

# RELEASE CLOSURE PACKET

The Example

## Petroleum Tank Cleanup Section – Closure Report for Petroleum Release

Submitted by: Shannon Cala  
Date: September 21, 2018

# THE FIRST PAGE

## Snap Shot:

Release Information – Who, Where, When

PTC Team Information – Who Prepared the CLOP,  
Who Reviewed the CLOP, The Reviewers Decision

Summary of the Release – What, Why, and How

Bullets that Support Closure

Facility and Petroleum Release Information			
<b>Facility Name:</b>	Winifred Farmers Oil Co.	<b>Facility ID:</b>	14-01292
<b>Address:</b>	108 Main Street	<b>Release #:</b>	3008
<b>City:</b>	Winifred	<b>Date Confirmed:</b>	09/17/96
<b>Responsible Party:</b>	CHS, Inc.	<b>County:</b>	Fergus

Closure Review Recommendations & Decision for Petroleum Release			
PTCS Project Manager:		Shannon Cala	
Report & Data Support Closure Recommendations?			
Reviewers	Yes	No	Comments (if No, then describe report/data deficiencies and propose remedies)
Allen Schiff	X		
Donnie McCurry	X		
<b>DEQ Decision on Closure:</b>		Reed Miner, Close per DEQ policy, 9/27/18	

**Summary:** A station remodel began in September 1996. Petroleum Release 3008 (Release) resulted from perforations in the diesel underground storage tank (UST) which were identified during system removal. Soil staining was noted in the tank basin and approximately 95 cubic yards of soil was removed and landfarmed. The Release is ready to be categorized as resolved (closed) based on the following completed remedial actions and information:

- The diesel UST and associated piping was removed from the site.
- Approximately 95 cubic yards of petroleum contaminated soils were landfarmed. The landfarm was closed in July of 2003.
- Subsurface soil with petroleum contamination decreases with depth and does not extend beyond 10' below ground surface. Residual subsurface soil with petroleum contamination does not exceed site specific risk-based screening levels (RBSLs).
- Groundwater is not impacted by diesel contamination at levels above RBSLs.
- There are no risks to human health or the environment from this diesel release.





