RBCA Process

- Release Confirmation
- Remedial Investigation
- Cleanup & Monitoring
- Evaluate Priority / Closure

Recap of RBCA Tables

GUIDANCE

Risk Based Corrective Action Guidance (RBCA)

- **Table 1**: Release Confirmation Soil RBSLs
- **Table 2**: All Tier 1 Soil RBSLs
- **Table 3**: Tier 1 Groundwater RBSLs and Standards
- **Table 4 (a)**: Calculated Tier 2**Soil RBSLs for Direct Contact Residential Receptor
- **Table 4 (b)**: Calculated Tier 2**Soil RBSLs* for Direct Contact Commercial Receptor
- **Table 4 (c)**: Calculated Tier 2**Soil RBSLs* for Direct Contact Construction Receptor

Release Confirmation

- Soil Samples Exceed Tier 1 RBSLs.
  - Table 1
- Groundwater Sample Exceeds RBSLs.

Responding to a Petroleum Release

- Immediate Threat – emergency response
  - Vapors
  - Drinking Water Wells
  - Aquatic Life (surface water)
  - Direct Contact to Soils
- No immediate threat – RI

Remedial Investigation

- Site Assessment / History
- Petroleum Source – Extent / Magnitude
- Petroleum Contaminants / Receptors
- Potential Transport Pathways

Remedial Investigation Guidance, on DEQ PTCS website under the Guidance Tab.

Conceptual Site Model (CSM)

- Relevant Site Features
- Source, Receptors, Exposure Pathways.
- Continuously Updated

Receptors

- **Receptors**:
  - Residential
  - Commercial
  - Construction
- **Environmental Media**:
  - Surface soil
  - Groundwater
  - Air

Exposure Pathways

5 elements of a pathway

- Source
- Affected media
- Exposure medium/point
- Exposure route
- Receptor

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

Complete Description for All Receptors

Describe why a Receptor is not threatened or impacted; and Describe proposed Investigation, Cleanup, and/or Monitoring Methods for each threatened or impacted Receptor.

Petroleum Source(s)	Affected Medium	Exposure Medium / Point	Exposure Route	Receptor	Complete Description for All Receptors
Required: Complete Description of the Source(s) of Petroleum Release	Surface Soil (0 - 2 ft bgs)	Soil	Ingestion Dermal	Resident and/or Worker	
		Soil	Leaching	Groundwater	
		Dust/Vapors	Inhalation	Resident and/or Worker	
		Surface Erosion to Surface Water and 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/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 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.

DEQ MONTANA

Table B
Testing Procedure for Soil and Water

Petroleum Product	VPH	EPH Screen	EPH Fractionation	EPH for PAHs	RCRA Metals + Zinc	EPA Method 8260B – Oxygenates /VOCs	Lead Scavengers
Gasoline/Aviation Gasoline	R						SS
Diesel (#1 & #2)	R	R	X	SS			
#1 - #2 Heating Oils	R	R	X	SS			
#3 - #6 Fuel Oils		R	X	X			
Used/Waste Oil	R	R	X	X	SS	R	SS
Kerosene, Jet Fuel (Jet-A, JP-4, JP-5, JP-8, etc.)	R	R	X	SS			
Mineral/Dielectric Oils		R	X				
Heavier Wastes		R	X	X			
Crude Oil	R	R	X	X			
Unknown Oils/Sources	R	R	X	X	SS	R	SS

Table B - Testing Procedures for Soils and Water

R - required analysis

X - analysis to be run if the EPH screen concentration in is >200 mg/kg TEH or >1,000 µg/L TEH in soil and water, respectively.

SS - Site-specific determination.

Tier 1 Evaluation

- Start here.
- Initial data collected is compared to Tier 1 RBSLs.
  - Need for additional evaluation.
  - Ready for release closure.

Tier 1 Evaluation

- Adequate number of samples and sample locations.
- If all analytes below Tier 1 RBSLs in Tables 2 and 3 - move to closure.
- If not, proceed to Tier 2 evaluation.

