STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

R E V I S E D T E N T A T I V E

TIME SCHEDULE ORDER NO. R4-2017-YYYY

REQUIRING THE CHEVRON PRODUCTS COMPANY (EL SEGUNDO REFINERY) TO COMPLY WITH REQUIREMENTS PRESCRIBED IN ORDER NO. R4-2017-XXXX (NPDES PERMIT NO. CA0000337)

The California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Water Board), finds:

1. The Chevron Products Company (hereinafter Discharger or Chevron) owns and operates the El Segundo Refinery (Facility or Refinery), a petroleum refinery, located at 324 West El Segundo Boulevard in El Segundo, California. Chevron has operated the El Segundo Refinery since 1911. The Facility converts crude oil and other intermediates into refined petroleum products, including: motor gasoline, jet fuel, diesel fuel, fuel oils, gas oils, liquefied petroleum gases, fuel blending components, coke, ammonia, and molten sulfur. The Facility also maintains the ability to import and export motor gasoline, jet fuel, diesel fuel, fuel oils, gas oils, and fuel blending components via the refinery's marine terminal and to import and export liquefied petroleum products via the refinery's rail and truck loading racks.

   Crude oil and intermediates are delivered by ship to the refinery's marine terminal, pumped to the Facility by existing underwater pipelines, and/or received via pipeline. The Facility utilizes a variety of technologies to turn the crude oil and intermediates into refined products including: atmospheric and vacuum distillation, catalytic cracking, alkylation, isomerization, coking, catalytic reforming, hydrogenation, sulfur recovery, chemical treating, and product blending. Auxiliary systems are maintained to support refinery operations including hydrogen plants to produce hydrogen needed for certain technologies, boilers to produce steam, cogeneration plants to produce electricity and steam, product storage facilities, and water treatment systems. The Facility has a rated crude throughput of 275,000 barrels per operating day.

2. The El Segundo Refinery's wastewater treatment facility, which treats only petroleum contaminated wastewater, consists of two separate drain and treatment systems: the "un-segregated" system and the "segregated" system.

Un-segregated System
The unsegregated system is normally used for non-process wastewater including cooling tower blowdown, steam condensate, a portion of the refinery's recovery well groundwater, and other wastewater streams containing free oil removed with primary treatment only. This system is also used to collect and treat storm water. The un-segregated system includes a gravity separator and an induced air flotation (IAF) unit. If the water meets the Refinery's specifications, the unsegregated water is ready for discharge after the separator and IAF treatment. If it does not meet the Refinery's specifications, the unsegregated water is sent to one of two diversion tanks for additional IAF treatment.

Segregated System
The segregated system is normally used to treat petroleum process wastewater containing emulsified oils and a portion of the Refinery's recovery well groundwater. This system is comprised of gravity separators, a dissolved air flotation (DAF) unit, and activated sludge units for secondary (biological) treatment. Effluent from the segregated system that does not meet the established specifications may receive additional solids removal from an auxiliary off-specification DAF unit, or routed to auxiliary effluent diversion tanks for additional IAF treatment. The auxiliary effluent diversion tanks are available for handling off-specification process wastewater from either of the two systems, in addition to rainfall run-off.

The two systems can be operated such that flow from either system can be diverted to effluent diversion tankage or to the other system where, if needed, the diverted flow can receive alternative or additional treatment.

3. Chevron is permitted to discharge up to 27 million gallons per day (MGD) of treated wastewater and/or storm water during dry and wet weather (with an average flow of 7.375 MGD) into the Pacific Ocean, specifically Santa Monica Bay at Dockweiler Beach, a water of the United States, (Latitude 33° 54' 29" North, Longitude 118° 26' 17" West).

   Until 1994, Chevron discharged treated wastewater through an outfall that extended 300 feet into the Santa Monica Bay. In 1994, Chevron voluntarily constructed a 3,200-foot outfall line extension consisting of a 60-inch nominal diameter, high density polyethylene pipe that was fitted to the existing 300-foot outfall line. The discharge occurs through the extended outfall line located approximately 2,200 feet south of Grand Avenue that extends approximately 3,500 feet offshore with its terminus at a depth of 42 feet. A diffuser was attached at the end of the extension. The extended outfall provides a minimum dilution ratio of 80 parts of seawater to one part of effluent (80:1).

