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Date: August 22, 2024
Subject: RE: Ecology Comments on Soil Vapor and Ambient Air Sampling Results
Texaco 211577 Monterey
631 Queen Anne Avenue N
Seattle, WA 98109
Facility Site ID.: 77774779
Cleanup Site ID: 6663
Agreed Order No. 16537

Dear Ms. Song:

On behalf of Chevron Environmental Management Company (CEMC), Arcadis U.S., Inc. (Arcadis) has prepared this response to the Washington State Department of Ecology (Ecology) comment letter dated July 10, 2024 (Letter; Attachment A). The Letter presented comments on the *Summary of Soil Vapor and Ambient Air Sampling Events – April and November 2022* memorandum (Memo; Arcadis 2023), submitted to Ecology on June 16, 2023 for the former Texaco 211577 Monterey facility (site). The site is generally located at 631 Queen Anne Avenue North in Seattle (the Property) and consists of the Property and multiple nearby properties and rights-of-way. Nearby properties include the Del Roy Apartments (25 W Roy Street), located adjacent to the Property to the west, and the Monterey Apartments (622 1st Avenue W), located adjacent to the Property to the southwest. Following review of the Memo, Ecology provided the following comments in the Letter:

1. The indoor air quality in Del Roy and Monterey Apartments basement does not meet the MTCA cleanup standards.
2. Ecology requires mitigation activities to reduce the vapor intrusion risk to Del Roy and Monterey Apartments.

Additionally, Ecology requested that CEMC implement necessary mitigation activities or submit a draft Mitigation System Work Plan (if a mitigation system was necessary) no later than 45 days after the receipt of the Letter (by August 25, 2024).

To support the findings in the Letter, Ecology also provided a risk assessment worksheet that evaluates compliance with MTCA Method B Cleanup Levels (CULs) for petroleum in indoor air at the Del Roy and Monterey Apartments.

Following receipt of the Letter, a virtual meeting was held on July 24, 2024, between CEMC, Ecology, and Arcadis to further discuss the site and review historical site data including vapor intrusion investigation results. Based on the results of these investigations, Arcadis' conclusions differ with those presented by Ecology. During the meeting, Ecology agreed that a formal response to comments letter could be submitted by August 25, 2024, in lieu of mitigation activities or submittal of a draft Mitigation System Work Plan as requested in the Letter.

Based on the data and information collected to date at the site, our responses to Ecology's comments are presented below. Ecology's comments are shown in italics, with responses following in plain text.

Ecology Comment 1:

The indoor air quality in Del Roy and Monterey Apartments basement DOES NOT meet the MTCA cleanup standards.

Based on the data provided in Table 1, both air samples that were collected from Del Roy and Monterey Apartments in November 2022 sampling event, had calculated non-carcinogenic HI greater than 1. These results do not meet the MTCA cleanup standards. The non-carcinogenic hazard is mainly caused by long-chain aliphatic hydrocarbons (aliphatics EC >8-12).

Response to Comment 1:

Based on the extensive remedial activities completed to remove residual petroleum impacts at the site, the results of historical vapor intrusion investigations completed to date, and current soil and groundwater conditions, Arcadis concludes that indoor air impacts that may be present at the Del Roy and Monterey Apartments are likely not attributed to any remaining subsurface petroleum impacts that may still be present at the site.

Vapor intrusion concerns in the vicinity of the Monterey and Del Roy Apartments were originally documented as reported gasoline odor and light non-aqueous phase liquid (LNAPL) observed in a basement sump near the Monterey Apartments in 1978. In response, gasoline vapor alarms were installed and LNAPL recovery was conducted between 1986 and 1989. In 1990 and 1991, a total of 31 soil vapor probes were installed on- and off-property and elevated benzene concentrations were detected in soil vapor near the Monterey and Del Roy apartment buildings. This investigation was documented in the 1991 *Phase I Remedial Investigation Report* (Ecology and Environment Inc. 1991).

As a result of this discovery and investigation, a soil vapor extraction (SVE) system was installed in the southwest corner of the property in 1993 and operated until December 1997. The SVE system was restarted in April 2003 and operated until October 2005, when it was replaced with a dual-phase extraction (DPE) system. The DPE system operated from 2006 to 2008. The DPE system was successful at removing approximately 45,000 pounds of soil vapor-phase hydrocarbon mass.

