



**California Regional Water Quality Control Board  
Central Valley Region  
Katherine Hart, Chair**



**Matthew Rodriguez**  
*Secretary for  
Environmental Protection*

11020 Sun Center Drive, #200, Rancho Cordova, California 95670-6114  
(916) 464-3291 • FAX (916) 464-4645  
<http://www.waterboards.ca.gov/centralvalley>

**Edmund G. Brown Jr.**  
*Governor*

25 August 2011

Certified Mail  
7009 1410 0002 1422 0713

Certified Mail  
7009 1410 0002 1422 0720

Mr. Sergio Morescalchi  
Atlantic Richfield Company  
P.O. Box 1257  
San Ramon, CA 94583

Mr. Ted Moise  
ConocoPhillips  
76 Broadway  
Sacramento, CA 95818

***NOTICE OF APPLICABILITY OF GENERAL ORDER NO. R5-2008-0149 – Atlantic Richfield Company, and ConocoPhillips, ARCO Service Station No. 6019 and ConocoPhillips 76 Service Station No. 6027, 2933 and 2893 65<sup>th</sup> Street, Sacramento, In-Situ Remediation of Petroleum Hydrocarbons, Sacramento County***

The Responsible Parties (RPs) Atlantic Richfield Company, a BP Affiliated Company (ARCO), and ConocoPhillips (COP) (collectively Dischargers) submitted a Notice of Intent, dated 22 October 2009 and supplemental information dated 12 March 2010 and 26 October 2010, requesting coverage under General Order No. R5-2008-0149, *General Waste Discharge Requirements for In-situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-Volatile Compounds and/or Petroleum Compounds*. Based on information in these submittals, it is our determination that this project meets the required conditions to operate under Order No. 2008-0149. All of the requirements contained in the General Order are applicable to your project. You are assigned Order No. R5-2008-0149-008.

**Project Location:**

The project is in the City of Sacramento in Sacramento County, T8N, R5E, S15 B&M. Assessor's Parcel Nos. 015-0031-033-0000 and 015-0031-0043-0000.

**Project Description:**

Operations at the ARCO Service Station and 76 Service Station in Sacramento caused pollution of the soil and groundwater. The primary pollutants of concern are petroleum hydrocarbon compounds, including total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl tert butyl ether (MTBE). Both the ARCO Service Station and the 76 Service Station are operating gasoline service

stations. Ozone injection pilot testing was successfully conducted between March 2004 and November 2008 without formation of unacceptable levels of hexavalent chromium.

For this project, the Dischargers completed a Remedial Action Plan (RAP), approved by Sacramento County. The RAP calls for injection of ozone into 24 sparge wells, 11 on the ARCO property and 13 on the COP Property. Approximately 2 pounds per day (lbs/day) of ozone will be injected. The 2 lbs/day will be divided among the 24 sparge wells. Injection of citric acid with a pH between 2 and 3 is also proposed to redevelop sparge wells, as needed, in case of bio-fouling or pressure buildup.

Ozone sparging was implemented in March 2004 and effectively reduced contaminant concentrations. No additional groundwater monitoring wells are anticipated at this time. It is estimated that the project will take up to a year and a half to complete. The Dischargers will also be conducting sampling and reporting the results as described in the attached Groundwater Monitoring and Reporting Program.

The contingency plan is as follows:

1. If hexavalent chromium concentrations in wells JW-5 and MW-17 increase to greater than 21 micrograms per liter (ug/l) (20% above the establish background concentration of 17 ug/l), injection of ozone will stop and sampling frequency for hexavalent chromium will increase to quarterly.
2. If hexavalent chromium concentrations have not also increased in the background wells UMW-3 and UMW-4, and if concentrations do not decrease in treatment zone and transition zone wells after six months, the Dischargers will evaluate the need to inject a low concentration (100 to 250 milligrams per liter) of high fructose corn syrup (HFCS) into injection well(s) or by direct push boring. If concentrations do not reduce to less than 21 ug/l within 6 months of injection of HFCS, additional injection events may be performed.
3. The exact treatment dose will be determined by testing a water sample for reaction using HFCS at two dosing levels. The lab study identified target dose will be applied to the field. This lab study will be conducted during the 6-month natural attenuation period to allow for immediate implementation of HFCS injection if natural attenuation is ineffective.

If the Dischargers desire to modify the injectants and/or volume of injectants, a revised Notice of Intent must be submitted and a new Notice of Applicability prepared prior to proceeding with the additional/modified injection.