# THE NEXT SECTION

## Location of Facility –

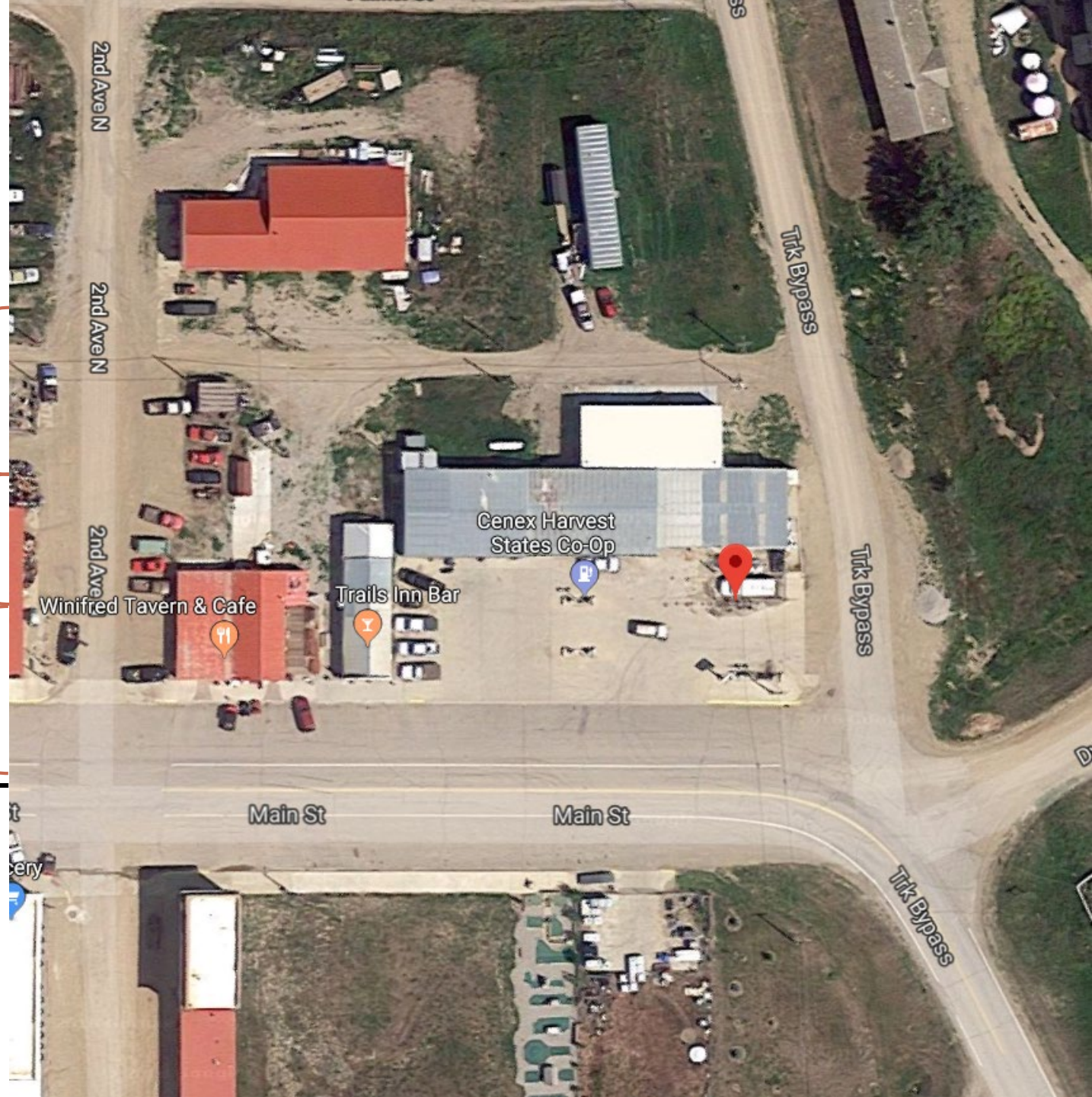
1. Street Address
2. Latitude and Longitude of the release point.
3. Surrounding Properties and Use.

## History of Ownership and Use(s) of Facility –

1. Who has owned the property
2. What type of business(es) occupied the property.
3. Proposed property use changes?

## Release Discovery, Confirmation, Cause(s) and Investigation –

1. Describe the source of the release
2. Describe the cause of the release.





# MORE PARTS



Petroleum Contamination – Type, Cause, Source, Impacts				
Petroleum Types		Sources		Known Impacts
Gasoline		UST	X	Soil – surface (<2')
Diesel	X	AST		Soil – subsurface (>2')
Heating Oil		Piping		Groundwater
Waste Oil		Spill		Vapor
Other (explain)		Other (explain)		Buried Utilities
Estimate Volume Lost (gallons)		Unknown		Other (specify)
Cause(s) of Release		Perforations to the UST		
Current Status of Fuel System(s) (list dates removed, repaired, replaced)		The leaking tank was removed in September 1996 and replaced with a new system within the same tank basin.		