Following these remedial activities, a follow-up soil vapor and indoor air investigation was conducted in 2009 at the site. The results of the 2009 soil vapor investigation indicated that sub-slab soil vapor was not adversely impacting indoor air quality within the Del Roy and Monterey Apartments. Indoor air samples collected during the investigation exceeded the MTCA Method B CUL for benzene; however, similar concentrations were detected in outdoor air samples indicating the indoor detections were due to ambient air. The results of the 2009 investigation also concluded that indoor air concentrations were within the range of typical urban background concentrations (EPA 2011). This investigation was documented in the *August 2009 Vapor Sampling Event Summary Report* (SAIC 2010).

The property was redeveloped in 2021-2022 with an eight-story mixed use apartment building and two levels of underground parking. As part of a lot line to lot line excavation for the underground parking, a total of approximately 16,745 tons of petroleum contaminated soil was removed from the property. As part of the continuing site remedial investigation (RI), and as documented in the 2023 Memo, Arcadis returned to the Monterey and Del Roy Apartments in April and November 2022 to evaluate soil vapor conditions and confirm the

results observed in 2009. Benzene was not detected in soil vapor during both of the sampling events conducted at the Del Roy Apartments. At the Monterey Apartments, benzene was only detected in the sample (and duplicate) collected from MVP-2 in April 2022 at concentrations of 4.3 µg/m^3 and 4.6 µg/m^3, respectively, which were below the MTCA Method B Soil Gas Screening Level of 11 µg/m^3. A site-specific CUL for total petroleum hydrocarbons (TPH) was calculated for the site in accordance with Ecology's 2022 Guidance for Evaluating Vapor Intrusion in Washington State, and all soil vapor samples collected in 2022 were well below the site-specific CUL (Arcadis 2023). The sub-slab soil vapor analytical results and the site-specific TPH CUL calculations for the site are presented in the attached Tables 1 and 2, respectively.

Indoor and ambient air samples were collected concurrently in each apartment building during the 2022 sampling events. The results indicated that TPH in IA-01-North (Del Roy Apartments basement) exceeded the 2023 Generic MTCA Method B Indoor Air CUL (46 µg/m^3) during the November 2022 sampling event, while IA-02-South (Monterey Apartments basement) exceeded the 2023 Generic MTCA Method B Indoor Air CUL during both 2022 sampling events. The detected benzene concentrations were also slightly above the MTCA Method B Indoor Air CUL (0.32 µg/m^3) in both apartment buildings during each 2022 sampling event (Arcadis 2023). The attached Table 3 presents the indoor and ambient air analytical results. However, as discussed during the July 24, 2024 meeting, even when the conservative Ecology default attenuation factor of 0.03 is applied to the 2022 TPH concentrations in soil vapor, the derived indoor air concentrations are less than the reported indoor air concentrations. Refer to the specific comparisons presented below:

- In the Del Roy Apartments in November 2022, EC >8-12 aliphatics were detected at 420 µg/m^3 in soil vapor (DRVP-2). Applying the 0.03 attenuation factor to that soil vapor concentration, the conservative expected contribution to indoor air would be 12.6 µg/m^3. However, the reported EC >8-12 aliphatics concentration in indoor air in November 2022 (65 µg/m^3) was higher, indicating that soil vapor is not a substantial contribution to indoor air quality, but rather a background or ambient source is contributing to elevated indoor air concentrations.

- Similarly, in the Monterey Apartments in November 2022, EC >8-12 aliphatics were detected at 630 µg/m^3 in soil vapor (MVP-1 duplicate). Applying the 0.03 attenuation factor to that soil vapor concentration, the conservative expected contribution to indoor air would be 18.9 µg/m^3. However, the reported EC >8-12 aliphatics concentration in indoor air in November 2022 (76 µg/m^3) was higher, indicating the same conclusion from the Del Roy Apartments data, that soil vapor is not a substantial contribution to indoor air quality, but rather a background or ambient source is contributing to elevated indoor air concentrations.

Additionally, in accordance with a multiple lines of evidence approach, which is the recommended method in current guidance (EPA 2015), to have a situation where vapor intrusion is the primary contribution to indoor air concentrations, the derived indoor air concentrations, when the conservative 0.03 attenuation factor is applied to soil vapor concentrations, should be greater than measured indoor air concentrations. As discussed above, there were no derived indoor air concentrations that exceeded measured indoor air concentrations when the default 0.03 attenuation factor was applied to corresponding soil vapor concentrations.

