

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

SELF-MONITORING AND REPORTING PROGRAM

FOR

**SHELL OIL PRODUCTS US
SHELL MARTINEZ REFINERY
3485 PACHECO BOULEVARD
MARTINEZ, CONTRA COSTA COUNTY**

ORDER NO. R2-2013-0034

CONSISTS OF PART A AND PART B

PART A

This Self-Monitoring and Reporting Program (SMP) specifies monitoring and reporting programs necessary to fulfill obligations under the Waste Discharge Requirements (WDRs) including:

- (a) General monitoring requirements for waste management units under the WDRs (Part A);
- (b) Self-monitoring report content and format (Part A);
- (c) Self-monitoring report submittal frequency and schedule (Part B); and
- (d) Monitoring locations, parameters, analytes and frequency for programs under the WDRs (Part B).

A. AUTHORITY AND PURPOSE

For discharges of waste to land, water quality monitoring is required pursuant to the California Code of Regulations (CCR), Division 2, Title 27, Subdivision 1, Chapter 3, Subchapter 3, sections 20380 through 20435. The principal purposes of an SMP include:

1) to document compliance with WDRs and prohibitions established by the Regional Water Board, 2) to facilitate self-policing by the discharger in the prevention and abatement of pollution arising from the waste discharge, 3) to develop or assist in the development of standards of performance, and 4) to assist the discharger in complying with the requirements of Title 27. Additionally, under California Water Code (CWC) section 13304, Shell Oil Products US (Shell) is required to implement corrective actions and monitor the effectiveness of the implemented corrective actions under this SMP.

Achievement of the above goals shall occur by collecting sufficient and meaningful data to demonstrate that site conditions are protective of human health and the environment and to serve as an early indicator of any potential concern areas. The specific volume, frequency, and parameter analysis may vary for different locations along the perimeter compliance points depending upon area-specific concerns. Ongoing data analysis shall be conducted to determine if sufficient and meaningful data are being collected as well as to determine if changes to this sampling plan are warranted either due to the collection of data with little or no value or due to the needed collection of additional data to address area specific concerns.

B. MONITORING REQUIREMENTS

Monitoring refers to the observation, inspection, measurement, and/or sampling of environmental media, waste management units (WMUs), containment and control facilities, and waste disposed in each WMU. Monitoring programs designed to evaluate the effectiveness of corrective actions implemented under CWC section 13304 are also described in the SMP. The following defines the types of monitoring that may be required.

Monitoring of Environmental Media

The Regional Water Board may require monitoring of groundwater, surface water, vadose zone, stormwater, leachate, and any other environmental media that may pose a threat to water quality or provide an indication of a water quality threat at the refinery.

Sample collection, storage, and analyses shall be performed according to the most recent version of U.S. EPA-approved methods or in accordance with the most recent version of Shell's Groundwater Monitoring Program Standard Operating Procedures (SOP). Analytical testing of environmental media required by this SMP shall be performed by a California State-approved laboratory for the required analyses. The director of the laboratory whose name appears on the certification shall be responsible for supervising all analytical work in his/her laboratory and shall have signing authority for all laboratory data reports or may designate signing of all such data included in reports submitted to the Regional Water Board.

All monitoring instruments and devices used to conduct monitoring in accordance with this SMP shall be maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once every two years.

Receiving waters refer to any surface water which actually or potentially receives surface or groundwater that pass over, through, or under waste materials or impacted soils. In this case, the following water bodies are considered receiving waters: the local groundwater beyond the Perimeter Compliance Points, and the marsh/wetlands of the Carquinez Strait.

Standard Observations

Standard observations refer to observations within the limits of each WMU, at their perimeter, and of the receiving waters beyond their limits. Standard observations include:

1. Waste Management Units:
 - a. Evidence of ponded water at any point on the WMU;
 - b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source; and
 - c. Evidence of erosion and/or daylighted waste.
2. Perimeter of Waste Management Units:
 - a. Evidence of liquid leaving or entering the WMU, estimated size of affected area and flow rate (show affected area on map);
 - b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source; and
 - c. Evidence of erosion and/or daylighted waste.
3. Receiving Waters:
 - a. Floating and suspended materials of waste origin, including their presence or absence, source, and size of affected area;
 - b. Discoloration and turbidity: description of color, source, and size of affected area;
 - c. Evidence of odors, presence or absence, characterization, source, and distance of travel from source;
 - d. Evidence of beneficial use, such as presence of water associated with wildlife;
 - e. Estimated flow rate; and
 - f. Weather conditions, such as estimated wind direction and velocity, total precipitation.

