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Arnold Schwarzenegger
Governor

TENTATIVE ORDER R2-2010-XXXX

AMENDMENT OF WASTE DISCHARGE REQUIREMENTS FOR SAN FRANCISCO BAY REGION REFINERIES

WHEREAS the California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter “Regional Water Board”), finds that:

1. The Regional Water Board issued waste discharge requirements that serve as National Pollutant Discharge Elimination System (NPDES) permits for the dischargers listed in Table 1 (hereinafter “Dischargers”). These permits authorize the Dischargers to discharge treated effluent from their respective facilities to waters of the United States under specific conditions.
2. This Order amends the orders listed in Table 1 to replace existing interim selenium limits with revised water quality-based effluent limits (WQBELs) calculated with limited dilution credits in accordance with the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (hereinafter “State Implementation Policy”). This Order also amends the orders listed in Table 1 to require effluent and receiving water studies pertaining to selenium.
3. The Fact Sheet attached to this Order as Attachment F contains background information and rationale for this Order’s requirements. It is hereby incorporated into this Order and therefore constitutes part of the findings for this Order.
4. This Order is exempt from the provisions of the California Environmental Quality Act pursuant to California Water Code §13389.
5. The Regional Water Board notified the Dischargers and interested agencies and persons of its intent to consider adoption of this Order, and provided an opportunity to submit written comments.
6. In a public meeting, the Regional Water Board heard and considered all comments pertaining to this Order.

**TABLE 1
DISCHARGERS SUBJECT TO THIS ORDER**

Discharger	Permit Number	Order Number	Permit Adoption Date
Chevron USA Inc., Richmond Refinery Chevron Chemical Company, LLC, Richmond Plant, and General Chemical Corporation, Richmond Works	CA0005134	R2-2006-0035	6/14/06
Conoco-Phillips San Francisco Refinery At Rodeo	CA0005053	R2-2005-0030	6/15/05
Shell Oil Products US and Equilon Enterprises LLC, Shell Martinez Refinery	CA0005789	R2-2006-0070	10/11/06
Tesoro Refining & Marketing Company, Golden Eagle Refinery	CA0004961	R2-2005-0041	9/21/2005

IT IS HEREBY ORDERED, pursuant to the provisions of California Water Code Division 7 and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder, that the Dischargers listed in Table 1 shall comply with their respective orders listed in Table 1, as amended by this Order.

- 1. The selenium WQBELs in Tables 2 and 3 shall replace all existing selenium limits in the orders listed in Table 1.**

These new WQBELs are both concentration-based and mass-based. Compliance with the mass-based limits in Table 3 shall be evaluated using running annual average mass loads, which shall be calculated from the arithmetic averages of each day's mass load and the mass loads from each of the preceding 364 days.

**TABLE 2
SELENIUM EFFLUENT CONCENTRATION LIMITS**

Discharger	Maximum Daily Effluent Limit (MDEL), µg/L	Average Monthly Effluent Limit (AMEL), µg/L
Chevron	34	29
Conoco-Phillips	50	37
Shell	50	42
Tesoro	50	42

**TABLE 3
SELENIUM MASS EMISSION LIMITS**

Discharger	Annual Average Effluent Limit, lbs/day	Annual Average Effluent Limit, kg/day
Chevron	1.8	0.82
Conoco-Phillips	0.85	0.39
Shell	2.0	0.93
Tesoro	1.0	0.45

2. The selenium compliance schedules and related requirements in the orders listed in Table 1 are hereby rescinded.

The Dischargers shall no longer be required to complete any remaining tasks or meet any remaining deadlines associated with their selenium compliance schedules.

3. The Dischargers listed in Table 1 shall implement effluent and receiving water selenium characterization studies as set forth in Table 4.

The Dischargers may complete, or cause to be completed, all or some of the required tasks collaboratively. All submittals shall be acceptable to the Executive Officer. Upon request by one or more Dischargers, the Executive Officer may modify the deadlines for the following tasks by no more than three years if good cause exists, such as delays in data collection, sample collection, analytical turnaround, or receipt of third party reports; laboratory QA/QC problems; other factors outside the Dischargers' control; or new information that warrants schedule modification. Any requests for schedule modification shall be in writing with necessary justification. Any approval shall also be in writing.