There were five detections of EC >8-12 aliphatics in soil vapor in April 2022 that did not exceed the corresponding indoor air concentration with the attenuation factor applied. EC >8-12 aliphatics were detected five times between both buildings in November 2022, and none of these detections exceeded the corresponding indoor air

concentration when the attenuation factor is applied. Therefore, soil vapor is not a significant contributor to indoor air concentrations.

Based on the lines of evidence, the indoor air concentrations above the CULs observed in the Monterey and Del Roy Apartments in 2022 are attributed to ambient air infiltration into the buildings or household products, chemicals, or materials inside the buildings. The site area is a dense, high-traffic urban environment, and the outdoor air samples collected during the April and November 2022 sampling events exhibited comparable concentrations to the indoor air samples.

To support comments included in the Letter, Ecology provided an informal risk assessment worksheet that was used to estimate potential indoor air risk and evaluate compliance with MTCA Method B CULs for petroleum in indoor air at the Del Roy and Monterey Apartments. Based on the calculations presented in the risk assessment worksheet, Ecology determined that both air samples collected from Del Roy and Monterey Apartments during the November 2022 sampling event had a non-carcinogenic Hazard Index (HI) greater than 1. Arcadis and CEMC respectfully disagree with these findings. Several overly conservative approaches and estimates were used in the risk assessment worksheet that are not considered appropriate. Refer to specific examples below:

- Risk calculations were based on adjusted indoor air concentrations. Specifically, ambient air concentrations were subtracted from the measured indoor concentration prior to calculating exposure risk. In the adjusted concentration calculations provided by Ecology in the risk assessment worksheet, only the upwind ambient values were used. Typically, 'upwind' is only an indication of the wind direction at the time of sample collection. However, wind direction is variable. As a result, the highest value between 'upwind' and 'downwind' should be used to calculate the adjusted indoor air concentrations.
- There were inconsistencies noted for values used in adjusted indoor air concentration calculations when laboratory analytical results were non-detect. Typically for risk assessments, half of the reported detection limit should be used to represent non-detect values if that analyte was detected anywhere (indoor air or ambient air) during the investigation and zero should be used to represent non-detect values if that analyte was not detected at all during the investigation; however, this approach was not consistently applied in the risk assessment worksheet. In some cases, zero was used for non-detect values in ambient air although that analyte was detected elsewhere on-site. Selectively choosing alternative methods for representing non-detect values is not considered appropriate; a consistent method should be used.
- EPA guidance recommends evaluating indoor air risk by calculating indoor and outdoor risks separately and comparing the two results (EPA 2015). This approach eliminates any bias from using adjusted values prior to risk calculation.

The risk assessment worksheet utilized has not been published by Ecology nor offered for public comment to date. Typically, during the public comment period, deficiencies in risk assessment worksheet calculations, such as these presented above, would be addressed by the VI practice community as a whole, prior to publication. Arcadis recommends Ecology provide this risk assessment worksheet for public comment prior to its use for determining risks and decision making for sites subject to Ecology oversight.

Ecology Comment 2:

Ecology requires mitigation activities to reduce the vapor intrusion risk to Del Roy and Monterey Apartments.

Response to Comment:

Based on the lines of evidence presented above including the soil vapor concentrations, Arcadis and CEMC respectfully disagree with the assumption made by Ecology that all indoor air concentrations detected in April and November 2022 are attributable to vapor intrusion. The evaluation completed by Ecology as presented in the Letter, which did not consider soil vapor results, is not appropriate as a multiple lines of evidence approach and does not appear to have been utilized in accordance with current industry guidance. Based on the results of the 2009 and 2022 soil vapor investigations, soil vapor is not impacting indoor air quality at the Monterey and Del Roy Apartments nor causing the CUL exceedances. Therefore, any indoor air quality issues at the properties are likely not attributable to residual site subsurface impacts.

As discussed in the July 24, 2024 meeting, Arcadis and CEMC propose to schedule a meeting following Ecology receipt and review of this response letter.

We appreciate the opportunity to provide this response to comments letter and your continued cooperation on this project. Please let us know if you have any questions or need any additional information.

Sincerely,
Arcadis U.S., Inc.

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Subject Matter Expert

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Eric Hetrick, CEMC

Enclosures:
Tables
Table 1. Summary of Sub-slab Soil Vapor Analytical Results
Table 2. Site Specific Cleanup Levels for TPH
Table 3. Summary of Indoor and Outdoor Air Analytical Results

Attachment
Attachment A: July 2024 Ecology Letter

References:

Arcadis. 2023. Summary of Soil Vapor and Ambient Air Sampling Events – April and November 2022. Former Texaco Station No. 211577, 631 Queen Anne Avenue North, Seattle, WA. June.