4. On January 6, 2012, Regional Water Board staff released a tentative order for the renewal of the NPDES Permit to Chevron for the discharge of wastewater and storm water from the El Segundo Refinery for public review and comment. The tentative order contained a new acute whole effluent toxicity (WET) effluent limit of 2.7 toxicity units acute (TUa), which is based on Ocean Plan criteria. WET protects the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent. The WET approach allows for protection of the narrative "no toxics in toxic amounts" criterion while implementing numeric criteria for toxicity. There are two types of WET tests: acute and chronic. An acute toxicity test is conducted over a short time period and measures mortality. A chronic toxicity test is conducted over a longer period of time and may measure mortality, reproduction, and growth.

5. Chevron's previous NPDES permit for the Refinery only included an effluent limit for chronic toxicity, but required Chevron to monitor monthly for both acute and chronic toxicity. Chevron has consistently complied with the chronic toxicity effluent limit. The acute toxicity monitoring data for the past five years, which the rationale for applying the new effluent limit for acute toxicity is based on, indicates that Chevron may not be able to immediately comply with the new acute toxicity effluent limit on a consistent basis without changes to the Refinery's operation, additional treatment, or a combination of both.

6. On April 16, 2012, the Discharger requested the Regional Water Board to issue a Time Schedule Order (TSO) with an interim, effluent limit for acute toxicity for Discharge Point No. 001. The Discharger indicated that Facility changes in operation, additional treatment, or a combination of both will likely be required in order to comply with the new final acute toxicity effluent limit in Order No. R4-2013-0025. The Discharger requested a time schedule of four years and two months after the effective date of Order No. R4-2013-0025 to make the required changes to meet the final acute toxicity effluent limit. The Discharger submitted a Work Plan to meet the final acute toxicity effluent limit.

7. On February 7, 2013, the Regional Water Board adopted waste discharge requirements in Order No. R4-2013-0025, which prescribed 2.7 TUa as the final effluent limit for acute toxicity based on the Ocean Plan criteria with a dilution credit of 80:1.

8. Determination of Stressors in Refinery:

In general, the concept of measuring WET is built on the premise that there are many potential stressors in any given effluent, and of those, a significant fraction are not easily measurable or identifiable. WET tests are meant to combine the impacts of all stressors, both measureable and unmeasurable.

This concept is well illustrated in refinery effluent. In refinery settings, there are a myriad of potential stressors, the combination of which may add toxicity above the final WET limit. A refinery has multiple processes, each one of which is somewhat variable with time. As a result, it can take a significant amount of time, resources, and studies before toxicant(s) are identified and a means of treatment to achieve consistent compliance selected and implemented.

9. Starting on March 1, 2012, Chevron conducted an initial assessment of the new acute toxicity effluent limit. The initial assessment included the following activities:

a. Working with toxicology and chemical experts within Chevron and externally to identify sources of acute toxicity.
b. Comparing the past acute toxicity results to other NPDES constituent results that could be associated with higher acute toxicity.
c. Comparing the acute toxicity results with the Quality Assurance/ Quality Control QA/QC data for test species (Mysid shrimp) during past toxicity tests to understand the impact that the health of the specimens had on acute toxicity.
d. Testing for acute toxicity on internal water streams (i.e. inside the Refinery) to identify specific source(s) of elevated acute toxicity.
e. Testing for acute toxicity on incoming Title 22 Recycled Water to identify the potential impact of recycled water use on acute toxicity at the discharge point.

Chevron was not able to make any conclusions as to the specific sources of acute toxicity from the limited amount of data collected in the initial assessment.

10. Time Schedule Phases

Since the initial assessment did not identify the specific sources of acute toxicity, Chevron requested a time schedule to conduct more detailed studies to determine the specific sources associated with acute toxicity excursions, and to select and implement the appropriate mitigation measures to achieve consistent compliance with the new acute toxicity effluent limit. In its Work Plan, Chevron proposed a phased approach. The phases are listed below and are discussed in detail.

