



PERSONAL AND CONFIDENTIAL

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June 27, 2017

Washington Department of Ecology  
Attn: Aaren Fiedler, toxic Cleanup Program  
Southwest Regional Office  
300 Desmond Drive SE  
Lacy, Washington 98504  
360.407.7437  
[Aaren.Fiedler@ecy.wa.gov](mailto:Aaren.Fiedler@ecy.wa.gov)

RE: 24-Hour Fuel LLC, 16835 Lewis River road, Cougar, Washington 98616  
(Cleanup Site ID: 13289, Facility/Site ID 15218, VCP Project ID SW1593)

Dear Mr. Fielder:

As discussed with Nick Acklam with the Washington Department of Ecology, we offered to screen the existing site data using the State's Model Remedy Guidance for petroleum impacted site. Below are requirements from the State's model remedy guidance and site-specific information on how this site meets those requirements.

- The site investigation must document that petroleum hydrocarbons consisting of gasoline, middle distillates/oils, or heavy fuels/oils and their constituents are the only contaminants present in soil.
  - Impacts appear to be related to gasoline-range petroleum hydrocarbons.
- **Affected Media.** An adequate characterization of the site is necessary to confirm that the only media impacted by the contamination is soil.
  - Only soil is impacted.
- Soil cleanup levels must address:
  - **Soil Direct Contact:**
    - Option 2: Apply the generic TPH cleanup level of 1500 mg/kg discussed above. The 1500 mg/kg level applies to situations where only TPH-Gx is present or for mixtures that include TPH-Gx.
      - Maximum soil concentration (620 mg/Kg, gasoline-range petroleum hydrocarbons, or GRO) is below the 1,500 mg/Kg generic TPH Clean-up Level.

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- **Soil to groundwater pathway:**
  - Additional data collected demonstrates impacts limited to shallow depth interval between 10.5- and 11.5 feet depth, and have not likely migrated to ground water (not encountered at 20-foot depth, suggesting approximately 10 feet of hydraulic separation).
- **Terrestrial Ecological Evaluation.** The site must: a) meet the criteria in WAC 173-340-7491 and therefore qualify for an exemption for a terrestrial ecological evaluation, or b) be eligible to complete a simplified terrestrial ecological evaluation.
  - WAC 173-340-7491: All soil contaminated with hazardous substances is, or will be, covered by buildings, paved roads, pavement, or other physical barriers that will prevent plants or wildlife from being exposed to the soil contamination. To qualify for this exclusion, an institutional control shall be required by the department under WAC 173-340-440.
    - Site is overlain with asphalt parking/drive surfaces and subject building (market).
- **Vapor Intrusion (VI) Pathway.** Prepare a conceptual site model (CSM). If the specified distances are met, then the VI pathway can be ruled out.
  - If soil is contaminated with one or more of the substances in Appendix B, Ecology recommends that soil gas (and/or indoor air) usually be sampled to determine the potential vapor intrusion threat to nearby buildings.
    - The vertical separation distance in EPA's guidance document is not met. GRO, ethylbenzene and total xylenes were the only constituents detected in soil, of which ethylbenzene and total xylenes are listed in Appendix B of Ecology's VI guidance document. To further assessment this pathway, ENW developed a simple vapor intrusion screening analytical model with the following assumptions:

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- Approximately 51.3 cubic yards of impacted soil (assuming a radius of 21 feet and a thickness of 2-feet, assume half the distance to boring B2, which showed no impacts to soil).
- 1700 square feet of building area with 10-foot ceiling heights (conservative as assumes no attic space).
- Soil bulk density: 1.4 g/cc
- 0.00028 volumes of indoor air exchanged each second
- 25-year exposure duration (to calculate the total volume of indoor air exposed to)
- The analytical model assumes 100% of each contaminant will volatilize into the indoor air space for the entire exposure duration, so is very conservative. Model output suggests that none of these constituents present a human health risk via the vapor intrusion pathway, and the cumulative risk for all three of these constituents from this pathway is below a Hazard Index of 1.0. Model output is attached.
- All the model remedies in this document provide for removing the contaminant source as well as the impacted soil, so that:
  - The remaining soil meets the cleanup levels established in accordance with MTCA;
    - Only GRO exceeds its Method A cleanup-level, none of the other constituent exceed their respective Method A or B cleanup levels.
- If structural impediments such as buildings, utility lines, or public roads prevent complete removal of the contaminated soil, the remaining residual contamination will not impact other media including groundwater or indoor air quality.
  - In cases with structural impediments, contaminated soil must be removed to the greatest degree practicable. This generally means that the contamination is not accessible due to the presence of structures (e.g. buildings or roadways) or due to safety concerns related to working in close

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proximity to utility lines or product piping systems. In these situations, institutional controls (typically environmental covenants) that meet the provisions in WAC 173-340-450 must be implemented to ensure the remedy remains protective.

- The area of impacted soil is overlain by both asphalt and utilities and is near a major highway. The area is also adjacent to the current Lakeside Market. Therefore, the area of impacted soil is not accessible for cost-efficient removal. Residual impacted soil should be managed with a Contaminated Media Management Plan.
- Selected Remedy:
  - Model Remedy 4. This model remedy is for situations where Method B has been selected to establish the cleanup levels and removal of the contaminated soil is sufficient to meet the calculated Method B levels. The Method B soil cleanup levels must be determined using the provisions contained in WAC 173-340-740(3).

**Table 1. Summary of Model Remedies**

Option	Soil Cleanup Method	Is use of the 1,500 mg/kg generic TPH CUL relevant?	Meets selected CUL throughout property?	IC required on property?
1	Method A - Unrestricted	No	Yes	No
2	Method A - Industrial	No	Yes, to Method A Industrial	Yes
3	Method A – Either Unrestricted or Industrial	No	No	Yes
<b>4</b>	<b>Method B</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>
5	Method B	Yes	No	Yes
6	Method C	Yes	Yes	Yes
7	Method C	Yes	No	Yes

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Based on this assessment, it appears the site meets the requirements of Model Remedy 4. Should you have any questions regarding these inspections, please do not hesitate to phone.

Kind regards,



*Lynn D. Green*

Lynn D. Green  
Exp. 12/14/2017

Lynn Green, L.E.G., Project Manager  
EVREN Northwest, Inc.

Attachments: ENW VI Assessment Model Output

CC: Patricia Jackman, **24-Hour Fuel, LLC** (no attachments, sent electronically)  
Nick Acklam, **Washington Department of Ecology** (no attachments, sent electronically)

ATTACHMENT  
ENW VI MODEL OUTPUT

**Volume of contaminated soil remaining (inverted cone)**

Vertical Extent (h <sub>L</sub> ) ft	Bottom radius R, ft	Top radius r, ft	Volume (ft <sup>3</sup> )	Volume (yd <sup>3</sup> )
2	21	21	2769.48	51.29

(divide by 2 if impacts only on one end of tank)

**Volume of indoor space**

1st fl area (ft <sup>2</sup> )	ceiling height (ft)	Volume (ft <sup>3</sup> )
1700	10	34000

(with basement, multiply by 2)

**Weight of Contaminated Soil**

Bulk Density (g/cc)	BD (Kg/yd <sup>3</sup> )	Volume (yd <sup>3</sup> )	Weight (Kg)
1.4	1071.155318	51.29	54935.99

**Total amount of GRO**

Analytical result (mg/Kg)	Weight of soil (Kg)	Total GRO (mg)
620	54935.99	34060311.15

**Total volume of air (30-yr exposure period)**

Total indoor air volume	Indoor air exchange rate (volumes/sec)	Exposure period (yr.)	Exposure period (s)	Total indoor air volume (ft <sup>3</sup> )
34000	0.00028	30	9.46E+08	9.01E+09