Table 2: All Tier 1 RBSLs

- Site specific information
  - Site use
  - Depth of high groundwater
  - Depth of each soil sample
- Organized into 2 exposure routes
  - Leaching
  - Direct contact

Leaching

Vertical Distance Between Soil Sample and Shallowest Groundwater

- 0-10’ to groundwater
- >10-20’ to groundwater
- >20’ to groundwater

Direct Contact

Site Use and Sample Depth

- Residential (0-2’ bgs)
- Commercial (0-2’ bgs)
- Construction (0-10’ bgs)

Table 2

20-Feb-2024

All Potential Tier 1 Risked-Based Screening Levels* (RBSLs) for Soil, mg/kg

Leaching RBSLs: require vertical distance (feet) from base of petroleum-contaminated soil sample to groundwater.

Direct Contact RBSLs: require depth below ground surface (feet bgs) to petroleum-contaminated soil sample.

Chemical / Analyte / Compound	Leaching RBSLs, mg/kg Distance (feet) from Soil Sample to Groundwater			Direct Contact RBSLs, mg/kg Carcinogenic Effects, Receptors, and Depth Intervals			
	0-10 feet	10-20 feet	>20 feet	carcinogenic / non-carcinogenic	Residential 0 - 2 feet bgs	Commercial 0 - 2 feet bgs	Construction 0 - 10 feet bgs
For Gasoline & Light Hydrocarbons measured using the Montana Method for Volatile Petroleum Hydrocarbons (VPH)							
MTBE	0.078	0.16	0.25	c	67	310	9,100
Benzene	0.07	0.21	0.33	c/n	1.7 [c]	7.6 [c]	190 [n]
Toluene	21	65	100	n	630	6,300	14,000
Ethylbenzene	26	84	130	c	8.4	38	1,200
Xylenes	320	1,000	1,600	n	75	330	1,900
Naphthalene	12	40	62	c/n	2.9 [c]	13 [c]	120 [n]
C9-C10 Aromatics	130	470	720	n	60	300	4,000
C5-C8 Aliphatics	220	770	1,200	n	90	450	2,000
C9-C12 Aliphatics	11,000	40,000	60,000	n	160	800	3,000
Lead Scavengers							
1,2-Dichloroethane (DCA)	0.019	0.052	0.079	c	0.67	3.0	100
1,2-Dibromoethane (EDB)	0.000086	0.00022	0.00033	c	0.05	0.24	7.3
For Diesel & Heavy Hydrocarbons measured using Montana Method for Extractable Petroleum Hydrocarbons (EPH)							
C9-C18 Aliphatics	53,000	170,000	270,000	n	290	1,600	6,000
C19-C36 Aliphatics	Considered Immobile			n	25,000	330,000	1,600,000
C11-C22 Aromatics	370	1,300	2,000	n	540	6,200	33,000

Cumulative Data Tables

Soil

- Sample Id
- Sample Depths (ft bgs)
- Direct Contact Receptors and/or potential future use (Residential, Commercial, Construction)
- Site-appropriate Leaching to Groundwater RBSLs
- Highlight any concentrations that exceed the applicable RBSL or Standard

Cumulative Data Tables

Groundwater

- Well number
- Sample ID Collection Date
- Sample Depth (ft bgs)
- Highlight any concentrations that exceed an applicable RBSL or Standard.

