(s):	
	Other:	
	What currently prevents Release Closure?	
	additional information required for PMZ Closure:	
	Information & Data Gaps:	
	Recommendations and comments:	

MT DEQ Petroleum Tank Cleanup Section – Release Closure Plan (7 Mar 2018)

for the Investigation, Cleanup, Monitoring & Closure of Petroleum Releases

Part 2: Conceptual Site Model (CSM) - Evaluation of Exposure Pathways

reference: MT DEQ Risked-Based Corrective Action (RBCA) Guidance for Petroleum Releases

Consultant:	0		Date:	1/0/1900	DEQ PM: 0
Facility Name:	0				
Facility ID:	**0**	**Release:**	**0**	WP ID:	0

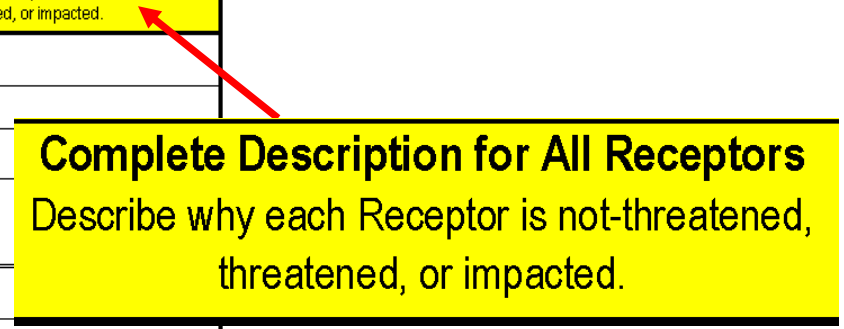
Required: Complete Description of the Source(s) of Petroleum Release

Petroleum Source(s)	Affected Medium	Exposure Medium / Point	Exposure Route	Receptor	Complete Description for All Receptors: Describe why each Receptor is not-threatened, threatened, or impacted.
→	Surface Soil (0 - 2 ft bgs)	Soil	Ingestion Dermal	Resident and/or Worker	
		Soil	Leaching	Groundwater	
		Dust and/or Vapors	Inhalation	Resident and/or Worker	
		Surface Erosion to Surface Water and/or Sediment	Ingestion Dermal	Recreator, Ecological Receptor [1]	
→	Sub-Surface Soil (> 2 ft bgs)	Soil	Ingestion Dermal	Construction Worker [2]	
		Soil	Leaching	Groundwater	
		Indoor Air	Inhalation	Commercial or Residential Indoor Air	
		Dust and/or Vapors	Inhalation	Construction Worker	
		Buried Water Line	Ingestion Dermal	Resident and/or Worker	
		Buried Utility Line	Inhalation of Indoor Air	Indoor Resident and/or Worker	
→	Groundwater	Groundwater	→	State water [3]	
		Indoor Air [4]	Inhalation of Indoor Air	Resident and/or Worker	
		Groundwater and/or Vapors	Ingestion Dermal Inhalation	Construction Worker [2]	
		Drinking Water	Ingestion Dermal	Resident and/or Worker	
		Surface Water and/or Sediment	Ingestion Dermal Inhalation	Recreator, Ecological Receptor	
		Buried Water Line	Ingestion Dermal	Resident and/or Worker	
		Buried Utility Line	Inhalation of Indoor Air	Indoor Resident and/or Worker	

Data Gaps:	
Recommendations:	

Footnotes:

1. Ecological Receptors (e.g. plants and animals) can be added as a separate line associated with surface soil but it is not common for PTC sites.
2. Construction worker covers excavations conducted for building construction, utility installation and repair, as well as residents planting trees, etc.
3. Standard or RBSL exceedence are a complete pathway to a receptor, which is state water (or groundwater).
4. Indoor Air is the exposure medium for a potential or known vapor intrusion setting where a resident or an employee of a business may breathe petroleum vapor from the release.



MT DEQ Petroleum Tank Cleanup Section -- Release Closure Plan (7 Mar 2018)

for the Investigation, Cleanup, Monitoring & Closure of Petroleum Releases

Part 3: Evaluation of Cleanup Alternatives

reference: MT DEQ Remedial Alternatives Analysis (RAA) Guidance for Petroleum Releases

Consultant:	0		Date:	1/0/1900	DEQ PM:	0	
Facility Name / Address:	0						
Facility ID:	**0**	**Release:**	**0**	WP ID:	0		

Administrative Rules of Montana 17.56.605(3) requires screening and selection of cleanup methods to develop a matrix evaluation of cleanup alternatives. A cleanup plan requires information on all alternatives and an explanation why any alternative was selected.

