

PMZ

PMZ LIVE

AT GREEN TOWN
ON THE ROCKS

WALKERMAN'S LAKEFRONT HARBOUR



6:00 PM

Petroleum Release Resolution by Petroleum Mixing Zone (PMZ)

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What is a PMZ?

When Appropriate?

Defined area for a Petroleum Release

Petroleum compounds exceed water quality standards & RBSLs

Requires certain conditions

Release resolved: Deed Restriction & Environmental Easement

Section H of the Closure Packet Checklist:

Petroleum Mixing Zones [ARM 17.56. 607 and DEQ Technical Guidance]

1. Have owners of all parcels of real property on which there are groundwater impacts been contacted and agreed to deed notice restrictions, easements, or restrictive covenants that are attached to apply to the real estate parcel? [ARM 17.56.607 (10)(i)-(l)]
2. Does groundwater monitoring indicate that the extent and magnitude of the dissolved contaminant plume has been stable or decreasing under fluctuating hydrogeologic conditions for a period of monitoring determined by the department to be sufficient to detect unacceptable risks to human health and safety? [ARM 17.56.607 (10)(g)]
3. Has the source area contamination been removed to the maximum extent practicable, and has any remaining source area contamination been demonstrated to not pose an unacceptable present or future risk to human health, safety, or the environment? [ARM 17.56. 607 (10)(h)]
4. Has the downgradient boundary of the dissolved contaminant plume been determined, by documented investigations, and is it less than or equal to 500 feet from the origin of the release? [ARM 17.56.607 (10)(i)]
5. Are drinking water wells or surface water 500 feet or more from the established edge of the PMZ? [ARM 17.56.607 (10)(j)]
6. Has an adequate demonstration been made to indicate that conditions are currently and will likely remain suitable for natural attenuation? [ARM 17.56.607 (11)(b)]

1. Have owners of all parcels of real property on which there are groundwater impacts been contacted and agreed to deed notice restrictions, easements, or restrictive covenants that are attached to apply to the real estate parcel? [ARM 17.56.607 (10)(i)-(l)]

If the release exceeds the facility property a recorded easement, restrictive covenant, or another institutional control

Not extend beyond 500 feet from the source

Not within 500 feet of an existing drinking water well or surface water

Risks to human health and safety are reduced to acceptable levels

2. Does groundwater monitoring indicate that the extent and magnitude of the dissolved contaminant plume has been stable or decreasing under fluctuating hydrogeologic conditions for a period of monitoring determined by the department to be sufficient to detect unacceptable risks to human health and safety? [ARM 17.56.607 (10)(g)]

Monitoring indicates the extent & magnitude of the dissolved contaminant plume.

Period of monitoring that is determined to be sufficient to detect unacceptable risks to human health and safety.

3. Has the source area contamination been removed to the maximum extent practicable, and has any remaining source area contamination been demonstrated to not pose an unacceptable present or future risk to human health, safety, or the environment? [ARM 17.56. 607 (10)(h)]

Source contamination has been removed to the maximum extent practicable

Does not pose a present or future risk to human health, safety, or the environment.

4. Has the downgradient boundary of the dissolved contaminant plume been determined, by documented investigations, and is it less than or equal to 500 feet from the origin of the release? [ARM 17.56.607 (10)(i)]

Down gradient boundary of the Release will be determined and documented by a Remedial Investigation.

Contaminate Plume must be within 500-foot buffer zone of source.

5. Are drinking water wells or surface water 500 feet or more from the established edge of the PMZ? [ARM 17.56.607 (10)(j)]

Plume must be contained within 500-foot buffer zone of source.

Wells for recreation or irrigation use must be beyond buffer zone.

6. Has an adequate demonstration been made to indicate that conditions are currently and will likely remain suitable for natural attenuation? [ARM 17.56.607 (11)(b)]

Demonstrated through modeling and trendlines.

Residual contamination from the release will be addressed by natural attenuation.