Quality Assurance/Quality Control (QA/QC) Sample Monitoring

Shell shall collect duplicate, field blank, equipment blank (if appropriate) and trip blank samples for each monitoring event at the frequency specified in the latest version of the Shell Groundwater Monitoring Program SOP.

C. REPORTING REQUIREMENTS

Reporting responsibilities of waste dischargers under WDRs are specified in CWC § 13225(a), 13267(b), 13383, and 13387(b) and this Regional Water Board's Resolution No.73-16 and Title 27. At a minimum, each Self-Monitoring Report (SMR) shall include the following information:

1. Transmittal Letter: A cover letter transmitting the essential points of the monitoring report shall be included with each monitoring report. The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall also certify the completion of all monitoring requirements. The letter shall be signed by the Discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.
2. Graphic Presentation: The following maps, figures, and graphs (if applicable) shall be included in each SMR to visually present data collected pursuant to this SMP:
 - a. Plan-view maps showing all monitoring and sampling locations, WMUs, groundwater protection systems (GWPS), and site/property boundaries;
 - b. Groundwater level/piezometric surface contour maps with data collected in the 2nd and 4th quarters of each year.
3. Tabular Presentation: The following data (if applicable) shall be presented in tabular form and included in each SMR to show a chronological history and allow quick and easy reference:
 - a. Well designation;
 - b. Well location coordinates;
 - c. Groundwater depths (collected 2nd and 4th quarters of each year);
 - d. Groundwater elevations;
 - e. Current analytical results;
 - f. Historical analytical results (including the past four sampling events); and
 - g. Measurement dates.
4. Compliance Evaluation Summary and Discussion:
 - a. A summary and certification of completion of all environmental media monitoring, standard observations, and facilities inspections;
 - b. The signature of the laboratory director or his/her designee in laboratory data deliverables indicating that he/she has supervised all analytical work in his/her laboratory; and
 - c. A discussion of the field and laboratory results that includes the following information:

- (1) Data interpretations;
 - (2) Conclusions;
 - (3) Recommendations;
 - (4) Newly implemented or planned investigations and remedial measures;
 - (5) Data anomalies;
 - (6) Variations from protocols and;
 - (7) Condition of wells.
5. Appendices: The following information shall be provided as appendices in electronic format only, unless requested otherwise by Regional Water Board staff and unless the information is already contained in an SOP approved by Regional Water Board staff:
- a. Method and time of water level measurements;
 - b. Purging methods and results including the type of pump used, pump placement in the well, pumping rate, equipment and methods used to monitor field pH, temperature, and electrical conductivity, calibration of the field equipment, pH temperature, conductivity, and turbidity measurements, and method of disposing of the purge water;
 - c. Sampling procedures, field, equipment, and trip blanks, number and description of duplicate samples, type of sample containers and preservatives used, the date and time of sampling, the name of the person actually taking the samples, and any other relevant observations; and
 - d. Documentation of laboratory results, analytical methods, detection limits and reporting limits, and QA/QC procedures for the required sampling.

D. ANNUAL REPORTING

The Discharger shall submit an annual self-monitoring report to the Regional Water Board covering the previous calendar year. The annual report must summarize all monitoring activities that have occurred in the previous year. The annual report shall include the following information for each monitoring event during the year required pursuant to this SMP, in addition to the transmittal letter, figures, tables and appendices described in Section C of this SMP:

1. Graphic Presentation

Include site maps (plot plans) that are drawn to a scale that remains constant from reporting period to reporting period. Line or bar graphs are helpful to illustrate variations in groundwater elevations, phase-separated product thickness, and dissolved chemical concentrations with time. These maps and graphs shall include the following information:

- a. Well locations;
- b. Groundwater elevation contours;
- c. Inferred groundwater flow direction(s);
- d. Identify wells containing free product;
- e. Extent of dissolved chemical constituents presented in map layout (chemical data box maps).

2. Tabular Presentation

Present all of the following data in one or more tables to show a chronological history and allow quick and easy reference. The table(s) shall include the following information:

- a. Well designations;
- b. Well location coordinates;
- c. Top of well casing elevation;
- d. Groundwater depths;
- e. Groundwater elevations;
- f. Free product thicknesses;
- g. Current analytical results;
- h. Historical analytical results for the most recent four sampling events;
- i. Measurement dates; and
- j. The quantity of groundwater captured by each GWPS.