Ecology and Environment, Inc. 1991. Phase 1 Remedial Investigation Report. Monterey Apartments, Seattle, Washington. August.

EPA. 2011. Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences (1990–2005): A Compilation of Statistics for Assessing Vapor Intrusion. June.

EPA. 2015. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. June.

SAIC. 2010. August 2009 Vapor Sampling Event Summary Report. Former Texaco Service Station / Chevron Site No. 211577, 631 Queen Anne Avenue North, Seattle, Washington. May 27.

Tables

Table 1. Summary of Sub-slab Soil Vapor Analytical Results
Monterey and Del Roy Apartments
211577 Queen Anne
Seattle, Washington

Location ID	Alternate ID	Sample Date	Parcel	Sample Location	APH EC5-8 Aliphatics	APH EC9-12 Aliphatics	APH EC9-10 Aromatics	Total Petroleum Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	Total Xylenes	Naphthalene
August 2018 MTCA Method B Sub-Slab Soil Vapor Screening Level (µg/m^3)								**1,500**	**10.6**	**76,190**	**15,238**	**--**	**--**	**1,524**	**2.45**
August 2023 MTCA Method B Sub-Slab Soil Vapor Screening Level (µg/m^3)								**1,500**	**11.0**	**76,000**	**15,000**	**--**	**--**	**1,500**	**2.45**
Site-Specific TPH Sub-Slab Soil Vapor Screening Level (µg/m^3)								**8,032**							
DRVP-1	--	1/28/2009	3879900500	Del Roy Apartments	--	--	--	--	<0.22	<0.10	<0.12	<0.24	<0.12	--	--
DRVP-1D	--	1/28/2009	3879900500	Del Roy Apartments	--	--	--	--	<0.22	0.12	<0.12	<0.24	<0.12	--	--
DRVP-1-081909	--	8/19/2009	3879900500	Del Roy Apartments	--	--	--	--	<0.24	<0.11	<0.13	<0.26	<0.13	--	--
DRVP-2	--	1/28/2009	3879900500	Del Roy Apartments	--	--	--	--	<0.23	0.64	<0.12	<0.25	<0.12	--	--
DRVP-2-081909	--	8/19/2009	3879900500	Del Roy Apartments	--	--	--	--	0.33	1.1	0.29	0.61	0.27	0.88	--
MVP-1	--	1/28/2009	3879900490	Monterey Apartments	--	--	--	--	<0.23	0.13	<0.13	<0.25	<0.13	--	--
MVP-1-081909	--	8/19/2009	3879900490	Monterey Apartments	--	--	--	--	0.31	0.65	<0.13	<0.25	<0.13	--	--
MVP-1D-081909	--	8/19/2009	3879900490	Monterey Apartments	--	--	--	--	<0.24	0.37	0.13 J3	0.26	<0.13	0.325	--
MVPT-1	--	1/28/2009	3879900490	Monterey Apartments	--	--	--	--	<0.23	0.82	<0.12	<0.25	<0.12	--	--
MVPT-1D	--	1/28/2009	3879900490	Monterey Apartments	--	--	--	--	<0.23	0.77	<0.12	<0.25	<0.12	--	--
MVPT-1 (L DUP)	--	1/28/2009	3879900490	Monterey Apartments	--	--	--	--	<0.23	0.76	<0.12	<0.25	<0.12	--	--
MVPT-1-081909	--	8/19/2009	3879900490	Monterey Apartments	--	--	--	--	0.40	0.54	<0.13	<0.25	<0.13	--	--
DRVP-1	--	4/7/2022	3879900500	Del Roy Apartments	<430	290	<140	575	<1.8	<110	<2.5	<5.0	<2.5	--	<1.5
DRVP-1	--	11/17/2022	3879900500	Del Roy Apartments	<530	350	<180	705	<2.3	<130	<3.1	<6.2	<3.1	--	<1.9
DRVP-2	--	4/7/2022	3879900500	Del Roy Apartments	480	550	<150	1,105	<1.9	<110	<2.6	<5.3	<2.6	--	<1.6
DRVP-2	--	11/17/2022	3879900500	Del Roy Apartments	<580	420	<190	805	<2.5	<150	<3.3	<6.7	<1.5	--	<2
MVP-1	--	4/7/2022	3879900490	Monterey Apartments	<460	570	<150	590	<1.9	<110	<2.6	<5.3	<2.6	--	<1.6
MVP-1	--	11/17/2022	3879900490	Monterey Apartments	<430	420	<140	705	<1.8	<110	<2.5	<5	<2.5	--	<1.5
MVP-2	--	4/7/2022	3879900490	Monterey Apartments	1100	750	<160	**1,930**	4.3	<120	<2.8	<5.6	<2.8	--	<1.7
MVP-2	--	11/17/2022	3879900490	Monterey Apartments	<390	160	<130	420	<1.7	<98	<2.3	<4.5	<2.3	--	<1.4
MVP-2	DUP-1	4/7/2022	3879900490	Monterey Apartments	990	1000	<140	**2,060**	4.6	<110	<2.5	5.1	<2.5	7.35	<1.5
MVP-1	DUP-1	11/17/2022	3879900490	Monterey Apartments	<400	630	<130	895	<1.7	<100	<2.3	<4.6	<2.3	--	<1.4
EB-1	--	4/7/2022	--	--	<430	190	<140	475	<1.8	<110	<2.5	<5.0	<2.5	--	<1.5
EB-1	--	11/17/2022	--	--	<420	250	<140	530	<1.8	<110	<2.4	<0.4.9	<2.4	--	<1.5