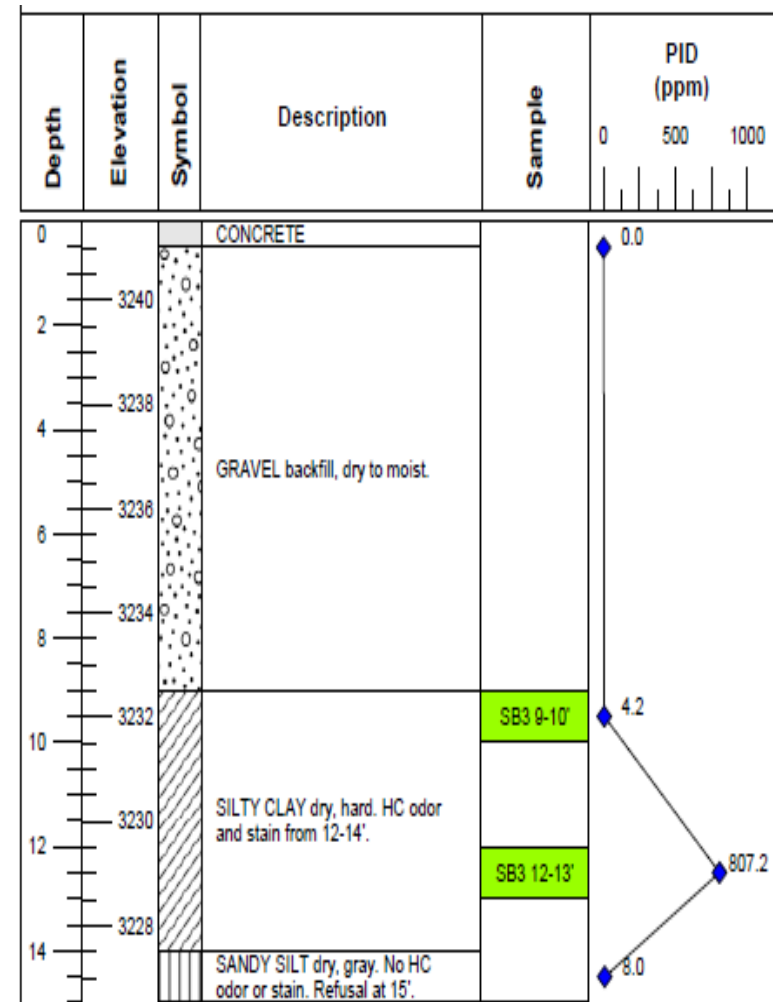
Other Releases at Facility			
Release	Confirmation Date	Date NFCA	Remedial Actions Taken (concise statement)
3040	10/11/96	NA	Surfactant injection with groundwater pumping. Investigation in 2018.

# SECTION FOUR F

## Review of the Soil Profile

### Soil Profile Summary

Depth, feet, bgs	Interval		Soil / Sediment Type and Interval Description
	Top	Interval Bottom	
	0	9	Gravel and backfill
	9	14	Clayey silt
	14	32	Silty clay





# PART 6

## Receptor –

From the Source Area state DISTANCE, DEPTH, DIRECTION, etc.

### Were the Receptors

1. Threatened
2. Impacted and/or
3. Investigated

### Are the Receptors

1. Threatened and/or
2. Impacted



**Site Name:** THE WINIFRED LIGHT HEAT AND POWER CO.  
**GWIC Id:** 178673

#### Section 1: Well Owner(s)

1) THE WINIFRED LIGHT HEAT AND POWER CO. (MAIL)  
N/A  
WINIFRED MT 59489 [07/02/1941]

#### Section 2: Location

Township	Range	Section	Quarter Sections	
21N	18E	26		
County			Geocode	
FERGUS				
Latitude	Longitude	Geomethod	Datum	
47.562172	-109.376797	TRS-SEC	NAD83	
Ground Surface Altitude		Ground Surface Method	Datum	Date
Addition		Block	Lot	
		7	1	

#### Section 3: Proposed Use of Water

There are no uses assigned to this well.

#### Section 4: Type of Work

Drilling Method:  
Status: NEW WELL

#### Section 5: Well Completion Date

Date well completed: Wednesday, July 02, 1941

#### Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.  
There are no casing strings assigned to this well.  
There are no completion records assigned to this well.  
**Annular Space (Seal/Grout/Packer)**

There are no annular space records assigned to this well.

