



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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September 4, 2015

Mr. Scott Zorn
Arcadis-US, Inc.
2000 Powell St. #700
Emeryville, CA 94608

Re: Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for the following Hazardous Waste Site:

- **Site Name:** Arco AM PM Lake Forest Park
- **Site Address:** 16901, 17001 Bothell Way NE, Lake Forest Park, WA 98155
- **Facility/Site No.:** 11251569
- **Cleanup Site ID No.:** 7883
- **VCP Project No.:** NW2460

Dear Mr. Zorn:

Thank you for submitting documents regarding your proposed remedial action for the **Arco AM PM Lake Forest Park facility (Site)** for review by the Washington State Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP). Ecology appreciates your initiative in pursuing this administrative option for cleaning up hazardous waste sites under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding a review of submitted documents/reports pursuant to requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site:

- Gasoline-range total petroleum hydrocarbons (TPHg), benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tertiary-butyl ether (MTBE), and lead into soil.
- TPHg, diesel-range total petroleum hydrocarbons (TPHd), BTEX, MTBE, and lead into ground water.

Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protects a person from contribution claims by third parties for matters addressed by the opinion. The State does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). This opinion is advisory only and not binding on Ecology.



Ecology's Toxic Cleanup Program has reviewed the following information:

- ARCADIS US, Inc. (Arcadis). *2014 Site Status and Closure Report, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. June 18, 2015.
- Arcadis. *2011 Subsurface Investigation Report, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. November 23, 2011.
- Arcadis. *2011 Remedial Investigation and Cleanup Action Report, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. June 18, 2011.
- Delta Environmental Consultants, Inc. (Delta). *2003 Distribution Line and Dispenser Island Soil Sampling, Overexcavation Activities, and Remediation System Piping Installation, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. February 14, 2003.
- Emcon. *Phase 2 Assessment, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. July 27, 1995.
- Geraghty & Miller, Inc. *Additional Site Characterization and Soil Vapor Extraction and Air Sparging Field Testing, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. September 2, 1993.
- Brown and Caldwell Consultants. *Groundwater and Soil Investigation, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. December 30, 1991.
- Brown and Caldwell Consultants. *Results of Site Investigation, ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. September 1, 1988.
- Various Authors. *Ground water Monitoring Reports ARCO Facility No. 1990 (5242)17001 Bothell Way NE, Lake Forest Park, Washington 98155*. Between February 1993 and June 18, 2015.

The reports listed above will be kept in Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. You can make an appointment by calling the NWRO resource contact at (425) 649-7235 or sending an e-mail to: nwro_public_request@ecy.wa.gov.

The Site is defined by the extent of contamination caused by the following releases:

- TPHg, BTEX, MTBE, and lead into soil.
- TPHg, TPHd, BTEX, MTBE, and lead into ground water.

The Site is more particularly described in Enclosure A to this letter, which includes a detailed Site diagram. The description of the Site is based solely on the information contained in the

documents listed above.

Based on a review of supporting documentation listed above, pursuant to **requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site, Ecology has determined:**

- A release of gasoline from the underground storage tanks (USTs) in 1986 reached McAleer Creek; however, the impacts at the Site were not reported until 1995 and the release to the creek was not documented. There is no information in Ecology's records about a release to the creek or its cleanup until now.

Contaminant concentrations in soil and groundwater above MTCA Method A cleanup levels remain at the Site less than 100 feet upgradient from the creek; however, there is no evidence, current or historical, that confirms that contamination from the Site is not currently impacting surface water.

- Characterization of soil impacts at the Site is not complete. Specifically, the following data gaps have been identified:
 - Based on historical soil concentrations at the Site, additional characterization is needed beyond the Property boundary on the west, southwest, south, and eastern areas of the Site to define the extent of the contamination.
 - Limited shallow soil samples were collected and several of these results indicate concentrations of TPHg and BTEX above MTCA Method A cleanup levels remain in place on the Site.
 - Only two soil samples within the Property boundaries have been collected at depths beyond 7 feet below ground surface (bgs). Therefore, soil below 7 feet bgs has not been characterized.
 - With the exception of two soil samples collected during installation of a monitoring well in 2011, the most recent soil samples collected at the Site are from 2002 during two excavations conducted near the dispensers. However, no confirmation soil samples were collected from these excavations. No current soil samples have been collected to confirm the effectiveness of the air sparge/soil vapor extraction (AS/SVE) system installed in 2003. Collection of confirmation soil samples from these areas is needed to document current soil conditions and complete soil characterization at the Site.
 - Because the original 1986 gasoline release reached McAleer Creek (located west and southwest from the Site), additional soil and ground water characterization is needed between the Site and the creek. Sediment and potentially surface water samples within the creek and creek bottom should be collected to ensure that impacts from the 1986 release do not persist. Cleanup

levels selected for the Site need to be protective of sediment and surface water criteria.