Notes:
1. Analytical concentrations are in micrograms per cubic meter.
2. The sum of EC5-8 aliphatics, EC9-12 aliphatics, and EC9-10 aromatics is compared to the Generic Sub-Slab Soil Gas Screening Level provided in Implementation Memorandum No. 18 (Washington State Department of Ecology [Ecology] 2018). When a fraction is reported as nondetect, a value of one-half the detection limit is assumed for the purpose of comparing the sum to the screening level.
3. Ecology allows for sub-slab soil vapor concentrations to be adjusted by using a generic indoor air attenuation factor (0.03) to create a site-specific cleanup level for soil vapor
4. **BOLD** indicates the analyte detection exceeded MTCA Method B sub-slab soil gas screening levels, but did not exceed the site-specific cleanup level (CUL) calculated for TPH
5. A site-specific CUL for TPH in indoor air was calculated in accordance with Memo 18 guidance (Ecology 2018). The calculation of this CUL is presented in Table 3.

Acronyms and Abbreviations:
-- = Not available
< = Analyte was not detected at the indicated reporting limit
µg/m^3 = micrograms per cubic meter
ft bgs = feet below ground surface

DUP = Duplicate sample
MTCA = Model Toxics Control Act

Reference:
Ecology. 2018. Ecology Implementation Memorandum No. 18, Draft Petroleum Vapor Intrusion (VI): Updated Screening Levels, Cleanup Levels, and Sampling Considerations. August 7.
Ecology. 2022. Guidance for Evaluating Vapor Intrusion in Washington State, Investigation and Remedial Actions. March.
Ecology. 2023. CLARC Table. August.

Table 2. Site Specific Cleanup Levels for TPH
Monterey and Del Roy Apartments
211577 Queen Anne
Seattle, Washington

Calculating Site Specific Cleanup Levels for TPH In Indoor Air and Soil Vapor

As discussed in Washington State Department of Ecology, Toxics Cleanup Program Implementation Memo #18, Attachment B: Process for Calculating a Site-Specific TPH Indoor Air Cleanup Level

		Input results from highest soil vapor sample on site	Calculated Indoor Air Concentration (AF = 0.03)	Auto Calculated	From CLARC (confirm prior to use)	Auto Calculated
	Petroleum Fraction or Compound	Measured Concentration Site - Specific Sample ($\mu g/m^3$)	Calculated Concentration Site - Specific Sample ($\mu g/m^3$)	Fraction of Total Concentration (F_i)	MTCA Method B Non-carcinogenic CUL ($\mu g/m^3$)	Fi / CULi
Required for all TPH sites	Aliphatics EC>5-8	1100	33	0.49	2.72E+03	1.80E-04
	Aliphatics EC>9-12	1000	30	0.44	1.36E+02	3.27E-03
	Aromatics EC>9-10[1]	80	2.4	0.04	1.82E+02	1.95E-04
	Benzene[1]	4.6	0.138	0.00	1.37E+01	1.49E-04
	Toluene[1]	55	1.65	0.02	2.24E+03	1.09E-05
	Ethylbenzene[1]	1.4	0.042	0.00	4.58E+02	1.36E-06
	Xylenes	7.35	0.2205	0.00	4.64E+01	7.04E-05
	Naphthalene[1]	0.85	0.0255	0.00	1.38E+00	2.74E-04
Add if present on site*	*EDB*	0	0	0.00	4.11E+00	0.00E+00
	EDC	0	0	0.00	3.20E+00	0.00E+00
	MTBE[1]	0	0	0.00	1.37E+03	0.00E+00
	TOTAL TPH	**2249.2**	**67.476**		**SITE-SPECIFIC TPH SOIL VAPOR CLEANUP LEVEL**	**8,032**