Cleaned up to Maximum extent practicable

PMZ may be appropriate when:

- (a) Source material removed to the maximum extent practicable.
- (b) Extent and magnitude of petroleum contamination defined.
- (c) Natural breakdown or attenuation is occurring within the plume.
 - Demonstrated through modeling or a trendline, with an estimation when it will drop below DEQ 7 levels.
- (d) No Further Corrective Action is reasonably required at the site.

Cleaned up to Maximum extent practicable

Easement, restrictive covenant, or other institutional controls for adjoining property

- All free product has been removed to the maximum extent practicable
- Remaining source contamination does not pose a risk to present or future human health, safety, or the environment

Challenges

- Impacted 3rd Parties
- Easements
- Institutional Controls

Institutional Controls

- Deed Restrictions
- Environmental Easements
- Zoning restrictions
- Groundwater use Restrictions
- Wellhead Protection Areas
- Permit Requirements
- Environmental Notices

Fun Facts

PMZ for closure of petroleum releases was passed in 2011.

- Remember some residual petroleum contamination can remain in the soil and groundwater, but the plume must be shrinking, and no further cleanup actions are required.

Only 7 PMZ closures have been approved of as to date.

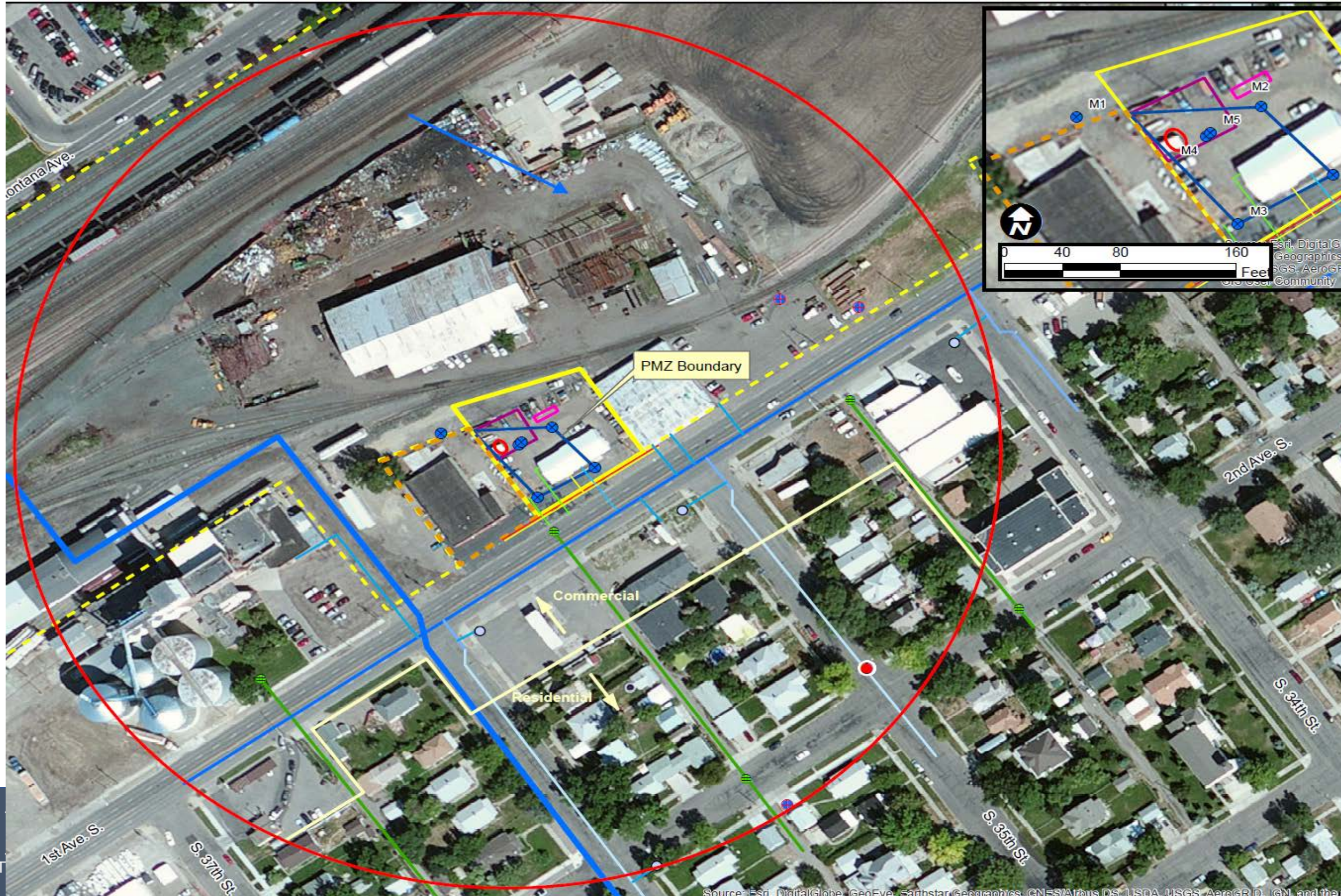
PMZ is voluntary by owner.