- Ground water at the Site has not been adequately characterized. Specifically, the following data gaps have been identified:
 - Historical data on ground water flow within the Property indicates that ground water at the Site can flow to the southeast, south, and southwest. Based on this information, no ground water monitoring wells are located directly downgradient from some of the sources at the Site. Additional ground water monitoring wells may be needed to ensure potential impacts from all source areas are adequately captured.
 - The use of city, county, and other state setback rules (mentioned in the 2014 Annual Site Status and Closure Request Report) to determine ground water use at the Site is not allowed under MTCA. Ground water is considered a future drinking water source, therefore, the ground water ingestion pathway is complete. Based on the concentrations of contaminants in ground water samples collected to date, the leaching pathway is also complete.
- The soil boring log for the most recent ground water monitoring well installed (MW-8) was not included in the document.
- Regarding the Terrestrial Ecological Evaluation (TEE):
 - A figure showing the Property and the 500-foot radii from the Site boundary used for the TEE exclusion was not included in the report.
 - Unless a qualified field biologist has reviewed the TEE and potential ecological receptors for the Site, a conclusion that McAleer Creek is not considered suitable habitat is not allowed under MTCA.
- Chain of Custodies and analytical reports for the ground water samples collected during the 2014 sampling year show that ground water was analyzed using the northwest total petroleum hydrocarbons method for diesel extended range (NWTPH-dx) using a silica gel cleanup preparation. Silica gel cleanup sample preparation method is not an accepted preparation method for ground water samples and is not approved by Ecology. Silica gel cleanup is only approved to be used in soil samples only if a total organic carbon (TOC) analysis of each specific sample indicates that TOC in that particular sample is outside the normal range in soil.
- An abbreviated version of a feasibility study (FS) and disproportionate cost analysis (DCA) was included in the *2014 Site Status and Closure Report*. Ecology determined that the FS/DCA included in the report does not meet the substantive requirements of MTCA. Per MTCA's specific requirements in WAC 173-340-350 and associated sections, at a minimum, the following should be included in the FS/DCA:

- A detailed description of the cleanup alternative which includes a reasonable number of alternatives, that protect human health and the environment by eliminating, reducing, or controlling risks, that have the standard point of compliance for all affected media, and which include at least one permanent cleanup alternative.
- The cleanup alternatives must meet the minimum requirements [WAC 173-340-360(2)(a)] and a determination must be made if the alternatives meet the threshold requirements.
- The cleanup alternatives should be represented in tabular format with numerical values for weighting criteria as presented in WAC 173-340-360.
- For the DCA, the cleanup alternative shall be evaluated per the specific criteria set in WAC 173-340-360(3).
- A figure showing cost versus environmental benefit for the disproportionate cost analysis where the most permanent practicable alternative is used as the baseline against which other alternatives are compared to.

This opinion does not represent a determination by Ecology that a proposed remedial action will be sufficient to characterize and address the specified contamination at the Site or that no further remedial action will be required at the Site upon completion of the proposed remedial action. To obtain either of these opinions, you must submit appropriate documentation to Ecology and request such an opinion under the VCP. **This letter also does not provide an opinion regarding the sufficiency of any other remedial action proposed for or conducted at the Site.**

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or conducted at the Site meet those requirements.

Mr. Scott Zorn
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If you have any questions regarding this opinion, please contact me at (425) 649-7233 or email at sofe461@ecy.wa.gov.

Sincerely,

A handwritten signature in black ink, appearing to be 'SF' with a stylized flourish.

Sonia Fernández, LG.
NWRO Toxics Cleanup Program

SF: sf

Enclosures: [1] A—Site Description

cc: Richard Rodríguez, Arcadis-US., Inc., (e-mail)
 Tamara Cardona, VCP Site Manager, Ecology

Enclosure A

Site Description

Site Description

This enclosure provides Ecology's understanding and interpretation of Site conditions and forms part of the basis for the opinion expressed in the letter.

- **Site Name:** Arco AM PM Lake Forest Park
- **Site Address:** 16901, 17001 Bothell Way NE, Lake Forest Park, WA 98155
- **Facility/Site No.:** 11251569
- **Cleanup Site ID No.:** 7883
- **VCP Project No.:** NW2460

Site and Property Definition: The Property is located on the northeast corner of the intersection between Brookside Boulevard NE and Bothell Way NE in Lake Forest Park, Washington. Contamination at the Site consists of:

- Gasoline-range total petroleum hydrocarbons (TPHg), benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tertiary-butyl ether (MTBE), and lead into soil.
- TPHg, diesel-range total petroleum hydrocarbons (TPHd), BTEX, MTBE, and lead into ground water.

The impacts are found throughout most of the Property near the underground storage tanks (UST) and dispenser islands; however, neither soil nor ground water at the Site have been adequately characterized. Soil samples collected directly west of the dispenser islands and the vicinity of the former UST nest had levels of TPHg and BTEX above MTCA Method A cleanup levels. Ground water samples from wells downgradient of the dispensers and former UST nest had levels of TPHg, TPHd, BTEX, and MTBE above MTCA Method A cleanup levels. In addition, an undocumented release of product (assumed gasoline) from the USTs in 1986 reached McAleer creek located approximately 100 feet from the west and southwest Property boundary.