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I. Stressor Determination Testing
II. Benchtop Testing and Evaluation
III. Selection, Design, and Installation of Pilot Test
IV. Selection and Design of Mitigation Measures
V. Construction/Implementation of Mitigation Measures
VI. Start-up, Optimization, and Testing

Phase I: Stressor Determination Testing (18 months)

In order to properly identify the class(es) of toxicants in the Refinery's effluent, Chevron has chosen to conduct stressor sampling tests once per month for 18 months, as needed, to investigate various toxicants with the potential to be associated with higher acute toxicity. The stressor determination tests for 18 months will allow Chevron to accurately and consistently determine and characterize the class of toxicants leading to higher toxicity values so that appropriate mitigation measure(s) can be selected and implemented.

Phase II: Benchtop Testing and Evaluation (12 months)

In Phase II, Chevron will develop a program of benchtop tests to assess the efficacy of various mitigation measures for acute toxicity. In parallel, Chevron will investigate whether substitution or elimination of chemicals and/or processes is a meaningful and effective solution. Due to the episodic nature of toxicity in the Refinery's effluent, the need to demonstrate consistent compliance, and the importance of verifying the results, the benchtop testing and evaluation will require 12 months to complete, but it will partially overlap with Phase I.

Phase III: Selection, Design, and Installation of Pilot Test (12 months)

Based on the results of the parallel Phases I and II approaches discussed above, Chevron will select, design, and implement pilot test(s) of selected mitigation measures to demonstrate their consistent effectiveness over a sufficient period of time. Phase III is expected to take a total of 12 months; selection, and design of a pilot test system is expected to take approximately 6 months with an additional 6 months for testing to verify the effectiveness of the selected mitigation measures.

Phase IV: Selection and Design of Mitigation Measures (24 months)

Based on the results of Phase III, Chevron will proceed with the selection and design work required for the construction/implementation of the selected mitigation measures to establish consistent WET testing compliance. It is possible that a non-standard treatment technology may be necessary to achieve compliance with the final acute toxicity effluent limit. Detailed engineering design on a non-standard technology will take a total of 24 months to complete, which includes approximately 6 months for requesting bids, evaluating the bids, and awarding a contract, 12 months for process design, and 6 months for design specifics (process and instrumentations diagrams, equipment data sheets, etc.). Receiving the necessary permits for the new treatment technology, will be worked in parallel during Phase IV and could extend into Phases V and VI. The types and amounts of permits needed are unknown at this time and will not be known until the specific mitigation measure is selected. (This was the status as of 2013. New information discussed in Findings 13 and 14 below provides specifics on the required permits)

Phase V: Construction/Implementation of Mitigation Measure (12 months)
Construction/Implementation of the selected mitigation measure will take 12 months to complete.

Phase VI: Start-up, Optimization, and Testing (6 months)
During the 6 months after construction, Chevron will be optimizing the selected mitigation measure and conducting additional testing to confirm consistent compliance with the final acute toxicity effluent limit. Due to the extreme variability in regards to- acute toxicity, a 6-month period will be needed to confirm that the new system is optimized properly.

11. The Regional Water Board found that the Discharger justified its April 16, 2012 request for a TSO. Therefore, at the February 7, 2013 hearing, the Regional Water Board also adopted TSO No. R4-2013-0026 to provide the Discharger with a time period of four years and two months to make required changes to meet the final acute toxicity effluent limit.

12. Since the original issuance of TSO No. R4-2013-0026 on February 7, 2013, the Discharger has completed the Phase I, II, and III tasks as required by the TSO schedule. On February 1, 2016, the Discharger provided the Regional Water Board with a summary of progress made to address the requirements in TSO No. R4-2013-0026. The summary indicated that the segregated drain was identified as the source of organic toxicants. After completing the required benchmark testing and evaluation, the Discharger selected a Powdered

Activated Carbon (PAC) system as the mitigation measure for organic toxicants in the segregated drain.

13. The PAC system requires additional air to be injected into the aeration basins in order to keep the PAC suspended, and this additional air injection requires the Discharger to obtain a Permit to Construct from the Air Quality Management District (AQMD). The permit approval process takes from 12-24 months. The Discharger submitted the AQMD Permit Application on June 15, 2015. To allow time for the new Phase IV task of obtaining the AQMD permit, the Discharger requested an extension of fifteen months to complete the requirements of TSO No. R4-2013-0026.