No comments were received on the draft Notice of Applicability and Monitoring and Reporting Program during the 30-day public comment period, which ended 19 August 2011.

**General Information:**

1. The project will be operated in accordance with the requirements contained in the General Order and in accordance with the information submitted in the Notice of Intent.
2. The required annual fee (as specified in the annual billing you will receive from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially revoked.
3. The Dischargers shall comply with the attached General Order No. R5-2008-0149, *General Waste Discharge Requirements for In-situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-Volatile Compounds and/or Petroleum Compounds*.
4. Injection of materials other than ozone, citric acid with a pH between 2 and 3, and HFCS into the subsurface is prohibited, unless analysis of the injectant, as specified in Order No. R5-2008-0149, is provided and approval is given by Board staff.
5. Failure to abide by the conditions of the General Order could result in an enforcement action as authorized by provisions of the California Water Code.
6. The project will implement the final contingency plan included as part of the Notice of Intent within 30 day of it being triggered.
7. The Dischargers shall comply with the attached Monitoring and Reporting Program, Order No. R5-2008-0149-008, and any revisions thereto as ordered by the Executive Officer.

If you have any questions regarding this matter, please call Vera Fischer at (916) 464-4792 or contact her at [vfischer@waterboards.ca.gov](mailto:vfischer@waterboards.ca.gov).

PAMELA C. CREEDON  
Executive Officer

Attachments - General Order No. R5-2008-0149-008

cc: Ms. Della Kramer, Regional Water Quality Control Board, Sacramento  
Mr. Charley Langer, Sacramento County Environmental Management, Sacramento  
Mr. Brian Westhoff, Stantec Consulting Corporation, Rancho Cordova

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0149-008

FOR  
IN-SITU GROUNDWATER REMEDIATION AT SITES WITH VOLATILE ORGANIC  
COMPOUNDS, NITROGEN COMPOUNDS, PERCHLORATE, PESTICIDES,  
SEMI-VOLATILE COMPOUNDS AND/OR PETROLEUM HYDROCARBONS

ARCO SERVICE STATION NO. 6019  
2933 65<sup>TH</sup> STREET, SACRAMENTO  
SACRAMENTO COUNTY  
AND  
CONOCOPHILLIPS 76 SERVICE STATION NO. 6027  
2893 65<sup>TH</sup> STREET, SACRAMENTO  
SACRAMENTO COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater extraction and/or treatment system. This MRP is issued pursuant to Water Code Section 13267. The Dischargers shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, Regional Board staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

### **GROUNDWATER MONITORING**

1. As shown on Figure 1, there are 25 monitor wells and 24 injection wells associated with these two sites. The groundwater monitoring program for these wells, and any treatment system 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, if applicable, shall also be provided in semi-annual monitoring reports. Sample collection and analysis shall follow standard EPA protocol.
2. The monitoring wells, extraction wells and/or injection wells shall be sampled according to the schedule in Table 1 and the samples analyzed by the methods in Table 2, as follows:

**Table 1: Sampling Frequency and Constituent Suite**

Well Number <sup>1</sup>	Frequency <sup>2</sup>	Constituent Suite(s) <sup>3</sup>	Monitoring Objective
MW-19 and MW-20	Semi-Annually	Suites A through D	Compliance <sup>4</sup>
MW-1 through MW-5, MW-7, MW-9, MW-10, UMW-1, UMW-2, and UMW-5	Semi-Annually	Suites A through D	Treatment Zone <sup>5</sup>
MW-6, MW-16 through MW-18, and JW-1 through JW-5	Semi-Annually	Suites A through D	Transition Zone <sup>6</sup>
UMW-7	Annually		
UMW-3 and UMW-4	Semi-annually	Suites A through D	Background <sup>7</sup>

<sup>1</sup> Well numbers as shown on Figure 1.

<sup>2</sup> Wells scheduled for semi-annual sampling shall be sampled during the first and third quarters. Wells scheduled for annual sampling shall be sampled during the third quarter.

<sup>3</sup> Constituent suite components listed in Table 2.

<sup>4</sup> Wells used to determine compliance with water groundwater limitations.

<sup>5</sup> Wells sampled to evaluate remedy effectiveness inside the treatment zone.

<sup>6</sup> Wells sampled to evaluate migration of pollutants within the transition zone.

<sup>7</sup> Wells used to develop background concentrations.