- A convenience cannot be force upon a property owner.



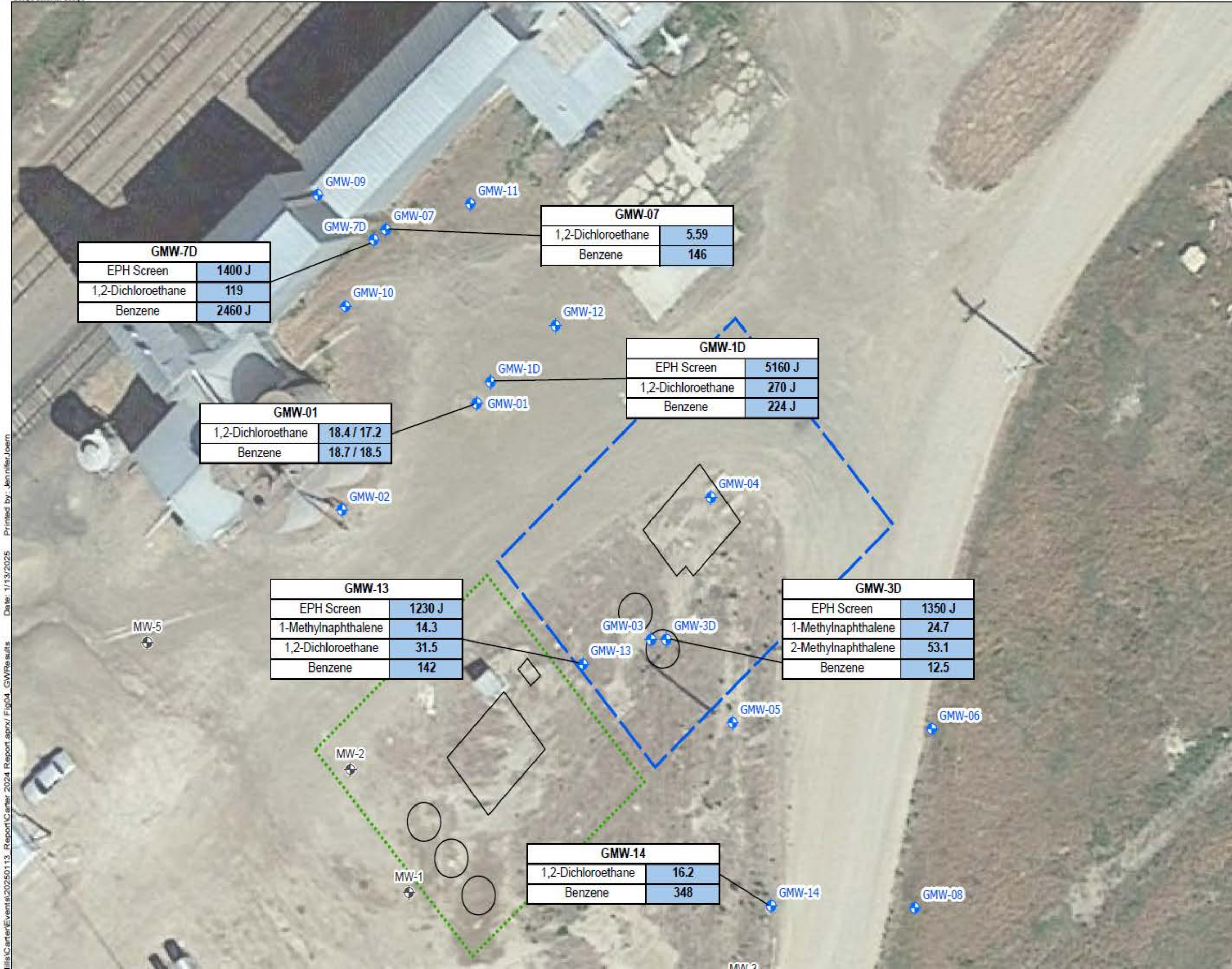
Crighton Distributors Inc. Release 4406

- Direct dermal exposure pathways not complete.
- GW contamination limited to property.
- Depth to water interval is approximately 7 to 10 feet bgs and is overlain by low permeability clay.
- Soil exceeding DEQ screening levels has been excavated to the extent practicable.
- The dissolved phase plume is stable and occupies an area confined to Facility property.
- No water supply wells or utilities are located within the 500-foot PMZ receptor radius.
- Facility is unoccupied and no occupied structures are currently present.
- Water quality of the aquifer is non-potable.
- BNSF does not intend to sell or change land use of property.
- Continued GWM could require more than 50 years.
- Remediation goals will eventually be met through natural attenuation.



Walters Bulk Plant Release 4284

- Direct dermal exposure pathways not complete.
- GW contamination limited to property.
- Depth to water interval is approximately 15 feet bgs and is overlain by low permeability clay.
- Soil containing COC's exceeding DEQ screening levels has been excavated to the extent practicable.
- The dissolved phase plume is stable and occupies an area confined to Facility property.