3. Discussion

Provide a discussion of the field and laboratory results that includes the following information:

- a. Data Interpretations;
- b. Conclusions;
- c. Recommendations;
- d. Newly implemented or planned investigations and remedial measures;
- e. Data anomalies;
- f. Variations from protocols; and
- g. Conditions of wells.

E. CONTINGENCY REPORTING

1. The Discharger shall report any seepage from the surface of any WMU or discharge prohibited in the WDRs immediately after it is discovered to the Regional Water Board by calling the Spill Hotline at 1-800-852-7550 and by sending an email to Rb2SpillReports@waterboards.ca.gov. The Discharger shall submit a written report with the Regional Water Board within five days of discovery of any discharge. The written report shall contain, at a minimum, the following information:
 - a. A map showing the location(s) of discharge;
 - b. Approximate flow rate;
 - c. A description of the nature of the discharge; and

- d. Corrective measures underway or proposed.
2. The Discharger shall submit a written report to the Regional Water Board within seven working days of determining that a statistically significant difference occurred in the sample result compared against the historical dataset and above an approved MACLs in a compliance point well. In addition, evaluation of GWPS performance will be reviewed to examine the effectiveness of hydraulic control.
 - a. Shell shall immediately re-sample at the compliance point where the anomalous result was observed, evaluate the result against the historical dataset and re-analyze if results are not consistent with historical trends.
 - b. If re-sampling and analysis confirm the anomalous result through statistical analysis, Shell shall document this in the text of the next Annual Report and notify the Regional Water Board in writing within 21 days of receiving the final laboratory results. In this letter, Shell shall evaluate whether any re-sampling or additional corrective measures need to be implemented.

F. ELECTRONIC REPORTING

1. Geotracker Requirements

The State Water Board has adopted regulations requiring electronic report and data submittal to Geotracker. The text of the regulations can be found at the following URL:

http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/index.shtml

Parties responsible for cleanup of pollution at sites overseen by the Regional Water Board's Land Disposal Programs are required to submit the following information electronically to Geotracker:

- a. Groundwater analytical data; and
- b. Portable data format (PDF) copies of all reports (the document in its entirety [signature pages, text, figures, tables, etc.] must be saved as a single PDF file).

Note that the Discharger is still responsible for submitting one hard copy of all reports pursuant to this Order. The Regional Water Board may require direct submittal of electronic reports and correspondence in addition to the State Water Board's Geotracker requirements.

2. Data Tables

Upon request, monitoring results shall also be provided electronically in Microsoft Excel or similar spreadsheet format to provide an easy to review chronological summary of site data, and to facilitate data computations and/or plotting that Water Board staff may undertake during the review process. Data tables submitted in electronic spreadsheet format will not be included in the case file for public review and should therefore be submitted on CD or diskette and included with the hard copy report.

Electronic tables shall include the following information:

- a. Well designations;
- b. Well location coordinates;
- c. Top of casing elevations;
- d. Groundwater depths and elevations;
- e. Free product thicknesses;
- f. Current analytical results by constituent of concern;
- g. Historical analytical results (including the past four sampling events); and
- h. Measurement dates.

G. MAINTENANCE OF WRITTEN RECORDS

The Discharger shall maintain information required pursuant to this SMP for a minimum of five years. The five-year period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board.

PART B: MONITORING AND OBSERVATION SCHEDULE

1. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

A. GROUNDWATER MONITORING:

Semi-Annual Report: Due August 31
Annual Report: Due March 31 of each year

Groundwater shall be sampled and analyzed as detailed in Tables 1, 2 and 3. Groundwater analyses shall include the following field measurements: pH, temperature, specific conductance, water level, volume purged, number of casings volumes purged, and whether the well went dry during sampling (including measures taken to ensure accuracy of analyses given this condition).

B. FACILITIES MONITORING - Observe semi-annually, report semi-annually

Semi-Annual Report: Due August 31
Annual Report: Due March 31 of each year

The Discharger shall inspect all WMUs to ensure proper and safe operation and report semi-annually.

2. GWPS PERFORMANCE MONITORING

Shell shall annually demonstrate that all perimeter GWPS are containing and extracting all perimeter compliance point groundwater at concentrations greater than the approved MACLs. The system performance evaluation shall include but not necessarily be limited to, groundwater capture zone modeling and/or evaluating chemical monitoring data to demonstrate site conditions are protective of human health and the environment at the perimeter compliance points. Historically, Shell has provided the Regional Water Board with an annual *Groundwater Boundary Control Capture Verification Modeling Report* to satisfy this requirement. Continued submittal of this report or submittal of an annual report using groundwater analytical data to demonstrate site conditions are protective of human health and the environment at the compliance points, or a combination of these reports is required.

