

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
CUP CONDITION H5 ANNUAL COMPLIANCE REPORT**

September 4, 2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

EXECUTIVE SUMMARY

This Annual Compliance Report (Report) provides an update on Chevron's compliance with the conditions of approval and mitigation adopted as part of the Chevron Richmond Modernization Project (Project) for 2019. This report is made up of this narrative summary and 14 attachments, including Attachment 10 – Annual Operations Emissions Summary that provides detailed information concerning the Project's compliance with the Project-related emissions limits, and Attachment 6 – Annual Reliability Program Report that provides detailed information concerning Chevron's implementation of the Project Reliability Program. The remaining attachments provide information required pursuant to specific conditions or mitigation measures, e.g., construction emissions. In addition, the staff report prepared by the City includes two tables updating Chevron's compliance with the Conditional Use Permit (CUP) and the Mitigation Monitoring and Reporting Program (MMRP).

Chevron commenced Project construction in June 2016 and accomplished significant milestones for the Project in 2019 by completing primary construction of the new hydrogen plant and sulfur removal improvements. The new hydrogen plant commenced operations on April 17, 2019, and the sulfur removal improvements went into service throughout the remainder of 2019.

With the start of Project operation, the Chevron Richmond Refinery (Refinery) became subject to additional compliance requirements specific to Project operations, including, but not limited to, Project-related emissions limits and implementation of the Reliability Program. As discussed in detail below, the Refinery did not exceed its emissions commitments to no net increase (NNI) in criteria air pollutants (CAPs), no net increase in health risk from toxic air contaminants (TACs), and no physical increase (NPI) in greenhouse gas (GHG) emissions over Baseline emissions established for the Project. Further, the Refinery has fully implemented and is in compliance with the Reliability Program, which has been subject to extensive pre- and post-start-up review by Contra Costa Health Services (CCHS), with the most recent round of review completed in June 2020. The Refinery continues to operate in compliance with its Title V permit, which incorporates Project requirements.

Since approval and commencement of construction, the Project has also:

- Hired more than 4,400 employees, and has worked closely with the City to identify and employ as many local residents as possible.
- Invested \$56 million dollars towards funding the Community GHG Reduction Program, the Richmond Promise Scholarship Program, and additional City programs pursuant to the Environmental and Community Investment Agreement (ECIA).
- Completed construction and placed into service tank domes on T-3225 and T-3202 to reduce organic compound emissions.
- Coordinated with the City throughout the construction period to implement modified traffic controls as needed.

- Helped facilitate the 18th annual county-wide CAER Shelter in Place drill for 18 local schools.
- Entered into a lease with MCE Clean Energy (MCE) pursuant to which MCE has developed a 10.5-megawatt solar project on 60 acres of Chevron land. The MCE Solar One project has been completed and the facility is currently operating.
- Put into service two newly constructed Suez Max ships and one newly constructed tug boat consistent with the project design features included as part of the Project, the effect of which is to lower emissions associated with shipping activity at the Chevron Long Wharf.
- Upgraded 17 piping circuits and four partial piping circuits and valves to 9-Chrome as part of its 2017 No. 4 Crude Unit turnaround, as committed to in and implemented by the Chevron Modernization Project Reliability Program approved as part of the Project.
- Coordinated with the City for a survey of local Richmond roadways to assess repairs needed for roadways frequently traveled for Project support.

Chevron is progressing plans for remaining construction, which includes the third tank dome, the mitigation project for construction-related GHG emissions, and demolition of the old hydrogen plant, commensurate with the required dates for completion set forth in the MMRP and CUP. Additionally, Chevron continues to undertake construction work associated with placing new process plants and equipment in service. Project modifications for the remaining sulfur recovery unit (SRU) and the Fluid Catalytic Cracker (FCC) Feed Hydrotreater (FHT) have yet to be constructed.

Chevron continues to work with the City of Richmond and other agencies to implement and monitor the requirements of the conditional use permit, mitigation monitoring and reporting program, Air District Permit Conditions, and Chevron Richmond Reliability Program. Chevron provides the City with regular reports on its implementation of the Project-related requirements, including updates on both construction-related and operation-related mitigation measures.

BACKGROUND

On July 29, 2014, the City of Richmond approved Conditional Use Permit and Design Review Permit No. PLN11-089 (CUP) authorizing construction and operation of the Project. On February 11, 2015, the Bay Area Air Quality Management District (District) reissued Authority to Construct (ATC) No. 12842 authorizing the same. In approving the CUP and the ATC, the City and the District relied upon the Final Environmental Impact Report (EIR) certified by the City on July 29, 2014, inclusive of the MMRP adopted by the City to mitigate Project-related impacts to less than significant. The EIR analyzed, and the CUP and ATC approved, the Reduced Sulfur Processing/No Increase in Refinery Greenhouse Gas Emissions Alternative, generally referred to as Alternative 11. Alternative 11 includes construction of a new hydrogen

plant, various so-called sulfur removal improvements (including modifications to the Refinery's existing sulfur recovery units (SRUs)), and related infrastructure and tie-ins, and requires the Refinery to achieve NNI in CAPs and health risks from TACs, and NPI in greenhouse gas (GHG) emissions.

On April 3, 2015, the Contra Costa Superior Court discharged the writ of administrative mandamus issued in 2009 concerning the prior version of the Project. Starting in second quarter 2015, Chevron began the process for obtaining internal project approval and funding. Once obtained, Chevron undertook a competitive bidding process to identify and select engineering and construction firms to implement the Project. Once those selections were made, Chevron undertook updates to all of its design engineering drawings to ensure compliance with the Project approvals.

This report is submitted pursuant to CUP condition, H5, which provides:

“On or before March 31 of each year beginning after the first full year of Project construction, Chevron shall submit to the City both an annual compliance report, and payment of an amount sufficient to cover staff costs (including time) associated with the compliance review, documenting compliance with the conditions of approval of this Conditional Use Permit and the mitigation measures and improvement measures as shown in the Mitigation Monitoring and Reporting Program, and to cover costs and fees (including time) of third party experts retained by the City pursuant to any mitigation measure of the Project or condition of approval. Chevron shall submit payments to the County and BAAQMD for their respective costs (including County and BAAQMD staff time, and time, costs, and fees of third party experts retained by the County pursuant to any mitigation measure of the Project), in accordance with a payment schedule determined by the County and BAAQMD. Following the first compliance report and payment from Chevron, and prior to March 31 of the next year, the City shall provide Chevron on an annual basis an accounting of the City's expenditure of the compliance review payment, which at a minimum shall include the City staff who worked on the compliance review, the time spent, and a general description of the work performed. The annual compliance reports shall contain supporting information from other regulatory agencies, as applicable. For each condition and mitigation measure, the report shall identify the status of compliance, times and dates of the monitoring and whether further action is required. The Planning Commission will hold hearings at a frequency of once each year to review Chevron's compliance with the conditions of approval of this Conditional Use Permit, including compliance with the mitigation measures and improvement measures. If, in the opinion of the Planning Commission, Chevron has completed all mitigation measures and improvement measures, and has complied with all conditions of approval, no further reports shall be necessary. The Planning and Building Services Department shall notify Chevron in writing when the Planning Commission has determined that annual reports will no longer be necessary pursuant to this Condition.”

At the June 6, 2019 Planning Commission Hearing, the City approved submittal of subsequent annual reports by September 1 to align with Report inputs from other regulatory agency submittals. The City subsequently extended the due date until September 8 for this reporting

year. This report for year 2019 is the third Annual Compliance Report and updates the City concerning status of construction, operation, and compliance with the conditions of approval of the CUP and the mitigation measures and improvement measures included in the MMRP for the period beginning in January 2019 and ending December 2019.

PROJECT CONSTRUCTION

Construction of the new Hydrogen Plant commenced in June 2016, and construction of the other project components commenced later that year. Detailed information concerning Chevron's implementation of and compliance with the various construction-related conditions of approval and mitigation measures is included in the City staff report, as well as Attachment 1 – 2019 Quarterly Construction Questionnaires and Attachment 4 – 2019 Quarterly Construction Emissions Reports.

To date, the Project has hired approximately 4,400 contract employees, including engineers, to work on the Project. Chevron has worked closely with the City to identify and employ as many local residents as possible, though the number fluctuates based on the availability of candidates with the necessary skills to fill positions that may be available at any given time. See Attachment 8.

Chevron accomplished significant milestones for the Project in 2019 by completing primary construction of the new hydrogen plant and sulfur removal improvements. The new hydrogen plant commenced operations on April 17, 2019, and the various sulfur removal improvements followed on May 30 (SRU 2), June 1 (6 H₂S and TKC), and September 3 (SRU 1). Additionally, in 2019, the Project completed construction of the Project Design Feature (PDF) tank dome on T-3202, which is the second of three tank domes required to be installed within three years of commencement of Project operations. The Project also decommissioned, and is in the process of planning demolition of, the old hydrogen plant.

During construction activities, Chevron ensured compliance with all applicable requirements in the CUP and MMRP, which also includes tracking construction-related emissions against thresholds of significance. In May 2019, Chevron proposed a GHG project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-11 (GHG mitigation project) and subsequently worked with the City to finalize details and gain concurrence from the City. Project engineering is underway with plans for completion of construction in 2021.

Chevron is progressing plans for remaining construction, which includes the third, and last, tank dome, the GHG mitigation project, and demolition of the old hydrogen plant, commensurate with the required dates for completion set forth in the MMRP and CUP. Additionally, Chevron continues to undertake construction work associated with placing new process plants and equipment in service. Project modifications for the remaining sulfur recovery unit (SRU) and the Fluid Catalytic Cracker (FCC) Feed Hydrotreater (FHT) have yet to be constructed.

PROJECT OPERATIONS

The Project commenced operations on April 17, 2019, which coincided with the end of commissioning at the new hydrogen plant pursuant to the ATC. As such, the Refinery became subject to additional requirements, specific to Project operations. The Project has complied with all of its CUP and MMRP requirements. Detailed information concerning Chevron's implementation of and compliance with the various operations-related conditions of approval and mitigation measures is included in the City staff report, as well as Attachment 10 – Annual Operations Emissions Summary and Attachment 6 – Annual Reliability Program Report.

Pursuant to the City's approval of Alternative 11 of the EIR, the Refinery must achieve NNI in CAPs, NNI in health risks from TACs, and NPI in GHG emissions over Baseline emissions established for the Project. As described in Attachment 10, Chevron worked with the City and City's environmental consultant, Ramboll, to develop the Operations Emissions Tracking Tool (OETT), which is a tool that calculates emissions of CAPs and TACs from the Refinery, as well as shipping and transportation activities, and compares those emissions to the Baseline established in the EIR. The OETT also calculates GHG emissions from shipping and transportation activities. GHG emissions from the Refinery are estimated and reported consistent with AB-32 as part of the mandatory monitoring and reporting program for the California Air Resources Board (CARB). Refinery GHG emissions are verified by a third party and subject to review by the CARB. Total combined GHG emissions from the Refinery, shipping, and transportation are then compared to the Baseline established in the EIR.

For operational year 2019, operations emissions were below Baseline values. See Attachment 10. Furthermore, Chevron complied with additional TAC emission limits and odor complaint requirements in the MMRP. See Attachments 11 and 12.

Aligned with operations emissions performance, the Facility utilization for operational year 2019 was 82%, which is below the 93% Utilization Scenario in the EIR that would trigger additional mitigation.

As described further in Attachment 6 – Annual Reliability Program Report, the Refinery has fully implemented the Reliability Program. The Refinery's design and implementation of the Reliability Program has been extensively revised by CCHS, with the last round of review occurring in June 2020. One component of the Reliability Program is the Crude Monitoring Program, further described in Attachment 9 – Project Operations Compliance Plan. The Crude Monitoring Program specifies TAN and post-operation sulfur limits for crude and gas oil feedstocks to meet reliability requirements in the Project Annual Reliability Program.

Chevron also continues to comply with its Title V permit requirements, which incorporate Project components as specified in the CUP and MMRP. Though flaring occurred in 2019 as part of integrating new process plants with existing Refinery operation, the Refinery has continued to optimize operation and successfully reduce flare events back to levels that align with Chevron's excellent historical flare performance as a leader within industry.

ENVIRONMENTAL AND COMMUNITY INVESTMENT AGREEMENT (ECIA)

On July 29, 2014, Chevron and the City of Richmond entered into an Environmental and Community Investment Agreement (ECIA). Pursuant to the ECIA, Chevron agreed to provide the equivalent of \$30 million dollars in funding for local GHG reduction projects, as well as an additional \$60 million in other community programs such as the newly formed Richmond Promise Scholarship Program, over a period of 10 years.

From 2014 to August 2020, Chevron has invested \$56 million dollars pursuant to the ECIA. Chevron also entered into a 25-year lease with MCE pursuant to which MCE has developed a 10.5-megawatt solar project on 60 acres of Chevron land. Pursuant to the ECIA, Chevron is leasing land valued at approximately \$10 million over the life of the lease for \$1.00 per year. Construction of the MCE Solar One Project has been completed and the facility is currently operating.

PROJECT DESIGN FEATURES & OTHER EMISSION REDUCTION PROJECTS

As part of the Modernization Project, Chevron committed to several emission reduction project design features, which were also incorporated as mitigation measures. Several of these project design features have already been implemented and the emissions reductions are being realized today. Specifically:

- Chevron has put in service two newly built Suezmax ships. The main and auxiliary engines from these ships are required to utilize a level of emission control called Tier 2, pursuant to the International Maritime Organization (IMO) requirements for new engines that have been adopted by US EPA. The two new Chevron ships, named Pegasus Voyager and Polaris Voyager, instead utilize cleaner Tier 3 standard main and auxiliary engines as defined by the IMO. These ships were put into service and engine tests were completed and verified in October 2017.
- Chevron contracted with Foss Tugs to build and put into service a new tugboat utilizing Tier 4 main engines and Tier 3 auxiliary engines, which is more stringent than the Tier 3 main engines required by the current CARB rule. Pursuant to Chevron's contract with Foss, this tugboat is prioritized to the Chevron Long Wharf. The new tugboat went into service in July 2017.
- Chevron committed to install three domes on its storage tanks and completed construction and placed into service one tank dome in 2018 on T-3225 and one tank dome in 2019 on T-3202. One additional dome is required to be installed on T-3189 within three years of commencement of Project operations and Chevron has commenced planning and permitting activities for this dome.
- Chevron committed to installing approximately 6,000 LED lights in its process areas. To date, Chevron has installed approximately 3,600 LED lights. Chevron and the City agreed to the phased installation of the remaining LED lights through 2025, because replacing all the fixtures during the accelerated construction period would have been impractical and unsafe. As part of the agreement to phase installation, Chevron funded \$2 million for the Cogeneration Project at the City's wastewater treatment plant, which will

install a biogas fired engine at the plant and result in greenhouse gas reductions of 856 metric tons per year.

- Chevron committed to enroll its commercial electricity accounts with MCE and has done so since 2014.

Chevron is continuing work on implementation of the remaining project design features.

COMPLIANCE, REPORTING, AND MONITORING

Pursuant to CUP condition A9, Chevron submitted its initial Compliance Plan on October 5, 2015, and provided subsequent updates to that plan on April 10, 2016, October 7, 2016, and November 4, 2016, and April 18, 2019. Chevron has reported its implementation of this plan and compliance with the various CUP and MMRP obligations through periodic communications, reports, and submittals as required by the CUP, MMRP, and Reliability Program. Copies of the latest versions of these reports are attached to this report for reference. Prior versions of these reports are available at the City Planning Division for review.

Further, CUP condition G2 provides:

Chevron shall include in its annual compliance reports (required by Condition H5) to the City information regarding the status of any ongoing agency investigations resulting from the August 2012 fire, including US EPA, CSB, Cal/OSHA, BAAQMD, and the County, including County safety audit(s) and safety culture audit(s). These reports shall include a comprehensive list of all findings, and corrective actions identified or requested by the agencies, as well as the status of Chevron's implementation of all such corrective actions. If Chevron determines not to implement any requested corrective action or otherwise not to address an agency finding, it shall explain in detail its rationale and the factual basis for its determination to do so.

Please see Attachments 3 and 7, which are the latest versions of reports as required pursuant to mitigation measures 4.13-13a and 13d, which address this obligation.

Pursuant to CUP condition H2 and mitigation measures 4.16-1, 2a, 2b, 4, 7a, 7b, & 7c, Chevron communicates with City staff on at least a quarterly basis, generally via email or telephone conversation, concerning implementation of various traffic-related mitigation measures.

Chevron developed additional reports to further summarize and provide more detailed background for select annual operational requirements. See Attachments 10, 11, and 12.

Lastly, Chevron has attached copies of three Air District permit documents that were renewed or amended in operational year 2019. See Attachments 13 and 14.

PUBLIC OUTREACH

Pursuant to condition IV.G of the Reliability Program, Chevron has conducted five annual community and employee town halls addressing the following topics:

1. The status of the enhanced safety measures being implemented by the Refinery following the August 6, 2012 fire, including actions taken to implement the recommendations made by public agencies that investigated the August 6 incident;
2. The status and/or results of the material upgrades, inspection and monitoring program, and ongoing compliance with the Richmond Industrial Safety Ordinance, including Project-related PHAs, DMRs, LOPAs, and ISSAs; and
3. The results of the reliability review revalidation and the status of any recommendations made as a result of this review.

Town halls were held on March 31, 2016, March 30, 2017, February 22, 2018, March 27, 2019, and August 12, 2020. Transcripts from the 2016 through 2019 meetings are on file with the Planning Division. Chevron will submit the transcript of the 2020 town hall once the transcript is issued.

MODERNIZATION CONCLUSION

Chevron continues to work cooperatively with the City to implement the Project and ensure that the various Project benefits are achieved in a safe and timely manner. Project operation and remaining construction components are proceeding accordingly, and Chevron will continue to provide all reports and complete all compliance actions required by the CUP and MMRP.

LIST OF ATTACHMENTS

ATTACHMENT	DOCUMENT	REQUIRED BY
1	2019 Quarterly Construction Questionnaires	MMs (various)
2	2019 Monthly Safety Training and Implementation Reports ¹	MM 4.13-2b
3	2019 Quarterly Crude Fire Corrective Action Status Reports	MM 4.13-13d
4	2019 Quarterly Construction Emissions Reports	MM 4.3-2a, 2b, 4.8-1
5	2019 Semi-Annual Construction Progress Reports	CUP H3
6	Annual Reliability Program Report	MM 4.13-7a, 7i, 7j, 13f, 13h; IV.A, IV.B, IV.H
7	Pre-Operations Report	MM 4.13-13a
8	2019 Local Hire Reports	ECIA 4.A(3)
9	Project Operations Compliance Plan	CUP A9
10	Annual Operations Emissions Summary	MM 4.3-5a, 5b, 5c, 5d, 5e, 5f, 4.3-6a
11	Feedstock and Fuel Gas Monitoring Summary	MM 4.3-6c, 6d
12	Annual Odor Report	MM 4.3-8a
13	Modernization Authority to Construct (ATC) Renewal	CUP A5
14	BAAQMD Permit Condition (PC) 24136, Modernization Project (Amended April 2019)	CUP A5, B7
1. As of April 19, 2019, the City indicated to Chevron that it no longer needed Chevron to submit these monthly reports.		

ATTACHMENT 1

Quarterly Construction Questionnaires
Operational Year 2019

Chevron Refinery - Chevron Construction Questionnaire 1Q 2019

Survey:	Chevron Construction Questionnaire 1Q 2019
Facility:	Chevron Refinery
Actual Start Date:	
Actual Complete Date:	

Category	Subcategory	Question No.	Question	Answer	Comment
HAVING PROBLEMS WITH THIS APPLICATION?	PLEASE CONTACT THE HELPDESK	IEH3.1.01	1-855-786-2631 or iehshelpdesk.us@anteagroup.com (No response needed to this INSTRUCTION. Proceed to 2.01.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
GENERAL INSTRUCTIONS	USE OF THIS TOOL	2.1.01	Click the "i" icon the right to view general instructions for completing this questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 3.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR GROUND DISTURBING CONSTRUCTION SECTION	INSTRUCTIONS	3.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 4.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Ground Disturbing Construction Questions	SCREENING QUESTION	4.1.01	Have any ground disturbing construction activities occurred?	Yes	

Category	Subcategory	Question No.	Question	Answer	Comment

Ground Disturbing
Construction Questions

Question

4.2.01

Was training regarding discovery of archaeological artifacts/resources provided to workers before ground disturbing activities began? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.

Yes

Chevron has issued an "Instructions to Contractors" (ITC) document (attached) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered.

Category	Subcategory	Question No.	Question	Answer	Comment

Ground Disturbing
Construction Questions

Question

4.2.02

Is monitoring being conducted for discovery of archaeological resources during construction? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.

Yes

Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered.

Category	Subcategory	Question No.	Question	Answer	Comment
Ground Disturbing Construction Questions	Question	4.2.03	Have all archaeological resources discovered been managed as required? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	N/A	No archaeological resources have been discovered to date.

Category	Subcategory	Question No.	Question	Answer	Comment

Ground Disturbing
Construction Questions

Question

4.2.04

Was training regarding discovery of paleontological resources provided to workers before ground disturbing activities began? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.

Yes

Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered.

Category	Subcategory	Question No.	Question	Answer	Comment
Ground Disturbing Construction Questions	Question	4.2.05	Have excavation plans been submitted, if required for all needed excavations? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Ground Disturbing Construction Questions	Question	4.2.06	Have all paleontological resources discovered been managed as required? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A	No paleontological discoveries have been made to date.