Cumulative Data Tables

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name:					Facility ID:					Release:																					
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg											Lead Scavengers		Extractible Petroleum Hydrocarbons (EPH), mg/kg					Lab Analytes pre-1999: TPH / TEH / DRO / GRO, mg/kg[3]				estimated C9-C18 & C11-C22 per RBCA[4]		*Not Used for VPH & EPH Data*			
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	DCA	EDB	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	TEH	TPH	GRO	TEH	DRO	C9-C18 Aliphatics	C11-C22 Aromatics				
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE	0.019	0.000086	NE	53,000	NE	370	NE	NE	NE	NE	NE	53,000	370				
DEQ Tier 1 RBSLs[1], Direct Contact Construction, 0 to 10 ft bgs					9,100	190	14,000	1,200	1,900	120	4,000	2,000	3,000	NE	100	7.3	NE	6,000	1,600,000	33,000	NE	NE	NE	NE	NE	6,000	33,000				
Calculated Tier 2 Direct Contact Construction (0-10 feet)*													15,000					30,000								30,000					
June 1990 UST Removals: 6,000-gallon diesel and 10,000-gallon gasoline																															
Diesel UST	North of Building, East end of tank	11	---	June 1990	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11,300	Excavated 2003		4,520	6,780				
	North of Building, West end of tank	11	---	June 1990	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3,500	Excavated 2003		1,400	2,100				
Gasoline UST	North of Building, East end of tank	11	---	June 1990	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	590	Excavated 2003		236	354				
	North of Building, West end of tank	11	---	June 1990	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	76	Excavated 2003							
1993 UST Removals: 6,000-gallon diesel and 4,000-gallon gasoline, North of building																															
Diesel UST	North End	11	---	05/05/93	---	---	---	---	---	Excavated 2003	---	---	---	---	---	---	---	---	---	---	---	13,000	Excavated 2003		5,200	7,800				
Diesel UST	South End	11	---	05/05/93	---	---	---	---	---	Excavated 2003	---	---	---	---	---	---	---	---	---	---	---	8,800	Excavated 2003		3,520	5,280				
Gasoline UST	North End	11	---	05/05/93	---	<20[2]	62	38	218	Excavated 2003	---	---	1,300	---	---	---	---	---	---	---	---									
Gasoline UST	South End	11	---	05/05/93	---	<20[2]	33	28	189	Excavated 2003	---	---	1,200	---	---	---	---	---	---	---	---									
Waste Oil UST		8	---	05/06/93	---	<0.2[2]	<0.2	<0.2	<0.2	---	---	---	---	72	---	---	---	---	---	---	---									
September 1993 to May 1994 RI: Wells GMW-2 to GMW-4 removed in July 1996																															

Tier 2 Evaluation

- Adjustments to DC soil RBSLs based on site-specific information.
- Contaminant concentrations are now compared to Tier 2 RBSLs.
- Tables 4 A-C.

What you need to do a Tier 2 Calculation

- Lab data
- Sample ID
- Sample depth (ft bgs)
- Current or potential site use
  - Residential
  - Commercial
  - Construction

EQUATION

Tier 1 RBSL X 10/ (#Non-Carcinogenic OR

Carcinogenic) Analytes > Tier 1 DC RBSLS

=

Tier 2 DC RBSL

**Only applies to direct contact RBSLs

Table 4c

Calculated Tier 2** Soil RBSLs* for Direct Contact Construction Receptor 0 - 10 feet bgs

Effects c: carcinogenic n: non-carcinogenic	Tier 1 Soil RBSLs, mg/kg Direct Contact Construction Receptor		Calculated Tier 2 RBSLs for Subsurface Soil Exceedances of Tier 1 RBSLs, mg/kg											
			Tier 2 RBSL = Tier 1 RBSL X 10 / (number of Non-Carcinogenic Analytes >Tier 1 RBSLs)						*Tier 2 RBSL = Tier 1 RBSL X 10 / (number of Carcinogenic Analytes >Tier 1 RBSLs)*					
	Chemical / Analyte / Compound	0 - 10 feet bgs	Number of Non-Carcinogenic Analytes >Tier 1 RBSLs						Number of Carcinogenic Analytes >Tier 1 RBSLs					
			1	2	3	4	5	6	1	2	3	4	5	6
	For Gasoline & Light Hydrocarbons measure		sing the Montana Method for Volatile Petroleum Hydrocarbons (VPH)											
c	MTBE	9,100	---	---	---	---	---	---	91,000	45,500	30,333	22,750	18,200	15,167
n	Benzene	190	1,900	950	633	475	380	317	---	---	---	---	---	---
n	Toluene	14,000	140,000	70,000	46,667	35,000	28,000	23,333	---	---	---	---	---	---
c	Ethylbenzene	1,200	---	---	---	---	---	---	12,000	6,000	4,000	3,000	2,400	2,000
n	Xylenes	1,900	19,000	9,500	6,333	4,750	3,800	3,167	---	---	---	---	---	---
n	Naphthalene	120	1,200	600	400	300	240	200	---	---	---	---	---	---
n	C9-C10 Aromatics	4,000	40,000	20,000	13,333	10,000	8,000	6,667	---	---	---	---	---	---
n	C5-C8 Aliphatics	2,000	20,000	10,000	6,667	5,000	4,000	3,333	---	---	---	---	---	---
n	C9-C12 Aliphatics	3,000	30,000	15,000	10,000	7,500	6,000	5,000	---	---	---	---	---	---