This value can be compared to Ecology's generic indoor air cleanup level of 140 $\mu g/m^3$. If it is <140 $\mu g/m^3$, a site specific cleanup level does not need to be calculated.

Additionally, compounds with a carcinogenic cleanup level must be lower than the MTCA Method B Carcinogenic CUL

Compound with carcinogenic CUL	Measured Concentration - Linked ($\mu g/m^3$)	MTCA Method B Carcinogenic CUL ($\mu g/m^3$)
Benzene	0.138	3.21E-01
Naphthalene	0.0255	7.35E-02
EDB	0	4.17E-03
EDC	0	9.62E-02
MTBE	0	9.62E+00

*EDB, EDC, and MTBE only required for PVI if they are a known COC in soil or groundwater

[1]Compound was not detected in soil vapor samples collected. Half the laboratory reporting limit was used for calculation.

Table 3. Summary of Indoor and Outdoor Air Analytical Results
Monterey and Del Roy Apartments
211577 Queen Anne
Seattle, Washington

Sample ID	Sample Type	Sample Location	Sample Date	EC5-8 Aliphatics	EC9-12 Aliphatics	EC9-10 Aromatics	TPH	Net TPH	Benzene	Toluene	Ethylbenzene	o-Xylene	m,p-Xylenes	Total Xylenes	Naphthalene
August 2018 Generic MTCA Method B Indoor Air Cleanup Level				**--**	**--**	**--**	**140**	**140**	**0.32**	**2,290**	**457**			**45.7**	**0.0735**
August 2023 Generic MTCA Method B Indoor Air Cleanup Level				**--**	**--**	**--**	**46**	**46**	**0.32**	**2,290**	**457**			**45.7**	**0.0735**
Del Roy Indoor Air - 012809	Indoor Air	Del Roy Apartments	1/28/2009	--	--	--	--	--	**1.4**	4.9	0.71	0.83	2.4	3.23	--
Del Roy Indoor Air 081909	Indoor Air	Del Roy Apartments	8/19/2009	--	--	--	--	--	**0.61**	12	1	1.4	3.4	4.8	--
Monterey Indoor Air - 012809	Indoor Air	Monterey Apartments	1/28/2009	--	--	--	--	--	**1.1**	2.3	0.43	0.48	1.3	1.78	--
Monterey Indoor Air -081909	Indoor Air	Monterey Apartments	8/19/2009	--	--	--	--	--	**0.65**	2.5	0.49	0.52	1.4	1.92	--
Ambient Air-012809	Outdoor Air	--	1/28/2009	--	--	--	--	--	**1**	2.1	0.37	0.44	1.2	1.64	--
Ambient Air-081909	Outdoor Air	--	8/19/2009	--	--	--	--	--	**0.46**	2.9	0.21	0.25	0.64	0.89	--
Ambient Air-081909-Duplicate	Outdoor Air	--	8/19/2009	--	--	--	--	--	**0.48**	3	0.23	0.28	0.73	1.01	--
IA-01-North	Indoor Air	Del Roy Apartments	4/7/2022	<75	<25	<25	**<62.5**	ND	**0.37**	<19	<0.43	<0.43	1.0	1.21	**0.13**
IA-01-North	Indoor Air	Del Roy Apartments	11/17/2022	<75	65	<25	**115**	ND	**0.54**	<19	1.7	1.6	5.8	7.4	0.073 j
IA-02-South	Indoor Air	Monterey Apartments	4/7/2022	<75	26	<25	**76**	ND	**0.37**	<19	<0.43	<0.43	<0.87	<0.87	**0.15**
IA-02-South	Indoor Air	Monterey Apartments	11/17/2022	81	76	<25	**170**	25	**0.56**	<19	1.5	1	5.1	6.5	**0.16 j**
OA-Downwind	Outdoor Air	Downwind Sample	4/7/2022	81	<25	<25	106	--	<0.32	<19	<0.43	<0.43	<0.87	<0.87	0.13
OA-Downwind	Outdoor Air	Downwind Sample	11/17/2022	120	<25	<25	145	--	1.8	19	3.6	4.9	13	17.90	0.26
OA-Upwind	Outdoor Air	Upwind Sample	4/7/2022	79	<25	<25	104	--	<0.32	<19	<0.43	0.6	1.7	2.3	0.12
OA-Upwind	Outdoor Air	Upwind Sample	11/17/2022	<75	<25	<25	<62.5	--	1.1	<19	<0.43	<0.43	1.1	1.32	<0.047 j