Category	Subcategory	Question No.	Question	Answer	Comment
Ground Disturbing Construction Questions	Question	4.2.07	Have any human skeletal remains been discovered? (4.5-3)	No	

Category	Subcategory	Question No.	Question	Answer	Comment
Ground Disturbing Construction Questions	Question	4.2.08	If human skeletal remains have been discovered, have they been managed as required? (4.5-3) If No, please explain by entering a comment. If Yes, please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR GHG EMISSIONS SECTION	INSTRUCTIONS	5.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 6.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
GHG Emissions	Question	6.1.01	Have GHG emissions from Project construction activities for a year exceeded 10,000 MT CO2e, after accounting for reductions realized from mitigation measures? (4.8-1l)	Yes	Construction-related GHG emissions for 2019 have not exceeded 10,000MT CO2e. As previously reported in the 4Q18 construction emissions report, construction-related GHG emissions did exceed 10,000 MT CO2e in 2018. Chevron is working with the City of Richmond to identify and implement a mitigation project pursuant to MM 4.8-1l to reduce emissions below 10,000 MT CO2e.

Category	Subcategory	Question No.	Question	Answer	Comment
GHG Emissions	Question	6.1.02	If yes, has Chevron implemented one or more of the specified measures to reduce GHG emissions to below 10,000 MT CO2e? (4.8-1l)If no, please explain by entering a comment. If yes please attach proof.	No	Chevron is working with the City of Richmond to identify and implement a mitigation project pursuant to MM 4.8-1l to reduce emissions below 10,000 MT CO2e.

Category	Subcategory	Question No.	Question	Answer	Comment
GHG Emissions	Question	6.1.03	Has Chevron implemented mitigation measures 4.8-2a through 4.8-2c to reduce greenhouse gas emissions? (4.8-2) If no, please explain by entering a comment. If yes, please attach proof	N/A	Mitigation Measures 4.8-2a through 4.8-2c address operations emissions and have therefore not been triggered because the Project is not yet operational.

Category	Subcategory	Question No.	Question	Answer	Comment
GHG Emissions	Question	6.1.04	Has Chevron provided its annual contribution to fund the Community Greenhouse Gas Reduction Measures? (4.8-2e) If no, please explain by entering a comment. If yes, please attach proof.	No	Chevron plans to provide its annual contribution for 2019 in June. The CGGRP contribution is included in the funding under to ECIA. The most recent payment was made in October 2018, check number 0025701523.

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR SOLAR PROJECT SECTION	INSTRUCTIONS	7.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 8.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	SCREENING QUESTION	8.1.01	Has construction of the 2MW (or other) solar project commenced?	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.01	If yes, did Chevron submit to City and RWQCB construction plans for the solar project prior to commencing construction? (CGRP Solar Bio 1,2, and Haz 1,2) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.02	Did Chevron update the Facility emergency response and evacuation plans to account for the presence of the solar site? (CGRP Solar Haz-2) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.03	Have standard construction BMPs and other project design features been implemented to treat and minimize discharge of soil and other pollutants into the marsh and vegetated areas during solar site construction? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.04	Have catch basin inlet protection and straw wattles been used throughout the solar project construction site? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.05	Have all additional BMPs required by RWQCB and BCDC for the solar site been implemented? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.06	Has exclusion fencing been placed as required? (CGRP Solar Bio-1 and Bio-2) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.07	Has awareness training been provided for all construction personnel? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.08	Has bright-colored fencing and signage been installed to identify and restrict construction within environmentally sensitive areas? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.09	Has a construction monitor/environmental inspector confirmed exclusion fence integrity on a daily basis? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.10	Have all solar project exclusion fencing repairs and reinforcements been completed immediately? (CGRP Solar Bio-1) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.11	Was a qualified biological monitor present during clearing and grubbing activities? (CGRP Solar Bio-2) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.12	Did a biological monitor pre-survey solar project disturbance areas to confirm absence of special-status small mammals? (CGRP Solar Bio-2) If no, please explain by entering a comment. If yes, please attach proof.	Yes	In June 2017, Cenergy contracted with Barnett Environmental to conduct surveys for bird nesting, burrowing owls, and small mammals. A copy is attached.

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.13	Has contractor education included species identification and protection information? (CGRP Solar Bio-2) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Solar Project	Question	8.2.14	Is a maximum speed limit of 25 mph imposed on construction and maintenance vehicles for solar site construction? (CGRP Solar Bio-2) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR CONTAMINATED SOIL SECTION	INSTRUCTIONS	9.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 10.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Contaminated Soil	SCREENING QUESTION	10.1.01	Has Project construction generated any contaminated soil?	Yes	The project has generated contaminated soil. Identification, management, storage, and shipment of this contaminated soil is managed by the Refinery's existing Hazardous Waste Group in accordance with the applicable regulations.

Category	Subcategory	Question No.	Question	Answer	Comment
Contaminated Soil	Question	10.2.01	If yes, has contaminated soil been handled and disposed of as required including covering with plastic sheeting of any soil stockpiles containing contaminants? (4.9-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an “Instructions to Contractors” document to contractors that specifies the requirements of MM 4.13-10a and has reviewed this requirement in the ITC meetings. The Modernization Compliance Team’s regular meetings with contractor representatives include a representative from the Refinery Hazardous Waste Team as needed to support reporting and waste stream management. The Refinery Hazardous Waste Team characterizes and manages soils according to applicable regulations.

Category	Subcategory	Question No.	Question	Answer	Comment
Contaminated Soil	SCREENING QUESTION	10.3.01	Has any contaminated soil been discovered during Project construction? (4.13-10a)	No	No contaminated soils requiring agency notifications have been discovered. See also the response to question 19.1.13.

Category	Subcategory	Question No.	Question	Answer	Comment
Contaminated Soil	Question	10.4.01	If Yes, did Chevron report the discovery to the City and other agencies? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Contaminated Soil	Question	10.4.02	Did Chevron promptly manage, contain, treat, transport, and dispose of it? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Contaminated Soil	Question	10.4.03	Did Chevron use authorized remediation contractors to manage contaminated media discovered during construction? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR NIGHTTIME CONSTRUCTION SECTION	INSTRUCTIONS	11.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 12.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Nighttime Construction	SCREENING QUESTION	12.1.01	Has Project construction included any nighttime construction activities?	Yes	

Category	Subcategory	Question No.	Question	Answer	Comment
Nighttime Construction	Question	12.2.01	Have nighttime construction noise mitigation requirements been implemented? (4.11-1) If no, please explain by entering a comment. If yes please attach proof.	No	Nighttime construction activities include bolt-up and welding of pipe and steel, electrical work, and scaffold building. Chevron is undertaking nighttime construction activities; however, those activities are not the type identified in the EIR as those which would potentially exceed noise significance thresholds. Further, Chevron has not received any noise complaints which would trigger additional mitigation obligations.

Category	Subcategory	Question No.	Question	Answer	Comment
Nighttime Construction	Question	12.2.02	Has there been a verified complaint regarding backup alarm noise during nighttime construction activities?	No	

Category	Subcategory	Question No.	Question	Answer	Comment
Nighttime Construction	Question	12.2.03	If Yes, have administrative controls or different alarms been implemented? (4.11-1b) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR SPILLS OR RELEASES SECTION	INSTRUCTIONS	13.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 14.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Spills or Releases	SCREENING QUESTION	14.1.01	Have there been any spills/releases of any hazardous substances?	No	

Category	Subcategory	Question No.	Question	Answer	Comment
Spills or Releases	Question	14.2.01	If Yes, did Chevron report the release within 48 hours to the City? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Spills or Releases	Question	14.2.02	Did Chevron report the release to all required agencies in accordance with applicable regulatory requirements? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Spills or Releases	Question	14.2.03	Was a prompt cleanup conducted? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR THIRD PARTY COMPLIANCE AUDIT SECTION	INSTRUCTIONS	15.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 16.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Third Party Compliance Audit	Question	16.1.01	Has the City or CCHS retained a third-party expert to audit compliance at the facility? (4.13-13c)	No	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.

Category	Subcategory	Question No.	Question	Answer	Comment
Third Party Compliance Audit	Question	16.1.02	If Yes, Has Chevron reimbursed the City or CCHS for these fees/expenses? (4.13-13c)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
INSTRUCTIONS FOR CRUDE UNIT SECTION	INSTRUCTIONS	17.1.01	Click the "i" icon the right to view specific instructions for completing this section of the questionnaire in the "Requirement" box. (No response needed to this INSTRUCTION - Proceed to 18.1.01)	N/A	

Category	Subcategory	Question No.	Question	Answer	Comment
Crude Unit	SCREENING QUESTION	18.1.01	Has the 2017 turnaround of the crude unit occurred?	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Crude Unit	Question	18.2.01	Has Chevron submitted closed permits reflecting replacement of 17 circuits and 4 partial components to 9Cr? (Reliability Program III.A) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Crude Unit	Question	18.2.02	Has Chevron either retubed, or inspected/repared/replaced/monitored the F1100 tubes? (Reliability Program III.C.2) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Crude Unit	Question	18.2.03	Has Chevron inspected and replaced as needed F-1160? (Reliability Program III.C.3) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.01	Did Chevron submit a SWPPP to RWQCB at least 10 days prior to commencing construction? (4.9-1a) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.02	Have BMPs from the SWPPP been implemented during construction? (4.9-1a) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron issued the BMPs for the Project to contractors on April 10, 2016. Appendix A of the "Instructions to Contractors" (ITC) document (attached to 4.2.01) contains the required SWPPP information and BMPs. Contractors have been provided with copies of the SWPPP. Chevron has conducted regular inspections to ensure that BMPs are in place and functioning.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.03	If the 4th quarter of 2015 has occurred, has Chevron conducted lab analyses of crudes/blends and H2S evolution to predict corrosion rates? (Reliability Program III.C.4) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.04	Before December 31, 2015, did Chevron install a test platform and sampling port, consistent with BAAQMDs "Guidance for Construction of Particulate Sampling and Test Facilities" on the FCC to allow for supplemental testing of PM10 and PM2.5 pursuant to USEPA Test Method 201a/202? (COA D3) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.05	Are all required dust control BMPs being implemented consistently? (4.3-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	All required dust control BMPs are being implemented consistently as described in the Instructions to Contractors (ITC) document attached to question 4.2.01.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.06	Has Chevron implemented the required PM emissions reduction practices for construction activities? (IM 4.3-3) If no, please explain by entering a comment.	Yes	Chevron has implemented Improvement Measure 4.3-3 through the “Instructions to Contractors” (ITC) document. Please see attachment to 4.2.01.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.07	Have hazardous materials been stored only in City-approved locations? (4.13-2a) If no, please explain by entering a comment.	Yes	Hazardous materials are stored within approved locations as identified within Figure 3-1 of the EIR. Small quantities of consumer products that might be classified as hazardous materials are also stored in OSHA regulated storage cabinets located within construction areas where the City approved construction activities are occurring. All construction activities are subject to the requirements of the City issued building permits.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.08	Has hazardous waste been stored only in locations approved by the City? (4.13-3a) If no, please explain by entering a comment.	Yes	Chevron has developed a Â“Waste Diversion Plan/Debris Recovery PlanÂ” (Plan) that identifies acceptable waste storage locations. The Plan was approved by the City of Richmond on May 17, 2016 and is attached to the Â“Instructions to ContractorsÂ” document (see 4.2.01). Acceptable waste storage locations are identified in the Plan as referenced under MM 3.13-3a. Contractors have been trained on the Plan and are responsible for complying with all of its provisions.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.09	Has all hazardous waste been transported off-site to an authorized facility by a licensed transporter within 90 days after the wastes were generated? (4.13-3b) If no, please explain by entering a comment.	Yes	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.10	Has all non-hazardous waste been transported off-site to an authorized facility by a licensed transporter within 180 days after the wastes were generated? (4.13-3c) If no, please explain by entering a comment.	Yes	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.11	Has Chevron reviewed and updated its programs and procedures to incorporate damage mechanism reviews and layers of protection analyses? (4.13-7c) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.12	Has Chevron reimbursed the City for any 3rd party experts retained by the City or CCHS to review PHAs, ISSAs, or LOPAs? (4.13-7d)	01 Have Not Received Invoice	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.13	Has Chevron trained construction workers in recognizing contamination and characterizing/managing any contaminated media? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an “Instructions to Contractors” (ITC) document to contractors (attached to 4.2.01) that specifies the requirements of MM 4.13-10a (see section 2.0 of the ITC) and has reviewed this requirement in ITC meetings. The Modernization Compliance Team’s regular meetings with contractor representatives include a representative from the Refinery Hazardous Waste Team to support reporting and waste stream management. The Refinery Hazardous Waste Team characterizes and manages any contaminated media.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.14	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for the Castro/W-180 westbound ramps? (4.16-1, 3, 6) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police, and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Castro/W-580 westbound ramps.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.15	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Richmond Parkway/Gertrude Ave? (4.16-2, 5, 9) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Richmond Parkway/Gertrude Ave. intersection. See also attachment to 19.1.22.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.16	For periods during which there is/will be both Project construction-related traffic combined with Other Project construction-related traffic, has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Castro/Hensley? (4.16-4, 8) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Castro/Hensley intersection.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.17	For periods during which there is/will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for Castro Street/General Chemical Access been implemented? (4.16-7) If no, please explain by entering a comment. If yes please attach proof.	Yes	As with the Fall 2016 and Winter 2017 major Refinery turnarounds (which occurred after the start of the Modernization Project construction) Chevron will work closely with the City of Richmond Engineering, Police, and Traffic Departments and implement traffic control measures to ensure smooth traffic flow during peak arrival and departure periods. See also attachment to 19.1.22.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.18	For periods during which there will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for County maintained intersections been implemented by Chevron in coordination with the City and County? (4.16-11) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	As with the Fall 2016 and Winter 2017 major Refinery turnarounds (which occurred after the start of the Modernization Project construction) Chevron will work closely with the City of Richmond Engineering, Police, and Traffic Departments and implement traffic control measures to ensure smooth traffic flow during peak arrival and departure periods. See also attachment to 19.1.22.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.19	Has Chevron paid the full costs of modified traffic controls? (4.16-1, 2a, 4, 7, 11) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has paid all invoices to date for St. Francis Electrical, the City of Richmond's traffic management contractor, and is set to pay all future traffic costs.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.20	Has Chevron hired additional security services as necessary for the increase in personnel on-site during construction? (IM 4.14-1) If No, please explain by entering a comment.	Yes	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.21	Has Chevron entered into an agreement with the City fire department to ensure training on new equipment and the acquisition of any necessary heavy equipment? (IM 4.14-2) If No, please explain by entering a comment.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.22	Has Chevron implemented one or more of the measures specified to further reduce construction traffic impacts by reducing construction-related traffic trips during AM and PM peak hours? (IM 4.16-1 through 9) If No, please explain by entering a comment. If Yes, please enter a comment summarizing the measures implemented.	Yes	Chevron and its contractors have implemented Improvement Measure IM 4.16-1 through 9 as follows: IM 9a: Chevron has staggered the hours of operation of the craft labor so that the construction-related traffic is distributed over the peak and nonpeak hours of traffic operation. IM 9b: Chevron and its contractors have promoted the use of car sharing by the craft labor force, including the use of incentives. IM 9c: Chevron has coordinated the schedule among construction of the Modernization project, other projects and major facility turnarounds. See attached.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.23	Has Chevron communicated on a weekly basis to site management and City management regarding the week's construction plans and schedule? (4.13-2b) If No, please explain by entering a comment.	Yes	The Modernization Project provides at least weekly updates to Refinery leadership on Modernization project construction status. Chevron's construction plans and permitting teams are in regular contact with the City's building inspection department concerning ongoing permitting and construction activities.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.24	Has Chevron submitted monthly reports regarding safety training? (4.13-2b) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.25	Has Chevron implemented the Leak Response Protocol? (4.13-2b) If No, please explain by entering a comment. If Yes, please enter a comment describing implementation.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.26	Has Chevron implemented one or more of the specified NOx emissions reduction measures for construction activities? (4.3-2a) If No, please explain by entering a comment. If Yes, please enter a comment describing what has been implemented and how.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.27	Has Chevron implemented one or more of the specified ROG emissions reduction measures for construction activities? (4.3-2b) If No, please explain by entering a comment. If Yes, please enter a comment describing what has been implemented and how.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.28	Has Chevron implemented the GHG mitigation measures specified for construction activities? (4.8-1a through 4.8-1k) If No, please explain by entering a comment. If Yes, please enter a comment describing implementation efforts.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.29	Have stockpiles of soil containing contaminants been kept covered with plastic sheeting? (4.9-2) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron has issued an “Instructions to Contractors” (ITC) document to contractors that specifies the requirements of MM 4.9-2 (see section 2.0 of the ITC) including Best Management Practices. Please see attachment to 4.2.01. The Chevron Modernization Compliance Team verifies compliance with these requirements

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.30	Has Chevron secured a permit amendment from BAAQMD reducing the annualized throughput limit of the SDA to 50,000 barrels/day? (4.3-5h) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.31	Were any trees removed during September 1 and March 31? (4.4-1c)	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.32	If yes, has Chevron submitted a pre-construction survey report for Monarch roost habitat? (4.4-1c) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.33	Has Chevron updated PHAs (including ISSAs, damage mechanism reviews, and LOPAs) for all new and modified Project components, and notified City and CCHS of their availability for review? (4.13-4a, 4.13-7b) If no, please explain by entering a comment. If yes, please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.34	Has Chevron funded the costs of a qualified expert in refinery safety to be selected and retained by County or City to review ISSAs, PHAs, LOPAs and other safety documentation (until such time as funded via RISO)? (4.13-13b) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The County has selected the qualified expert. Chevron will pay invoices for this expert upon receipt. See attachment to 19.1.43.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.35	Has Chevron submitted quarterly reports to City (and copies to CCHS) on the status of corrective actions taken to implement agency recommendations resulting from August 2012 fire as well as corrective actions taken by Chevron as a result of its own investigation? (4.13-13d) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The sixteenth quarterly 4.13-13d report is attached.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.36	Has Chevron funded the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations? (4.13-13e) If no, please explain by entering a comment. If yes, please attach proof.	No	Chevron has not been invoiced for, nor notified of, the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.37	Has Chevron submitted its most current quarterly mitigation measure compliance report demonstrating compliance with the required NOx, ROG, and GHG measures? (4.3-2a, 2b, 4.8-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	See Transmittal #19.9 attached.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.38	Has a third-party retained by Chevron quantified and verified the GHG emissions reductions achieved by the specified mitigation measures for construction activities? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	No	Chevron has worked with the City's independent environmental consultant, Ramboll, to develop a construction emissions tracking tool that takes into account quantifiable reductions. Please see the attachment to question 19.1.37 for an update concerning current construction emissions.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.39	Has Chevron submitted an annual report for the most current reporting period verifying GHG emissions reductions from construction activities, reductions achieved through mitigation, and compliance with mitigation requirements? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	No	Please see the attachment to question 19.1.37 for an update concerning current quarterly construction emissions.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.40	Has Chevron submitted an annual Reliability Program report for the most current reporting period? (4.13-7a) If no, please explain by entering a comment. If yes please attach proof.	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.41	Has Chevron submitted annual compliance reports by March 31 of each year (starting after the first full year of construction) to the City regarding the status of any ongoing agency investigations resulting from the August 2012 fire, including EPA, CSB, Cal/OSHA, BAAQMD, and the County, including County safety audit(s) and safety culture audit(s), including a comprehensive list of all findings, corrective actions identified/requested by the agencies, and status of implementation by Chevron of the corrective actions? (COA G2, H5) If no, please explain by entering a comment. If yes please attach proof.	Yes	On March 29, 2019 Chevron submitted the annual compliance report for calendar year 2018 in Transmittal #25. See attached.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.42	Has Chevron submitted payment to the City to cover all staff/3rd party expert costs and fees for review and verification of compliance with all mitigation measures, improvement measures, and conditions of approval? (COA H5)	SATISFIED-NO RESPONSE REQUIRED	

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.43	Has Chevron submitted payment to the County to cover all County costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the County? (COA H5)	02 Payment is in Progress	Chevron received invoice 1707 dated 4/4/19 for the amount \$66,271.00. Invoice 1707 is attached and is in the process of being paid. Chevron also received and paid invoice 1706 in the amount of \$61,044.00.

Category	Subcategory	Question No.	Question	Answer	Comment
Miscellaneous	Question	19.1.44	Has Chevron submitted payment to the BAAQMD to cover all BAAQMD costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the BAAQMD? (COA H5)	01 Have Not Received invoice	

Category	Subcategory	Question No.	Question	Answer	Comment
Final Certifications	Attestation	20.1.01	I (Enter name or names in text box to the right) certify that this response 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 those who manage the system or who gather the information, I attest on behalf of Chevron that all information provided in this response is, to the best of my knowledge and belief, true, accurate, and complete.	Laurie Mintzer for Shawn Lee	

Submitted Questionnaire Review

Question Category	Question Number	Reference Citation(MM#/COA#)	Question	Chevron Response	Chevron Comments	Document Uploaded by Chevron
Ground Disturbing Construction Questions	4.1.1		Have any ground disturbing construction activities occurred?	Yes		
Ground Disturbing Construction Questions	4.2.1	4.5-1	Was training regarding discovery of archaeological artifacts/resources provided to workers before ground disturbing activities began? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	ITC Procedure Rev-8 03-28-17.pdf
Ground Disturbing Construction Questions	4.2.2	4.5-1	Is monitoring being conducted for discovery of archaeological resources during construction? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	
Ground Disturbing Construction Questions	4.2.3	4.5-1	Have all archaeological resources discovered been managed as required? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	N/A	No archaeological resources have been discovered to date.	