#### Section 7: Well Test Data

Total Depth: 113  
Static Water Level:  
Water Temperature:

#### Unknown Test Method \*

Yield \_ gpm.  
Pumping water level \_ feet.  
Time of recovery \_ hours.  
Recovery water level \_ feet.

\* During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

#### Section 8: Remarks

#### Section 9: Well Log

##### Geologic Source

Unassigned

From	To	Description
0	90	BLUE SHALE
90	100	SANDY SHALE
100	113	WATER SAND

#### Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

<p><b>Name:</b> <b>Company:</b> WAREHAM <b>License No.:</b> - <b>Date Completed:</b> 7/2/1941</p>
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# SE7EN

How was the Release Cleaned Up?

- In-situ
- Ex-situ



**Elimination of Exposure Pathways and Minimizing Risks to Human Health and Environment**

**Describe / Summarize all Remediation Methods Used for Release:**

~95 cubic yards of impacted soils were excavated and successfully landfarmed.

# SECTION 8



## Soil Discussion-

- Soils Exceed Tier 1 RBSLs
- Which Soils Exceed Tier 1 RBSLs
- Can Existing Soils Impact Human Health or the Environment
- How did you Eliminate the Risk
- Was a Tier 2 Adjustment made to RBSLs
- Summarize the Soil Monitoring Data and Identify Trends

Soil Impacts - Investigation and Pathway Elimination	
Tier 1 RBSLs ever exceeded (Y/N)?	Yes
Tier 1 RBSLs extent defined (Y/N)?	Yes
<b>Initial Impacted-Soil Media:</b> (check all that apply)	
Surficial Soil (<2')	No
Subsurface Soil	Yes
Not Applicable	
Soil Pathway eliminated (Y/N)?	Yes
<b>Soil Exposure Pathway eliminated by:</b> (check all that apply)	
Lab data; Analytes < site-specific Tier 1 RBSLs	X
Remediated (in-situ)	
Excavation (confirmation sampling)	Landfarm soil samples SS-01 and SS-02 resolved the landfarm.
Other (specify)	

Alternative Soil Exposure Pathway Elimination – Direct Contact Exceedances RBCA Guidance Section 5.2; Tier-2 Adjustment to RBSLs on Table 4 (Tier 2 Master Table)				
Site-Specific Soil Exposure Methods (check all that apply):	Analyte Exceedances of RBCA Appendix-C Tier-1 RBSLs		Analyte Exceedances of Tier-2 Adjusted RBSLs	
	Number of Carcinogens	Number of Non-Carcinogens	Number of Carcinogens	Number of Non-Carcinogens
Direct Contact, Residential (0 – 2 ft, bgs)	0	0	0	0
Direct Contact, Commercial (0 – 2 ft, bgs)	0	0	0	0
Direct Contact, Excavation (>2 ft, bgs)	0	1	0	0

Compliance Monitoring -- Soil
<b>Summary of Soil Monitoring Points, Number, Locations, Time Interval (Years) of Monitoring:</b>
Confirmation soil samples collected from 10 separate locations and up to three points vertically from the boring completed in 2018 (22 years after the release was confirmed) indicate that residual petroleum soil contamination is below RBSLs at this facility.
<b>Summary of Trend(s) in Soil Attenuation and Quality:</b>
Petroleum impacts to soil exist from approximately 8 to 9 feet below ground surface and attenuate with depth. The contamination is not migrating off-site or leaching to groundwater. Migration is limited by the tight clay soils that exist on-site.