Tier 3 Evaluation

- Risk Assessor
- Lots of different methods
  - Modeling
  - Statistical analysis
  - Organ specific analysis (NC)

Corrective Action

- If concentrations of COCs exceed Tier 2 RBSLs, move to cleanup phase.
- Release Closure Plan (RCP)
  - Evaluate different cleanup strategies based on:
    - Site Specific Information
    - Effectiveness
    - Cost
- Choose a remediation strategy.

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.

Enter appropriate site-specific Cleanup Methods that are based on RI results & CSM

Evaluation Criteria		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)							
	Method-specific regulatory requirements (e. g. disposal of impacted soil & water, access agreements)							
	Method-specific feasibility requirements (e. g. pilot tests, treatability studies)							
	Contaminant-specific requirements (e. g. method achieves soil & GW RBSLs & DEQ-7 standards)							
	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:								

* 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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Example 1 - 4C

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name: Fairmont Hot Springs					Facility ID: Consultant's Day 2025					Release: 41825					Lead Scavengers		Extractible Petroleum Hydrocarbons (EPH),			
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg															
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	DCA	EDB	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE	0.019	0.000086	NE	53,000	NE	370
DEQ Tier 1 RBSLs[1], Direct Contact Construction 0 to 10 ft bgs					9,100	190	14,000	1,200	1,900	120	4,000	2,000	3,000	NE	100	7.3	NE	6,000	1,600,000	33,000
Calculated Tier 2 Direct Contact Construction (0-10 feet)*																				
SB1	Source Area	4			5,230	212	2,400	1,400	3,585	144	4,632	2,410	2,547					5,400	2,000	3,100

Analytes that exceed

- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- Naphthalene
- C9-C10 Aromatics
- C5-C8 Aliphatics

Split analytes up based on effect

- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- Naphthalene
- C9-C10 Aromatics
- C5-C8 Aliphatics

1 Carcinogen, 5 Non-Carcinogens

Example 1 – 4C

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name: Fairmont Hot Springs					Facility ID: Consultant's Day 2025										Release: 41825					
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg										Lead Scavengers		Extractible Petroleum Hydrocarbons (EPH),			
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	DCA	EDB	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE	0.019	0.000086	NE	53,000	NE	370
DEQ Tier 1 RBSLs[1], Direct Contact Construction 0 to 10 ft bgs					9,100	190	14,000	1,200	1,900	120	4,000	2,000	3,000	NE	100	7.3	NE	6,000	1,600,000	33,000
Calculated Tier 2 Direct Contact Construction (0-10 feet)*																				
SB1	Source Area	4			5,230	212	2,400	1,400	3,585	144	4,632	2,410	2,547					5,400	2,000	3,100

Table 4c

Calculated Tier 2** Soil RBSLs* for Direct Contact Construction Receptor 0 - 10 feet bgs