Ground Disturbing Construction Questions	4.2.4	4.5-2	Was training regarding discovery of paleontological resources provided to workers before ground disturbing activities began? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	
Ground Disturbing Construction Questions	4.2.5	4.5-2	Have excavation plans been submitted, if required for all needed excavations? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Ground Disturbing Construction Questions	4.2.6	4.5-2	Have all paleontological resources discovered been managed as required? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A	No paleontological discoveries have been made to date.	
Ground Disturbing Construction Questions	4.2.7	4.5-3	Have any human skeletal remains been discovered? (4.5-3)	No		
Ground Disturbing Construction Questions	4.2.8	4.5-3	If human skeletal remains have been discovered, have they been managed as required? (4.5-3) If No, please explain by entering a comment. If Yes, please attach proof.	N/A		
GHG Emissions	6.1.1	4.8-1l	Have GHG emissions from Project construction activities for a year exceeded 10,000 MT CO2e, after accounting for reductions realized from mitigation measures? (4.8-1l)	Yes	Construction-related GHG emissions for 2019 have not exceeded 10,000MT CO2e. As previously reported in the 4Q2018 construction emissions report, construction-related GHG emissions did exceed 10,000 MT CO2e in 2018. In May, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Chevron continues to work with the City to finalize details regarding this project.	
GHG Emissions	6.1.2	4.8-1l	If yes, has Chevron implemented one or more of the specified measures to reduce GHG emissions to below 10,000 MT CO2e? (4.8-1l)If no, please explain by entering a comment. If yes please attach proof.	In progress	Chevron is working with the City to finalize details regarding a mitigation project pursuant to MM 4.8-1l for 2018 construction-related GHG emissions. Project planning and implementation is being managed with Chevron's project management process.	
GHG Emissions	6.1.3	4.8-2	Has Chevron implemented mitigation measures 4.8-2a through 4.8-2c to reduce greenhouse gas emissions? (4.8-2) If no, please explain by entering a comment. If yes, please attach proof	Yes	In accordance with COR memo dated 8/31/2018, Chevron has implemented the Wastewater Reuse Project and provided funding in the amount of \$2MM in lieu of the FCC PDF and for the delay of the LED lighting (see attached). LED lighting is scheduled for implementation over a 10 year period.	Chevron Check No 0024121959.pdf COR Memo to file re PDF and Permasense.pdf
GHG Emissions	6.1.4	4.8-2e	Has Chevron provided its annual contribution to fund the Community Greenhouse Gas Reduction Measures? (4.8-2e) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron provided its annual contribution on June 7, 2019, check number 0024107107, for invoice 64439. The CGGRP contribution is included in the funding under ECIA.	Chevron Check No 0024107107.pdf

Contaminated Soil	10.1.1		Has Project construction generated any contaminated soil?	Yes	The project has generated contaminated soil. Identification, management, storage, and shipment of this contaminated soil is managed by the Refinery's existing Hazardous Waste Group in accordance with the applicable regulations.	
Contaminated Soil	10.2.1	4.9-2	If yes, has contaminated soil been handled and disposed of as required including covering with plastic sheeting of any soil stockpiles containing contaminants? (4.9-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an "Instructions to Contractors" document to contractors that specifies the requirements of MM 4.13-10a and has reviewed this requirement in the ITC meetings. The Refinery Hazardous Waste Team characterizes and manages soils according to applicable regulations.	
Contaminated Soil	10.3.1	4.13-10a	Has any contaminated soil been discovered during Project construction? (4.13-10a)	No	No contaminated soils requiring agency notifications have been discovered. See also the response to question 19.1.13.	
Contaminated Soil	10.4.1	4.13-10a	If Yes, did Chevron report the discovery to the City and other agencies? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Contaminated Soil	10.4.2	4.13-10a	Did Chevron promptly manage, contain, treat, transport, and dispose of it? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Contaminated Soil	10.4.3	4.13-10a	Did Chevron use authorized remediation contractors to manage contaminated media discovered during construction? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Nighttime Construction	12.1.1		Has Project construction included any nighttime construction activities?	Yes		
Nighttime Construction	12.2.1	4.11-1	Have nighttime construction noise mitigation requirements been implemented? (4.11-1) If no, please explain by entering a comment. If yes please attach proof.	No	Nighttime construction activities include bolt-up and welding of pipe and steel, electrical work, and scaffold building. Chevron is undertaking nighttime construction activities; however, those activities are not the type identified in the EIR as those which would potentially exceed noise significance thresholds. Further, Chevron has not received any noise complaints which would trigger additional mitigation obligations.	
Nighttime Construction	12.2.2		Has there been a verified complaint regarding backup alarm noise during nighttime construction activities?	No		
Nighttime Construction	12.2.3	4.11-1b	If Yes, have administrative controls or different alarms been implemented? (4.11-1b) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.1.1		Have there been any spills/releases of any hazardous substances?	No		
Spills or Releases	14.2.1	4.13-5c	If Yes, did Chevron report the release within 48 hours to the City? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.2.2	4.13-5c	Did Chevron report the release to all required agencies in accordance with applicable regulatory requirements? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.2.3	4.13-5c	Was a prompt cleanup conducted? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Third Party Compliance Audit	16.1.1	4.13-13c	Has the City or CCHS retained a third-party expert to audit compliance at the facility? (4.13-13c)	No	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.	
Third Party Compliance Audit	16.1.2	4.13-13c	If Yes, Has Chevron reimbursed the City or CCHS for these fees/expenses? (4.13-13c)	N/A		

Miscellaneous	19.1.5	4.3-1	Are all required dust control BMPs being implemented consistently? (4.3-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	All required dust control BMPs are being implemented consistently as described in the Instructions to Contractors (ITC) document attached to question 4.2.01.	
Miscellaneous	19.1.6	IM 4.3-3	Has Chevron implemented the required PM emissions reduction practices for construction activities? (IM 4.3-3) If no, please explain by entering a comment.	Yes	Chevron has implemented Improvement Measure 4.3-3 through the "Instructions to Contractors" (ITC) document. Please see attachment to 4.2.01.	
Miscellaneous	19.1.7	4.13-2a	Have hazardous materials been stored only in City-approved locations? (4.13-2a) If no, please explain by entering a comment.	Yes	Hazardous materials are stored within approved locations as identified within Figure 3-1 of the EIR. Small quantities of consumer products that might be classified as hazardous materials are also stored in OSHA regulated storage cabinets located within construction areas where the City approved construction activities are occurring. All construction activities are subject to the requirements of the City issued building permits.	
Miscellaneous	19.1.8	4.13-3a	Has hazardous waste been stored only in locations approved by the City? (4.13-3a) If no, please explain by entering a comment.	Yes	Chevron has developed a "Waste Diversion Plan/Debris Recovery Plan" (Plan) that identifies acceptable waste storage locations. The Plan was approved by the City of Richmond on May 17, 2016 and is attached to the "Instructions to Contractors" document (see 4.2.01). Acceptable waste storage locations are identified in the Plan as referenced under MM 3.13-3a. Contractors have been trained on the Plan and are responsible for complying with all of its provisions.	
Miscellaneous	19.1.9	4.13-3b	Has all hazardous waste been transported off-site to an authorized facility by a licensed transporter within 90 days after the wastes were generated? (4.13-3b) If no, please explain by entering a comment.	Yes		
Miscellaneous	19.1.10	4.13-3c	Has all non-hazardous waste been transported off-site to an authorized facility by a licensed transporter within 180 days after the wastes were generated? (4.13-3c) If no, please explain by entering a comment.	Yes		
Miscellaneous	19.1.12	4.13-7d	Has Chevron reimbursed the City for any 3rd party experts retained by the City or CCHS to review PHAs, ISSAs, or LOPAs? (4.13-7d)	Have not received invoice	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.	
Miscellaneous	19.1.13	4.13-10a	Has Chevron trained construction workers in recognizing contamination and characterizing/managing any contaminated media? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an "Instructions to Contractors" (ITC) document to contractors (attached to 4.2.01) that specifies the requirements of MM 4.13-10a (see section 2.0 of the ITC) and has reviewed this requirement in ITC meetings. The Refinery Hazardous Waste Team characterizes and manages any contaminated media.	
Miscellaneous	19.1.14	4.16-1, 3, 6	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for the Castro/W-180 westbound ramps? (4.16-1, 3, 6) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police, and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Castro/W-580 westbound ramps.	

Miscellaneous	19.1.15	4.16-2, 5, 9	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Richmond Parkway/Gertrude Ave? (4.16-2, 5, 9) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Richmond Parkway/Gertrude Ave. intersection. See attachment.	Chevron Richmond Modernization Project - MM 4 16-11 Traffic Data.msg
Miscellaneous	19.1.16	4.16-4, 8	For periods during which there is/will be both Project construction-related traffic combined with Other Project construction-related traffic, has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Castro/Hensley? (4.16-4, 8) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Castro/Hensley intersection.	
Miscellaneous	19.1.17	4.16-7	For periods during which there is/will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for Castro Street/General Chemical Access been implemented? (4.16-7) If no, please explain by entering a comment. If yes please attach proof.	Yes	As with previous major Refinery turnarounds which occurred after the start of the Modernization Project construction, Chevron is working closely with the City of Richmond Engineering, Police, and Traffic Departments and implement traffic control measures to ensure smooth traffic flow during peak arrival and departure periods. See also attachment to 19.1.15.	
Miscellaneous	19.1.18	4.16-11	For periods during which there will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for County maintained intersections been implemented by Chevron in coordination with the City and County? (4.16-11) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	As with previous major Refinery turnarounds which occurred after the start of the Modernization Project construction, Chevron is working closely with the City of Richmond Engineering, Police, and Traffic Departments and implement traffic control measures to ensure smooth traffic flow during peak arrival and departure periods. See also attachment to 19.1.15.	
Miscellaneous	19.1.19	4.16-1, 2a, 4, 7, 11	Has Chevron paid the full costs of modified traffic controls? (4.16-1, 2a, 4, 7, 11) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has paid all invoices to date for St. Francis Electrical, the City of Richmond's traffic management contractor, and is set to pay all future traffic costs.	
Miscellaneous	19.1.20	4.14-1	Has Chevron hired additional security services as necessary for the increase in personnel on-site during construction? (IM 4.14-1) If No, please explain by entering a comment.	Yes		
Miscellaneous	19.1.23	4.13-2b	Has Chevron communicated on a weekly basis to site management and City management regarding the week's construction plans and schedule? (4.13-2b) If No, please explain by entering a comment.	Yes	Refinery site management took ownership of the Modernization Project construction following commencement of Project operations. Chevron's permitting teams are in regular contact with the City's building inspection department concerning ongoing permitting and construction activities.	
Miscellaneous	19.1.29	4.9-2	Have stockpiles of soil containing contaminants been kept covered with plastic sheeting? (4.9-2) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document to contractors that specifies the requirements of MM 4.9-2 (see section 2.0 of the ITC) including Best Management Practices. Please see attachment to 4.2.01. The Chevron Modernization Compliance Team verifies compliance with these requirements.	

Miscellaneous	19.1.34	4.13-13b	Has Chevron funded the costs of a qualified expert in refinery safety to be selected and retained by County or City to review ISSAs, PHAs, LOPAs and other safety documentation (until such time as funded via RISO)? (4.13-13b) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The County has selected the qualified expert. Chevron will pay invoices for this expert upon receipt. See attachment to 19.1.43.	
Miscellaneous	19.1.35	4.13-13d	Has Chevron submitted quarterly reports to City (and copies to CCHS) on the status of corrective actions taken to implement agency recommendations resulting from August 2012 fire as well as corrective actions taken by Chevron as a result of its own investigation? (4.13-13d) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The seventeenth quarterly 4.13-13d report is attached.	Transmittal 1_17 MM4_13-13d Quarterly Report .msg
Miscellaneous	19.1.36	4.13-13e	Has Chevron funded the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations? (4.13-13e) If no, please explain by entering a comment. If yes, please attach proof.	No	Chevron has not been invoiced for, nor notified of, the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations.	
Miscellaneous	19.1.37	4.3-2a, 2b, 4.8-1	Has Chevron submitted its most current quarterly mitigation measure compliance report demonstrating compliance with the required NOx, ROG, and GHG measures? (4.3-2a, 2b, 4.8-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	See Transmittal #19.10 attached.	Modernization Project - Transmittal #19_10 Construction Emissions Report_ Second Quarter 2019.msg
Miscellaneous	19.1.38	4.8-1l	Has a third-party retained by Chevron quantified and verified the GHG emissions reductions achieved by the specified mitigation measures for construction activities? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	No	Chevron has worked with the City's independent environmental consultant, Ramboll, to develop a construction emissions tracking tool that takes into account quantifiable reductions. Please see the attachment to question 19.1.37 for an update concerning current construction emissions.	
Miscellaneous	19.1.39	4.8-1l	Has Chevron submitted an annual report for the most current reporting period verifying GHG emissions reductions from construction activities, reductions achieved through mitigation, and compliance with mitigation requirements? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	Yes	Please see the attachment to question 19.1.37 for an update concerning current construction emissions.	
Miscellaneous	19.1.41	COA G2, H5	Has Chevron submitted annual compliance reports by March 31 of each year (starting after the first full year of construction) to the City regarding the status of any ongoing agency investigations resulting from the August 2012 fire, including EPA, CSB, Cal/OSHA, BAAQMD, and the County, including County safety audit(s) and safety culture audit(s), including a comprehensive list of all findings, corrective actions identified/requested by the agencies, and status of implementation by Chevron of the corrective actions? (COA G2, H5) If no, please explain by entering a comment. If yes please attach proof.	Yes	On March 29, 2019 Chevron submitted the annual compliance report for calendar year 2018 in Transmittal #25. See attached.	Annual Report and Meeting Request.msg
Miscellaneous	19.1.43	COA H5	Has Chevron submitted payment to the County to cover all County costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the County? (COA H5)	Payment is in progress	Chevron received invoice 1707 dated 4/4/19 for the amount \$66,271.00. Invoice 1707 is attached and is in the process of being paid.	CCHS Invoice No HM-Chevron-1707.pdf

Miscellaneous	19.1.44	COA H5	Has Chevron submitted payment to the BAAQMD to cover all BAAQMD costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the BAAQMD? (COA H5)	Have not received invoice		
Final Certifications	20.1.1		I (Enter name or names in text box to the right) certify that this response 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 those who manage the system or who gather the information, I attest on behalf of Chevron that all information provided in this response is, to the best of my knowledge and belief, true, accurate, and complete.	Laurie Mintzer for Shawn Lee		

Chevron Richmond Modernization Project 3Q2019 Submitted Questionnaire Review

Question Category	Question Number	Reference Citation(MM#/COA#)	Question	Chevron Response	Chevron Comments	Document Uploaded by Chevron
Ground Disturbing Construction Questions	4.1.1		Have any ground disturbing construction activities occurred?	Yes		
Ground Disturbing Construction Questions	4.2.1	4.5-1	Was training regarding discovery of archaeological artifacts/resources provided to workers before ground disturbing activities began? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	ITC Procedure Rev-8 03-28-17.pdf
Ground Disturbing Construction Questions	4.2.2	4.5-1	Is monitoring being conducted for discovery of archaeological resources during construction? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	
Ground Disturbing Construction Questions	4.2.3	4.5-1	Have all archaeological resources discovered been managed as required? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	N/A	No archaeological resources have been discovered to date.	

Ground Disturbing Construction Questions	4.2.4	4.5-2	Was training regarding discovery of paleontological resources provided to workers before ground disturbing activities began? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	
Ground Disturbing Construction Questions	4.2.5	4.5-2	Have excavation plans been submitted, if required for all needed excavations? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Ground Disturbing Construction Questions	4.2.6	4.5-2	Have all paleontological resources discovered been managed as required? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A	No paleontological discoveries have been made to date.	
Ground Disturbing Construction Questions	4.2.7	4.5-3	Have any human skeletal remains been discovered? (4.5-3)	No		
Ground Disturbing Construction Questions	4.2.8	4.5-3	If human skeletal remains have been discovered, have they been managed as required? (4.5-3) If No, please explain by entering a comment. If Yes, please attach proof.	N/A		
GHG Emissions	6.1.1	4.8-1l	Have GHG emissions from Project construction activities for a year exceeded 10,000 MT CO2e, after accounting for reductions realized from mitigation measures? (4.8-1l)	Yes	Construction-related GHG emissions for 2019 have not exceeded 10,000MT CO2e. As previously reported in the 4Q2018 construction emissions report, construction-related GHG emissions did exceed 10,000 MT CO2e in 2018. In May, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Chevron continues to work with the City to finalize details regarding this project.	
GHG Emissions	6.1.2	4.8-1l	If yes, has Chevron implemented one or more of the specified measures to reduce GHG emissions to below 10,000 MT CO2e? (4.8-1l)If no, please explain by entering a comment. If yes please attach proof.	In progress	Chevron is working with the City to finalize details regarding a mitigation project pursuant to MM 4.8-1l for 2018 construction-related GHG emissions. Project planning and implementation is being managed with Chevron's project management process.	
GHG Emissions	6.1.3	4.8-2	Has Chevron implemented mitigation measures 4.8-2a through 4.8-2c to reduce greenhouse gas emissions? (4.8-2) If no, please explain by entering a comment. If yes, please attach proof	Yes	In accordance with COR memo dated 8/31/2018, Chevron has implemented the Wastewater Reuse Project and provided funding in the amount of \$2MM in lieu of the FCC PDF and for the delay of the LED lighting (see attached). LED lighting is scheduled for implementation over a 10 year period.	Chevron Check No 0024121959.pdf COR Memo to file re PDF and Permasense.pdf
GHG Emissions	6.1.4	4.8-2e	Has Chevron provided its annual contribution to fund the Community Greenhouse Gas Reduction Measures? (4.8-2e) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron provided its annual contribution on June 7, 2019, check number 0024107107, for invoice 64439. The CGGRP contribution is included in the funding under ECIA.	Chevron Check No 0024107107.pdf

Contaminated Soil	10.1.1		Has Project construction generated any contaminated soil?	Yes	The project has generated contaminated soil. Identification, management, storage, and shipment of this contaminated soil is managed by the Refinery's existing Hazardous Waste Group in accordance with the applicable regulations.	
Contaminated Soil	10.2.1	4.9-2	If yes, has contaminated soil been handled and disposed of as required including covering with plastic sheeting of any soil stockpiles containing contaminants? (4.9-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an "Instructions to Contractors" document to contractors that specifies the requirements of MM 4.13-10a and has reviewed this requirement in the ITC meetings. The Refinery Hazardous Waste Team characterizes and manages soils according to applicable regulations.	
Contaminated Soil	10.3.1	4.13-10a	Has any contaminated soil been discovered during Project construction? (4.13-10a)	No	No contaminated soils requiring agency notifications have been discovered. See also the response to question 19.1.13.	
Contaminated Soil	10.4.1	4.13-10a	If Yes, did Chevron report the discovery to the City and other agencies? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Contaminated Soil	10.4.2	4.13-10a	Did Chevron promptly manage, contain, treat, transport, and dispose of it? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Contaminated Soil	10.4.3	4.13-10a	Did Chevron use authorized remediation contractors to manage contaminated media discovered during construction? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Nighttime Construction	12.1.1		Has Project construction included any nighttime construction activities?	Yes		
Nighttime Construction	12.2.1	4.11-1	Have nighttime construction noise mitigation requirements been implemented? (4.11-1) If no, please explain by entering a comment. If yes please attach proof.	No	Nighttime construction activities include bolt-up and welding of pipe and steel, electrical work, and scaffold building. Chevron is undertaking nighttime construction activities; however, those activities are not the type identified in the EIR as those which would potentially exceed noise significance thresholds. Further, Chevron has not received any noise complaints which would trigger additional mitigation obligations.	
Nighttime Construction	12.2.2		Has there been a verified complaint regarding backup alarm noise during nighttime construction activities?	No		
Nighttime Construction	12.2.3	4.11-1b	If Yes, have administrative controls or different alarms been implemented? (4.11-1b) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.1.1		Have there been any spills/releases of any hazardous substances?	No		
Spills or Releases	14.2.1	4.13-5c	If Yes, did Chevron report the release within 48 hours to the City? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.2.2	4.13-5c	Did Chevron report the release to all required agencies in accordance with applicable regulatory requirements? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.2.3	4.13-5c	Was a prompt cleanup conducted? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Third Party Compliance Audit	16.1.1	4.13-13c	Has the City or CCHS retained a third-party expert to audit compliance at the facility? (4.13-13c)	No	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.	
Third Party Compliance Audit	16.1.2	4.13-13c	If Yes, Has Chevron reimbursed the City or CCHS for these fees/expenses? (4.13-13c)	N/A		

Miscellaneous	19.1.5	4.3-1	Are all required dust control BMPs being implemented consistently? (4.3-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	All required dust control BMPs are being implemented consistently as described in the Instructions to Contractors (ITC) document attached to question 4.2.01.	
Miscellaneous	19.1.6	IM 4.3-3	Has Chevron implemented the required PM emissions reduction practices for construction activities? (IM 4.3-3) If no, please explain by entering a comment.	Yes	Chevron has implemented Improvement Measure 4.3-3 through the "Instructions to Contractors" (ITC) document. Please see attachment to 4.2.01.	
Miscellaneous	19.1.7	4.13-2a	Have hazardous materials been stored only in City-approved locations? (4.13-2a) If no, please explain by entering a comment.	Yes	Hazardous materials are stored within approved locations as identified within Figure 3-1 of the EIR. Small quantities of consumer products that might be classified as hazardous materials are also stored in OSHA regulated storage cabinets located within construction areas where the City approved construction activities are occurring. All construction activities are subject to the requirements of the City issued building permits.	
Miscellaneous	19.1.8	4.13-3a	Has hazardous waste been stored only in locations approved by the City? (4.13-3a) If no, please explain by entering a comment.	Yes	Chevron has developed a "Waste Diversion Plan/Debris Recovery Plan" (Plan) that identifies acceptable waste storage locations. The Plan was approved by the City of Richmond on May 17, 2016 and is attached to the "Instructions to Contractors" document (see 4.2.01). Acceptable waste storage locations are identified in the Plan as referenced under MM 3.13-3a. Contractors have been trained on the Plan and are responsible for complying with all of its provisions.	
Miscellaneous	19.1.9	4.13-3b	Has all hazardous waste been transported off-site to an authorized facility by a licensed transporter within 90 days after the wastes were generated? (4.13-3b) If no, please explain by entering a comment.	Yes		
Miscellaneous	19.1.10	4.13-3c	Has all non-hazardous waste been transported off-site to an authorized facility by a licensed transporter within 180 days after the wastes were generated? (4.13-3c) If no, please explain by entering a comment.	Yes		
Miscellaneous	19.1.12	4.13-7d	Has Chevron reimbursed the City for any 3rd party experts retained by the City or CCHS to review PHAs, ISSAs, or LOPAs? (4.13-7d)	Have not received invoice	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.	
Miscellaneous	19.1.13	4.13-10a	Has Chevron trained construction workers in recognizing contamination and characterizing/managing any contaminated media? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an "Instructions to Contractors" (ITC) document to contractors (attached to 4.2.01) that specifies the requirements of MM 4.13-10a (see section 2.0 of the ITC) and has reviewed this requirement in ITC meetings. The Refinery Hazardous Waste Team characterizes and manages any contaminated media.	
Miscellaneous	19.1.14	4.16-1, 3, 6	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for the Castro/W-180 westbound ramps? (4.16-1, 3, 6) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police, and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Castro/W-580 westbound ramps.	

