

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2007-0812
CALIFORNIA WATER CODE SECTION 13267

FOR

**THE ATLANTIC RICHFIELD OIL COMPANY/ARCO, AND THE THOMAS AND
JOSEPHINA KALAPURAYIL FAMILY TRUST, MR. GEORGE PUTHENPURAYIL,
AND MS. SHYLIMOL ABRAHAM
FORMER ARCO SERVICE STATION NO. 2019
SACRAMENTO COUNTY**

The Former Arco Service Station No. 2019 (Site) at 3801 47th Avenue in Sacramento, Sacramento County, is situated on the northeast corner of 47th Avenue and Martin Luther King Boulevard. The Site is a former gasoline service station, and is currently a vacant lot proposed for development into a fast food restaurant. A petroleum discharge from the former underground storage tank system occurred while the property and former service station was owned and operated by the Atlantic Richfield Oil Company/Arco (Arco). The Thomas and Josephina Kalapurayil Family Trust, Mr. George Puthenpurayil, and Ms. Shylimol Abraham purchased the property in January 2002, after abandonment of the tank system had been completed. Fruitridge Vista Water Company Well #11 is located approximately 500 feet southwest of the Site. Well #11 is 452 feet deep, is impacted by methyl tertiary butyl ether (MTBE), and was taken out of service in 1998. Groundwater is first encountered at approximately 40 feet below ground surface (bgs) below the former Arco site. Initial soil and groundwater investigations showed petroleum hydrocarbon constituents in soil at maximum concentrations of: total petroleum hydrocarbons as gasoline (TPH-G) 3,800 milligrams per kilogram (mg/kg), benzene 8.0 mg/kg, toluene 210 mg/kg, ethylbenzene 100 mg/kg, and xylenes 470 mg/kg. Groundwater samples have contained petroleum hydrocarbon constituents at maximum concentrations of: TPH-G 120,000 micrograms per liter (ug/l), benzene 21,000 ug/l, toluene 26,000 ug/l, ethylbenzene 1,700 ug/l, xylenes 15,000 ug/l, MTBE 3,600 ug/l, and 1,2-dichloroethane (1,2-DCA) 2,100 ug/l. During the third quarter 2006 groundwater monitoring event, concentrations of petroleum constituents were detected at maximum concentrations of: TPH-G 81,000 ug/l, benzene 14,000 ug/l, toluene 20,000 ug/l, ethylbenzene 1,500 ug/l, total xylenes 11,000 ug/l, MTBE 0.57 ug/l, and 1,2-DCA 1,000 ug/l. This pollution has impaired the beneficial uses of the underlying water resource. A dual phase extraction (DPE) pilot test and a soil vapor extraction (SVE) pilot test were performed in September 2006. The DPE test removed approximately 23 pounds (lbs) of TPH-G and 0.15 lbs of benzene from soil and approximately 0.04 lbs of TPH-G and 0.0036 lbs of benzene from groundwater, while the SVE test removed approximately 51 pounds (lbs) of TPH-G and 0.75 lbs of benzene from soil.

This Monitoring and Reporting Program (MRP) is issued pursuant to Section 13267 of the California Water Code and is necessary to delineate waste discharged from the former Arco Service Station No. 2019, characterize groundwater pollutant plumes and determine whether remediation efforts are effective. Existing data and information about the Site show the presence of petroleum hydrocarbons, including TPH-G; and benzene, toluene, ethylbenzene, and xylenes (BTEX) emanating from the property resulting from former operations at the Site. The Atlantic Richfield Oil Company/Arco, and the Thomas and Josephina Kalapurayil Family

Trust, Mr. George Puthenpurayil, and Ms. Shylimol Abraham (the Dischargers) shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer of this Regional Water Board.

Prior to construction of any new groundwater monitoring or extraction wells, and prior to destruction of any groundwater monitoring or extraction wells, the Dischargers shall submit plans and specifications to the Regional Water Board for review and approval. Once installed, all new wells shall be added to the monitoring program and shall be sampled and analyzed according to the schedule below.