Effects c: carcinogenic n: non-carcinogenic	Tier 1 Soil RBSLs, mg/kg Direct Contact Construction Receptor		Calculated Tier 2 RBSLs for Subsurface Soil Exceedances of Tier 1 RBSLs, mg/kg											
			Tier 2 RBSL = Tier 1 RBSL X 10 / (number of Non-Carcinogenic Analytes >Tier 1 RBSLs)						*Tier 2 RBSL = Tier 1 RBSL X 10 / (number of Carcinogenic Analytes >Tier 1 RBSLs)*					
	Chemical / Analyte / Compound	0 - 10 feet bgs	Number of Non-Carcinogenic Analytes >Tier 1 RBSLs						Number of Carcinogenic Analytes >Tier 1 RBSLs					
			1	2	3	4	5	6	1	2	3	4	5	6
	For Gasoline & Light Hydrocarbons measured using the Montana Method for Volatile Petroleum Hydrocarbons (VPH)													
c	MTBE	**9,100**	---	---	---	---	---	---	91,000	45,500	30,333	22,750	18,200	15,167
n	Benzene	**190**	1,900	950	633	475	380	317	---	---	---	---	---	---
n	Toluene	**14,000**	140,000	70,000	46,667	35,000	28,000	23,333	---	---	---	---	---	---
c	Ethylbenzene	**1,200**	---	---	---	---	---	---	12,000	6,000	4,000	3,000	2,400	2,000
n	Xylenes	**1,900**	19,000	9,500	6,333	4,750	3,800	3,167	---	---	---	---	---	---
n	Naphthalene	**120**	1,200	600	400	300	240	200	---	---	---	---	---	---
n	C9-C10 Aromatics	**4,000**	40,000	20,000	13,333	10,000	8,000	6,667	---	---	---	---	---	---
n	C5-C8 Aliphatics	**2,000**	20,000	10,000	6,667	5,000	4,000	3,333	---	---	---	---	---	---
n	C9-C12 Aliphatics	**3,000**	30,000	15,000	10,000	7,500	6,000	5,000	---	---	---	---	---	---
	Lead Scavengers													
c	1,2-Dichloroethane (DCA)	**100**	---	---	---	---	---	---	1,000	500	333	250	200	167
c	1,2-Dibromoethane (EDB)	**7.3**	---	---	---	---	---	---	73	37	24	18.3	14.6	12.2
	For Diesel & Heavy Hydrocarbons measured using Montana Method for Extractable Petroleum Hydrocarbons (EPH)													
n	C9-C18 Aliphatics	**6,000**	60,000	30,000	20,000	15,000	12,000	10,000	---	---	---	---	---	---
n	C19-C36 Aliphatics	**1,600,000**	16,000,000	8,000,000	5,333,333	4,000,000	3,200,000	2,666,667	---	---	---	---	---	---
n	C11-C22 Aromatics	**33,000**	330,000	165,000	110,000	82,500	66,000	55,000	---	---	---	---	---	---

Example 1 – 4C

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name: Fairmont Hot Springs					Facility ID: Consultant's Day 2025										Release: 41825						
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg										Lead Scavengers		Extractible Petroleum Hydrocarbons (EPH),				
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	DCA	EDB	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE	0.019	0.000086	NE	53,000	NE	370
DEQ Tier 1 RBSLs[1], Direct Contact Construction 0 to 10 ft bgs					9,100	190	14,000	1,200	1,900	120	4,000	2,000	3,000	NE	100	7.3	NE	6,000	1,600,000	33,000
l Tier 2 Direct Contact Construction (0-10 feet)*					91,000	380	28,000	12,000	3,800	240	8,000	4,000	6,000							
SB1	Source Area	4			5,230	212	2,400	1,400	3,585	144	4,632	2,410	2,547					5,400	2,000	3,100

Example 2

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name: Fairmont Hot Springs					Facility ID: Consultants Day 2025					Release: 41825				
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg									
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE
DEQ Tier 1 RBSLs[1], Direct Contact Residential 0-2 ft bgs					67	1.7	630	8	75	3	60	90	160	NE
Calculated Tier 2 Direct Contact Residential (0-2 feet)*														
SB1	Source Area	1.5		04/18/25	40	7	213	42	108	9	315	97	264	

Analytes that exceed

- Benzene
- Ethylbenzene
- Xylenes
- Naphthalene
- C9-C10 Aromatics
- C5-C8 Aliphatics
- C9-C12 Aliphatics

Split analytes up based on effect

- Benzene
- Ethylbenzene
- Xylenes
- Naphthalene
- C9-C10 Aromatics
- C5-C8 Aliphatics
- C9-C12 Aliphatics

3 Carcinogens, 4 Non-Carcinogens

Example 2

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name: Fairmont Hot Springs					Facility ID: Consultants Day 2025									
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg									
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE
DEQ Tier 1 RBSLs[1], Direct Contact Residential 0-2 ft bgs					67	1.7	630	8	75	3	60	90	160	NE
Calculated Tier 2 Direct Contact Residential (0-2 feet)*														
SB1	Source Area	1.5		04/18/25	40	7	213	42	108	9	315	97	264	