4. If conflicts exist between this Order's provisions and those of the orders listed in Table 1, this Order's provisions shall prevail.

Apparent conflicts may include, but may not necessarily be limited to, selenium limits, limit calculations and discussions, and text denying dilution credits when calculating selenium WQBELs. This Order's provisions, and the bases for them, shall supersede similar requirements and findings in the orders listed in Table 1.

5. This Order shall become effective on April 1, 2010.

**TABLE 4
EFFLUENT AND RECEIVING WATER CHARACTERIZATION STUDY
TASKS AND SCHEDULE**

Task	Compliance Date
<p>1. Submit a study plan for a minimum two-year study that includes the following elements:</p> <ul style="list-style-type: none"> a. effluent and receiving water sampling locations (the effluent sampling location may be the existing effluent compliance sampling point; receiving water sampling locations shall be within a 100-foot radius of the outfall to characterize near-field concentrations and speciation); b. receiving water sampling along transects from the Pacific Ocean (Golden Gate) to the Sacramento River (Rio Vista) and San Joaquin River (USGS Station 757), including sampling in the freshwater portions of the rivers at Vernalis (San Joaquin River) and Freeport (Sacramento River); c. sampling and analysis protocols (including means to evaluate seasonal conditions under low and high flows from the Sacramento / San Joaquin River Delta, selenium concentrations in the water column and suspended particles, and speciation and particulate selenium content in the effluent); d. comparison of the proposed protocols and analytical methods to previous sampling efforts; e. sampling parameters (including, at a minimum, salinity, carbon, nitrogen, and chlorophyll-a in receiving water, and dissolved and particulate selenate, selenite, organic selenides, and elemental selenium concentrations in both effluent and receiving water); f. data interpretation models and other methods to be used (representing conservative, reasonable worst case conditions); and g. implementation schedule. 	May 1, 2010
2. Begin implementation of the study plan developed for Task 1.	July 15, 2010
3. Submit a status report for Tasks 1 and 2 containing, at a minimum, monitoring data collected since the beginning of the study, summary of results to date, and necessary updates to the study plan.	Annually on February 1, 2011, and February 1, 2012, with annual self-monitoring reports
<p>4. Submit a final study report that includes the following elements:</p> <ul style="list-style-type: none"> a. sampling results, data interpretation, and conclusions, such as receiving water and mixing zone characterization, seasonal variability, etc.; b. effluent characterization; c. determination if there is reasonable potential for selenium in the discharge to violate the Basin Plan's narrative bioaccumulation objective through the use of pertinent models; d. comparison of near-field selenium water column concentrations to applicable numeric objectives; e. demonstration of spatial and temporal extent to which the objectives and other relevant guidelines are being exceeded; and f. determination of whether selenium levels adversely affect food web or wildlife, or contributes to bioaccumulation. 	August 15, 2012

I, Bruce Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 10, 2010.

Bruce H. Wolfe
Executive Officer

ATTACHMENT F

FACT SHEET

This Fact Sheet describes the legal requirements and technical rationale that serve as the basis for this Order's requirements.

Purpose

The purpose of this Order is to replace the selenium limits in the orders listed in Table 1 with WQBELs based on new information developed to support a future selenium Total Maximum Daily Load (TMDL). These limits are interim measures to control selenium in advance of a TMDL. The new WQBELs reflect limited dilution credit in accordance with the State Implementation Policy. This Order also requires the Dischargers, either individually or collaboratively, to study selenium in their effluents and its effects on San Francisco Bay.

Background

Selenium is a component of crude oil. The Dischargers listed in Table 1 discharge selenium into San Pablo Bay, Suisun Bay, and Carquinez Strait with their treated refinery wastewaters. Pursuant to Clean Water Act section 303(d), USEPA maintains a list of waters not meeting water quality standards, and San Pablo Bay, Suisun Bay, and Carquinez Strait are on that list because selenium in these waters bioaccumulates within the food web. The livers of San Francisco Bay waterfowl that feed on bottom-dwelling organisms, such as clams, contain elevated selenium levels. The Office of Environmental Health and Hazard Assessment issued an advisory in 1987 for consumption of two species of North Bay diving ducks found to have high tissue levels of selenium. This advisory is still in effect. White sturgeons, which also feed on clams, also contain elevated selenium levels.