Notes:

1. Analytical concentrations are measured in units of microgram per cubic meter ($\mu g/m^3$).
2. The sum of EC5-8 aliphatics, EC9-12 aliphatics, and EC9-10 aromatics; benzene, toluene, ethylbenzene, and total xylenes, and naphthalene is compared to the indoor air cleanup level (CUL) provided in Memo 18 (Washington State Department of Ecology [Ecology] 2018.) When a fraction is reported as nondetect, a value of one-half the detection limit is assumed for the purpose of comparing the sum to the cleanup level.
3. Total xylenes are the summation of m-, p-, and o-xylenes. If the results are nondetect, one-half the reporting limit was used in the calculation.
4. Net TPH, benzene, and naphthalene concentrations were calculated by subtracting the greater of their respective concentrations detected in the outdoor air samples (upwind or downwind) from the concentrations observed in the indoor air samples.
5. **BOLD** concentrations exceed the generic MTCA Method B indoor air CUL, but do not exceed the laboratory reporting limit.
6. **BOLD** concentrations exceed the generic MTCA Method B indoor air CUL.

Acronyms and Abbreviations:

-- = not analyzed or not applicable
< = not detected at or greater than the laboratory detection limit
CUL = cleanup level
ND = detections in the outdoor air samples, OA-Downwind and OA-Upwind, are greater than concentration detections in the ambient indoor air.
[ ] = duplicate sample results
Memo 18 = Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings, Implementation Memorandum No. 18
MTCA = Model Toxics Control Act
TPH = total petroleum hydrocarbons

Laboratory Qualifiers:

j = The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

Laboratory Analytical Methods:

EC5-8 aliphatics, EC9-12 aliphatics, and EC9-10 aromatics were analyzed by the Massachusetts Department of Environmental Protection's Method for Determination of Air-Phase Petroleum Hydrocarbons.
Benzene, toluene, ethylbenzene, and xylenes analyzed using United States Environmental Protection Agency (USEPA) Method TO-15.
Naphthalene analyzed by USEPA Method TO-15.

Reference:

Ecology. 2018. Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings, Implementation Memorandum No. 18. January 10.
Ecology. 2023. CLARC Table. August.

Attachment A

July 2024 Ecology Letter

Electronic Copy

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Region Office

PO Box 330316, Shoreline, WA 98133-9716 • 206-594-0000

July 10, 2024

James P. Kiernan
Chevron Environmental Management and Real Estate Company
6001 Bollinger Canyon Road
San Ramon, CA 94583
(jkiernan@chevron.com)

Re: Ecology Comments on Soil Vapor and Ambient Air Sampling Results

Texaco 211577 Monterey
631 Queen Anne Avenue N, Seattle, WA 98109
Facility Site No.: 77774779
Cleanup site ID No.: 6663

Dear James Kiernan:

On June 6, 2023, the Washington State Department of Ecology (Ecology) received the *Summary of Soil Vapor and Ambient Air Sampling Events – April and November 2022* report, for the Texaco 211577 Monterey facility (Site). The Site is generally located at 631 Queen Anne Avenue North in Seattle (the Property), and consists of the Property and multiple nearby properties and rights-of-way.

Currently, the Site cleanup is conducted under an *Agreed Order No. 16537* (*AO 16537*), effective August 21, 2019. The *AO 16537* requires Chevron Environmental Management Company (CEMC) to complete a Site Remedial Investigation (RI), Feasibility Study (FS), and prepare a preliminary Draft Cleanup Action Plan (DCAP). Under *AO 16537*, CEMC submitted a final *Remedial Investigation Work Plan* (*RIWP*) on February 8, 2022. Ecology approved the *RIWP* in an email dated February 10, 2022.