Table 4a

Calculated Tier 2** Soil RBSLs* for Direct Contact Residential Receptor 0 - 2 feet bgs

Effects c: carcinogenic n: non-carcinogenic	Tier 1 Soil RBSLs, mg/kg Direct Contact Residential Receptor		Calculated Tier 2 RBSLs for Surface Soil Exceedances of Tier 1 RBSLs, mg/kg											
			Tier 2 RBSL = Tier 1 RBSL X 10 / (number of Non-Carcinogenic Analytes >Tier 1 RBSLs)						*Tier 2 RBSL = Tier 1 RBSL X 10 / (number of Carcinogenic Analytes >Tier 1 RBSLs)*					
	Chemical / Analyte / Compound	0 - 2 feet bgs	Number of Non-Carcinogenic Analytes >Tier 1 RBSLs						Number of Carcinogenic Analytes >Tier 1 RBSLs					
			1	2	3	4	5	6	1	2	3	4	5	6
	For Gasoline & Light Hydrocarbons measured using the Montana Method for Volatile Petroleum Hydrocarbons (VPH)													
c	MTBE	**67**	---	---	---	---	---	---	670	335	223	168	134	112
c	Benzene	**1.7**	---	---	---	---	---	---	17	8.5	5.7	4.3	3.4	2.8
n	Toluene	**630**	6,300	3,150	2,100	1,575	1,260	1,050	---	---	---	---	---	---
c	Ethylbenzene	**8.4**	---	---	---	---	---	---	84	42	28	21	16.8	14
n	Xylenes	**75**	750	375	250	188	150	125	---	---	---	---	---	---
c	Naphthalene	**2.9**	---	---	---	---	---	---	29	15	9.7	7.3	5.8	4.8
n	C9-C10 Aromatics	**60**	600	300	200	150	120	100	---	---	---	---	---	---
n	C5-C8 Aliphatics	**90**	900	450	300	225	180	150	---	---	---	---	---	---
n	C9-C12 Aliphatics	**160**	1,600	800	533	400	320	267	---	---	---	---	---	---
	Lead Scavengers													
c	1,2-Dichloroethane (DCA)	**0.67**	---	---	---	---	---	---	6.7	3.4	2.23	1.68	1.34	1.12
c	1,2-Dibromoethane (EDB)	**0.05**	---	---	---	---	---	---	0.5	0.3	0.17	0.13	0.10	0.08
	For Diesel & Heavy Hydrocarbons measured using Montana Method for Extractable Petroleum Hydrocarbons (EPH)													
n	C9-C18 Aliphatics	**290**	2,900	1,450	967	725	580	483	---	---	---	---	---	---
n	C19-C36 Aliphatics	**25,000**	250,000	125,000	83,333	62,500	50,000	41,667	---	---	---	---	---	---
n	C11-C22 Aromatics	**540**	5,400	2,700	1,800	1,350	1,080	900	---	---	---	---	---	---

DEQ MONTANA

Example 2

Table 1. Cumulative Soil Sample Laboratory Analytical Results (mg/kg)

Facility Name: Fairmont Hot Springs					Facility ID: Consultants Day 2025									
Sample Information and Field Data					Volatile Petroleum Hydrocarbons (VPH) compounds, mg/kg									
Sample ID	Location from Source Area	Sample Depth, ft bgs	PID, ppm	Date	MTBE	Benzene	Toluene	Ethyl-benzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH
DEQ Tier 1 RBSLs[1], Leaching 0-10 ft to GW					0.078	0.07	21	26	320	12	130	220	11,000	NE
DEQ Tier 1 RBSLs[1], Direct Contact Residential 0-2 ft bgs					67	1.7	630	8	75	3	60	90	160	NE
Calculated Tier 2 Direct Contact Residential (0-2 feet)*					223	5.7	1575	28	188	9.7	150	225	400	
SB1	Source Area	1.5		04/18/25	40	7	213	42	108	9	315	97	264	

Latysha will now talk about petroleum vapor intrusion (PVI)