This information, together with high uncertainty regarding how different sources of selenium contribute to bioaccumulation, have previously led the Regional Water Board to deny dilution credits for selenium. The Dischargers' existing permits include selenium WQBELs based on National Toxics Rule chronic and acute water quality objectives of 5 and 20 µg/L, and because these WQBELs do not account for dilution credits, they are very conservative. Since the Dischargers could not immediately comply with these WQBELs, their permits also include compliance schedules with specific tasks and deadlines, and performance-based interim limits in lieu of WQBEL compliance. The interim selenium limits are 34 µg/L for Chevron and 50 µg/L for ConocoPhillips, Shell, and Tesoro (expressed as daily maxima).

Since adoption of the existing permits, the Dischargers have significantly reduced their selenium discharges and altered the chemical forms of the selenium they discharge so the selenium is generally less bioavailable. Also, since adoption of the existing permits, substantially more information has become available to advance the development of a selenium TMDL for north San Francisco Bay segments. Recent work reduces some uncertainties regarding selenium sources, fate, and transport, and suggests that some assimilative capacity remains in the receiving

waters. Based on this preliminary information, this Order grants limited dilution credits for selenium, but only to a level that maintains existing refinery performance. When a selenium TMDL is completed, the Regional Water Board will amend these limits to be consistent with TMDL wasteload allocations. Granting dilution credits for selenium at this time is appropriate specifically because of the substantial new information about selenium in San Francisco Bay now available. This information does not apply to other pollutants.

Table F-1 provides some basic information about the facilities this Order covers.

**TABLE F-1
DISCHARGER FACILITY INFORMATION**

Discharger	Facility Name	Facility Address	Facility Average Flow¹ (mgd)	Receiving Water
Chevron U.S.A. Inc., Richmond Refinery, Chevron Chemical Company LLC, Richmond Plant, and General Chemical Corporation, Richmond Works	Richmond Refinery	841 Chevron Way Richmond, CA 94801 Contra Costa County Contact: J.G. Whiteside, (510) 242-4400	7.4	San Pablo Bay
ConocoPhillips	San Francisco Refinery	1380 San Pablo Ave Rodeo, CA 94572-1354 Contra Costa County Contact: Dennis Quilici, (510) 245-4403	3.0	San Pablo Bay
Shell Oil Products US and Equilon Enterprises, LLC	Shell Martinez Refinery	3485 Pacheco Blvd Martinez, CA 94553 Contra Costa County Contact: Steven Overman, (925) 313-3281	5.8	Carquinez Strait
Tesoro Refining & Marketing Co.	Golden Eagle Refinery	150 Solano Way Martinez, CA 94553 Contra Costa County Contact: Peter Carroll, (925) 335-3497	4.1	Suisun Bay

¹ Average flow calculated from daily flow over the period October 1, 2003, to September 30, 2009.

Dilution Credits

The Dischargers’ outfalls are designed to achieve a minimum initial dilution of 10:1. Table F-2 provides the estimated actual initial dilution at each Discharger’s outfall. The State Implementation Policy provides the basis for any dilution credit. State Implementation Policy section 1.4.2.1 states, “dilution credit may be limited or denied on a pollutant-by-pollutant basis....” Based on Regional Monitoring Program monitoring data for San Francisco Bay, there

**TABLE F-2
ESTIMATED DILUTION AND DILUTION CREDITS**

Discharger	Discharge Point	Estimated Initial Dilution	New Dilution Credit
Chevron	E-001	200:1	7:1
ConocoPhillips	E-002	67:1	10:1
Shell	E-001	16:1	10:1
Tesoro	E-001	15:1	10:1

is variability in the receiving water, and the hydrology of the receiving water is very complex. Therefore, it is uncertain how representative the ambient background data used to determine the effluent limitations is. Therefore, this Order significantly restricts selenium dilution credits. ConocoPhillips, Shell, and Tesoro receive a dilution credit of $D = 9$ (10 parts combined ambient water plus effluent to 1 part effluent). Chevron receives a dilution credit of $D = 6$ (7:1) because any larger dilution credit would result in WQBELs less stringent than Chevron's existing interim maximum daily effluent limit of 34 $\mu\text{g/L}$.