14. The Regional Water Board found that the Discharger justified its request for an extension of TSO No. R4-2013-0026. Therefore, the Executive Officer issued amended TSO No. R4-2013-0026-A1 on November 17, 2016. The amended TSO incorporated the new task of obtaining the AQMD permit and provided a limited eight month extension that terminates on January 10, 2018, which is the same termination date as the National Pollutant Discharge Elimination System (NPDES) permit, Order No. R4-2013-0021. The amended TSO stated that, as per the Discharger, additional time may be required beyond that date. In the event that the Phase IV, V, and VI activities are not completed during the term of the amended TSO, the Discharger may make a request to the Regional Water Board for an amended or new TSO and provide the required information to support the request.

15. The Discharger filed a report of waste discharger (ROWD) and submitted an application for reissuance of its waste discharge requirements and NPDES permit on March 1, 2017. Supplemental information was requested during a meeting with Facility representatives on March 9, 2017 and received on March 16, 2017. The application was deemed complete on March 17, 2017.

16. The aforementioned ROWD indicated that Chevron received the AQMD permit to construct in late January 2017 and has begun construction of the PAC treatment system. Completion of construction and testing of the system is anticipated in the third quarter, 2018. Therefore the Discharger requests a TSO be issued concurrently with the renewal of the NPDES permit allowing additional time, until September 30, 2018, to complete Phase IV, V and VI activities.

17. On October 5, 2017, the Regional Water Board adopted waste discharge requirements in Order No. R4-2017-XXXX, which prescribed 2.7 TUa as the final effluent limit for acute toxicity based on the Ocean Plan criteria with a dilution credit of 80:1. Order No.

R4-2017-XXXX becomes effective on January 1, 2018 and expires on December 31, 2022.

18. Section 13300 of the California Water Code states:

"Whenever a regional board finds that a discharge of waste is taking place or threatening to take place that violates or will violate requirements prescribed by the regional board, or the state board, or that the waste collection, treatment, or disposal facilities of a discharger are approaching capacity, the board may require the discharger to submit for approval of the board, with such modifications as it may deem necessary, a detailed time schedule of specific actions the discharger shall take in order to correct or prevent a violation of requirements."

19. Based on the monitoring data submitted, Chevron cannot immediately and consistently achieve compliance with the new, final effluent limit for acute toxicity in Order No. R4-2017-XXXX. Accordingly, pursuant to Water Code section 13300, a discharge of waste is taking place and/or threatens to take place that violates requirements prescribed by the Regional Water Board.

20. A TSO is appropriate in these circumstances in order to allow Chevron the necessary time to undertake actions at the Refinery to achieve compliance with the final effluent limit for acute toxicity.

21. Therefore, this TSO establishes both an interim effluent limit for acute toxicity based on performance and also requires Chevron to undertake specific actions according to a detailed time schedule. This TSO will provide Chevron with the necessary time to investigate and implement actions to bring the Refinery into compliance with the final effluent limit for acute toxicity. The established time schedule is as short as possible, taking into account the technological, operation, and economic factors that affect the design, development, permitting and implementation of the control measures and Refinery modifications that are necessary to comply with the final effluent limit.

22. California Water Code section 13263.3(d)(1)(D) authorizes the Regional Water Board to require a discharger to complete and implement a Pollution Prevention Plan (PPP) if the discharger is subject to a time schedule order issued pursuant to section 13300. Therefore, a PPP will be necessary for the pollutants addressed in this TSO.

23. The Regional Water Board has notified the Discharger, interested agencies, and interested persons of its intent to issue this TSO concerning compliance with the waste discharge requirements, and has provided them with an

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opportunity to submit written comments. The Regional Water Board considered all comments pertinent to this matter.

24. Issuance of this TSO is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with section 15321(a)(2), title 14 of the California Code of Regulations.