# SOIL DATA

## Cumulative Soil Data

## Tier 2 RBSL Calculation

$v_{eq} = \frac{d}{dt}$   
 $q = V_{eq} \frac{dM}{dt}$   
 $du = -V_{eq} dM$   
 $u = -V_{eq} \frac{dM}{M}$   
 $\Delta u = -V_{eq} \ln\left(\frac{M}{M_0}\right)$   
 $\sum_{i=1}^{100} i = \frac{n(n+1)}{2} = \frac{100(100+1)}{2} = 5050$   
 $PV = nRT$   
 $w = 2 * \pi * f$   
 $F = \text{net force} = \text{thrust} = \dot{m} V_{eq}$   
 $V_{eq} = \text{equivalent engine exhaust velocity}$   
 Newton's second law of motion:  
 $\frac{d(Mu)}{dt} = F = V_{eq} \frac{dM}{dt}$   
 $M^2 du + u dM = V_{eq} dM$   
 $u du = -V_{eq} \frac{dM}{M}$   
 $\Delta u = -V_{eq} \ln\left(\frac{M}{M_0}\right) = V_{eq} \ln MR = 100 \ln 2$

Location	Date	Depth bgs in feet	VPH										EPH			Lead Scavengers		
			MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	C5 - C8 Aliphatics	C9 - C12 Aliphatics	C9 - C10 Aromatics	EPH Screen	C9 - C18 Aliphatics	C19 - C36 Aliphatics	C11 - C22 Aromatics	1,2-Dibromoethane	1,2-Dichloroethane	
2018 RBSLs			<10'	0.078	0.07	21	26	320	12	220	640	130	200	900	200,000	370	0.00002	0.019
			10' - 20'	0.16	0.21	65	84	610	40	410	640	470	200	900	200,000	1,300	0.000051	0.052
			>20'	0.25	0.33	100	130	610	62	410	640	720	200	900	200,000	2,000	0.000079	0.079
Dispenser	E End Gasoline	09/23/96	3.0'	NA	0.11	0.17	0.9	4	NA	NA	NA	---	---	---	---	---	---	
Dispenser	SW End Diesel	09/23/96	3.0'	NA	NA	NA	NA	NA	NA	NA	NA	---	760	---	1,140	---	---	
SB1		08/21/18	10-11'	<0.068	<0.034	<0.068	<0.068	<0.27	<0.82	<6.8	<6.8	<1.4	72	---	---	---	---	
		08/21/18	20-21'	<0.065	<0.033	<0.065	<0.065	<0.26	<0.78	<6.5	<6.5	<1.3	<24.4	---	---	---	---	
SB2 (MW3)		08/21/18	9-10'	<0.045	<0.023	<0.045	<0.045	<0.18	1.8	6.9	25.8	40.7	213	154	47.6	52.9	---	
		08/21/18	13-14'	<0.045	0.099	<0.045	0.21	<0.18	0.83	10.4	5.4	6.3	35.7	---	---	---	---	
SB3		08/21/18	9-10'	<0.048	<0.024	<0.048	<0.048	<0.19	<0.58	<4.8	<4.8	1.7	124	---	---	---	---	
		08/21/18	12-13'	<0.036	2.20	<0.036	8.1	3.3	3.1	306	118	137	54.6	---	---	---	---	
SB4		08/21/18	9-10'	<0.24	<0.12	<0.24	<0.24	<0.96	4	<24	67.7	107	388	222	42.9	123	---	
		08/21/18	12-13'	<0.047	<0.024	<0.047	<0.047	<0.19	0.61	8.1	9.1	5.8	<23.1	---	---	---	---	
SB5		08/21/18	9-10'	<0.18	<0.089	<0.18	<0.18	<0.71	<2.1	<17.8	31.7	57.9	898	637	136	174	---	
		08/21/18	10-11'	<0.048	0.94	<0.048	3.1	1.2	3.3	173	67.2	100	<22.3	---	---	---	---	
		08/21/18	13-14'	<0.049	<0.024	<0.049	<0.049	<0.2	<0.59	<4.9	<4.9	<0.98	<22.6	---	---	---	---	
SB6 (MW2)		08/21/18	12-13'	<0.055	<0.027	<0.055	<0.055	<0.22	<0.66	13.7	39.4	20.1	<23.3	---	---	---	---	
SB7 (MW4)		08/21/18	10-11'	<0.051	<0.025	<0.051	<0.051	<0.22	<0.61	6.7	10.5	9.9	<22.7	---	---	---	---	
		08/21/18	13-14'	<0.048	<0.024	<0.048	<0.048	<0.19	<0.57	<4.8	<4.8	<0.95	<22.9	---	---	---	---	
SB8		08/21/18	9-10'	<0.11	<0.056	<0.11	<0.11	<0.45	2.4	<11.3	29.5	43.1	40	---	---	---	---	
		08/21/18	13-14'	<0.05	<0.025	<0.05	<0.05	<0.2	<0.6	<5	<5	<0.99	<22.6	---	---	---	---	
SB9 (MW5)		08/21/18	8-9'	<0.28	<0.14	<0.28	<0.28	<1.1	<3.4	<28	54.8	90.6	2,780	1,280	252	734	---	
		08/21/18	12-13'	<0.06	<0.03	<0.06	<0.06	<0.24	<0.72	<6.0	<6.0	<1.2	<23	---	---	---	---	
SB10 (MW6)		08/21/18	12-13'	<0.099	<0.049	<0.099	<0.099	<0.39	<1.2	<9.9	32.2	49.1	<23.1	---	---	---	---	