**Table 2: Analytical Methods**

Constituent	Method <sup>1</sup>	Maximum Practical Quantitation Limit (ug/L) <sup>2</sup>
<b>Suite A</b>		
Gasoline Range Organics	EPA 8015B (M) or 8260B	50
BTEX, MTBE, TAME, DIPE, ETBE, 1,2-Dichlorethane	EPA 8260B or 8020	0.50
TBA	EPA 8260B or 8020	5
Ethanol	EPA 8260B	50
<b>Suite B</b>		
Volatile Organic Acids	EPA 6500	1,000
Orthophosphate	SM 4500	100
<b>Suite C</b>		
Total Dissolved Solids	EPA 160.1	10,000
Total Organic Carbon	EPA 415	300
Nitrate	EPA 6500	300
Sulfate	EPA 6500	200
Sulfide	SM 4500	50
<b>Suite D</b>		
Iron, Total	EPA 200.7	100

Constituent	Method <sup>1</sup>	Maximum Practical Quantitation Limit (ug/L) <sup>2</sup>
Ferrous Iron	EPA 200, 6020 or SM3000 or Hach Test Kit	100
Hexavalent Chromium	EPA 7199	1
<b>Suite D (cont.)</b>		
Total Chromium	EPA 200.7, 200.8	50
Phosphorous	EPA 200.7, 365	1,000
Metals, Total and Dissolved <sup>3</sup>	EPA 200.7, 200.8	Various

<sup>1</sup> Or an equivalent EPA Method that achieves the same or lower Practical Quantitation Limit.

<sup>2</sup> All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.

<sup>3</sup> Metals include arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, and silica.

### FIELD SAMPLING

3. In addition to the above sampling and analysis, field sampling and analysis shall be conducted each time a monitor well or injection well is sampled. The sampling and analysis of field parameters shall be as specified in Table 3.

**Table 3: Field Sampling Requirements**

Parameters	Units	Type of Sample
Groundwater Elevation	Feet, Mean Sea Level	Measurement +/-0.01 ft.
Oxidation-Reduction Potential	Millivolts	Grab
Electrical Conductivity	uhmos/cm	Grab
Dissolved Oxygen	mg/L	Grab
pH	pH Units (to 0.1 units)	Grab

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

- a. The operator is trained in proper use and maintenance of the instruments;
- b. The instruments are calibrated prior to each monitoring event;
- c. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
- d. Field calibration reports are submitted as described in item (b) of the "Reporting" section of this MRP.

## DISCHARGE MONITORING

- The Dischargers shall monitor daily the discharge of amendments that are injected into the groundwater according to the requirements specified in Table 4. Each amendment addition shall be recorded individually, along with information regarding the time period over which the amendment was injected into the aquifer.

**Table 4: Discharge Monitoring Requirements**

<b>Parameters</b>	<b>Units</b>	<b>Type of Sample</b>
Injected Volume	pounds per day	Meter
Citric Acid Added	gallons per day	Measured
High Fructose Corn Syrup	gallons per day	Measured

## ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

- The Dischargers developed a background value for the concentration of hexavalent chromium of 17 ug/l.

## REPORTING

- 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 Board within 48 hours of any unscheduled shutdown of any soil vapor and/or groundwater extraction system. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to the Regional Board.
- 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.
- The Dischargers shall submit semi-annual electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. The semi-annual reports shall be submitted electronically over the internet to the Geotracker database system by the 1st day of the second month following the end of each half of the year by **1 February** (second half of the year) and **1 August** (first half of the year) until such time as the Executive Officer determines that the reports are no longer necessary.
- Hard copies of semi-annual reports shall be submitted to the Regional Board by the **1st day of the second month following the end of** each half of the year by **1 February** (second half of the year) and **1 August** (first half of the year). Each semi-annual 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) pollutant concentration maps for all groundwater zones, if applicable;
  - (e) a table showing well construction details such as well number, groundwater zone being monitored, coordinates (longitude and latitude), ground surface elevation, reference elevation, elevation of screen, elevation of bentonite, elevation of filter pack, and elevation of well bottom;
  - (f) a table showing historical lateral and vertical (if applicable) flow 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, which may be submitted in an electronic format;
  - (i) the status of any ongoing remediation, including an estimate of the cumulative 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; and
  - (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.
10. An Annual Report shall be submitted to the Regional Board by **1 February** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation, and may be substituted for the second semi-annual monitoring report. The Annual Report shall contain the following minimum information:
- (a) both tabular and graphical summaries of all data obtained during the year;
  - (b) groundwater contour maps and pollutant concentration maps containing all data obtained during the previous year;
  - (c) a discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;
  - (d) an analysis of whether the pollutant plume is being effectively treated;



- (e) 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;
- (f) an identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program; and
- (g) if desired, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.