In accordance with the Ecology approved *RIWP*, soil vapor investigations and air sampling were completed for Del Roy Apartments and Monterey Apartments in 2022. Soil vapor and indoor air samples were collected from the basement of the two apartment buildings in two sampling events – April 7 and November 17, 2022. Outdoor air samples were collected at the same time. The sampling activities and results were submitted to Ecology in the *Summary of Soil Vapor and Ambient Air Sampling Events – April and November 202*2 report.

Based on a review of the summary report, Ecology provides the following comments:

1. **The indoor air quality in Del Roy and Monterey Apartments basement DOES NOT meet the MTCA cleanup standards.**

Ecology conducted risk assessments on the indoor air samples collected from Del Roy and Monterey Apartments. The non-carcinogenic hazard indices (HI) and cancer risks for the indoor air samples in both sampling events are summarized in the table below:

Table 1 – Non-carcinogenic Hazards and Cancer Risks for Indoor Air Samples
Monterey and Del Roy Apartments

Sample Location	Sample ID	Date	Hazard Index (unitless)	Cancer Risk (unitless)
Del Roy Apartments	IA-01-North	4/7/2022	0.3	8E-07
		11/17/2022	2	7E-07
Monterey Apartments	IA-02-South	4/7/2022	0.6	1E-06
		11/17/2022	2	2E-06

In accordance with Model Toxics Control Act (MTCA), WAC 173-340-708, air samples must meet all of the following requirements to be in compliance with the MTCA cleanup standards:

- The cancer risk for each individual carcinogen (in this case, benzene and naphthalene) does not exceed one in one million (1E-6).
- Total cancer risk for multiple carcinogens in a sample does not exceed one in one hundred thousand (1E-5).
- For a sample that contains multiple non-carcinogenic compounds, the calculated HI does not exceed 1.

Based on the data provided in Table 1, both air samples that were collected from Del Roy and Monterey Apartments in November 2022 sampling event, had calculated non-carcinogenic HI greater than 1. These results do not meet the MTCA cleanup standards. The non-carcinogenic hazard is mainly caused by long-chain aliphatic hydrocarbons (aliphatics EC >8-12).

2. Ecology requires mitigation activities to reduce the vapor intrusion risk to Del Roy and Monterey Apartments.

Since vapor intrusion (VI) is causing an exceedance of non-carcinogenic hazard in the basement of both Del Roy and Monterey Apartments, mitigation activities are required to reduce the VI risk for both apartment buildings.

Ecology requires CEMC to communicate with the building owners to identify an approach for reducing VI exposures as soon as possible. Potential mitigation activities can include:

- Sealing obvious openings for preferential vapor entry into the buildings, where applicable.
- Increasing ventilation to certain indoor spaces.
- Adjusting heating, ventilation, and air conditioning (HVAC) controls to positively pressurize the building's basement.
- Installing indoor air treatment devices.

- Re-locating residents from the basements, if any, and reducing the amount of time maintenance or management personnel spend in the basements.
- Installing and operating a mitigation system, such as a sub-slab depressurization system (SSDS).

Please refer to Ecology's Guidance for Evaluating Vapor Intrusion in Washington State Investigation and Remedial Action,[1] March 2022, for detailed requirements and guidance for identifying, designing, and implementing mitigation activities.

Please note, additional VI sampling (soil vapor and/or indoor air) are necessary to verify the effectiveness of the mitigation activities. Ecology may request additional indoor air sampling in the first residential floor of the buildings, if needed.

If an active mitigation system is needed, installing such a system may be considered as an interim action and shall follow the appropriate interim action procedure specified in *AO 16537*.

Ecology appreciates your submission of the *Summary of Soil Vapor and Ambient Air Sampling Events – April and November 2022* report. **Please take the necessary mitigation activities, or submit a draft Mitigation System Work Plan (if a mitigation system is necessary), no later than 45 days after receipt of this letter.**

Please work with Ecology during identification and implementation of the mitigation activities. If you have any questions about this letter, please contact me at (425) 229-2565 or jing.song@ecy.wa.gov.

Sincerely,

Jing Song
Site Manager
Toxics Cleanup Program, NWRO

cc: Jeremy Wilson, Arcadis (Jeremy.Wilson@Arcadis.com)
Robert Goodman, Rogers Joseph O'Donnell (rgoodman@rjo.com)
Derek Threet, Office of the Attorney General (derek.threet@atg.wa.gov)
Nick Treat, Ecology (nick.treat@ecy.wa.gov)

[1] https://apps.ecology.wa.gov/publications/documents/0909047.pdf