All Results in mg/kg (ppm)  
 \* Converted from DRO as Diesel  
 Exceeds the <10' to GW, surface soil RBSLs  
 Exceeds Master Table RBSLs

Tier 2 Conversions

Direct Contact, Construction					
Constituent	RBSL	Multiply	Factor	Equals	Adj. RBSL
C9-C18	900	*	8'	=	7,200



# NINER

## Groundwater Discussion-

- Is there Groundwater
- How Deep
- What is the Flow Direction
- Can Existing Groundwater Impact Human Health or the Environment
- How did you Eliminate the Risk
- Summarize the Groundwater Monitoring Data and Identify Trends



Groundwater (GW) Impacts - Investigation and Pathway Elimination	
Was GW encountered at the facility (Y/N)?	Y
Depth to GW (feet below ground surface)	>7.0
General GW flow direction	SE
Tier 1 RBSLs extent defined (Y/N)?	Yes
GW Pathway eliminated (Y/N)?	Yes
<b>GW Exposure Pathway eliminated by:</b> (check all that apply)	
Lab data: Analytes < RBSL and WQ Standards	Yes
Lab data: Analytes <WQ standards; and TPH / EPH fractions >RBSLs; and exposure pathway to receptor(s) incomplete. If Yes, explain why exceedance is not a threat:	
The subsurface water located on the facility appears to be a non-contiguous water bearing unit that is fed by surface water. The water appears to accumulate in the more porous tank basin backfill or soils used to fill the roadway. Monitoring wells installed in native soils were dry to 18' <u>bgs</u> .	

Compliance Monitoring -- Groundwater
<b>Summary of Monitoring Wells, Number, Locations, Time Interval (Years) of Monitoring:</b>
Well MW1 was installed in 1997 and was used as the injection point for surfactant. The well has been monitored and shown a declining trend in diesel range constituents. Wells MW2 through MW6 were installed in August 2018, three wells had measurable groundwater which was sampled and two were dry.
<b>Summary of Trend(s) in Groundwater Attenuation and Quality:</b>
Diesel contamination in groundwater does not exceed RBSLs in any of the sampled wells.



# GROUNDWATER DATA

- ❖ Cumulative Groundwater Data
- ❖ Well Screens Included w/GW Depth
- ❖ DRO Converted to EPH Fractions