**Calculated concentration of GRO in indoor air**

Total indoor air volume (ft <sup>3</sup> )	Total indoor air volume (M <sup>3</sup> )	Total amount of GRO (mg)	Total amount of GRO (ug)	Concentration (ug/m <sup>3</sup> )	Method B Indoor Air Cleanup Level (ug/m <sup>3</sup> )	Exceed CUL?
9.01E+09	2.55E+08	34060311.15	3.41E+10	1.34E+02	2400	NO

Risk Driver	HI	ECR
NC	0.056	---

**Volume of contaminated soil remaining (inverted cone)**

Vertical Extent ( $h_L$ ) ft	Bottom radius R, ft	Top radius r, ft	Volume ( $ft^3$ )	Volume ( $yd^3$ )
2	21	21	2769.48	51.29

(divide by 2 if impacts only on one end of tank)

**Volume of indoor space**

1st fl area ( $ft^2$ )	ceiling height (ft)	Volume ( $ft^3$ )
1700	10	34000

(with basement, multiply by 2)

**Weight of Contaminated Soil**

Bulk Density (g/cc)	BD ( $Kg/yd^3$ )	Volume ( $yd^3$ )	Weight (Kg)
1.4	1071.155318	51.29	54935.99

**Total amount of Ethylbenzene**

Analytical result (mg/Kg)	Weight of soil (Kg)	Total Ethylbenzene (mg)
0.17	54935.99	9339.12

**Total volume of air (30-yr exposure period)**

Total indoor air volume	Indoor air exchange rate (volumes/sec)	Exposure period (yr.)	Exposure period (s)	Total indoor air volume ( $ft^3$ )
34000	0.00028	30	9.46E+08	9.01E+09

**Calculated concentration of Ethylbenzene in indoor air**

Total indoor air volume ( $ft^3$ )	Total indoor air volume (M3)	Total amount of Ethylbenzene (mg)	Total amount of Ethylbenzene ( $\mu g$ )	Concentration ( $\mu g/m^3$ )	Method B Indoor Air Cleanup Level ( $\mu g/m^3$ )	Exceed CUL?
9.01E+09	2.55E+08	9339.12	9.34E+06	3.66E-02	460	NO

Risk Driver	HI	ECR
NC	0.000080	---

**Volume of contaminated soil remaining (inverted cone)**

Vertical Extent ( $h_L$ ) ft	Bottom radius R, ft	Top radius r, ft	Volume ( $ft^3$ )	Volume ( $yd^3$ )
2	21	21	2769.48	51.29

(divide by 2 if impacts only on one end of tank)

**Volume of indoor space**

1st fl area ( $ft^2$ )	ceiling height (ft)	Volume ( $ft^3$ )
1700	10	34000

(with basement, multiply by 2)

**Weight of Contaminated Soil**

Bulk Density (g/cc)	BD ( $Kg/yd^3$ )	Volume ( $yd^3$ )	Weight (Kg)
1.4	1071.155318	51.29	54935.99

**Total amount of Xylenes**

Analytical result (mg/Kg)	Weight of soil (Kg)	Total Xylenes (mg)
1.1	54935.99	60429.58

**Total volume of air (30-yr exposure period)**

Total indoor air volume	Indoor air exchange rate (volumes/sec)	Exposure period (yr.)	Exposure period (s)	Total indoor air volume ( $ft^3$ )
34000	0.00028	25	7.88E+08	7.51E+09

**Calculated concentration of Xylenes in indoor air**

Total indoor air volume ( $ft^3$ )	Total indoor air volume (M3)	Total amount of Xylenes (mg)	Total amount of Xylenes (ug)	Concentration ( $ug/m^3$ )	Method B Indoor Air Cleanup Level ( $ug/m^3$ )	Exceed CUL?
7.51E+09	2.13E+08	60429.58	6.04E+07	2.84E-01	46	NO

Risk Driver	HI	ECR
NC	0.0062	---