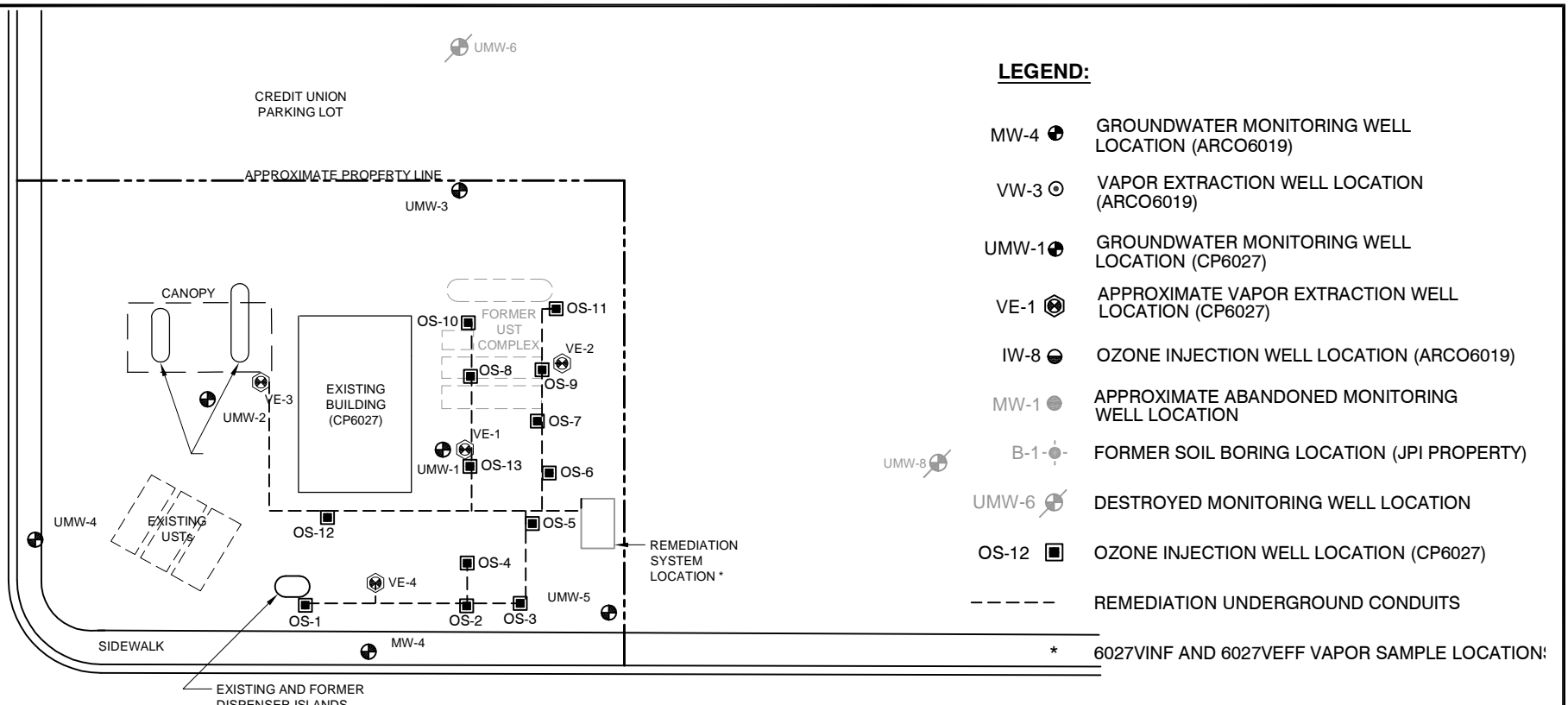
11. A letter transmitting the monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following issuance of this Order.