Location	Date	MW Screened Interval	GW Depth (bgs in feet)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	VPH				EPH				Lead Scavengers		
										TPH	C5 - C8 Aliphatics	C9 - C12 Aliphatics	C9 - C10 Aromatics	EPH Screen	TEH	C9 - C18 Aliphatics	C19 - C36 Aliphatics	C11 - C22 Aromatics	1,2 Dibromoethane	1,2 Dichloroethane
<b>2018 RBSLs</b>				<b>30</b>	<b>5</b>	<b>1,000</b>	<b>700</b>	<b>10,000</b>	<b>100</b>	<b>1,000</b>	<b>650</b>	<b>1,400</b>	<b>1,100</b>	<b>1,000</b>	<b>1,000</b>	<b>1,400</b>	<b>1,000</b>	<b>1,100</b>	<b>0.004</b>	<b>4</b>
MW1	05/21/97 <sup>ˆ</sup>	10-20'		--	--	--	--	--	--	--	--	--	--	2,510,000	1,004,000	--	1,506,000	--	--	
	07/9/97 <sup>ˆ</sup>			--	--	--	--	--	--	--	--	--	--	170,000	68,000	--	102,000	--	--	
	08/18/97 <sup>ˆ</sup>			--	--	--	--	--	--	--	--	--	--	4,000	1,600	--	2,400	--	--	
	09/23/97 <sup>ˆ</sup>		12.00	--	--	--	--	--	--	--	--	--	--	70,000	28,000	--	42,000	--	--	
	10/27/97 <sup>ˆ</sup>			--	--	--	--	--	--	--	--	--	--	760,000	304,000	--	456,000	--	--	
	11/11/98 <sup>ˆ</sup>		11.21	<10	150	12	14	110	--	10,600	--	--	--	--	12,000	4,800	--	7,200	--	--
	06/7/01 <sup>*ˆ</sup>		13.63	<2	89	1	8.5	22	--	4,135	824	546	320	--	4,700	1,710	<500	<500	--	--
	04/22/03		9.55	<2	48	6.5	20	56	<1.0	34,710	270	15,420	7,100	--	--	--	--	--	--	--
	05/04/04		9.25	<2	76	47	71	270	<1.0	102,560	420	70,690	1,000	--	255,500	--	--	--	--	--
	04/22/05		9.69	<2	17	<0.5	<0.5	19	<1.0	440	81	230	96	--	29,540	--	--	--	--	--
08/24/18	8.02	<1	1,230	5,920	415	3,420	122	22,500	7,900	2,370	1,370	23,900	1,840	477	871	495	<0.01	11.5		
MW2	08/24/18	8-18'	8.88	<1	<0.5	<0.5	10	<2	6.7	245	72.6	33	102	266	266	--	--	--	<0.01	<0.5
MW3	08/24/18	5-15'	7.14	<1	<0.5	<0.5	0.65	<2	<5	91.4	27.7	21.4	28.7	799	799	--	--	--	<0.0099	<0.5
MW4	08/24/18	6-16'	8.05	<1	4.5	<0.5	1.3	<2	<5	189	76.7	31.5	60.9	836	836	--	--	--	<0.0099	2.3
MW5	08/24/18	8-18'	DRY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW6	08/24/18	8-18'	DRY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

All results in µg/L (ppb)  
<sup>\*</sup> Lab received at 10°C  
<sup>ˆ</sup> Converted from DRO as Diesel

# 10-4

PVI-Is there a risk?

Petroleum-Vapor Intrusion (PVI) Assessment	
PVI assessed for this Release (Y/N)?	No-the pathway is eliminated based on fuel type and the vertical and horizontal distance of contamination to any at risk receptors.
PVI impact related to this Release (Y/N)?	No
If Yes, explain results, sample points, and mitigation:	





# 10-4 PART TWO

Surface Water-Is there a risk?