GROUNDWATER MONITORING

- As shown on Figure 1, there are 20 wells, MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15, VE-1, VE-2 (VE-2S), SP-1 (VE-2D), and VE-3 associated with the former Arco site. The groundwater monitoring program for the 20 wells and any wells installed subsequent to the issuance of this MRP, shall follow the schedule below. Monitoring wells with free phase petroleum product or visible sheen shall be monitored, at a minimum, for product thickness and depth to water. The volume of extracted groundwater also shall be provided in quarterly monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

SAMPLING FREQUENCY ¹										
	Quarterly					Semi-annually ²		Annually ³		
Wells	MW-1	MW-3	MW-4	MW-5	MW-8	MW-2		MW-6	MW-7	MW-11,
	MW-9	MW-10	MW-14	MW-15	VE-1			MW-12	MW-13	
	VE-2	SP-1	VE-3	New Wells						

1 All wells shall be monitored quarterly for water levels and the presence and thickness of free product.

2 Wells shall be sampled semi-annually during the first and third quarters.

3 Wells shall be sampled annually during the third quarter.

Constituents	EPA Analytical Method	Maximum Practical Quantitation Limit (µg/l) ⁵	Analysis Frequency ⁶
Depth to Groundwater	---	---	---
Total Petroleum Hydrocarbons as Gasoline	8015M	50	Quarterly
Total Extractable Petroleum Hydrocarbons as Diesel	8015M	50	Quarterly
Benzene	8020 or 8260B	0.5	Quarterly
Toluene	8020 or 8260B	0.5	Quarterly
Ethylbenzene	8020 or 8260B	0.5	Quarterly
Xylenes	8020 or 8260B	0.5	Quarterly
MTBE	8260B	0.5	Quarterly
TBA	8260B	5.0	Annually
TAME	8260B	0.5	Annually

Constituents	EPA Analytical Method	Maximum Practical Quantitation Limit (µg/l) ⁵	Analysis Frequency ⁶
DIPE	8260B	0.5	Annually
ETBE	8260B	0.5	Annually
Ethanol	8260B	50	Annually
Methanol	8260B	100	Annually
1,2-Dichloroethane	8260B	0.5	Quarterly
PAHs	8270	0.50	Quarterly
Total Lead	7421	10	Quarterly

- 5 All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as trace.
 6 TPH-D, ethanol, methanol, total lead, and PAHs may be eliminated from the list of analytes pending 2 consecutive quarters of non-detect results at the Practical Quantitation Limit.
 7 PAHs = polycyclic aromatic hydrocarbons

REPORTING

2. When reporting the data, the Dischargers shall arrange the information in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to illustrate clearly the compliance with this Order. In addition, the Dischargers shall notify the Regional Water Board within 48 hours of any unscheduled shutdown of any soil vapor and/or groundwater extraction system.
3. As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional or their subordinate and signed by the registered professional.
4. The Dischargers shall submit a paper copy of the quarterly report to this Regional Water Board office and submit the quarterly electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30, electronically over the internet to the State Water Board's GeoTracker database system. Both the paper copy and the electronic submittal are due by the 1st day of the second month following the end of each calendar quarter by **1 February, 1 May, 1 August, and 1 November**, until such time as the Executive Officer determines that the reports are no longer necessary. Each quarterly report shall include the following minimum information:
 - (a) A description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants and groundwater elevations in the wells, how and when samples were collected, and whether the pollutant plume(s) is delineated.
 - (b) Field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc.
 - (c) Groundwater contour maps for all groundwater zones, if applicable.

- (d) Concentration contour maps for all groundwater zones for TPH-G, benzene, MTBE, and 1,2-DCA.
 - (e) A table showing well construction details such as well number, groundwater zone being monitored, ground surface elevation, screen interval, bentonite interval, filter pack interval, and total depth of the well.
 - (f) A table showing historical lateral and vertical (if applicable) down-gradient directions and gradients.
 - (g) Cumulative data tables containing the water quality analytical results and depth to groundwater.
 - (h) A copy of the laboratory analytical data report.
 - (i) If applicable, the status of any ongoing remediation, including cumulative information on the mass of pollutant removed from the subsurface, system operating time, the effectiveness of the remediation system, and any field notes pertaining to the operation and maintenance of the system.
 - (j) If applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.
5. The Fourth Quarter Groundwater Monitoring Report, due **15 January** of each year shall be an expanded report and will include the following additional information/items:
- (a) Tabular summaries of all data obtained during the year.
 - (b) Graphical summaries, of TPH-G, benzene, and MTBE concentrations, groundwater elevation data, and remediation system operation versus time for wells MW-1, MW-4, MW-12, MW-13, MW-14, and MW-15, and additional wells as requested by Regional Water Board staff.
 - (c) A rose diagram presenting groundwater flow direction and magnitude data.
 - (d) Contaminant concentration contour maps for TPH-G, benzene, and MTBE for each quarter from the previous year.
 - (e) A discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells.
 - (f) An analysis of whether the pollutant plume is being captured by an extraction system or is continuing to spread.
 - (g) A description of all remedial activities conducted during the year, an analysis of their effectiveness in removing the pollutants, and plans to improve remediation system

effectiveness.