Miscellaneous	19.1.15	4.16-2, 5, 9	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Richmond Parkway/Gertrude Ave? (4.16-2, 5, 9) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Richmond Parkway/Gertrude Ave. intersection. See attachment.	Chevron Richmond Modernization Project - MM 4 16-11 Traffic Data.msg
Miscellaneous	19.1.16	4.16-4, 8	For periods during which there is/will be both Project construction-related traffic combined with Other Project construction-related traffic, has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Castro/Hensley? (4.16-4, 8) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has held periodic traffic coordination and planning meetings with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of these meetings has been to plan for implementation of the modified traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the Castro/Hensley intersection.	
Miscellaneous	19.1.17	4.16-7	For periods during which there is/will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for Castro Street/General Chemical Access been implemented? (4.16-7) If no, please explain by entering a comment. If yes please attach proof.	Yes	As with previous major Refinery turnarounds which occurred after the start of the Modernization Project construction, Chevron is working closely with the City of Richmond Engineering, Police, and Traffic Departments and implement traffic control measures to ensure smooth traffic flow during peak arrival and departure periods. See also attachment to 19.1.15.	
Miscellaneous	19.1.18	4.16-11	For periods during which there will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for County maintained intersections been implemented by Chevron in coordination with the City and County? (4.16-11) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	As with previous major Refinery turnarounds which occurred after the start of the Modernization Project construction, Chevron is working closely with the City of Richmond Engineering, Police, and Traffic Departments and implement traffic control measures to ensure smooth traffic flow during peak arrival and departure periods. See also attachment to 19.1.15.	
Miscellaneous	19.1.19	4.16-1, 2a, 4, 7, 11	Has Chevron paid the full costs of modified traffic controls? (4.16-1, 2a, 4, 7, 11) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has paid all invoices to date for St. Francis Electrical, the City of Richmond's traffic management contractor, and is set to pay all future traffic costs.	
Miscellaneous	19.1.20	4.14-1	Has Chevron hired additional security services as necessary for the increase in personnel on-site during construction? (IM 4.14-1) If No, please explain by entering a comment.	Yes		
Miscellaneous	19.1.23	4.13-2b	Has Chevron communicated on a weekly basis to site management and City management regarding the week's construction plans and schedule? (4.13-2b) If No, please explain by entering a comment.	Yes	Refinery site management took ownership of the Modernization Project construction following commencement of Project operations. Chevron's permitting teams are in regular contact with the City's building inspection department concerning ongoing permitting and construction activities.	
Miscellaneous	19.1.29	4.9-2	Have stockpiles of soil containing contaminants been kept covered with plastic sheeting? (4.9-2) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document to contractors that specifies the requirements of MM 4.9-2 (see section 2.0 of the ITC) including Best Management Practices. Please see attachment to 4.2.01. The Chevron Modernization Compliance Team verifies compliance with these requirements.	

Miscellaneous	19.1.34	4.13-13b	Has Chevron funded the costs of a qualified expert in refinery safety to be selected and retained by County or City to review ISSAs, PHAs, LOPAs and other safety documentation (until such time as funded via RISO)? (4.13-13b) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The County has selected the qualified expert. Chevron will pay invoices for this expert upon receipt. See attachment to 19.1.43.	
Miscellaneous	19.1.35	4.13-13d	Has Chevron submitted quarterly reports to City (and copies to CCHS) on the status of corrective actions taken to implement agency recommendations resulting from August 2012 fire as well as corrective actions taken by Chevron as a result of its own investigation? (4.13-13d) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The eighteenth quarterly 4.13-13d report is attached.	Transmittal 1_18 MM4_13-13d Quarterly Report .msg
Miscellaneous	19.1.36	4.13-13e	Has Chevron funded the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations? (4.13-13e) If no, please explain by entering a comment. If yes, please attach proof.	No	Chevron has not been invoiced for, nor notified of, the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations.	
Miscellaneous	19.1.37	4.3-2a, 2b, 4.8-1	Has Chevron submitted its most current quarterly mitigation measure compliance report demonstrating compliance with the required NOx, ROG, and GHG measures? (4.3-2a, 2b, 4.8-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	See Transmittal #19.11 attached.	Modernization Project - Transmittal #19_11 Construction Emissions Report_ Third Quarter 2019.msg
Miscellaneous	19.1.38	4.8-1l	Has a third-party retained by Chevron quantified and verified the GHG emissions reductions achieved by the specified mitigation measures for construction activities? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	No	Chevron has worked with the City's independent environmental consultant, Ramboll, to develop a construction emissions tracking tool that takes into account quantifiable reductions. Please see the attachment to question 19.1.37 for an update concerning current construction emissions.	
Miscellaneous	19.1.39	4.8-1l	Has Chevron submitted an annual report for the most current reporting period verifying GHG emissions reductions from construction activities, reductions achieved through mitigation, and compliance with mitigation requirements? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	Yes	Please see the attachment to question 19.1.37 for an update concerning current construction emissions.	
Miscellaneous	19.1.41	COA G2, H5	Has Chevron submitted annual compliance reports by March 31 of each year (starting after the first full year of construction) to the City regarding the status of any ongoing agency investigations resulting from the August 2012 fire, including EPA, CSB, Cal/OSHA, BAAQMD, and the County, including County safety audit(s) and safety culture audit(s), including a comprehensive list of all findings, corrective actions identified/requested by the agencies, and status of implementation by Chevron of the corrective actions? (COA G2, H5) If no, please explain by entering a comment. If yes please attach proof.	Yes	On March 29, 2019 Chevron submitted the annual compliance report for calendar year 2018 in Transmittal #25. See attached.	Annual Report and Meeting Request.msg
Miscellaneous	19.1.43	COA H5	Has Chevron submitted payment to the County to cover all County costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the County? (COA H5)	Yes	Chevron received invoice 1708 dated 7/12/19 for the amount \$67,992.06. Invoice 1708 is attached and has been paid.	CCHS Invoice No HM-Chevron-1708.pdf

Miscellaneous	19.1.44	COA H5	Has Chevron submitted payment to the BAAQMD to cover all BAAQMD costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the BAAQMD? (COA H5)	Have not received invoice		
Final Certifications	20.1.1		I (Enter name or names in text box to the right) certify that this response 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 those who manage the system or who gather the information, I attest on behalf of Chevron that all information provided in this response is, to the best of my knowledge and belief, true, accurate, and complete.	Laurie Mintzer for Shawn Lee		

Chevron Richmond Modernization Project: 2019 Q4 Submitted Questionnaire Review						
Question Category	Question Number	Reference Citation(MM#/COA#)	Question	Chevron Response	Chevron Comments	Document Uploaded by Chevron
Ground Disturbing Construction Questions	4.1.1		Have any ground disturbing construction activities occurred?	Yes		
Ground Disturbing Construction Questions	4.2.1	4.5-1	Was training regarding discovery of archaeological artifacts/resources provided to workers before ground disturbing activities began? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	ITC Procedure Rev-8 03-28-17.pdf
Ground Disturbing Construction Questions	4.2.2	4.5-1	Is monitoring being conducted for discovery of archaeological resources during construction? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	
Ground Disturbing Construction Questions	4.2.3	4.5-1	Have all archaeological resources discovered been managed as required? (4.5-1) If no, please explain by entering a comment. If yes please attach proof.	N/A	No archaeological resources have been discovered to date.	
Ground Disturbing Construction Questions	4.2.4	4.5-2	Was training regarding discovery of paleontological resources provided to workers before ground disturbing activities began? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document (attached to 4.2.01) to contractors that specifies the requirements of MM 4.5-1 (see section 2.9 of the ITC). The initial cultural resources training of contractor supervisors and environmental, health and safety contacts was held on April 8, 2016. No additional training has been necessary because the trained personnel overseeing excavation activities have not changed. In the event these personnel leave the project, additional training to new personnel will be provided pursuant to the ITC. To date, no additional sessions have been required. Chevron has also retained the consulting firm CH2M Hill to provide a qualified archaeologist who will be immediately engaged in the event that any prehistoric or historic subsurface cultural resources, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, horseshoes, etc.) are discovered during ground-disturbing activities. Chevron Construction Representatives serve as the initial point of contact for contractors who encounter any cultural resources.	
Ground Disturbing Construction Questions	4.2.5	4.5-2	Have excavation plans been submitted, if required for all needed excavations? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Ground Disturbing Construction Questions	4.2.6	4.5-2	Have all paleontological resources discovered been managed as required? (4.5-2) If no, please explain by entering a comment. If yes please attach proof.	N/A	No paleontological discoveries have been made to date.	

Ground Disturbing Construction Questions	4.2.7	4.5-3	Have any human skeletal remains been discovered? (4.5-3)	No		
Ground Disturbing Construction Questions	4.2.8	4.5-3	If human skeletal remains have been discovered, have they been managed as required? (4.5-3) If No, please explain by entering a comment. If Yes, please attach proof.	N/A		
GHG Emissions	6.1.1	4.8-1f	Have GHG emissions from Project construction activities for a year exceeded 10,000 MT CO2e, after accounting for reductions realized from mitigation measures? (4.8-1f)	Yes	Construction-related GHG emissions for 2019 did not exceed 10,000MT CO2e. As previously reported in the 4Q2018 construction emissions report, construction-related GHG emissions did exceed 10,000 MT CO2e in 2018. In May 2019, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1f and worked with the City to finalize details and gain concurrence from the City. Project planning and implementation is underway.	
GHG Emissions	6.1.2	4.8-1f	If yes, has Chevron implemented one or more of the specified measures to reduce GHG emissions to below 10,000 MT CO2e? (4.8-1f) If no, please explain by entering a comment. If yes please attach proof.	In progress	In May 2019, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1f and worked with the City to finalize details and gain concurrence from the City. Project planning and implementation is underway. See Transmittal #41.1 attached.	Refinery Modernization Project - Transmittal #41_1 Implementation of MM 4_8-1(ii).msg
GHG Emissions	6.1.3	4.8-2	Has Chevron implemented mitigation measures 4.8-2a through 4.8-2c to reduce greenhouse gas emissions? (4.8-2) If no, please explain by entering a comment. If yes, please attach proof	Yes	In accordance with COR memo dated 8/31/2018, Chevron has implemented the Wastewater Reuse Project and provided funding in the amount of \$2MM in lieu of the FCC PDF and for the delay of the LED lighting (see attached). LED lighting is scheduled for implementation over a 10 year period.	Chevron Check No 0024121959.pdf COR Memo to file re PDF and Permasense.pdf
GHG Emissions	6.1.4	4.8-2e	Has Chevron provided its annual contribution to fund the Community Greenhouse Gas Reduction Measures? (4.8-2e) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron provided its annual contribution on June 7, 2019, check number 0024107107, for invoice 64439. The CGGRP contribution is included in the funding under ECIA.	Chevron Check No 0024107107.pdf
Contaminated Soil	10.1.1		Has Project construction generated any contaminated soil?	Yes	The project has generated contaminated soil. Identification, management, storage, and shipment of this contaminated soil is managed by the Refinery's existing Hazardous Waste Group in accordance with the applicable regulations.	
Contaminated Soil	10.2.1	4.9-2	If yes, has contaminated soil been handled and disposed of as required including covering with plastic sheeting of any soil stockpiles containing contaminants? (4.9-2) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an "Instructions to Contractors" document to contractors that specifies the requirements of MM 4.13-10a and has reviewed this requirement in the ITC meetings. The Refinery Hazardous Waste Team characterizes and manages soils according to applicable regulations.	
Contaminated Soil	10.3.1	4.13-10a	Has any contaminated soil been discovered during Project construction? (4.13-10a)	No	No contaminated soils requiring agency notifications have been discovered. See also the response to question 19.1.13.	
Contaminated Soil	10.4.1	4.13-10a	If Yes, did Chevron report the discovery to the City and other agencies? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Contaminated Soil	10.4.2	4.13-10a	Did Chevron promptly manage, contain, treat, transport, and dispose of it? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Contaminated Soil	10.4.3	4.13-10a	Did Chevron use authorized remediation contractors to manage contaminated media discovered during construction? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Nighttime Construction	12.1.1		Has Project construction included any nighttime construction activities?	Yes		
Nighttime Construction	12.2.1	4.11-1	Have nighttime construction noise mitigation requirements been implemented? (4.11-1) If no, please explain by entering a comment. If yes please attach proof.	No	Chevron is undertaking nighttime construction activities; however, those activities are not the type identified in the EIR as those which would potentially exceed noise significance thresholds. Further, Chevron has not received any noise complaints which would trigger additional mitigation obligations.	
Nighttime Construction	12.2.2		Has there been a verified complaint regarding backup alarm noise during nighttime construction activities?	No		
Nighttime Construction	12.2.3	4.11-1b	If Yes, have administrative controls or different alarms been implemented? (4.11-1b) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.1.1		Have there been any spills/releases of any hazardous substances?	No		

Spills or Releases	14.2.1	4.13-5c	If Yes, did Chevron report the release within 48 hours to the City? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.2.2	4.13-5c	Did Chevron report the release to all required agencies in accordance with applicable regulatory requirements? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Spills or Releases	14.2.3	4.13-5c	Was a prompt cleanup conducted? (4.13-5c) If no, please explain by entering a comment. If yes please attach proof.	N/A		
Third Party Compliance Audit	16.1.1	4.13-13c	Has the City or CCHS retained a third-party expert to audit compliance at the facility? (4.13-13c)	No	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.	
Third Party Compliance Audit	16.1.2	4.13-13c	If Yes, Has Chevron reimbursed the City or CCHS for these fees/expenses? (4.13-13c)	N/A		
Miscellaneous	19.1.5	4.3-1	Are all required dust control BMPs being implemented consistently? (4.3-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	All required dust control BMPs are being implemented consistently as described in the Instructions to Contractors (ITC) document attached to question 4.2.01.	
Miscellaneous	19.1.6	IM 4.3-3	Has Chevron implemented the required PM emissions reduction practices for construction activities? (IM 4.3-3) If no, please explain by entering a comment.	Yes	Chevron has implemented Improvement Measure 4.3-3 through the "Instructions to Contractors" (ITC) document. Please see attachment to 4.2.01.	
Miscellaneous	19.1.7	4.13-2a	Have hazardous materials been stored only in City-approved locations? (4.13-2a) If no, please explain by entering a comment.	Yes	Hazardous materials are stored within approved locations as identified within Figure 3-1 of the EIR. Small quantities of consumer products that might be classified as hazardous materials are also stored in OSHA regulated storage cabinets located within construction areas where the City approved construction activities are occurring. All construction activities are subject to the requirements of the City issued building permits.	
Miscellaneous	19.1.8	4.13-3a	Has hazardous waste been stored only in locations approved by the City? (4.13-3a) If no, please explain by entering a comment.	Yes	Chevron has developed a "Waste Diversion Plan/Debris Recovery Plan" (Plan) that identifies acceptable waste storage locations. The Plan was approved by the City of Richmond on May 17, 2016 and is attached to the "Instructions to Contractors" document (see 4.2.01). Acceptable waste storage locations are identified in the Plan as referenced under MM 3.13-3a. Contractors have been trained on the Plan and are responsible for complying with all of its provisions.	
Miscellaneous	19.1.9	4.13-3b	Has all hazardous waste been transported off-site to an authorized facility by a licensed transporter within 90 days after the wastes were generated? (4.13-3b) If no, please explain by entering a comment.	Yes		
Miscellaneous	19.1.10	4.13-3c	Has all non-hazardous waste been transported off-site to an authorized facility by a licensed transporter within 180 days after the wastes were generated? (4.13-3c) If no, please explain by entering a comment.	Yes		
Miscellaneous	19.1.12	4.13-7d	Has Chevron reimbursed the City for any 3rd party experts retained by the City or CCHS to review PHAs, ISSAs, or LOPAs? (4.13-7d)	Have not received invoice	CCHS personnel have performed onsite verification and have not retained a third-party expert to-date.	
Miscellaneous	19.1.13	4.13-10a	Has Chevron trained construction workers in recognizing contamination and characterizing/managing any contaminated media? (4.13-10a) If no, please explain by entering a comment. If yes please attach proof.	Yes	Refinery Instructions 505, Excavation Procedures, and 506, Hazardous Waste Management, were included in construction contracts and provide guidance on managing excavations and waste streams. Chevron has issued an "Instructions to Contractors" (ITC) document to contractors (attached to 4.2.01) that specifies the requirements of MM 4.13-10a (see section 2.0 of the ITC) and has reviewed this requirement in ITC meetings. The Refinery Hazardous Waste Team characterizes and manages any contaminated media.	
Miscellaneous	19.1.14	4.16-1, 3, 6	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for the Castro/W-180 westbound ramps? (4.16-1, 3, 6) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	Chevron has been in communication with representatives from the City of Richmond Engineering, Police and Traffic Departments. The purpose of the communication has been to discuss adequacy of traffic controls. The City has contracted with St. Francis Electrical, which has prepared signal timing modifications and other changes to ensure smooth traffic flow for the specified intersection.	