## Surface Water Assessment

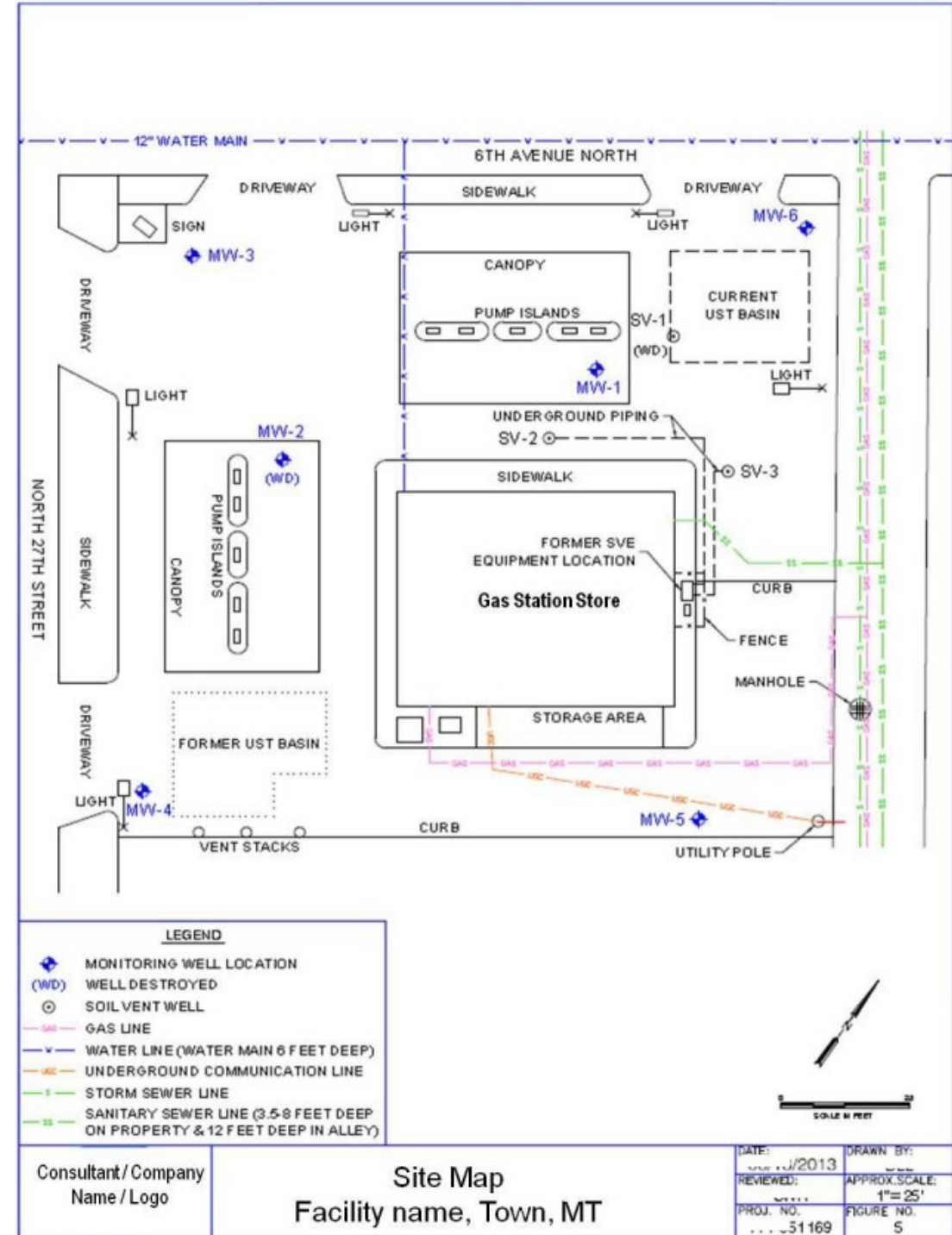
Surface Water assessed for this Release (Y/N)?	No-Dog Creek is more than 1,000' E.
Surface Water impacted by this Release (Y/N)?	No
If Yes, explain results, sample points, and mitigation:	



# SNAKE EYES

## Reference Documents:

- 24-Hour Report
- 30-Day Report
- Maps-
  - Location Map
  - Area Map
  - Site Map(s)
  - System Maps
  - Potentiometric Map
- Cumulative Analytical Tables





# Questions