For perimeter compliance point locations where groundwater capture is not achieved and where chemical monitoring data are above the MACLs, Shell shall inform the Regional Water Board of their plans to provide groundwater capture or to collect additional data to demonstrate site conditions are protective of human health and the environment at the perimeter compliance points.

3. CHEMICAL CONSTITUENT MONITORING

- a. Refinery-Wide Groundwater Monitoring Program: Shell shall sample the Refinery-Wide Groundwater Monitoring Program compliance points (wells) listed in Table 1 for the analytical parameters and at the frequencies listed in Table 1. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the most recent version of Shell's Groundwater Monitoring Program SOPs.

- b. Five-Year Groundwater Monitoring Program: Shell shall sample the wells listed on Table 3 for the analytical parameters listed on Table 3 at a frequency on once every five years. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the most recent version of Shell's Groundwater Monitoring Program SOPs.

Attachments:

- Table 1: List of Monitoring Wells and Analyses
Table 2: Maximum Allowable Concentration Limits (MACLs) for Perimeter Compliance Points
Table 3: 5 Year Sampling List of Wells and Analyses

**TABLE 1
LIST OF MONITORING WELLS AND ANALYSES
SHELL MARTINEZ REFINERY**

Well	POC Well	Groundwater Basin	WMU	Sampling Frequency	Purpose	Analytical Suite
86	Yes	Reservoir Lakes	na	Semiannual (1Q & 3Q)	WMU Monitoring	A
159	No	East Valley	PG&E	Semiannual (1Q & 3Q)	WMU Monitoring	A
164	Yes	Reservoir Lakes	na	Semiannual (1Q & 3Q)	WMU Monitoring	A
173	No	Reservoir Lakes	N	Semiannual (1Q & 3Q)	WMU Monitoring	A
207	Yes	East Valley	JT	Semiannual (1Q & 3Q)	WMU Monitoring	A
237	No	Reservoir Lakes	YY	Semiannual (1Q & 3Q)	WMU Monitoring	A
242	No	Central Valley	Ms	Semiannual (1Q & 3Q)	WMU Monitoring	A
350	Yes	East Valley	JT	Semiannual (1Q & 3Q)	WMU Monitoring	A
438	Yes	East Valley	JT	Semiannual (1Q & 3Q)	WMU Monitoring	A
449	Yes	East Valley	Z'	Semiannual (1Q & 3Q)	WMU Monitoring	A
459	No	West Valley	I	Semiannual (1Q & 3Q)	WMU Monitoring	A
481	No	West Valley	K	Semiannual (1Q & 3Q)	WMU Monitoring	A
524	Yes	East Valley	Z'	Semiannual (1Q & 3Q)	WMU Monitoring	A
525	Yes	East Valley	Z'	Semiannual (1Q & 3Q)	WMU Monitoring	A
540	No	Reservoir Lakes	YY	Semiannual (1Q & 3Q)	WMU Monitoring	A
574	No	West Valley	I	Semiannual (1Q & 3Q)	WMU Monitoring	A
575	No	West Valley	I	Semiannual (1Q & 3Q)	WMU Monitoring	A
581	No	East Valley	DD	Semiannual (1Q & 3Q)	WMU Monitoring	A
583	No	East Valley	DD	Semiannual (1Q & 3Q)	WMU Monitoring	A
63	Yes	East Valley	Y	Annual (1Q)	System Performance	A & B
81	Yes	Reservoir Lakes	na	Annual (1Q)	System Performance	A
224	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
279	No	Reservoir Lakes	na	Annual (1Q)	System Performance	A
437	Yes	East Valley	Y	Annual (1Q)	System Performance	A & B
471	Yes	East Valley	Y	Annual (1Q)	System Performance	A & B
504	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
516	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
518	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
520	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
529	Yes	East Valley	X	Annual (1Q)	System Performance	A & B
554	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
293S	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
294FB	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
294S	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
296FB	Yes	West Valley	Pond 5C/5D/8	Annual (1Q)	System Performance	A
316B	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
317B	Yes	West Valley	PS	Annual (1Q)	System Performance	A & B
319FB	Yes	West Valley	na	Annual (1Q)	System Performance	A
321F	Yes	West Valley	Pond 4	Annual (1Q)	System Performance	A
323G	Yes	West Valley	Pond 6	Annual (1Q)	System Performance	A
M-6	Yes	West Valley	Pond 5	Annual (1Q)	System Performance	A
228	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
600	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
604	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
225R	No	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
292B	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
292S	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
293B	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C
293S	Yes	West Valley	Pond 7	Semiannual (1Q & 3Q)	RCRA Monitoring	C