Miscellaneous	19.1.15	4.16-2, 5, 9	Has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Richmond Parkway/Gertrude Ave? (4.16-2, 5, 9) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	See response to 19.1.14.	
Miscellaneous	19.1.16	4.16-4, 8	For periods during which there is/will be both Project construction-related traffic combined with Other Project construction-related traffic, has Chevron coordinated with the City and CalTrans to implement modified traffic controls at peak PM hours per the specified methods for Castro/Hensley? (4.16-4, 8) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	As with previous major Refinery turnarounds which occurred after the start of the Modernization Project construction, Chevron is working with the City of Richmond Engineering, Police, and Traffic Departments and implementing traffic control measures to ensure smooth traffic flow during peak arrival and departure periods for the specified intersection.	
Miscellaneous	19.1.17	4.16-7	For periods during which there is/will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for Castro Street/General Chemical Access been implemented? (4.16-7) If no, please explain by entering a comment. If yes please attach proof.	Yes	See response to 19.1.16.	
Miscellaneous	19.1.18	4.16-11	For periods during which there will be Project construction-related traffic combined with Other Project construction-related traffic combined with traffic related to a major turnaround, have the traffic measures specified for County maintained intersections been implemented by Chevron in coordination with the City and County? (4.16-11) If No, please explain by entering a comment. If Yes, please enter a comment summarizing coordination.	Yes	See response to 19.1.16.	
Miscellaneous	19.1.19	4.16-1, 2a, 4, 7, 11	Has Chevron paid the full costs of modified traffic controls? (4.16-1, 2a, 4, 7, 11) If no, please explain by entering a comment. If yes please attach proof.	Yes	Chevron has paid all invoices to date for St. Francis Electrical, the City of Richmond's traffic management contractor, and is set to pay all future traffic costs.	
Miscellaneous	19.1.20	4.14-1	Has Chevron hired additional security services as necessary for the increase in personnel on-site during construction? (IM 4.14-1) If No, please explain by entering a comment.	Yes		
Miscellaneous	19.1.23	4.13-2b	Has Chevron communicated on a weekly basis to site management and City management regarding the week's construction plans and schedule? (4.13-2b) If No, please explain by entering a comment.	Yes	Refinery site management took ownership of the Modernization Project construction following commencement of Project operations. Chevron's permitting teams are in regular contact with the City's building inspection department concerning ongoing permitting and construction activities.	
Miscellaneous	19.1.29	4.9-2	Have stockpiles of soil containing contaminants been kept covered with plastic sheeting? (4.9-2) If no, please explain by entering a comment. If yes, please attach proof.	Yes	Chevron has issued an "Instructions to Contractors" (ITC) document to contractors that specifies the requirements of MM 4.9-2 (see section 2.0 of the ITC) including Best Management Practices. Please see attachment to 4.2.01. The Chevron Modernization Compliance Team verifies compliance with these requirements.	
Miscellaneous	19.1.34	4.13-13b	Has Chevron funded the costs of a qualified expert in refinery safety to be selected and retained by County or City to review ISSAs, PHAs, LOPAs and other safety documentation (until such time as funded via RISO)? (4.13-13b) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The County has selected the qualified expert. Chevron will pay invoices for this expert upon receipt. See attachment to 19.1.43.	
Miscellaneous	19.1.35	4.13-13d	Has Chevron submitted quarterly reports to City (and copies to CCHS) on the status of corrective actions taken to implement agency recommendations resulting from August 2012 fire as well as corrective actions taken by Chevron as a result of its own investigation? (4.13-13d) If no, please explain by entering a comment. If yes, please attach proof.	Yes	The nineteenth quarterly 4.13-13d report is attached.	Transmittal 1_19 MM4_13-13d Quarterly Report .msg

Miscellaneous	19.1.36	4.13-13e	Has Chevron funded the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations? (4.13-13e) If no, please explain by entering a comment. If yes, please attach proof.	No	Chevron has not been invoiced for, nor notified of, the City's coordination with CSB, CalOSHA, BAAQMD, and EPA on their investigations.	
Miscellaneous	19.1.37	4.3-2a, 2b, 4.8-1	Has Chevron submitted its most current quarterly mitigation measure compliance report demonstrating compliance with the required NOx, ROG, and GHG measures? (4.3-2a, 2b, 4.8-1) If no, please explain by entering a comment. If yes please attach proof.	Yes	See Transmittal #19.12 attached.	Modernization Project - Transmittal #19_12 Construction Emissions Report_ Fourth Quarter 2019.msg
Miscellaneous	19.1.38	4.8-1l	Has a third-party retained by Chevron quantified and verified the GHG emissions reductions achieved by the specified mitigation measures for construction activities? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	No	Chevron has worked with the City's independent environmental consultant, Ramboll, to develop a construction emissions tracking tool that takes into account quantifiable reductions. Please see the attachment to question 19.1.37 for an update concerning current construction emissions.	
Miscellaneous	19.1.39	4.8-1l	Has Chevron submitted an annual report for the most current reporting period verifying GHG emissions reductions from construction activities, reductions achieved through mitigation, and compliance with mitigation requirements? (4.8-1l) If no, please explain by entering a comment. If yes please attach proof.	Yes	Please see the attachment to question 19.1.37 for an update concerning current construction emissions.	
Miscellaneous	19.1.41	COA G2, H5	Has Chevron submitted annual compliance reports by March 31 of each year (starting after the first full year of construction) to the City regarding the status of any ongoing agency investigations resulting from the August 2012 fire, including EPA, CSB, Cal/OSHA, BAAQMD, and the County, including County safety audit(s) and safety culture audit(s), including a comprehensive list of all findings, corrective actions identified/requested by the agencies, and status of implementation by Chevron of the corrective actions? (COA G2, H5) If no, please explain by entering a comment. If yes please attach proof.	Yes	On March 29, 2019 Chevron submitted the annual compliance report for calendar year 2018 in Transmittal #25. See attached.	Annual Report and Meeting Request.msg
Miscellaneous	19.1.43	COA H5	Has Chevron submitted payment to the County to cover all County costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the County? (COA H5)	Yes	Chevron received invoice 1709 dated 10/17/19 for the amount \$61,468.46. Invoice 1709 is attached and has been paid.	CCHS Invoice No HM-Chevron-1709.pdf
Miscellaneous	19.1.44	COA H5	Has Chevron submitted payment to the BAAQMD to cover all BAAQMD costs, staff time, and third party fees and costs associated with any mitigation measure in accordance with a payment scheduled determined by the BAAQMD? (COA H5)	Have not received invoice		
Final Certifications	20.1.1		I (Enter name or names in text box to the right) certify that this response 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 those who manage the system or who gather the information, I attest on behalf of Chevron that all information provided in this response is, to the best of my knowledge and belief, true, accurate, and complete.	Laurie Mintzer for Shawn Lee		

ATTACHMENT 10
Annual Operations Emissions Summary
Operational Year 2019

Pursuant to Alternative 11 approved in the Chevron Richmond Refinery (“Refinery”) Modernization Project (“Project”) Environmental Impact Report (EIR), once the Project becomes operational, the Refinery is required to demonstrate compliance with commitments for no net increase (NNI) in emissions of criteria air pollutants (CAPs) and toxic air pollutants (TACs) compared with Refinery emissions for the 2008-2010 baseline period. Criteria air pollutants are defined as carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM₁₀), sulfur dioxide (SO₂), and volatile organic compounds (VOCs). A representative subset of TACs agreed upon by the City and the Refinery is used to assess compliance with the requirement for no net increase in emissions from TACs: benzene, diesel particulate matter (DPM), and naphthalene.

Alternative 11 also requires the Refinery to demonstrate compliance with no physical increase (NPI) in greenhouse gas (GHG) emissions. In accordance with the Project Conditional Use Permit (CUP) issued by the City, Condition B12 states in relevant part:

“Chevron shall not emit greenhouse gases from the Facility in excess of 4,602,947 metric tons (MT) per year, and shall ensure it achieves ‘no physical increase’ in greenhouse gas emissions from the Facility resulting from the Project.”

The EIR calculates emissions of criteria air pollutants and toxic air contaminants for the Facility, which is comprised of emissions from the Refinery, Shipping, and Transportation. In the case of GHG emissions, indirect emissions from electricity and water usage are also calculated.

Chevron worked with the City and City’s environmental consultant, Ramboll, to develop the Operations Emissions Tracking Tool (OETT), which is a tool that calculates emissions of CAPs and TACs from the Refinery, as well as shipping and transportation activities, and compares those emissions to the Baseline established in the EIR. CAP, TAC, and GHG emissions for Shipping activities associated with the Richmond Long Wharf are calculated in the Shipping Module of the OETT, which was developed in consultation with the Shipping subject matter expert and approved by the City.

The OETT also calculates GHG emissions from shipping and transportation activities. GHG emissions from the Refinery are estimated and reported consistent with AB-32 as part of the mandatory monitoring and reporting program for the California Air Resources Board (CARB). Refinery GHG emissions are verified by a third party and subject to review by the CARB. Total combined GHG emissions from the Refinery, shipping, and transportation are then compared to the Baseline established in the EIR.

This document summarizes Chevron’s compliance with the NNI commitment for CAP and TAC emissions and with the NPI commitment for GHG emissions for operational year 2019.

Operations Emissions Tracking Tool Methodology

The emissions reported in this document represent a direct comparison of Post-Project Emissions to the 2008-2010 Adjusted Baseline Emissions in the EIR using the same calculation methods. As described in Section 1.4.3 of the Draft EIR Appendix 4.3-OP, these calculations used a tiered approach for emissions data prioritized as follows:

- Continuous Emissions Monitoring System (CEMS) data
- BAAQMD Engineering Evaluation Emission Factors
- Updated BAAQMD Inventory Emission Factors

- Reported BAAQMD Inventory Emission Factors

All sources that were captured in the Adjusted Baseline Emissions inventory of the EIR were included in the emissions calculations reported in this document using the same calculation “tier”, except for the sources that were shut down as a result of the Modernization Project. For sources that were modified as part of the Modernization Project and had new CEMS installed, the higher tiered data source was used as that represent a more accurate picture of actual emissions. Any sources added within the Refinery boundary since 2010 that were not related to the Modernization Project were also included in this emissions report, using the appropriate calculation tier. Therefore, the emissions reported in this document are directly comparable to the EIR Adjusted Baseline Emissions and are used to evaluate compliance with the Refinery’s commitment to No Net Increase in CAP emissions, no significant increase in health impacts from TAC emissions, and No Physical Increase in GHG emissions.

The Post-Project emissions forecasted and documented in the EIR were calculated using best available information at the time. This included predicting future refinery unit utilization and assuming that CAP, TAC, and GHG emissions would scale directly with unit utilization, as well as using BAAQMD-estimated emissions for new or modified units. Post-Project actual CEMs and meter data were of course not available at the time the EIR was written. Therefore, the post-Project emissions in the EIR were projected estimates, whereas the emissions reported in this document represent calculations based on directly-measured concentrations and flow rates, consistent with the EIR methodology for calculating the Adjusted Baseline Emissions.

Thus, the post-project emissions in this document include the use of actual reported fuel gas combustion to allow for changes in fuel gas usage per unit throughput, as well as continuously measured sulfur content. In contrast, the EIR methodology for calculating Post-Project emissions assumed a constant, direct relationship between throughput and fuel gas consumption, which is less accurate than the methodology used in this report but was necessary at the time due to the analysis being a prediction of future emissions without data inputs to rely on.

By calculating emissions directly based on the data inputs listed above, this report is thus consistent with the methodology utilized in the EIR to calculate Adjusted Baseline Emissions. Thus, these emissions provide the best comparable emissions for comparison with the Adjusted Baseline Emissions in the EIR for determination of the No Net Increase and No Physical Increase commitments.

Operations Emissions Summary

The NNI requirements for CAP and TAC emissions and the NPI requirement for GHG emissions became effective when the new hydrogen plant commenced operations on April 17, 2019, with the first full day of operations on April 18. Hence, refinery operations emissions were calculated for the time period of April 17 through December 31. The calculated total emissions demonstrate that the Refinery is in compliance with the NNI commitment for CAP and TAC emissions and with the NPI commitment for GHG emissions for Operational Year 2019. Upon request, emissions calculation tools and supporting documentation are available for review at the Refinery.

For TAC emissions, the total actual change, or delta, of toxic equivalents is compared with the maximum delta of toxic equivalents of scenarios modeled in the EIR. The maximum delta of toxic equivalents is based on the highest change in emission value for each of the three TACs. Those values are the highest emissions values modeled that show no significant health risk, which has the same meaning as no net increase in health risk for

purposes of this mitigation measure. Therefore, a total actual delta of toxic equivalents results in no net increase in health risk if the total actual delta is less than the maximum delta of toxic equivalents.

As summarized in Tables 2019-CAP and 2019-TAC, Chevron complied with Modernization emissions limits for both CAPs and TACs.

Table 2019-CAP 2019 Facility Cumulative CAP Emissions (in Tons)		
Criteria Air Pollutant (CAP)	Actual Emissions^{1,2}	Baseline Emissions
Carbon Monoxide (CO) ³	236	525
Nitrogen Oxides (NOx) ³	897	1,303
Particulate Matter (PM ₁₀)	176	503
Sulfur Dioxide (SO ₂)	291	373
Volatile Organic Compounds (VOCs)	623	973
¹ Based on data from April 17 through December 31. ² This data comes from the most recent Emissions Inventory pursuant to BAAQMD Rule 12-15 and could be subject to change based on additional BAAQMD comments. ³ Actual Emissions use best available CEMS data from Rule 12-15 reporting.		

Table 2019-TAC 2019 Facility Change in TAC Emissions (in Tons)		
Toxic Air Contaminant (TAC)	Delta, Actual^{1,2}	Delta, Maximum³
Toxic Equivalents ⁴	- 4.66	+ 1.68
¹ Based on data from April 17 through December 31. ² This data comes from the most recent Emissions Inventory pursuant to BAAQMD Rule 12-15 and could be subject to change based on additional BAAQMD comments. ³ Based on the Change in Emissions values in DEIR Tables A4.3-HRA-3, A4.3-HRA-5, and A4.3-SHP-3 ⁴ Toxic Equivalents are calculated as the sum of TAC emissions for benzene, naphthalene, and diesel particulate matter, weighted by their corresponding Inhalation Cancer Potency Factor from BAAQMD Regulation 2, Rule 5.		

Table 2019-GHG shows Chevron's compliance with the Modernization NPI commitment with Baseline emissions¹.

Table 2019-GHG 2019 Facility GHG Emissions from Operations (in Metric Tons CO₂ equivalent (MT CO₂e))		
Year	Actual Emissions¹	Baseline Emissions
2019	3,475,062	4,602,947
¹ Based on data from April 17 through December 31.		

¹ Facility GHG Baseline emissions are Baseline emissions from 2008-2010 period that are adjusted to take into account rulemaking changes and equipment upgrades and changes that were scheduled to take effect prior to 2016. These adjusted emissions are referred to in the EIR as Baseline (2016) and differ from the 2008-2010 baseline period.

ATTACHMENT 11
Feedstock and Fuel Gas Monitoring Summary
Operational Year 2019

Pursuant to the Chevron Richmond Refinery (“Refinery”) Modernization Project (“Project”) Mitigation Monitoring and Reporting Program (“MMRP”), Chevron monitors its Facility feedstock and air emissions in accordance with MM 4.3-6c and MM 4.3-6d, which state, respectively, in relevant form:

“Chevron shall monitor designated metals in Facility feedstock and refinery fuel gas (RFG) and report annually on the correlation, if any, between total annual designated metal emissions (as calculated from RFG samples) and average annual concentrations of such metals in feedstocks. The annual report shall address the following metals of concern: nickel, vanadium, selenium, cadmium, and mercury. Metals are TACs, and contribute to health risks, and any net increase in metal emissions would also trigger the mitigation measure compliance requirements in Mitigation Measures 4.3-6a and 4.3-6b, above,

and

Chevron shall monitor average annual sulfur and nitrogen concentrations in Facility feedstocks, and nitrogen-related refinery fuel gas air emissions, and report annually on the correlation, if any, between total annual nitrogen-related CAP and TAC emissions (as reported in the BAAQMD annual Emissions Inventory) and average annual concentrations of sulfur and nitrogen in feedstocks. Any such increase over Baseline would require compliance with mitigation measures specified above to ensure no net increase in CAPs or risks from TACs over Baseline levels”

BACKGROUND

Extensive analysis for the EIR concluded that the Project’s increase in sulfur removal capacity to process higher sulfur feedstocks could have potential to result in processing feedstocks with lower API, thereby increasing potential for increased metals and/or nitrogen content in feedstocks associated with lower API feedstocks; thus, there could be potential for an increase in metals emissions and/or nitrogen-related emissions due to Refinery operations required to process higher sulfur feedstocks. However, with respect to nitrogen-related emissions, Section 4.3.6.2.5 of the DEIR explicitly states that, “increased emissions of nitrogen compounds, including NOx and nitrogen-related TACs, are not anticipated as part of this Project, nor is any increase in risk from a nitrogen-related TAC.” Based on agency and institution data, analysis for the EIR captured in EIR Appendix 4.3-MET showed:

- A “weak statistical relationship” between metals, specifically nickel and vanadium, and sulfur in feedstocks, and
- A “weak statistical relationship” between nitrogen and sulfur in feedstocks.

Limited data was available for cadmium and mercury.

METHODOLOGY

In accordance with MM 4.3-6c, Chevron measures and reports on metals in two different ways. First, the mitigation measure requires Chevron to monitor and review designated metals in facility feedstocks and fuel gas samples and report out on any correlation, where Facility feedstock is defined in the EIR Unit Rate Model (URM) as feedstocks to the crude unit and “gas oil gateway” process units¹. Chevron has established a program to monitor and review designated metals in facility feedstocks and RFG samples. Total TAC emissions for refinery fuel gas combustion use metals sample data and Operations Emissions Tracking Tool (OETT) throughput rates sourced from the Refinery’s annual Emissions Inventory, also referred to as BAAQMD Rule

¹ EIR Appendix 4.3-URM states that gas oil obtained from the crude unit and gas oil purchased by and shipped to the Facility is processed at one of five gas oil gateway units: the fluidized catalytic cracker feed hydrotreater (FCC FHT), the fluid catalytic cracker (FCC); the hydrocracker; and the light neutral hydrocracker (LNC) and heavy neutral hydrocracker (HNC).

12-15 Emissions Inventory (EI). Second, MM 4.3-6c requires Chevron to verify designated metals emissions specified as part of this mitigation measure have resulted in no net increase to health risk compared with Baseline levels.

Chevron complies with MM 4.3-6d in two different ways: first, by implementing a program to monitor and report annually on the correlation, if any, between total annual nitrogen-related CAP and TAC emissions and average annual concentrations of sulfur and nitrogen in feedstocks; and second, by assessing no net increase in nitrogen-related CAPs or risks from nitrogen-related TACs over Baseline levels, as measured and reported in the OETT.

Refinery CAP emissions are calculated in the Annual Operations Emissions Summary and use the calculation methodology referenced therein. See Attachment 10: Annual Operations Emissions Summary. For purposes of assessing no net increase in health risk from TAC emissions, the total actual change, or delta, of each pollutant is compared with the maximum delta of each pollutant from scenarios modeled in the EIR and included in DEIR Table A4.3-HRA-3, with the exception of vanadium². This assessment is based on the Health Risk Assessment (HRA) in the Project EIR, which evaluated potential health effects from toxic air contaminants (TACs) by operation associated with the Project. EIR Table A4.3-HRA-2 lists the Facility TAC emissions, which include the following metals associated with refinery fuel gas combustion³: nickel (Ni), vanadium (Vn), selenium (Se), cadmium (Cd), and mercury (Hg).

Assessing no net increase in health risk from TAC emissions uses a similar approach as is used for benzene, diesel particulate matter, and naphthalene in the OETT. The maximum delta is based on the highest change in emission value for each TAC. Those values are the highest emissions values modeled that show no significant health risk, which has the same meaning as no net increase in health risk for purposes of these mitigation measures. Therefore, a total actual delta results in no net increase in health risk if the actual delta is less than the maximum delta.

RESULTS

For purposes of assessing if the correlations contemplated by MM 4.3-6c and MM 4.3-6d exist, Chevron has implemented the program described above. However, given the recent start date of Project operation on April 17, 2019, there is an insufficient quantity of annual data sets available at this time to draw a correlation as part of this task. Each annual pollutant value corresponds to the annual average feedstock concentration of that pollutant and the total emissions associated with fuel gas combustion for that pollutant. In order to evaluate for a correlation, a minimum of three annual pollutant values are needed. As such, at least three years of data are necessary to begin assessing a correlation. Chevron will continue to monitor and review data as part of these mitigation measures and communicate updates to the City as sufficient datasets are available. The underlying data for the annual pollutant value is confidential business information, and, as such, is maintained at the Refinery.

² DEIR Tables A4.3-HRA-2 and 3, which detail total TAC emissions from all sources and TAC emissions from refinery operations, respectively, show that vanadium was not included in the EIR for refinery operations sources, consistent with the BAAQMD Emissions Inventory and Engineering Evaluation. All Vanadium emissions in the EIR are from shipping. In addition, vanadium was not included in the HRA, as shown in these tables. Thus any “increase” in Vanadium emissions in RFG would not result in an increase in health risks per EIR methods. The total actual vanadium emissions from fuel gas combustion were calculated and found to be below the BAAQMD 2-5 trigger level.

³ DEIR Table A4.3-OP-4 lists the RFG combustion TACs; this list contains the previously stated five metals but no nitrogen-related TACs and, therefore, only nitrogen-related CAP emissions from RFG combustion apply for MM 4.3-6d.

For purposes of determining if Chevron has met the no net increase commitments described above, Chevron has calculated respective CAP and TAC emissions required by MM 4.3-6c and MM 4.3-6d. As shown in the following tables, there has been no net increase in nitrogen-related CAP emissions and no net increase in health risk from refinery fuel gas metals and nitrogen-related TAC emissions. For CAP emissions, the total nitrogen-related emissions are below baseline levels. See Attachment 10: Annual Operations Emissions Summary. For TAC emissions, the total actual change, or delta, of each TAC pollutant is less than the maximum delta of each TAC pollutant from scenarios modeled in the EIR; therefore, mitigation was not triggered. See Table 2019-MM 4.3-6c and Table 2019-MM 4.3-6d below.

Table 2019-MM 4.3-6c 2019 Change in Metals Emissions (in lb)		
Pollutant	Delta, Actual^{1,2}	Delta, Maximum³
Nickel	- 3.3	+ 80.8
Vanadium	See Footnote 2	See Footnote 2
Selenium	- 4.3	+ 81.5
Cadmium	- 0.3	+ 9.8
Mercury	- 2.0	+ 3.9
¹ Based on data from April 17 through December 31. ² This data comes from the most recent Emissions Inventory pursuant to BAAQMD Rule 12-15 and could be subject to change based on additional BAAQMD comments. ³ Uses the Change in Emissions values from Table A4.3-HRA-2		

Table 2019-MM 4.3-6d 2019 Refinery Nitrogen-Related CAP Emissions (in Tons)		
Pollutant	Actual Emissions ¹	Baseline Emissions
Nitrogen Oxides (NOx) ²	See Attachment 10	
¹ Based on data from April 17 through December 31. ² Actual Emissions use CEMS data.		