Area Description: The Property is located in an area zoned as mixed residential and commercial by the City of Lake Forest Park. The Property is surrounded on the northwest by a fire station; on the north by a portion of a residential property and a parking lot; on the northeast and east by commercial retail businesses; to the southeast, south and southwest by residential properties and to the west by Blue Heron Park. The nearest residential property is located directly adjacent to the north of the Property. The Property is paved with asphalt and concrete.

Property History and Current Use: The Property was first developed as a gasoline service station in 1975. The prior use of the Property before 1975 is unknown.

Prior to 1986, the gas station operated with three USTs. These USTs were replaced after a significant loss of product which was reported to have reached McAleer Creek however details of the release are unknown. These USTs were replaced in 1986 within the same location with three 10,000-gallon gasoline USTs and are the same USTs in operation today. The Property is currently an ARCO Shell-branded service station operating five dispenser islands.

Contaminant Sources and History of Releases: The source of soil contamination at the Site is

likely attributed to releases from the fuel USTs and dispenser islands. The 1986 release to McAleer Creek is the only major release that has been reported to Ecology.

Physiographic Setting: The Property is located at an elevation of approximately 35 feet above mean sea level. General topography around the Site is relatively flat with a slight slope to the southwest, south, and southeast. The Property is paved with asphalt and concrete.

Ecological Setting: Although Blue Heron Park (0.5 acre) is located across the street from the Property, approximately 150 feet southwest of the Property, there are less than 1.5 acres of contiguous undeveloped land on or within 500 feet from the Site. Based on this information, the Site qualifies for an exclusion under WAC 173-340-7490 and further assessment for a Terrestrial Ecological Evaluation (TEE) was not necessary.

Geology: The Site is located within the Puget Lowland Physiographic Province in Western Washington. The Puget Lowland is a north-south trending trough located between the Olympic Mountains to the west and the Cascade Mountains to the east. Elevations in the lowlands range from sea level to several hundred feet above sea level.

Soils encountered at the Site include approximately five feet of fill over native soils consisting of sand and silty sand with lenses of lacustrine silt and clay to the maximum depth explored of 13 feet below ground surface (bgs).

Ground Water: Ground water was encountered at the Property between 1 foot and 2.27 feet bgs. The direction of ground water flow is to the south, southeast, and southwest with a gradient ranging between 0.01 and 0.03 feet per foot. Several water supply wells are located within approximately one mile from the Property but all are located north and northeast, and therefore upgradient from the Site. These wells are reportedly screened between 25 and 465 feet bgs. Several ground water monitoring wells (4 to 385 feet bgs) are also located within 1 mile from the Site. Only one of these monitoring wells is located downgradient from the Site (south) and it is screened on a deeper aquifer at 172 feet bgs.

Surface and Storm Water: The nearest surface water bodies are McAleer Creek (100 feet west), Lyons Creek (100 feet north-northeast), and Lake Washington (approximately 1,000 feet south-southeast). Surface water runoff from the Property is collected in on-site catch basins and discharges into storm drains along Bothell Way NE and Brookside Boulevard NE.

Water Use: The Property's drinking water is provided by the North City Water District (formerly Shoreline Water District). The District obtains its water from the Tolt River watershed in the Cascade Mountains.

Interim Actions: Interim remedial actions at the Site have included an emergency response in 1986 to the UST product release, installation and operation of a ground water treatment system (1986), excavation of impacted soil in 2002, and installation and operation of an air sparge soil vapor extraction system (AS/SVE) in 2003.

The amount of product lost in 1986 is unknown and no cleanup details have been provided on the emergency response at the Site or the creek. However, a ground water treatment system was

installed within the Property after the release and operated from 1986 to 1994. There is no information on how many gallons of ground water were treated or how much product was removed by the system.

In 2002, dispenser and product line upgrades prompted overexcavation of impacted soil around the dispensers and the conveyance lines to a maximum depth of 2 feet bgs. All confirmation soil samples were above MTCA Method A cleanup levels for TPHg (57.4 to 5,510 mg/kg), benzene (0.0868 to 7.3 mg/kg), toluene (8.79 to 118 mg/kg), ethylbenzene (9.33 to 137 mg/kg), and xylenes (22.2 to 739 mg/kg). Also, additional soil was overexcavated west of the dispensers to a maximum depth of 6.5 feet bgs in the center and four feet on the sidewalls. Three of the confirmation soil samples collected from three of the sidewalls were significantly above MTCA Method A Cleanup levels for TPHg (4,010 to 17,100 mg/kg) benzene (4.25 to 109 mg/kg) toluene (99.9 to 1,550 mg/kg), ethylbenzene (117 to 529 mg/kg), and xylenes (542 to 2,570 mg/kg). Approximately 400 tons of impacted soil were overexcavated and disposed off-Site during these two events.

An AS/SVE system was installed in 2003 and operated between 2004 and 2006; however, no information on the amount of volatile compounds removed by the system nor information on the performance of the system was provided. No additional soil samples were collected to confirm the effectiveness of the system after shutdown.