Concentration-Based WQBEL Calculations

Table F-3 presents the calculations underlying the concentration-based selenium WQBELs. These calculations reflect the State Implementation Policy methodology for calculating WQBELs and are based on the same data used to derive the concentration-based WQBELs in the existing permits. The only difference is the dilution credit applied.

The Dischargers' previous permits contained performance-based interim maximum daily effluent limits of 34 $\mu\text{g/L}$ (Chevron) or 50 $\mu\text{g/L}$ (ConocoPhillips, Shell, Tesoro). To maintain current performance and avoid unnecessary backsliding, this Order retains these existing limits. The resulting concentration-based maximum daily WQBELs in this Order, shown in Table F-4, are therefore lower than those in calculated in Table F-3.

Mass Emission Limitation Calculations

State Implementation Policy section 2.1.1 states that, for bioaccumulative compounds on the 303(d) list, the Regional Water Board should consider whether mass loads should be limited to current levels pending TMDL development. Consistent with the orders listed in Table 1, the Regional Water Board continues to find that selenium mass limits are warranted. Such limits ensure that the Dischargers maintain their existing treatment performance and do not further contribute to water quality impairment. Therefore, this Order establishes selenium mass emission limits as described below.

The mass emission limits are based on the average monthly effluent limits (calculated above) and the average daily effluent flows from October 1, 2003, through September 30, 2009 (shown in Table F-5). The limits are calculated using using average monthly effluent limits, instead of maximum daily effluent limits, because average monthly effluent limits better represent long-term performance.

**TABLE F-3
CONCENTRATION-BASED WQBEL CALCULATIONS (µg/L)**

	Chevron	Conoco Phillips	Shell	Tesoro
Dilution Factor (D) (if applicable)	6	9	9	9
No. of samples per month	4	4	4	4
Aquatic life criteria analysis required? (Y/N)	Y	Y	Y	Y
HH criteria analysis required? (Y/N)	N	N	N	N
Applicable Acute WQO	20	20	20	20
Applicable Chronic WQO	5	5	5	5
HH criteria	N/A	N/A	N/A	N/A
Background (Max Conc for Aquatic Life calc)	0.39	0.39	0.39	0.39
Background (Avg Conc for Human Health calc)	N/A	N/A	N/A	N/A
Is the pollutant Bioaccumulative(Y/N)?	Y	Y	Y	Y
ECA acute	137.7	196.5	196.5	196.5
ECA chronic	32.66	46.49	46.49	46.49
ECA HH	N/A	N/A	N/A	N/A
No. of data points <10 or at least 80% of data reported non-detect? (Y/N)	N	N	N	N
Avg of effluent data points	12.4	22.6	33.7	10.2
Std Dev of effluent data points	4.7	15.9	9.5	3.1
CV calculated	0.38	0.70	0.28	0.31
CV (Selected) - Final	0.38	0.70	0.28	0.31
ECA acute mult99	0.46	0.28	0.55	0.52
ECA chronic mult99	0.66	0.48	0.73	0.71
LTA acute	63.1	55.0	107.6	102.4
LTA chronic	21.5	22.3	33.9	33.0
minimum of LTAs	21.5	22.3	33.9	33.0
AMEL mult95	1.3	1.7	1.2	1.3
MDEL mult99	2.2	3.6	1.8	1.9
AMEL (aq life)	28.8	36.9	42.3	41.9
MDEL(aq life)	47.0	79.6	62.0	63.3
MDEL/AMEL Multiplier	1.63	2.16	1.47	1.51
AMEL (human hlth)	N/A	N/A	N/A	N/A
MDEL (human hlth)	N/A	N/A	N/A	N/A
Min of AMEL for Aq. life vs HH	28.8	36.9	42.3	41.9
min of MDEL for Aq. Life vs HH	47.0	79.6	62.0	63.3
Final limit - AMEL	29	37	42	42
Final limit - MDEL	47	80	62	63