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Mitigation Monitoring and Reporting Program, Section 4.3-8a
Annual Odor Report for Operational Year 2019

September 4, 2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Pursuant to the Chevron Richmond Refinery Modernization Project (Project) Mitigation Monitoring and Reporting Program (MMRP) mitigation measure 4.3-8a, Chevron is submitting this annual compliance report to the City of Richmond (COR). Pursuant to mitigation measure 4.3-8a:

“Chevron shall report annually to the City in writing on the number of odor complaints confirmed by the BAAQMD, and shall specify in such report, where applicable, whether each complaint relates to hydrogen sulfide, NH₃, or an unspecified compound or source.”

Per mitigation measures 4.3-8b and 8c, if in any year following commencement of Project operations there is an increase in the number of District-confirmed odor complaints above the baseline, and such odors are confirmed to have been related to ammonia and/or hydrogen sulfide, the mitigations contained therein are triggered.

As stated in EIR Volume 1, Part 4.3.4.4, “there were 62 confirmed odor complaints filed against Chevron with BAAQMD between January 1, 2008 and February 18, 2014, which is an average of 10.1 confirmed complaints per year.”

The information reported herein pertaining to odor complaints are based solely on odor complaints that have been communicated via email from the District’s Air Compliance Inspection Officer (APCO) to the Refinery’s Environmental Field Coordinators (EFCs). Per District practice, emailed odor complaints alleging the Chevron Richmond Refinery as the source of odors typically contain at a minimum the complaint number, the date and time of the odor occurrence, the general location of the odor, a general description of the odor and the confirmation status of the odor and its source as determined by the APCO.

Odor Complaint Summary

All District-confirmed odor complaints received by Chevron from the commencement of Modernization Project operations through the end of the year (April 17 – December 31, 2019), alleging the Richmond Refinery as the odor source are summarized in Table 1 below.

Table 1 – 2019 BAAQMD Confirmed Odor Complaints			
Complaint Number	Date of Occurrence	Location of Odor	Odor Description
No BAAQMD-confirmed odor complaints since commencement of Modernization Project operations			

There were zero District-confirmed odor complaints alleging the Chevron Richmond Refinery as the odor source since commencement of Modernization Project operations.

ATTACHMENT 13

Modernization Authority to Construct (ATC) (2019 Renewal)



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

January 31, 2019

Chevron Products Company
841 Chevron Way
Richmond, CA 94802

Attention: **Jeff Hartwig**

Application Number: 12842
Plant Number: 10
Equipment Location: Same as above

ALAMEDA COUNTY
John J. Bauters
Pauline Russo Cutter
Scott Haggerty
Nate Miley

CONTRA COSTA COUNTY
John Gioia
David Hudson
(Chair)
Karen Mitchoff
Mark Ross

MARIN COUNTY
Katie Rice
(Vice Chair)

NAPA COUNTY
Brad Wagenknecht

SAN FRANCISCO COUNTY
Rafael Mandelman
Hillary Ronen
Tyrone Jue
(SF Mayor's Appointee)

SAN MATEO COUNTY
David Canepa
Carole Groom
Doug Kim

SANTA CLARA COUNTY
Margaret Abe-Koga
Cindy Chavez
Liz Kniss
Rod G. Sinks
(Secretary)

SOLANO COUNTY
Pete Sanchez
James Spering

SONOMA COUNTY
Teresa Barrett
Shirlee Zane

Jack P. Broadbent
EXECUTIVE OFFICER/APCO

Dear Applicant:

SUBJECT: AUTHORITY TO CONSTRUCT RENEWAL

In accordance with Regulation 2-1-407, an Authority to Construct expires two years from the date of issuance unless the Authority to Construct has been renewed. The Authority to Construct issued to you on August 31, 2017 which expires on February 11, 2019 has been renewed until February 11, 2021 for the following equipment:

S-4454 #6 H2S Plant, Recycle Amine Regenerator, 11 MMSCFD maximum capacity

A-4450 Acid Gas Scrubber (C-2440), 11 MMSCFD Acid Gas for abatement of: #3 H2S Plant (S-4433), #4 H2S Plant (S-4434), #5 H2S Plant (S-4435), Recycle Amine Regenerator (S-4454), and the #8 NH3-H2S Plant (S-4429) and #18 NH3-H2S Plant (S-4345)

S-4456 Fresh Amine Storage Tank, 70,000 gal maximum capacity

S-3227 Lean Amine Storage Tank, 130,000 gallon maximum capacity

S-3228 Caustic Storage Tank, 200,000 gallon maximum capacity

S-3229 Spent Caustic Storage Tank, 400,000 gallon maximum capacity

S-4436 F-2170 Stack Gas Heater No. 1 SRU, 31.9 MMBtu/hr maximum firing rate HHV [Vented to P-0151 SRU Train #1 Exhaust]



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

S-4437 F-2270 Stack Gas Heater No. 2 SRU, 31.9 MMBtu/hr maximum firing rate HHV [Vented to P-0152 SRU Train #2 Exhaust]

S-4438 F-2370 Stack Gas Heater No. 3 SRU, 56.1 MMBtu/hr maximum firing rate HHV [Vented to P-0153 SRU Train #3 Exhaust]

This is your Authority to Construct for **Modification of Existing Equipment:**

S-4253 TKC/FCC Feed Hydrotreater, 96,000 BPD maximum capacity

S-4435 No. 5 H₂S Plant, 9.6 MMSCFD maximum capacity

S-4227 Sulfur Recovery Unit Train #1, 345 LTD maximum capacity abated by both A-0020 SRU#1 Tail Gas Unit Thermal Oxidizer 30.8 MMBtu/hr HHV maximum firing rate and A-120 Wet Electrostatic Precipitator (ESP)

S-4228 Sulfur Recovery Unit Train #2, 345 LTD maximum capacity abated by A-0021 SRU#2 Tail Gas Unit Thermal Oxidizer 30.8 MMBtu/hr HHV maximum firing rate and A-121 Wet Electrostatic Precipitator (ESP)

S-4229 Sulfur Recovery Unit Train #3, 570 LTD maximum capacity abated by A-0022 SRU#3 Tail Gas Unit Thermal Oxidizer 45.0 MMBtu/hr HHV maximum firing rate and A-122 Wet Electrostatic Precipitator (ESP)

The equipment described above is subject to condition no. 24136.
Existing equipment is also subject to any existing conditions.

Please include your application number with any correspondence with the District.
The District's regulations may be viewed online at www.baaqmd.gov If you have any questions on this matter, please call Bhagavan R. Krishnaswamy, **Supervising Air Quality Engineer at (415) 749-4637.**

Very truly yours,

Jack P. Broadbent
Executive Officer/APCO


by
Engineering Division

BRK
Attachment: Condition no. 24136

ATTACHMENT 14

BAAQMD Permit Condition (PC) 24136, Modernization Project



CHEVRON PRODUCTS COMPANY Plant A0010
Modernization Project Application No. 12842
841 Chevron Way
Richmond, CA 94802

FUGITIVE EQUIPMENT

1) Fugitive Equipment

Parts 1 through 4 apply to the Modernization Project Hydrogen Purity Improvements. The Hydrogen Plant fugitive equipment conditions appear in Parts 2, 3, 35, and 36.

a) The Owner/Operator shall as part of the Modernization Project install only the following types of valves in hydrocarbon service as defined in part 2: (1) bellows sealed, (2) live loaded, (3) graphitic packed, (4) quarter-turn (e.g., ball valves or plug valves), or equivalent as determined by the APCO. [Basis: Cumulative Increase, BACT, Offsets, Regulation 8-18]

b) The Owner/Operator shall comply with a leak standard of 100 ppm of TOC (measured as C1) at any valve installed as part of the Modernization Project in hydrocarbon service as defined in part 2 unless the owner/operator complies with the applicable minimization and repair provisions contained in Regulation 8-18. Valves that are not of a type listed in part 1(a) and for which a leak greater than 100 ppm (measured as C1) has been determined, shall become subject to the inspection provisions contained in Regulation 8-18 unless the component is already subject to the Part 4 inspection frequency. If the leak remains greater than 100 ppm (measured as C1) after repair, or if the valve is determined to have a leak greater than 100 ppm (measured as C1) a second time within a 5-year period, the Owner/Operator shall replace the valve with a type listed in part 1(a) within 5 years or at the next scheduled turnaround, whichever is sooner. [Basis: BACT, Regulation 8 Rule 18]

c) The Owner/Operator shall install graphitic-based gaskets on all flanges or connectors (gasketed) installed as part of the Modernization Project in hydrocarbon service as defined in part 2 unless the Owner/Operator demonstrates to the satisfaction of the APCO that the service requirements prevent this gasket material from being used. [Basis: BACT]

d) The Owner/Operator shall comply with a leak standard of 100 ppm of TOC (measured as C1) at any flanges/connectors installed as part of the Modernization Project in hydrocarbon service as defined in part 2 unless the owner/operator complies with the applicable minimization and repair provisions contained in Regulation 8-18. [Basis: BACT, Regulation 8 Rule 18]

e) The Owner/Operator shall install dual mechanical seals w/ non-VOC barrier fluid (gas or liquid); or seal system with leakage vented to a thermal oxidizer; or oil ring seals



with non-VOC/barrier fluid; or other District approved equivalent control device or technology as determined by the APCO on all compressors installed as part of the Modernization Project. [Basis: BACT]

f) The Owner/Operator shall comply with a leak standard of 100 ppm of TOC (measured as C1) at any pumps and/or compressors installed as part of the Modernization Project in hydrocarbon service as defined in part 2 unless the owner/operator complies with the applicable minimization and repair provisions contained in Regulation 8-18. [Basis: BACT]

g) The Owner/Operator shall install double mechanical seals w/ barrier fluid; magnetically coupled pumps; canned pumps; magnetic fluid sealing technology; seal system with leakage vented to thermal oxidizer, or other BAAQMD approved equivalent control device; or District approved control technology as determined by the APCO on all pumps installed as part of the Modernization Project in hydrocarbon service as defined in part 2. The Owner/Operator shall install mechanical seals or District approved equivalent technology on all pumps in hydrocarbon service.

All pumps installed as part of the Modernization Project in hydrocarbon service where either the hydrocarbon has an initial boiling point greater than 302 degrees Fahrenheit or a flash point greater than 250 degrees Fahrenheit, shall be subject to quarterly inspection provisions contained in Part 4.c). If any of these pumps is determined to have a leak greater than 100 ppm (measured as C1) and if the leak remains greater than 100 ppm (measured as C1) after repair, or if the pump is determined to have a leak greater than 100 ppm (measured as C1) a second time within a 5-year period, then the owner/operator shall install double mechanical seals w/ barrier fluid; magnetically coupled pumps; canned pumps; magnetic fluid sealing technology; or gas seal system vented to thermal oxidizer or other BAAQMD approved equivalent control device or technology as determined by the APCO within 5 years or at the next scheduled turnaround, whichever is sooner. [Basis: BACT]

h) The Owner/Operator shall vent all pressure relief valves installed as part of the Modernization Project in hydrocarbon service as defined in part 2 subject to Rule 8-28 to a flare gas recovery system with a recovery and/or destruction efficiency of at least 98% by weight. [Basis: BACT]

i) Unless the equipment exclusively handles material(s) with a flash point greater than 250F, the Owner/Operator shall identify all new and replacement valves, pressure relief devices, flanges, connectors, process drains, pumps, and compressors installed as part of the Modernization Project in hydrocarbon service as defined in part 2 with a unique permanent identification code and shall include all new and replaced fugitive equipment in the fugitive equipment monitoring and repair program as specified in Parts 1 through 4. The owner/operator shall monitor all repaired equipment within 24 hours of the repair. The unique permanent identification code does not apply to quarter-inch or



less tubing and connectors associated with analytical sampling systems. [Basis: Cumulative Increase, Offsets, BACT]

2) The Owner/Operator shall submit a count of pumps, compressors, valves, pressure relief devices, flanges/connectors, and process drains installed in hydrocarbon service. For the purpose of this condition, hydrocarbon service is defined as all organic compound materials with a flash point less than or equal to 250F or an Initial Boiling Point less than or equal to 302F. The intent of this condition is to extend the monitoring beyond that contained in Rule 8-18 up to the flash point of 250F. The owner/operator shall submit the component count within 30 days of the close of each calendar quarter until completion of project construction. The Owner/Operator has been permitted to install the following number of these hydrocarbon service fugitive components for the Modernization Project, including the Hydrogen Plant Replacement.

Pumps: 43 [As identified in part 1(i)]

Compressors: 46

Valves: 8,932

Pressure Relief Devices: 240

Connectors (No Flanges): 4,718

Flanges: 12,465

Process Drains: 207

The Owner/Operator shall not exceed 15.92 tons per year of POC emissions measured as C1 from all fugitive components included in the above counts, including Hydrogen Plant Replacement fugitive components. Compliance with this provision shall be verified quarterly using methods described in part 3. The results shall be submitted to the District within 30 days of the close of each calendar quarter after commencing with start-up of the first Modernization Project source. The owner/operator shall keep documentation of fugitive component counts and corresponding POC emissions for at least five years from date of entry.

Within 30 days of the completion of the installation of all fugitive components, the owner/operator shall submit a final component count and POC emissions estimate to the District. If any of the fugitive component counts exceed a count stated above, the plant's cumulative increase emissions for the Modernization Project shall be adjusted as needed, subject to APCO approval, to reflect only the difference between emissions based on predicted component counts versus actual component counts. The Owner/Operator shall provide to the District all additional required offsets at an offset ratio of 1.15:1 no later than 21 days after the submittal of the final POC fugitive equipment count and corresponding final fugitive component POC emissions estimate. If any of the fugitive component counts are less than a count stated above, the total cumulative increase emissions may be adjusted accordingly and emission offsets applied by the owner/operator in excess of the permitted levels may be requested by the owner/operator through the submittal of a banking application. [Basis: Cumulative Increase, Offsets, Rule 2-5]



3) The Owner/Operator shall calculate fugitive emissions from all Modernization Project fugitive components in hydrocarbon service (including the Hydrogen Plant Replacement) utilizing District approved methods. For leaking components the owner/operator shall use the modified trapezoidal method and LeakDAS as documented within the application 12842 or other method pre-approved by the District. The owner/operator shall include emissions estimates from all Modernization Project fugitive components regardless of the component Rule 8-18 repair status. [Basis: Cumulative Increase, BACT, Offsets]

4) a) The Owner/Operator shall conduct inspections of Modernization Project fugitive components in hydrocarbon service as defined in Part 2 of these conditions in accordance with the frequency below:

Pumps: Quarterly

Compressors: Quarterly

Valves: Quarterly

Pressure Relief Devices: Quarterly

Process drains: Quarterly

Connectors (Not Flanges): Biannual

Flanges: Biannual

[Basis: BACT, Regulations 8-18, 8-8]

b) The Owner/Operator shall conduct quarterly inspections of all Modernization Project pumps in hydrocarbon service with a flash point less than or equal to 250F. [Basis: BACT]

c) The Owner/Operator shall conduct quarterly inspections of all Modernization Project pumps in hydrocarbon service where either the hydrocarbon has an initial boiling point greater than 302 degrees Fahrenheit or a flash point greater than 250 degrees Fahrenheit. [Basis: BACT]

HYDROGEN PLANT REPLACEMENT

5) The Owner/Operator of Hydrogen Plant Trains (S-4449, S-4450) shall not exceed the following maximum capacity limit: [Basis: Cumulative Increase, Condition B.7 in City of Richmond Conditional Use Permit Resolution Number 67-14 dated July 29, 2014]

140 MMSCF of hydrogen for each train, calendar day maximum

244 MMSCF of hydrogen per calendar day for both trains combined on an annual average basis



6) The Owner/Operator of the Hydrogen Recovery Unit (S-4451) shall not exceed the following maximum capacity limitations: [Basis: Cumulative Increase]

50 MMSCF of hydrogen, calendar day maximum

7) The Owner/Operator shall fire only natural gas (including medium BTU natural gas), or Hydrogen Plant offgas ("PSA tail gas"), in the Hydrogen Plant Reformer Furnaces (S-4471, S-4472). The owner/operator of S-4471 and S-4472 shall not exceed a maximum of 30% natural gas of the total annual fuel usage (Btu basis) with the balance being PSA tail gas. [Basis: BACT]

8) The Owner/Operator shall abate the S-4471 furnace at all times of operation except startup, shutdown, dryout/warmup, and commissioning periods by the properly operated and properly maintained SCR unit A-0302. The Owner/Operator shall abate the S-4472 furnace at all times of operation except startup, shutdown, dryout/warmup, and commissioning periods by the properly operated and properly maintained SCR unit A-0303. [Basis: BACT]

9) a) The Owner/Operator shall not exceed the following combined annual limits from the hydrogen plant reformer furnaces (S-4471, S-4472) and hydrogen plant flare (S-6021) in any consecutive 12 month period: [Basis: Cumulative Increase, 2-2-302, 2-2-303]

Pollutant	Annual (tons)
NOx	64.43
CO	92.28
SO2	5.25
PM10	20.98
POC	28.6

The Owner/Operator shall not exceed the following combined annual limits from the hydrogen plant reformer furnaces (S-4471, S-4472) and hydrogen plant flare (S-6021) in any consecutive 12 month period when utilizing supplemental natural gas for the hydrogen plant flare: [Basis: Cumulative Increase]

Pollutant	Annual (tons)
NOx	67.81
CO	110.69
SO2	5.39
PM10	21.35
POC	35.57

b) The Owner/Operator shall not exceed the following combined annual emissions limits from the hydrogen plant reformer furnaces (S-4471, S-4472) in any consecutive 12 month period: [Basis: Cumulative Increase, 2-2-302, 2-2-303]



Pollutant	Annual (tons)
NOx	53.28
CO	64.88
SO ₂	4.94
PM ₁₀	20.68
POC	23.22

c) The Owner/Operator shall determine the daily and monthly emissions used to establish rolling annual emissions totals from S-4471 and S-4472 using continuous emission monitor (CEM) data for NOx and CO, and using District approved emission factors shown in part 14 and District-approved fuel consumption data from each S-4471 and S-4472 for PM₁₀ and POC. The owner/operator shall determine daily (with monthly totals) SO₂ emissions from the sum of the total sulfur in the natural gas (including medium BTU natural gas) fuel stream and the total sulfur in the feed gas stream ("PSA tail gas"), assuming 100% conversion of total sulfur to SO₂. SO₂ emissions shall be calculated using a method approved by the APCO. The sulfur in the natural gas fuel stream shall be calculated as the concentration of sulfur in the incoming natural gas supply, as measured daily by an on-stream analyzer, multiplied by the measured flow of natural gas used as fuel. The sulfur in the feed gas stream shall be calculated as the measured total feed gas processed in the desulphurization unit multiplied by the actual total sulfur content either as measured downstream of the desulphurization unit by the continuous on-stream analyzer or that analyzer's lower detection limit, whichever is greater.

The owner/operator of the hydrogen plant flare (S-6021) shall use the emissions factors presented in part 27 in order to demonstrate compliance with the part 9a annual limits.