Analytical Suite	Constituents
A	Ba, Cr, Pb, Ni, Zn, BTEX/TPH-G & Purgeables
B	Phenols
C	Ba, Cr, Cu, Pb, Hg, Ni, Se, V, BTEX/TPH-G & Purgeables, Semivolatiles/Phenols

Notes:

WMU = Waste management unit

na = not applicable

POC = Point of Compliance

TABLE 2
MAXIMUM ALLOWABLE CONCENTRATION LIMITS (MACLs)
FOR PERIMETER COMPLIANCE POINTS
SHELL MARTINEZ REFINERY

Constituents of Concern	Recommended Shell MACL (µg/L)	Basis for MACL
TPH-Gas	500	ESL - Aquatic Habitat
TPH-Diesel	640	ESL - Aquatic Habitat
Benzene	46	ESL - Aquatic Habitat
Toluene	130	ESL - Aquatic Habitat
Ethylbenzene	43	ESL - Aquatic Habitat
Xylenes	100	ESL - Aquatic Habitat
MTBE	8,000	ESL - Aquatic Habitat
Naphthalene	24	ESL - Aquatic Habitat
Antimony	30	ESL - Aquatic Habitat
Arsenic	36	ESL - Aquatic Habitat
Barium	1000	ESL - Aquatic Habitat
Beryllium	0.53	ESL - Aquatic Habitat
Cadmium	0.25	ESL - Aquatic Habitat
Chromium (total)	180	ESL - Aquatic Habitat
Cobalt	3	ESL - Aquatic Habitat
Copper	3.1	ESL - Aquatic Habitat
Lead	2.5	ESL - Aquatic Habitat
Manganese	100	EPA Aquatic Life Protection
Mercury	0.025	ESL - Aquatic Habitat
Molybdenum	240	ESL - Aquatic Habitat
Nickel	8.2	ESL - Aquatic Habitat
Selenium	5	ESL - Aquatic Habitat
Silver	0.19	ESL - Aquatic Habitat
Thallium	4	ESL - Aquatic Habitat
Vanadium	19	ESL - Aquatic Habitat
Zinc	81	ESL - Aquatic Habitat
Bis(2-ethylhexyl)phthalate	32	ESL - Aquatic Habitat
2,4-Dimethylphenol	110	ESL - Aquatic Habitat
Phenol	260	ESL - Aquatic Habitat

Notes:

ESL Aquatic Habitat reference from Table F1b of the December 2013 SFRWQCB ESL document

µg/L = micrograms per liter

These MACLs are applicable at perimeter compliance points except for the Crude Hill Groundwater Basin.

**TABLE 3
5 YEAR SAMPLING
LIST OF WELLS AND ANALYSES**

Well	Groundwater Basin
63	East Valley
81	Reservoir Lakes
86	Reservoir Lakes
145	Central Valley
159	East Valley
164	Reservoir Lakes
173	Reservoir Lakes
207	East Valley
224	West Valley
228	West Valley
237	Reservoir Lakes
242	Central Valley
279	Reservoir Lakes
280	East Valley
350	East Valley
437	East Valley
438	East Valley
449	East Valley
452	Central Valley
459	West Valley
471	East Valley
476	East Valley
481	West Valley
504	West Valley
516	East Valley
518	East Valley
520	East Valley
524	East Valley

Well	Groundwater Basin
525	East Valley
529	East Valley
540	Reservoir Lakes
554	West Valley
574	West Valley
575	West Valley
581	East Valley
583	East Valley
600	West Valley
604	West Valley
627	East Valley
225R	West Valley
292B	West Valley
292S	West Valley
293B	West Valley
293S	West Valley
294FB	West Valley
294S	West Valley
296FB	West Valley
298S	West Valley
316B	West Valley
317B	West Valley
319FB	West Valley
321F	West Valley
323G	West Valley
457R	Reservoir Lakes
M-6	West Valley

Notes:

5-year sampling schedule: 2001, 2006, 2011, 2016, etc

The wells listed above are analyzed for:

- TPH as Gasoline
- TPH as Diesel (with Silica Gel Clean Up)
- CAM 17 Metals
- Manganese
- Semi Volatiles/Phenols (EPA 8270B Full List)
- Volatile Organic Compounds (EPA 8260 Full List)
- Phenols