Evaluation Criteria		**Enter appropriate site-specific Cleanup Methods that are based on RI results & CSM**						
		No Action*	e.g. Excavation	e.g. Excavation & ORC	e.g. SVE & AS	fill-in as needed or leave blank	fill-in as needed or leave blank	fill-in as needed or leave blank
	Estimated Costs							
Performance	Protective of Human Health & Environment (e. g. residences, utilities, water supply, future use)							
Performance	Method-specific regulatory requirements (e. g. disposal of impacted soil & water, access agreements)							
Performance	Method-specific feasibility requirements (e. g. pilot tests, treatability studies)							
Performance	Contaminant-specific requirements (e. g. method achieves soil & GW RBSLs & DEQ-7 standards)							
Performance	Location-specific requirements (e. g. potential historical, cultural, or ecological significance, or site near wetlands, floodplains, surface water, endangered species / migratory bird habitat)							
	Reliability -- Short Term							
	Reliability -- Long Term							
	Implementation Issues & Limitations							
	Safety Issues							
	Effects on Public Health and Environment (includes Receptors)							
	Other site-specific criteria & issues:							
	Advantages of Cleanup Method:							
	Disadvantages of Cleanup Method:							
	Est. Years to Complete Cleanup Method:							
	Cleanup Recommendations:							
	Information & Data Gaps:							
	Recommendations and comments:							

Performance Criteria2017

Performance - Protective

Performance - method achieves soil & GW RBSLs & DEQ-7 standards

* Note: Cleanup technologies may be removed or added as appropriate for each Release; however, the 'No Action' alternative must be evaluated for comparison at every Release.

MT DEQ Petroleum Tank Cleanup Section -- Release Closure Plan (7 Mar 2018)

for the Investigation, Cleanup, Monitoring & Closure of Petroleum Releases

Part 4: Compliance Monitoring

reference: MT DEQ Remedial Alternatives Analysis (RAA) Guidance for Petroleum Releases

Consultant:	0	Date:	1/0/1900	DEQ PM:	0
Facility Name / Address:	0				
Facility ID:	**0**	**Release:**	**0**	WP ID:	0

Compliance & Operation Monitoring Methods to Evaluate Effectiveness of each Cleanup Alternative Listed in Part 3

	Administrative Rules of Montana 17.56.605(6) requires the cleanup plan to include a plan and schedule for compliance monitoring to evaluate the effectiveness of cleanup activities.	No Action*	e.g. Excavation	e.g. Excavation & ORC	e.g. SVE & AS	fill-in as needed or leave blank	fill-in as needed or leave blank	fill-in as needed or leave blank
Evaluation of Cleanup	Confirmation Sampling							
	Borings/ Monitoring Wells (MWs)							
	GW Monitoring (freq., wells, years)							
	System O/M (frequency & years)							
	Petroleum Vapor Monitoring (freq., locations, years)							
	Receptor Monitoring							
	Waste Management							
	Other site-specific monitoring:							
	Method(s) to Evaluate Interim Results and Optimize Cleanup:							
	Est. Years to Complete all Monitoring:							
	Estimated costs for O/M & monitoring:							
Closure	Estimated Total Years to Closure:							
	Natural Attenuation Trends:							
	What currently prevents Closure?							
	Is this a PMZ Closure Candidate?							
	Other:							
	Information & Data Gaps:							
	Recommendations and comments:							

* Note: Cleanup technologies may be removed or added as appropriate for each Release; however, the 'No Action' alternative must be evaluated for comparison at every Release.

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DEQ Montana Department of Environmental Quality

DIVISIONS CONTACTS

Waste Management & Remediation Division

- Resources
- Abandoned Mine Lands
- Federal Superfund & Construction
- Contaminated Site Clean-Up
- Waste & Underground Tank Management

Petroleum Tank Cleanup Section



Section Overview

5

Information | NEW UPDATES | Approved Work Plans | **Resources** | Related Links | Contacts | Webinars and Trainings

Forms
Petroleum Tank Release Compensation Board Forms and Worksheets
Enforcement Spill Report
DEQ UST Montana Certificate of Financial Responsibility Form
Financial Data Request Form for Individuals
Financial Data Request Form for Businesses
Work Plan and Report Templates
Release Closure Plan (PDF not Fillable)
Release Closure Plan (Excel)
Guidance
Electronic Subbmittals: File Transfer Service for Corrective Action Plans (CAP)and Reports
Technical Guidance Documents
Petroleum Brownfields Guidance
RBCA Guidance Documents

RAA & RI → Work Plan and Report Templates

RCP → Release Closure Plan (Excel)

RAA & RI → Technical Guidance Documents

Business Process Improvements – Benefits

O/Os Engaged – planning & thought process for Investigation, Cleanup, Monitoring, Pathway to Closure of Release

Thoroughness – planning, work, compilation & presentation of data and information

Efficiency – time & effort from confirmation to closure

Release Closure Plan – updated cumulative summary Investigation, Cleanup, Monitoring