Ordered by:

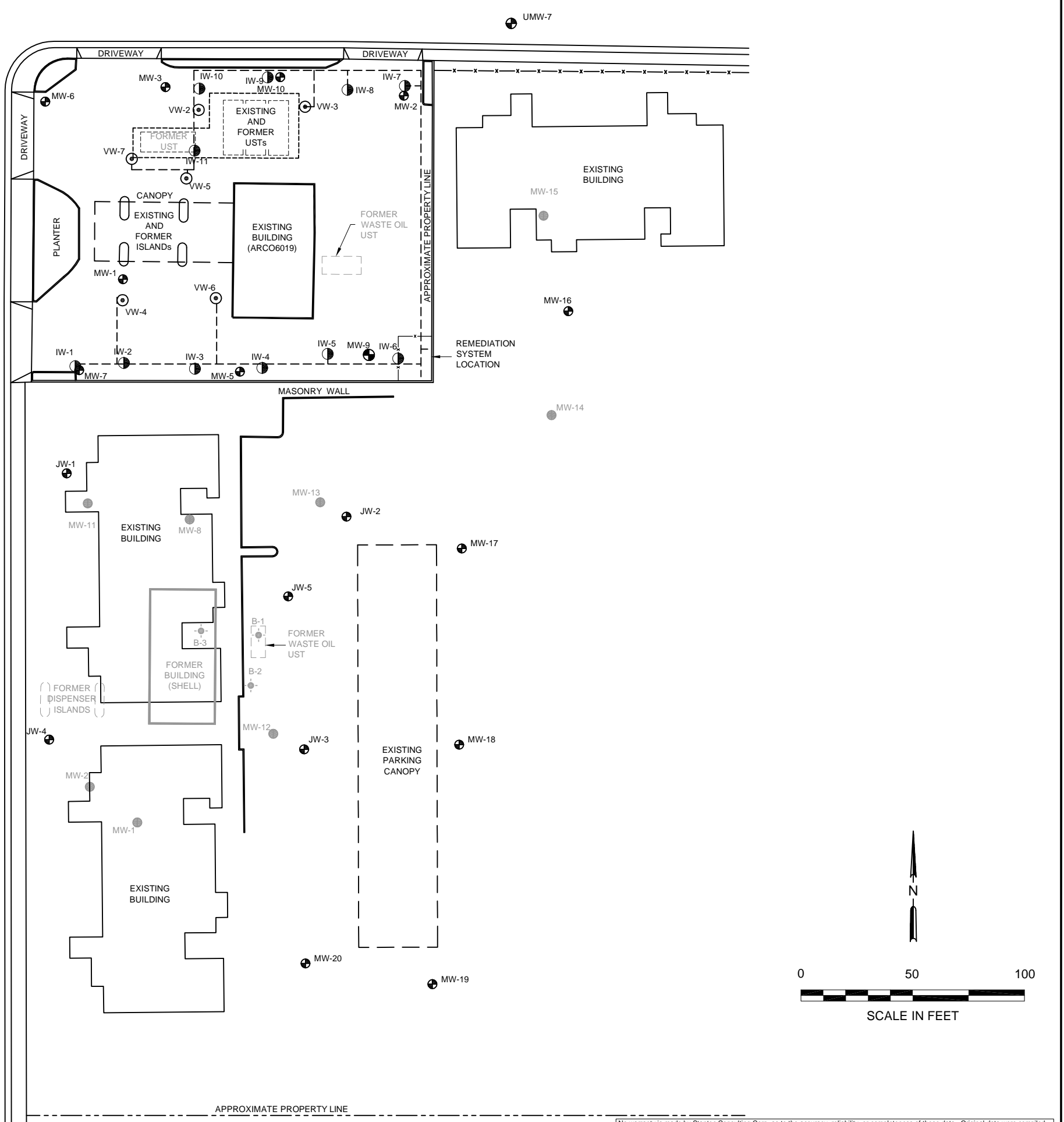
\_\_\_\_\_  
PAMELA C. CREEDON, Executive Officer

\_\_\_\_\_  
(Date)



65TH STREET

4TH AVENUE



No warranty is made by Stantec Consulting Corp. as to the accuracy, reliability, or completeness of these data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed electronically, and may be updated without notification. Any reproduction may result in a loss of scale and/or information.

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



FOR: ARCO SERVICE STATION NO. 6019  
2933 65TH STREET  
CONOCOPHILLIPS / FORMER UNOCAL  
SERVICE STATION NO. 6027  
2893 65TH STREET  
SACRAMENTO, CALIFORNIA

**SITE PLAN**

FIGURE:  
**1**

JOB NUMBER:  
211602005

DRAWN BY:  
MDR/STA

CHECKED BY:  
AR

APPROVED BY:  
BW

DATE:  
04/08/10