- No water supply wells or utilities (except for a short section of the sanitary sewer) are located within the 500-foot PMZ receptor radius
- Water quality of the aquifer is non-potable.
- BNSF does not intend to sell or change land use of property.
- Continued GWM could require more than 30 years
- Remediation goals will eventually be met through natural attenuation.



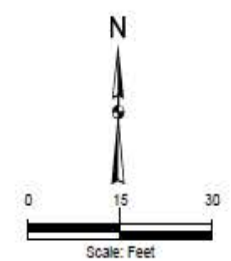
Legend

- Monitoring Well
- Mountain View Co-Op Groundwater Monitoring Well
- Mountain View Co-Op Original Lease Site
- General Mills Bulk Site
- Co-Op Former Buildings

Chemical	Units	MT TIER 1 RBSL	MT DEQ- 7
MADEP EPH			
C11-C22 Aromatics	ug/l	1100	--
C9-C18 aliphatics	ug/l	3000	--
EPH Screen	ug/l	1000	--
SVOCs			
1-Methylnaphthalene	ug/l	11	--
2-Methylnaphthalene	ug/l	36	--
VOCs/Lead Scavengers			
1,2-Dichloroethane	ug/l	4	4
Benzene	ug/l	5	5

Notes:

- Locations are approximate.
- Samples were collected on 7-8 August 2024.
- All results are shown in ug/L (micrograms per liter).
- Only Exceedances are shown.
- J = Estimated Value.
- Duplicate values are shown separated by a "/".





Conclusion

PMZ is not a short cut to closure

PMZ closure requires more work than a normal closure

PMZ still requires as much cleanup as practicable

Connect with us!

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