[Basis: Monitoring, cumulative increase, offsets]

10) For each furnace (S-4471, S-4472), the Owner/Operator shall install, calibrate, maintain, and operate a District-approved CEM and recorder for NOx, CO and O₂.
[Basis: Regulation 1-523]

11) The Owner/Operator of S-4471 and S-4472 shall properly install and operate District-approved equipment for continuous fuel flow monitoring and recording in order to determine fuel consumption, at each S-4471 and/or S-4472 using District approved methods. The Btu content of the fuels used at S-4471 and S-4472 shall be calculated or measured hourly at a minimum using a District-approved method. The gas composition analysis and sulfur content of the fuels used at S-4471 and/or S-4472 shall be measured and recorded hourly at a minimum using a District-approved method. Combustion stack flow shall be calculated using a District-approved method from either the fuel flow, gas composition, and combustion stack CEM excess oxygen monitor information, or a flow meter. [Basis: Monitoring, Cumulative Increase]



12) The Owner/Operator shall not exceed the following maximum heat input limits for each furnace (S-4471, S-4472): (1) 8,059,200 MMBTUs (HHV) in any consecutive 12 month period, and (2) 950 MMBTUs (HHV)/hr averaged over any calendar day. [Basis: Cumulative Increase, Offsets]

13)

a) The "Commissioning Period" is a one-time occurrence for each furnace, that shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed for that furnace. The Commissioning Period for each furnace shall terminate when the furnace has completed performance testing and is available for operation. In no event shall the Commissioning Period for either furnace exceed 90 days unless the applicant has made a written request for an extension and the District has granted such an extension. The commencement of the Commissioning Period shall be considered the date of initial operation for the Authority to Construct. The final startup conducted at the end of the Commissioning Period shall be considered the initial startup.

b) "Commissioning Activities" shall be defined as all testing, adjustment, tuning, and calibration activities during the Commissioning Period, recommended by the equipment manufacturers and the construction contractor, to insure safe and reliable steady state operation of the hydrogen plant reformer furnace and associated systems. [Basis: cumulative increase, offsets]

i) The Owner/Operator of S-4471 and S-4472 shall submit a District-approved commissioning plan that includes all commissioning activities and corresponding commissioning emissions estimates and monitoring within 60 days prior to any commissioning activities. [Basis: Cumulative Increase]

c) The following conditions shall apply during the Commissioning Period and Commissioning Activities:

i. During the Commissioning Period, the Owner/Operator shall demonstrate compliance with parts ii through iii below through the use of properly operated and properly maintained continuous emission monitors and data recorders for the following parameters:

- firing hours;
- fuel flow rates (calculated exhaust flow rate or measured exhaust flow rate);
- stack gas nitrogen oxide emission concentrations;
- stack gas carbon monoxide emission concentrations; and
- stack gas oxygen concentrations.

ii. The Owner/Operator shall not exceed 600 hours for both furnaces during the Commissioning Period of S-4471 and S-4472 hydrogen plant reformer furnaces without abatement by A-302 and A-303 SCR Systems, respectively. Such operation of the S-4471 and S-4472 hydrogen plant reformer furnaces without abatement shall be limited



to discrete Commissioning Activities that can only be properly executed without the SCR system in operation. Upon completion of these activities for each furnace, the owner/operator shall provide written notice to the District and the unused balance of the 600 firing hours without abatement shall expire. The Owner/Operator shall maintain records of all furnace firing hours without the SCR systems in place and operational. (Basis: offsets, Cumulative Increase)

iii. The total mass emissions of NO_x, CO, POC, PM₁₀, and SO₂ that are emitted by the S-4471 and S-4472 hydrogen plant reformer furnaces during the commissioning period shall be included towards the consecutive twelve-month emission limitations specified in part 9. (Basis: offsets)

d) "Startup" shall mean that period of time including Furnace Startup as defined in part 13e and the introduction of hydrocarbon feedstock to the Hydrogen Plant S-4449 and S-4450, ending with the full routing of the PSA tail gas to either of the respective furnaces. The period of time from the introduction of hydrocarbon feedstock to S-4449 and S-4450 to the end of startup shall not exceed 8 hours. Each individual "Startup", which includes Furnace Startup, shall not exceed 24 hours except during the "Commissioning Period". For S-4449, "Startup" is completed once PV-17004 PSA1 Tail Gas to Flare Control Valve, has been closed for 30 minutes. For S-4450, "Startup" is completed once PV-27004 PSA2 Tail Gas to Flare Control Valve, has been closed for 30 minutes. If "Startup" shall be interrupted before completion, the resumed startup activities shall constitute a second "Startup" with its own time limitations.

e) "Furnace Startup" shall mean that period of time during which the furnace is put into service immediately following "Commissioning Period" as defined in part 13a, or any subsequent shutdown, by following a prescribed series of separate steps or operations. "Furnace Startup" shall be initiated when the furnace begins to receive fuel flow from its inactive, pre-startup temperature up to the point where the respective SCR unit is placed in operation in accordance with part 16. If "Furnace Startup" shall be interrupted before completion, the resumed furnace startup activities shall constitute a second "Furnace Startup" with its own time limitations.

i) The Owner/Operator of Furnaces S-4471 and S-4472 shall not exceed a combined total of 132 consecutive hours during any consecutive 12-month period for "Furnace Startup". The owner/operator of each individual "Furnace Startup" shall not exceed 20 hours for each hydrogen plant reformer furnace (S-4471 and S-4472) except during the "Commissioning Period".

f) "Shutdown" shall mean that period of time during which the furnace is taken out of service following a prescribed series of separate steps or operations including clearing the reformer system piping of combustibles. "Shutdown" for each furnace S-4471 and S-4472 is initiated once ammonia injection into the respective SCR units (A-0302, A-0303) has been stopped in accordance with part 16. The end of shutdown is reached when the fuel supply to the reformer has been shut off and reformer system piping has been cleared of combustibles.



g) Except during the commissioning period, the Owner/Operator of S-4471 and S-4472 shall not exceed the following operation limitations for either furnace:

(1) Each "Shutdown" shall not exceed 9 consecutive hours.

h) The owner/operator shall not exceed 600 hours of total combined hours of Startup and Shutdown in any consecutive 12-month period. To demonstrate compliance with this part, the owner/operator shall maintain a District-approved log of the total time in hours and minutes of each Startup and Shutdown as defined in parts (d), (e), (f), and (g) above. The log shall be retained for five years of date of entry and shall be made available to District staff upon request.

i) "Dryout/warmup" shall mean an event that occurs during the Commissioning Period and whenever new hydrogen plant reformer furnace refractory has been installed. When this new refractory is heated for the first time, the hydrogen plant reformer furnace is brought gradually to operating temperature through a series of prescribed steps designed to ensure safe operation of the furnace.

j) Except during the commissioning period, the Owner/Operator of S-4471 and S-4472 shall not exceed the following operation limitation for either furnace:

(1) Each "Dryout/Warmup" of new furnace refractory heating shall not exceed 120 hours.

14) The Owner/Operator of S-4471 and S-4472 shall not exceed the following emission limits at each furnace except during startup, shutdown, dryout/warmup, and commissioning periods, unless specifically noted below:

a) NO_x emissions – 5.0 ppmv, dry, corrected to 3% oxygen, averaged over any 1 hour period. Note: This NO_x emissions limit applies at times of operation of A-302 and A-303 as required in Part 16 of these conditions, when the catalyst bed is equal to or greater than 562 degrees F.;
[Basis: BACT]

b) CO emissions – 10.0 ppmv, dry, corrected to 3% oxygen averaged over any 1 hour period; [Basis: BACT]

c) PM₁₀ emissions – 0.0026 lb/MMBtu (HHV), averaged over 3 hours; [Basis: BACT] and

d) POC emissions – 0.00288 lb/MMBtu (HHV), averaged over 3 hours.

e) SO₂ emissions – See part 9c.



[Basis: BACT, cumulative increase]

15) The Owner/Operator of S-4471 and S-4472 shall demonstrate compliance with part 14 using a District-approved CEM for NO_x and CO, and using District-approved fuel consumption and emission factors verified through District-approved source tests as specified in parts 17 and 18 for PM₁₀ and POC. The owner/operator of S-4471 and S-4472 shall determine the SO₂ emissions as specified in condition part 9c. [Basis: BACT]

16) The Owner/Operator of A-0302 and A-0303 shall operate A-302 and/or A-303 at all times of operation of S-4471 and/or S-4472, respectively, when the catalyst bed is equal to or greater than 500 degrees Fahrenheit except for during dryout/warmup. The Owner/Operator of A-0302 and A-0303 shall not exceed the following ammonia emission limits except during periods of startup, shutdown, dryout/warmup, and Commissioning unless otherwise specified: 10 ppmv of ammonia, dry, corrected to 3% oxygen, as verified by District approved source test method, not to exceed three hours averaging time. The owner/operator shall maintain the catalyst bed above 500 degrees at all times of operation of S-4471 and S-4472, except during startup, shutdown, or dryout/warmup of S-4471 or S-4472 as specified in part 13. [Basis: Toxics, BACT]

a) The Owner/Operator shall not inject ammonia into the SCR units (A0302, A-0303) until the catalyst bed reaches 500 degrees Fahrenheit. During startup, the owner/operator shall start injecting ammonia as soon as practicable, but under no circumstances later than the lesser of either: 30 minutes from when the catalyst bed reaches 500 degrees Fahrenheit or the catalyst bed reaching a temperature of 562 degrees F. During shutdown, the owner/operator shall stop injecting ammonia when the catalyst bed reaches 500 degrees Fahrenheit. The Owner/Operator shall properly install and operate a control valve that automatically shuts off the ammonia injection when the catalyst bed reaches 500 degrees Fahrenheit during shutdown. The Owner/Operator shall maintain records that demonstrate the temperature during all times of operation of S-4471 and/or S-4472 and the times that the ammonia injection to the SCR unit(s) (A-302/303) begins and ends.

17) The Owner/Operator of S-4471 and S-4472 shall conduct a District-approved source test within 120 days of the initial startup date of each plant to demonstrate compliance with the limits in parts 9, 14 and 16 for POC, PM₁₀, SO₂, and ammonia slip. The Owner/Operator shall conduct the District-approved source tests in accordance with parts 18, and with the applicable parts of 109 through 117. The Owner/Operator shall submit the District approved source test results to the District no later than 60 days from the date of the source test. [Basis: BACT, Cumulative Increase, Offsets]

18) The Owner/Operator of S-4471 and S-4472 shall follow either (a) or (b) below to demonstrate subsequent compliance with the POC, PM₁₀, and SO₂ mass emission rates specified in parts 9 and 14 and the ammonia slip limit in part 16:



a) The Owner/Operator shall install, calibrate, and maintain a District approved continuous emission monitor and recorder for ammonia slip to demonstrate subsequent compliance with the ammonia slip limit in part 16. The Owner/Operator shall conduct one reference test or use the test from part 17 to demonstrate accuracy of the continuous emission monitor. After the initial source test, the Owner/Operator shall conduct three quarterly District approved source tests, followed by two semi-annual District approved source tests to demonstrate subsequent compliance with the POC, and PM10 mass emission rates specified in parts 9 and 14 and the ammonia slip limit in part 16. After the additional source tests specified in this part 18.a. have been completed, the Owner/Operator shall conduct a district approved source test in each subsequent calendar year to demonstrate compliance with the POC and PM10 mass emission rates specified in parts 9 and 14. Each subsequent calendar year source test shall be at least nine months apart, but not more than 15 months apart. The Owner/Operator may conduct less frequent source tests upon approval by the District. The owner/operator may be required by the APCO to conduct more frequent source tests if source test results indicate POC, SO₂, and/or PM10 emissions are either within 90% of a limit or exceeding a limit specified in parts 9 and/or 14. The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 through 117. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the date of the source test; or

b) After the initial source test specified in part 17 has been completed, the Owner/Operator of S-4471 and S-4472 shall conduct three quarterly District approved source tests, followed by two semi-annual District approved source tests to demonstrate subsequent compliance with the POC, and PM10 mass emission rates specified in part 14 and the ammonia slip limit in part 16. After the additional source tests specified in this part 18.b. have been completed, the Owner/Operator shall conduct a source test in each subsequent calendar year. Each subsequent calendar year source test shall be at least nine months apart. The Owner/Operator may conduct less frequent source tests upon approval by the District. The owner/operator may be required by the APCO to conduct more frequent source tests if source test results indicate POC, PM10, SO₂, and/or ammonia slip emissions are within 90% of an emissions limit or exceeding an emissions limit specified in parts 9, 14 and/or 16. The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 through 117. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the date of the source test. [Basis: Periodic Monitoring, cumulative increase]

19) The Owner/Operator of S-4471 and S-4472 shall not exceed the following emission limits: [Basis: Rule 2-5]

S-4471 Train 1 Hydrogen Furnace

Arsenic

6.90 lb/yr



Cadmium	4.91 lb/yr
Nickel	40.74 lb/yr

S-4472 Train 2 Hydrogen Furnace

Arsenic	6.90 lb/yr
Cadmium	4.91 lb/yr
Nickel	40.74 lb/yr

If source test results indicate that other toxic air contaminants not identified above are emitted at rates greater than evaluated prior to the issuance of the Authority to Construct, then the owner/operator shall re-run the HRSa to determine compliance with Regulation 2, Rule 5 and potentially add these compounds to the lists above.

20) The Owner/Operator of S-4471 and S-4472 shall conduct District approved source tests in accordance with part 109 through 117 to demonstrate compliance with the limits in part 19. The Owner/Operator may conduct less frequent source tests upon approval by the District. The owner/operator may be required by the APCO to conduct more frequent source tests if source test results indicate emissions are either within 90% of any part 19 emissions limit or exceeds any part 19 emissions limit. The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 through 117. [Basis: Rule 2-5, Source Tests]

Hydrogen Plant Cooling Water Tower (S-4465)

21) The Owner/Operator of S-4465 shall not exceed 51,840,000 gallons per calendar day of cooling water tower recirculation rate through the process equipment system. The owner/operator shall maintain a District-approved daily log of the total throughput (including cooling water tower recirculation rate) at S-4465. This log shall be kept on site for at least 5 years from the date of entry and be made available to District staff upon request.

[Basis: Cumulative Increase, Offsets]

22) The Owner/Operator of S-4465 shall conduct a District approved flow determination within 60 days of initial startup to demonstrate compliance with part 21 using the cooling tower water pump curves or other method approved by the APCO.

[Basis: Cumulative Increase, Offsets]

23) The Owner/Operator of S-4465 shall not exceed 5000 milligrams per liter total dissolved solids in the cooling tower. The Owner/Operator shall sample the cooling tower water on a monthly basis to determine total dissolved solids (TDS) content. The owner/operator shall calculate TDS from the result of a conductivity measurement in units of micromhos per centimeter ($\mu\text{mhos/cm}$) multiplied by 0.62 or other District-approved method. The PM₁₀ emissions from the cooling tower drift shall not exceed 10.8 pounds per day or 1.97 tons per year, based on a 51,840,000 gallons per day



recirculation rate, 5000 milligrams per liter of TDS, and a drift factor of 0.0005 percent. [Basis: Cumulative Increase, Offsets]

24) The Owner/Operator shall not emit VOC from S-4465, except as allowed in part 25.

[Basis: Cumulative Increase, Offsets]

25) The Owner/Operator of S-4465 shall inspect the riser chamber in the cooling water return line to the cooling tower on a daily basis for a hydrocarbon leak using a District-approved method. If a leak is detected, the owner/operator shall both identify and repair the leak within 15 days. As part of the Modernization Project, POC emission reduction credits (ERCs) were provided to the District to cover 15 days (360 hours) of hydrocarbon leakage over any consecutive 12-month period. The Owner/Operator of S-4465 shall not exceed a POC emissions limit of either 36.0 lb/day or 0.27 tons/year. Should any leak occur for more than 360 hours in any consecutive 12-month period, the owner/operator shall submit to the District a permit application for a change of condition containing both an emissions estimate to be approved by the APCO and POC emission reduction credits (ERCs) to offset emissions from the leak of any hydrocarbon leakage in excess of 360 hours over any consecutive 12-month period at a ratio specified in Regulation 2, Rule 2. ERCs will be calculated as part of the permit application process. [Basis: Cumulative Increase, BACT, Offsets]

Hydrogen Plant Flare (S-6021/A-6021)

26) The Owner/Operator of the hydrogen plant flare S-6021 shall design S-6021 to maintain a hydrocarbon and carbon monoxide destruction efficiency of at least 98%, on a mass basis when the gases vented to the flare have a minimum lower heating value (LHV) greater than or equal to 300 BTU/scf, or at least 93%, on a mass basis when the gases vented to the flare have a minimum LHV below 300 BTU/scf. [Basis: Rule 12-11-401.9]

27) The Owner/Operator shall calculate S-6021 flare emissions for compliance with part 9a annual limits by using the following emission factors (including flare pilot and vented gas emissions):

a) NO_x emissions - 0.068 lb/MMBtu for each combustible to be flared

b) CO emissions - 0.37 lb/MMBtu for flaring of natural gas, RPG, and methane. CO emissions for flaring will be calculated as 2.0% of CO concentration multiplied by the flow rate when fuel has lower heating value (LHV) greater than or equal to 300 BTU/scf and 7.0% of CO concentration multiplied by the flow rate when fuel has lower heating value less than 300 BTU/scf, unless both of the following parameters are satisfied:

i) The owner/operator may assume 98% destruction efficiency during flaring events when the LHV is less than 300 BTU/scf provided that the flare tip velocity does not



exceed 122 feet/second. The owner/operator shall continuously monitor and record the flare tip velocity during all events, and

ii) The hydrogen content of the vent gas to the flare shall be maintained at a minimum of 15.5% by volume on a wet basis. The hydrogen content of the vent gas to the flared shall be continuously monitored and recorded during all events.

If both of the above parameters are satisfied, then 2.0% of CO shall be used in the flare emissions estimate for purposes of BACT, not for Rule 12-11 purposes. If either of the above parameters is not satisfied or if information is not available, then 7.0% of the CO shall be used in the flare emissions estimate. [Basis: BACT]

c) POC emissions – 0.14 lb/MMBtu for flaring of natural gas, RPG and methane. POC emissions for flaring will be calculated as 2.0% of POC concentration multiplied by the flow rate when fuel has lower heating value (LHV) greater than or equal to 300 BTU/scf and 7.0% of POC concentration multiplied by the flow rate when fuel has lower heating value less than 300 BTU/scf, unless both of the following parameters are satisfied:

i) The owner/operator may assume 98% destruction efficiency during flaring events when the LHV is less than 300 BTU/scf provided that the flare tip velocity does not exceed 122 feet/second. The owner/operator shall continuously monitor and record the flare tip velocity during all events, and

ii) The hydrogen content of the vent gas to the flare shall be maintained at a minimum of 15.5% by volume on a wet basis. The hydrogen content of the vent gas to the flared shall be continuously monitored and recorded during all events.

If both of the above parameters are satisfied, then 2.0% of POC shall be used in the flare emissions estimate for purposes of BACT, not for Rule 12-11 purposes. If either of the above parameters is not satisfied or if information is not available, then 7.0% of the POC shall be used in the flare emissions estimate. [Basis: BACT]

d) PM10 emissions - 0.00745 lb/MMBtu for flaring of natural gas, RPG, CO and methane.

e) SO2 emissions - Calculated from both the fuel usage and total sulfur in the fuel to the flare pilot (burner) and the flow rate and total sulfur content of the vent gas to be flared assuming 100% conversion of total sulfur to SO2.

[Basis: Cumulative Increase]

28) The owner/operator shall fire S-6021 flare pilots continuously with only natural gas. When flaring gas containing refinery process gas (RPG) and/or refinery fuel gas (RFG), the owner/operator of S-6021 flare shall only operate the flare during periods of planned startup, planned shutdown, emergency upset and breakdown. A planned shutdown may include small amounts of RPG and/or RFG from piping system



maintenance activities provided that those activities are conducted in accordance with an APCO-approved Regulation 12, Rule 12 Flare Minimization Plan (FMP). For purposes of this part, an emergency is a situation that is beyond the reasonable control of the owner/operator that is caused by a sudden, infrequent and not reasonably preventable equipment failure, natural disaster, act of war or terrorism or external power curtailment, excluding power curtailment due to an interruptible power service agreement from a utility. For the purposes of this part, a breakdown is considered any unforeseeable failure or malfunction where such failure or malfunction is not the result of intent, neglect, or disregard to this part, or improper maintenance and is not excessively recurrent. In the absence of any other indicators, the owner/operator shall conduct an investigation to determine if RPG or RFG has been flared when SO₂ emissions from S-6021 exceed two pounds per day. When flaring gas containing no RPG or RFG, the owner/operator of S-6021 flare shall only operate the flare in accordance with the District-approved FMP for the Chevron Richmond Refinery. The owner/operator of S-6021 shall not exceed the maximum design capacity of 217,000 lb/hour of vent gas to the flare as defined in Regulation 12-11-210. The owner/operator of S-6021 shall use steam assist at S-6021 during all times that vent gas is being sent to S-6021.

[Basis: BACT]

29) For the purposes of these conditions, a flaring event is defined as a flow rate of vent gas flared in any consecutive 15-minute period that continuously exceeds 330 standard cubic feet per minute (scfm). If during a flaring event, the vent gas flow rate drops below 330 scfm and then increases above 330 scfm within 30 minutes, that shall still be considered a single flaring event, rather than two separate events. For each flaring event during daylight hours (between sunrise and sunset), the Owner/Operator shall inspect the flare within 15 minutes of determining the flaring event, and within 30 minutes of the last inspection thereafter, using District-approved video monitoring or District-approved visible inspection following the procedure described in part 30b.

[Basis: Regulation 12-12]

30) The Owner/Operator shall use the following procedure for the initial inspection and each subsequent 30-minute inspection of a flaring event.

a) If the Owner/Operator can determine that there are no visible emissions using District-approved video monitoring, then no further monitoring is necessary for that particular inspection.

b) If the Owner/Operator cannot determine that there are no visible emissions using video monitoring, the Owner/Operator shall conduct a visual inspection outdoors using either:

i) EPA Reference Method 9, or



ii) Survey the flare by selecting a position that enables a clear view of the flare at least 15 feet, but not more than 0.25 miles, from the emission source, where the sun is not directly in the observer's eyes.

c) If a visible emission is observed, the Owner/Operator shall continue to monitor the flare for at least 3 minutes, or until there are no visible emissions, whichever is shorter.

d) The Owner/Operator shall repeat the inspection procedure for the duration of the flaring event, or until a violation is documented in accordance with part 31. After a violation is documented, no further inspections are required until the beginning of a new calendar day.

[Basis: Regulation 6-1-301, 2-1-403]

31) The Owner/Operator of S-6021 shall comply with one of the following requirements if visual inspection is used:

a) If EPA Method 9 is used, the Owner/Operator shall comply with Regulation 6-1-301 when operating the flare.

b) If the procedure of part 30.b.ii is used, the Owner/Operator shall not operate a flare that has visible emissions for three consecutive minutes.