**TABLE F-4
FINAL CONCENTRATION-BASED WQBELs**

Discharger	Maximum Daily Effluent Limit (MDEL), µg/L	Average Monthly Effluent Limit (AMEL), µg/L
Chevron	34	29
Conoco-Phillips	50	37
Shell	50	42
Tesoro	50	42

**TABLE F-5
AVERAGE FLOWS**

Discharger	Average Flow, mgd
Chevron	7.4
ConocoPhillips	3.0
Shell	5.8
Tesoro	4.1

The limits are calculated using the following equation.

$$\text{Mass Emission (kg/day)} = (\text{Flow, MGD}) \times (\text{Selenium Concentration, mg/L}) \times 3.785$$

For two of the Dischargers, ConocoPhillips and Tesoro, the newly-calculated mass emission limits exceed the existing mass emission limits. Therefore, to maintain current performance and avoid unnecessary backsliding, this Order retains the existing limits.

The mass emission limits are expressed as running annual averages to be consistent with the limits in the existing permits. The running annual average is the arithmetic average of the current day's mass load and the mass loads for each of the previous 364 days, as shown in the following example:

$$\text{Annual Mass emission rate (kg/day)} = \frac{3.785}{N} \sum_{i=1}^N Q_i C_i$$

where:

N = number of samples analyzed in any calendar year

Q_i = flow rate (MGD) associated with the Nth sample

C_i = selenium concentration (mg/L) associated with the Nth sample.

Effluent and Receiving Water Selenium Characterization Study

This Order requires the Dischargers to characterize (a) the concentrations and speciation of selenium in effluent and receiving water, (b) the variability of selenium in the discharge, (c) the potential for uptake and conversion of selenium to more bioavailable forms, (d) mixing and dilution in the receiving waters, and (e) the ability to comply with any more-stringent selenium criteria that may become effective in the foreseeable future. These requirements are reasonable and warranted because the Dischargers discharge selenium into San Pablo Bay, Suisun Bay, and Carquinez Strait with their refinery wastewaters. Based on the results of the studies, the Regional Water Board will be able to evaluate better how the Dischargers contribute to the selenium impairment of San Francisco Bay. The Regional Water Board may use the data to evaluate dilution credits, characterize selenium bioaccumulation potential and ecological risk, and evaluate the receiving water quality with respect to selenium. The Regional Water Board may also use the data to determine whether receiving water quality correlates with seasonal or other environmental factors. California Water Code sections 13267 and 13383 authorize the Regional Water Board to require these studies.

Anti-backsliding

Clean Water Act sections 402(o)(2) and 303(d)(4), and 40 CFR 122.44(l), prohibit backsliding in NPDES permits. These anti-backsliding provisions require revised effluent limitations to be at least as stringent as those previously in place, with some exceptions. The WQBELs in this Order replace existing performance-based interim limits, which are not WQBELs. Anti-backsliding requirements do not apply when comparing different types of limits developed for different purposes (e.g., performance-based interim limits versus WQBELs). The WQBELs in this Order also replace WQBELs in the orders listed in Table 1; however, the WQBELs already in the permits have not yet become effective. Anti-backsliding requirements do not apply when imposing new WQBELs in lieu of WQBELs that have not gone into effect. Nevertheless, the WQBELs in this Order have been adjusted to maintain existing performance.

Antidegradation

Antidegradation policies require that the existing quality of waters be maintained unless degradation is justified based on specific findings. State Water Board Resolution Number 68-16 sets forth California's antidegradation policy. Consistent with 40 CFR 131.12, Resolution Number 68-16 incorporates the federal antidegradation policy. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. Permitted discharges must be consistent with these antidegradation policies.

This Order is consistent with antidegradation policies because it will not result in any additional pollutant discharges and will not reduce receiving water quality. This Order requires that existing selenium discharge concentrations be maintained or reduced, and authorizes no flow increases. The revised WQBELs are at least as stringent as the interim limits currently in effect. Moreover, generic pollution minimization requirements in the existing permits remain in place.

Notification of Interested Parties

The Regional Water Board encouraged public participation in this amendment process. It notified the Dischargers and other interested parties, and provided an opportunity to submit written comments between December 23, 2009 and January 27, 2010. The Contra Costa Times and Martinez News-Gazette published a notice that the Regional Water Board would consider this item during its March 10, 2010, meeting.