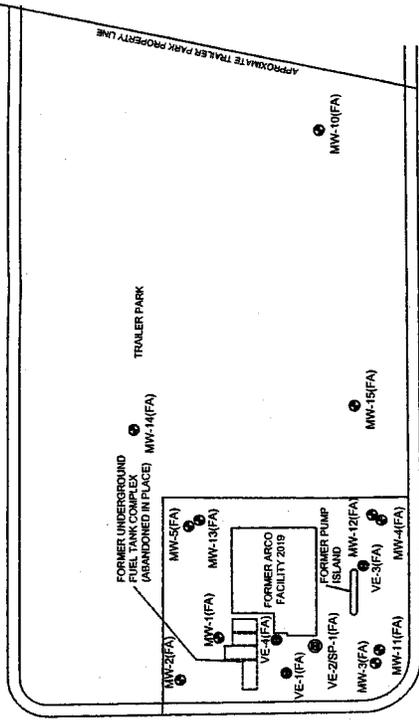
- (h) An identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program.
 - (i) If desired, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.
6. The results of any monitoring done more frequently than required at the locations specified in the MRP also shall be reported to the Regional Water Board.

The Discharger shall implement the above monitoring program as of the date of the Order.

Ordered by: _____
PAMELA C. CREEDON
Executive Officer

(Date)

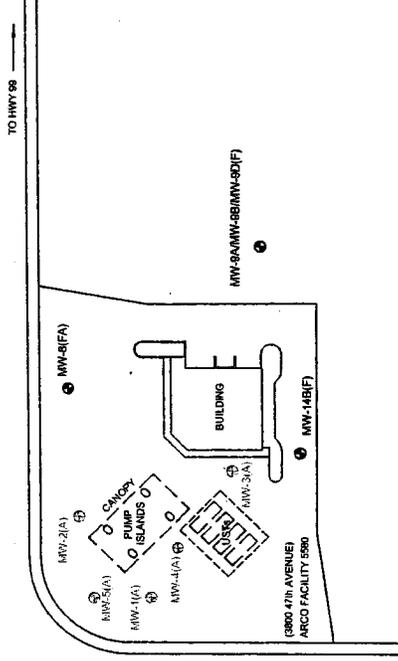
46th AVENUE



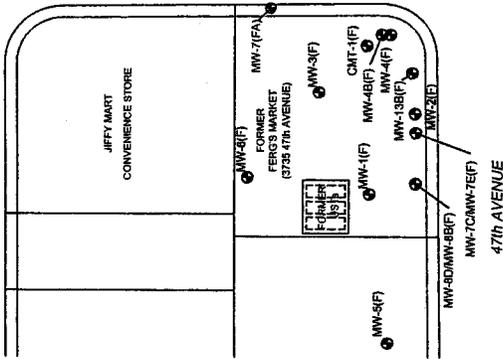
LEGEND:

- MW-1(FA) ● GROUNDWATER MONITORING WELL (FORMER ARCO 2019)
- MW-1(F) ● GROUNDWATER MONITORING WELL (FERG'S)
- MW-1(A) ● GROUNDWATER MONITORING WELL (ARCO 5580)
- VE-1(FA) ● SOIL VAPOR EXTRACTION WELL (FORMER ARCO 2019)
- VE-2/SP-1(FA) ● VAPOR EXTRACTION/AIR SPARGING WELL (FORMER ARCO 2019)

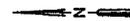
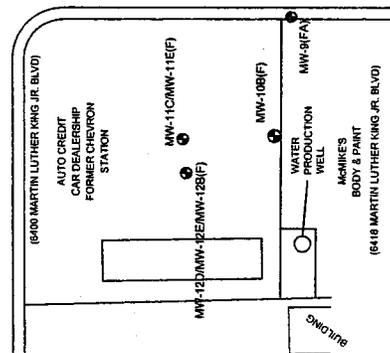
47th AVENUE



48th AVENUE



MARTIN LUTHER KING JR. BOULEVARD



<p>SECOR 3817 KILGORE ROAD, SUITE 100 RANCHO CORDOVA, CALIFORNIA PHONE: (916) 881-0408/881-0409 (FAX)</p>	<p>FOR: ARCO SERVICE STATION NO. 2019 SACRAMENTO, CALIFORNIA ARCO SERVICE STATION NO. 5580 SACRAMENTO, CALIFORNIA</p>	<p>FIGURE: 1</p>
	<p>CHECKED BY: MALS APPROVED BY: RB</p>	<p>DATE: 01/25/07</p>
<p>JOB NUMBERS: 778P (2019) 01 778P (5580) 01</p>	<p>DRAWN BY: CDH</p>	

REFERENCE: THIS FIGURE IS BASED ON A MAP PROVIDED BY STRATUS ENVIRONMENTAL, INC.