25. Any person aggrieved by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must *receive* the petition by 5:00 p.m., 30 days after the Regional Water Board action, except that if the thirtieth day following the action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

IT IS HEREBY ORDERED that, pursuant to California Water Code Section 13300, the Chevron Products Company, as owner and operator of the El Segundo Refinery, shall comply with the requirements listed below to ensure compliance with the final effluent limit for acute toxicity contained in Order No. R4-2017-XXXX:

1. Comply with the following interim effluent limit, which shall be deemed effective from December 1, 2017 to September 30, 2018:

Parameter	**Units**	**Interim Effluent Limit** ~~**Instantaneous**~~ **Daily** **Maximum**
Acute Toxicity	TU_a	8.7[1]

[1] The numeric interim effluent limit for acute toxicity is based on current treatment facility performance. Data for the current treatment facility performance includes 62 results from January 2007 to January 2012. One outlier result of 15.7 TU_a was not included in the data set. The interim limit is set at 99th percentile of treatment performance for that period based on 61 monitoring data results.

2. Achieve full compliance with the final effluent limit for acute toxicity in Order No. R4-2017-XXXX no later than September 30, 2018.

3. Comply with the following time schedule, which is, in part, based on the Work Plan submitted and proposed by the Discharger, as well as the Discharger's March 1, 2017 ROWD:

Phase	**Length (months)**	**Activity**	**Begin**	**Complete**
I	18	Stressor Determination Testing	3/1/2012	8/31/13[1]
II	12	Design of Benchtop Testing and Evaluation	8/31/2012	2/28/2013[1]
		Benchtop Testing and Evaluation	3/1/2013	8/31/2013[1]
III	12	Selection and Design of Pilot Test	9/1/2013	2/28/2014[1]
		Installation and Testing of Pilot Tests	3/1/2014	8/31/2014[1]
IV	30	Selection and Design of Mitigation Measures	9/1/2014	12/31/2016[1]
		AQMD Permit Application	6/15/2015	1/31/2017[1]
V	12	Construction/Implementation of Mitigation Measure(s)	2/1/2017	2/28/2018[2]
VI	6	Optimization and Testing	2/1/2018	7/31/2018[2]

1. Task completed before the effective date of this TSO.
2. Task scheduled to be completed during the term of this TSO.

4. Submit as soon as possible, but no later than February 28, 2018, a Pollution Prevention Plan (PPP), with time schedule for implementation, for approval by the Executive Officer pursuant to California Water Code section 13263.3.

5. Submit a semiannual progress report of efforts taken towards compliance with the final effluent limit for acute toxicity. The report is due by August 15, 2018 for the period of January through June of 2018.

6. Submit a final report on the results of the implementation and evaluation of the selected actions/measures by December 31, 2018. The report shall include: a) a description of the actions/measures selected, b) the monitoring data collected after the implementation of the selected actions/measures including treatment process; if any, and c) an evaluation of the effectiveness of the selected actions/ measures.

7. All technical and monitoring reports required under this TSO are required pursuant to California Water Code sections 13267 and 13383. The Regional Water Board needs the required information in order to determine compliance with this TSO No. R4-2017-YYYY and Order No. R4-2017-XXXX. The Regional Water Board believes that the burdens, including costs, of these reports bear a reasonable relationship to the needs for the reports and the benefits to be obtained from the reports.

8. Any person signing a document submitted under this TSO shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

9. If the Discharger fails to comply with any provisions of this TSO, the Regional Water Board may take any further action authorized by law. The Executive Officer, or his/her delegee, is authorized to take appropriate administrative enforcement action pursuant, but not limited to, Water Code sections 13350 and 13385. The Regional Water Board may also refer any violations to the Attorney General for judicial enforcement, including injunction and civil monetary remedies.

10. All other provisions of NPDES Order No. R4-2017-XXXX not in conflict with this TSO are in full force and effect.

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11. The Regional Water Board may reopen this TSO at its discretion or at the request of the Discharger or interested person, if warranted. Lack of progress towards compliance with this TSO may be cause for the Regional Water Board to modify the conditions of this TSO.

12. This Time Schedule Order becomes effective on December 1, 2017 and it expires on September 30, 2018.

I, Samuel Unger, 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, Los Angeles Region, October 5, 2017.

Samuel Unger, P.E., Executive Officer