[Basis: Regulation 2-6-403]

32) The Owner/Operator of S-6021 shall maintain records of all flaring events, as defined in part 29 for a period of five years from the date of entry. These records shall be kept onsite and made available to District staff upon request. The Owner/Operator shall include in the records the name of the person performing the visible emissions check, whether video inspection or visual monitoring (EPA Method 9 or visual inspection procedure of part 30) was used, the results of each inspection, and whether any violation of this condition (using visual inspection procedure in part 30) or Regulation 6-1-301 (using EPA method 9) occurred. [Basis: Regulation 2-6-501; 2-6-409.2]

33) The owner/operator of S-6021 shall comply with the monitoring, recordkeeping and reporting requirements for the flare as outlined in Regulation 12-11. The owner/operator of S-6021 shall properly install, maintain, and operate a District-approved total sulfur monitor in the flare gas. In order to demonstrate compliance with Parts 9a, 27, 28, the owner/operator shall maintain records of the lower heating value (BTU/scf) of the vented gas for each flaring event and if the flare vent gas contained any RPG or RFG. The owner/operator of S-6021 shall properly install and operate the pilot and purge monitoring as required in Sections 12-11-503 and 12-11-504. [Basis: Regulation 12-11]

34) The Owner/Operator of S-6021 shall operate the flare in accordance with the District-approved Flare Minimization Plan (FMP) for the Chevron Richmond Refinery. [Basis: Regulation 12-12]



Hydrogen Plant Fugitives

35)

Fugitive Equipment

a) The Owner/Operator of all Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall install only the following types of valves in RPG, RFG and/or natural gas service (1) bellows sealed, (2) live loaded, (3) graphitic packed, (4) Teflon packed, (5) quarter-turn (e.g., ball valves or plug valves), or equivalent as determined by the APCO. [Basis: Cumulative Increase, BACT, Offsets, 8-18]

b)

The Owner/Operator of all Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall comply with a leak standard of 100 ppm of TOC (measured as C1) at any valve installed as part of the Hydrogen Plant in RPG, RFG, natural gas, methane, and/or process gas service unless the owner/operator complies with the applicable minimization and repair provisions contained in Regulation 8-18. Valves that are not of a type listed in part 35(a) and for which a leak greater than 100 ppm (measured as C1) has been determined, shall become subject to the inspection provisions contained in Regulation 8-18-401 unless the component is already subject to the Part 36 inspection frequency. If the leak remains greater than 100 ppm (measured as C1) after repair, or if the valve is determined to have a leak greater than 100 ppm (measured as C1) a second time within a 5-year period, the Owner/Operator shall replace the valve with a type listed in part 35(a) within 5 years or at the next scheduled turnaround, whichever is sooner. Methane service shall be any stream that contains any methane. For the purposes of these permit conditions, RPG is refinery process gas and RFG is refinery fuel gas. [Basis: BACT, Regulation 8 Rule 18]

c) The Owner/Operator of all Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall install as part of this project graphitic-based gaskets on all flanges or connectors (gasketed) installed in natural gas, process gas, RPG and/or RFG service unless the Owner/Operator demonstrates to the satisfaction of the APCO that the service requirements prevent this material from being used. [Basis: BACT]

d) The Owner/Operator of all Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall comply with a leak standard of 100 ppm of TOC (measured as C1) at any flanges/connectors installed as part of the Hydrogen Plant in RPG, RFG, methane, and/or natural gas service unless the owner/operator complies with the applicable minimization and repair provisions contained in Regulation 8-18. [Basis: BACT, Regulation 8 Rule 18]

e) The owner/operator shall install liquid seals with non-VOC purge fluid (gas or liquid) or dual dry gas mechanical seals with inert/non-VOC purge gas or dual dry gas mechanical seals with venting to an approved recovery/abatement device or other BAAQMD Approved control device or technology on all compressors installed in TOC



service as part of the Modernization Project or other BAAQMD Approved control device or technology. [Waiting for Praxair information on proposed seals.] [Basis: BACT]

f) The Owner/Operator shall comply with a leak standard of 100 ppm of TOC (measured as C1) at any pumps and/or compressors installed in RPG, RFG, and/or natural gas service as part of the Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) unless the owner/operator complies with the applicable minimization and repair provisions contained in Regulation 8-18. [Basis: BACT]

g) The Owner/Operator shall install dual mechanical seals, vented to a District approved abatement device that achieves a minimum of 95% VOC destruction efficiency or District approved equivalent technology as determined by the APCO on all pumps in RPG, RFG, and/or natural gas service installed as part of the Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021). [Basis: BACT]

h) The Owner/Operator shall vent all pressure relief valves in hydrocarbon service subject to Rule 8-28 to a furnace or flare with a destruction efficiency of at least 98% by weight. Hydrocarbon service as defined in Part 2 of these conditions.

i) The Owner/Operator shall identify all new valves, pressure relief devices, flanges, connectors, process drains, pumps, and compressors installed in RPG, natural gas, methane, and/or RFG service as part of the Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) with a unique permanent identification code. This identification code does not apply to quarter-inch or less tubing and connectors associated with analytical sampling systems. The owner/operator shall clearly identify the fugitive components listed above that are in methane service only. The Owner/Operator shall include all new fugitive equipment in the fugitive equipment monitoring and repair program. [Basis: Rule 8-18 (includes methane), cumulative increase, offsets, BACT]

j) The owner/operator of all fugitive components at the Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall handle only RPG, RFG, natural gas, and methane. [basis: BACT, 8-18, 2-5]

36) The Owner/Operator of all Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall conduct inspections of all Hydrogen Plant sources fugitive components in RPG, RFG, and/or natural gas service based on the frequency below:

Pumps:	Quarterly
Compressors:	Quarterly
Valves:	Quarterly
Pressure Relief Devices:	Quarterly
Connectors (No Flanges):	Biannual
Flanges:	Biannual



Process Drains: Quarterly

The Owner/Operator of all Hydrogen Plant sources (S-4449, S-4450, S-4451, S-4471, S-4472, and S-6021) shall conduct inspections of all Hydrogen Plant sources' fugitive components exclusively in methane service in accordance with the frequencies specified in Rule 8-18.

[Basis: BACT, Regulation 8-18]

Hydrogen Plant General Recordkeeping

37) The Owner/Operator of S-4449, S-4450, S-4451, S-4471, S-4465, S-4472, S-6021, A-302, A-303, A-6021 shall maintain all CEM and all source testing records and the following associated records (i.e. fuel usage rates, HHV heat content of fuel, hours of operation, flow rates used for emissions calculations, daily, monthly, and annual mass emissions estimates, etc.) for the last 5 years of operation to verify compliance with Modernization Project permit conditions. [Basis: Recordkeeping]

- a) For part 11, continuous fuel flow and gas component analysis records and calculations of combustion stack flow.
- b) For part 12, daily, monthly, and consecutive 12 month heat input (HHV) to each furnace (S-4471, S-4472).
- c) For part 13)c)i, firing hours, fuel flow rates, and stack gas concentrations.
- d) For part 13)c)i, 14, and part 15, the CEMS records for each furnace (S-4471, S-4472).
- e) For part 13)c)ii, all furnace firing hours without the SCR in place and operational.
- f) Throughput for parts 5,6, 21
- g) Emissions data for parts 9, 14,15, 16, 18, 19, 23, 25, 27, all source test results required within parts 5- 36 [BAAQMD recordkeeping]

38) The Owner/Operator shall maintain the following in a District-approved daily log and shall keep these records on site for a period of at least 5 years from date of entry and make the records available to District staff upon request. [Basis: Regulation 2-1-301, Recordkeeping]

In order to demonstrate compliance with part 5, the Owner/Operator shall maintain the daily, monthly, and consecutive 365-day total record of hydrogen production (MMSCF of H₂ per day) for each new Hydrogen Plant Train (S-4449, S-4450);

In order to demonstrate compliance with part 6, the owner/operator shall maintain daily, monthly, and consecutive 365-day total record of hydrogen production at S-4451; and

In order to demonstrate compliance with part 7, the owner/operator shall maintain daily, monthly, and consecutive 365-day total record of all fuel usage at S-4471 and S-4472.



Plant No. 10, Chevron Products Company

Condition No. 24136

Application No. 12842

- 39) DELETED
- 40) DELETED
- 41) DELETED
- 42) DELETED
- 43) DELETED
- 44) DELETED
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74) Deleted.

75) DELETED

76) DELETED

HYDROGEN PURITY IMPROVEMENTS

77) The Owner/Operator of S-4454 No. 6 H₂S Plant (Recycle Amine Regenerator) shall not exceed the following limits:
[Basis: Cumulative Increase]

3358 MMSCF H₂S produced, any consecutive 12-month period
11 MMSCF H₂S produced, maximum per calendar day

78) DELETED (Superseded by permit condition 25814)
(Sulfur Loading Rack S-4490 was issued a separate ATC under Application 25793 in June 2014 and its operation is governed by permit condition 25814)



79) DELETED (Superseded by permit condition 25814)
(Sulfur Loading Rack S-4490 was issued a separate ATC under Application 25793 in June 2014 and its operation is governed by permit condition 25814)

80) The Owner/Operator of S-4253 TKC/FCC Feed Hydrotreater shall not exceed the following throughput limitations:

29,200 kbbl feed material, over any consecutive 12-month period
80,000 bbl feed material per day on an annual average basis
96,000 bbl feed material, calendar day

[Basis: Cumulative Increase, Condition B.9 in City of Richmond Conditional Use Permit Resolution Number 67-14 dated July 29, 2014]

Sulfur Recovery Units S-4227 through S-4229:

81) The Owner/Operator of A-0020, A-0021 and A-0022 Tail Gas Units abating the S-4227, S-4228, and S-4229 Claus Plants (SRUs), respectively, shall each maintain a minimum oxidization temperature of 1400 degrees Fahrenheit. [Basis: BACT]

The owner/operator shall comply with the temperature limit of 1400F in Part 81 at all times, except during an "Allowable Temperature Excursion" as specified below, provided that the temperature controller setpoint remains at a minimum of 1400 degrees Fahrenheit. An Allowable Temperature Excursion is one of the following:

- a. A temperature excursion not exceeding 20 degrees F; or
- b. A temperature excursion for a period or periods which when combined are less than or equal to 15 minutes in any hour; or
- c. A temperature excursion for a period or periods which when combined is more than 15 minutes in any hour, provided that all three of the following criteria are met.
 - i. the excursion does not exceed 50 degrees F;
 - ii. the duration of the excursion does not exceed 24 hours; and
 - iii. the total number of such excursions does not exceed 12 per calendar year (or any consecutive 12 month period).

Two or more excursions greater than 15 minutes in duration occurring during the same 24-hour period shall be counted as one excursion toward the 12-excursion limit. (basis: Regulation 2-1-403)

For each Temperature Excursion below 1400 degrees Fahrenheit, the owner/operator shall keep all records to the satisfaction of the APCO in order to demonstrate compliance with the qualifying criteria described above. Records shall be retained for a minimum of five years from the date of entry, and shall be made available to the District upon request. Records shall include at least the following information:



- a. Temperature controller setpoint;
- b. Starting date and time, and duration of each Allowable Temperature Excursion;
- c. Measured temperature during each Allowable Temperature Excursion;
- d. Number of both Temperature Excursions and Allowable Temperature Excursions per month, and total number for the current consecutive 12-month period; and
- e. All strip charts or other temperature records.

(Basis: Regulation 2-1-403)

82) The owner/operator of S-4227, 4228 and 4229 shall abate each at all times of operation of S-4227, S-4228, and S-4229 by the properly maintained and properly operated A-20, A-21, and A-22 tail gas units, respectively. The owner/operator shall also install and maintain an acid gas scrubber (A-4450) to prevent the release of acid gas during an unscheduled loss of SRU capacity. The owner/operator of S-4227, 4228, and 4229 shall not exceed a combined acid gas feed rate to the three SRUs of 24.5 MMscf/day averaged over any consecutive 3-hour period plus an additional 3 MMscf/day from sour water sources, which can be shut down immediately. Prior to exceeding the emergency scrubber capacity of A-4450 and/or A-4451, the owner/operator shall shut down refinery acid gas generating sources including the 3 MMscf/day from sour water sources, and cease acid gas generation at the refinery to reduce the acid gas feed rate below the capacity of the two remaining SRUs ("Load Shed Procedures"). (Basis: BACT)

83) The owner/operator of S-4227, S-4228, and S-4229 shall abate each by the properly installed, properly maintained, and properly operated A-120, A-121, and A-122 Wet Electrostatic Precipitators (Wet ESPs), respectively, at all times of operation of S-4227, S-4228, and/or S-4229. [Basis: BACT, Rule 2-5].

84) The Owner/Operator of S-4227, S-4228, and S-4229 shall not exceed the following limits at the emission point of each A-0020, A-0021, and A-0022 except during periods of startup, shutdown, and refractory dryout as defined below, as demonstrated by a District-approved source test method, CEM, or other District-approved method:

- a) NO_x emissions of 50.0 ppm, dry, corrected to 0% O₂, 3-hour average
- b) SO₂ emissions of 50.0 ppm, dry, corrected to 0% oxygen, averaged over any calendar day
- c) H₂S emissions of 4.0 ppm, dry, corrected to 0% O₂, averaging time based on district approved source test method
- d) PM₁₀ emissions: short-term limit as specified in part 88.
- e) Sulfuric Acid Mist emissions: See part 95
- f) 15,000 dscfm, corrected to 0% O₂, exhaust flow rate averaged over any 1 hour period at each S-4227 and S-4228.
- g) 30,000 dscfm, corrected to 0% O₂, exhaust flow rate averaged over any 1 hour period at S-4229.



For the purposes of complying with this part, the following definitions and limits apply for the startup, shutdown, and refractory dryout periods of S-4227, S-4228, and/or S-4229:

“Startup” begins with startup of the main air blower and ends when operation is stable and the Air-to-H₂S ratio controller is placed in the automatic control mode.

“Refractory dryout” shall mean an event that occurs whenever new refractory has been installed. When this new refractory is heated for the first time, the unit is brought gradually to operating temperature through a prescribed series of steps designed to ensure safe operation.

The owner/operator of S-4227, S-4228, or S-4229 shall not exceed 12 consecutive hours for startup or 24 hours for startups involving refractory dryout.

“Shutdown” begins after acid gas feed has been replaced with natural gas purge and, following the sequence to remove residual sulfur compounds from the unit, the Main Reaction Furnace firing rate is reduced while increasing excess O₂ to check for residual reactions. The shutdown period ends when the main air blower is shut down.

The owner/operator of S-4227, S-4228, or S-4229 shall not exceed 9 consecutive hours for any shutdown.

[Basis: BACT, cumulative increase, Rule 2-5]

85) The Owner/Operator of S-4227, S-4228, and S-4229 shall comply with parts 84, 86, 87, 90, and 92. These conditions supersede Condition 19063, after modification of each SRU S-4227, S-4228, and S-4229, respectively. [Basis: BACT, Rule 2-5, Cumulative Increase]

86) The Owner/Operator of S-4227, S-4228, and S-4229 Sulfur Recovery Units (SRUs) shall perform all of the following:

a. In order to reduce H₂S bypassing at the thermal oxidizers, the owner/operator shall modify each SRU's thermal oxidizer internals for better mixing, improve the control of excess oxygen, and relocate the sulfur pit vent line to the tail gas inlet line unless studies required below demonstrates that there is no beneficial effect. Within 60 days of the issuance of the Authority to Construct for this project, the owner/operator shall both conduct and submit studies in order to indicate whether the relocation of the sulfur pit vent line to the tail gas inlet line would have any beneficial effect, subject to District approval. If the study demonstrates to the satisfaction of the District that there is a beneficial effect, then the owner/operator shall relocate the sulfur pit vent line to the tail gas inlet line. Within 60 days of the issuance of the Authority to Construct for this project, the owner/operator shall submit the thermal oxidizer engineering design drawings or other equivalent drawings, and a written explanation of all design features



that demonstrate that the thermal oxidizer internals will improve mixing and detailed description of measures taken to improve the control of excess oxygen.

b. The owner/operator shall install ultra low-NO_x burners equipped with fuel induced recirculation (FIR) on each thermal oxidizer of each SRU. Within 30 days of an ultra low-NO_x burner vendor or design selection, the owner/operator shall submit for District approval the design drawings and explain the design features that will result in the NO_x reductions.

c. The owner/operator shall install ultra low-NO_x burners equipped with FIR on each stack gas heater of each SRU. Stack gas source numbers are S-4436, S-4437, and S-4438. Within 30 days of an ultra low-NO_x burner vendor or design selection, the owner/operator shall submit for District approval the design drawings and explain the design features that will result in the NO_x reductions.

d. The owner/operator shall not exceed the following maximum firing rates: (Basis: Cumulative Increase)

No. 1 SRU Stack Gas Heater	S-4436	765.60 MMBTU/day HHV
No. 2 SRU Stack Gas Heater	S-4437	765.60 MMBTU/day HHV
No. 3 SRU Stack Gas Heater	S-4438	1,346.0 MMBTU/day HHV

No. 1 SRU Thermal Oxidizer burner	S-4227/A-20	739.0 MMBTU/day HHV
No. 2 SRU Thermal Oxidizer burner	S-4228/A-21	739.0 MMBTU/day HHV
No. 3 SRU Thermal Oxidizer burner	S-4229/A-22	1,080.0 MMBTU/day HHV

e. The owner/operator shall perform District-approved computational fluid dynamic analysis (flow modeling) of the thermal oxidizers to assist in optimizing the performance. The results shall be submitted to the District for review and approval.

f. The owner/operator shall improve the scrubbing of SO₂ by the SRU SO₂ Absorbers by increasing the makeup sodium sulfite rate, and upgrading the piping and controls to meet the SO₂ concentration limit in Part 84c. The controls for caustic makeup will also be upgraded for more stable operation. Within 60 days of the issuance of the Authority to Construct for this project, the owner/operator shall submit for District review and approval the pre-project and post-project engineering design drawings or other equivalent drawings that demonstrate, which may include the following to meet the SO₂ concentration limit in Part 84c:

1. the makeup sodium sulfite rate for each SRU to improve the scrubbing of SO₂ by the SO₂ Absorbers,
2. the piping and control upgrades, and
3. the caustic makeup control upgrades.



- g. On S-4454 #6 H₂S Recovery Unit, the owner/operator shall install carbon filtration of the amine, optimize sizing and internal design of the amine flash drum, and follow Best Practice design guidelines for hydrocarbon removal including District-approved monitoring and carbon change-out procedures.
- h. Within 60 days of the issuance of the Authority to Construct for this project, the owner/operator shall complete design development and submit the design for District review in order to identify whether an alternative design will achieve or accomplish the same objective to the satisfaction of the District, which is to reduce C₃ and C₄ carryover into the vent gas and acid gas by adding/upgrading coolers in at least three locations.
- i. The owner/operator shall reroute the PSA tail gas, which currently goes to the RLOP Gas Recovery Unit to the Hydrogen Plant (S-4449 through S-4450) feed or to the refinery fuel gas system in order to reduce the GRU feedrate and improve cooling and separation at the RLOP GRU.
- j. The owner/operator of S-4227, S-4228, and S-4229 shall properly install and properly operate a Medium Oxygen Enrichment System (up to 50%) in order to comply with parts 84, 87, 90, and 92.

(Basis for parts a through j, not including d: Cumulative Increase, BACT)

87) The Owner/Operator of S-4227, S-4228, and S-4229 shall abate the S-4227, S-4228, and S-4229 SRUs at all times of operation by the properly installed, properly maintained, and properly operated A-20, A-21, and A-22 Tail Gas Units, respectively, and the properly installed, properly maintained, and properly operated A-120, A-121, A-122 Wet Electrostatic Precipitators (Wet ESPs), respectively. The owner/operator of each SRU S-4227 through S-4229 shall not exceed the following total sulfur production levels [Basis: cumulative increase, offsets, Rule 2-5, Condition B.8 in City of Richmond Conditional Use Permit Resolution Number 67-14 dated July 29, 2014]:

- a) S-4227 abated by A-20 and A-120:
 - i) The lesser of either: 345 Long Tons in any calendar day, or the throughput level determined through District-approved source testing to be maximum calendar day throughput achievable while complying with all emissions limitations. Annual throughput values will be determined either through District-approved source testing and/or the use of the District-approved CEMs and District-approved flowmeters in order to determine the maximum annual throughput that corresponds to compliance with all annual emissions limits.
- b) S-4228 abated by A-21 and A-121:
 - i) The lesser of either: 345 Long Tons in any calendar day or the throughput level determined through District-approved source testing to be maximum calendar day throughput achievable while complying with all emissions limitations. Annual throughput values will be determined either through District-approved source testing and/or the use



of the District-approved CEMs and District-approved flowmeters in order to determine the maximum annual throughput that corresponds to compliance with all annual emissions limits.

c) S-4229 abated by A-22 and A-122:

i) The lesser of either: 570 Long Tons in any calendar day, or the throughput level determined through District-approved source testing to be maximum calendar day throughput achievable while complying with all emissions limitations. Annual throughput values will be determined either through District-approved source testing and/or the use of the District-approved CEMs and District-approved flowmeters in order to determine the maximum annual throughput that corresponds to compliance with all annual emissions limits.

d) The total combined calendar day throughput from S-4227, S-4228, and S-4229 combined shall not exceed either of the following:

900 Long Tons in any calendar day

750 Long Tons per day on an annual average basis

e) The owner/operator of S-4227, S-4228, and S-4229 may exceed the throughput levels established through District-approved source testing per Parts 87a, b, and/or c and the next paragraph, upon receipt of written approval by the APCO of a source test plan for demonstrating compliance with all concentration and mass limits at a higher throughput level. During the source test, the throughput level may not exceed the maximum level stated in Parts 87a, b, and/or c and all emissions measured by CEMs shall remain in compliance with the permitted concentration and/or permitted mass levels to be averaged over the source test. Exceedance of emission levels determined by source testing that occur during the source test shall not be considered a violation as long as Chevron follows the source test plan pre-approved by the APCO. Until 24-months after startup of each SRU, the owner/operator may conduct source tests, pursuant to this part, to establish the throughput levels not to exceed the maximum throughput levels specified in Part 87 for each SRU. During this time period, consistent with both Regulation 2-1-234 and Regulation 2-5-214, an increase in throughput up to the maximum throughput levels as specified in Part 87 shall not be considered a modification for purposes of Regulation 2 provided that there is no increase in any permitted emission levels from these SRUs. For the purposes of Regulation 2, Rule 6, changes made as a result of this part shall be considered either Minor or Administrative as determined by the APCO.

The owner/operator of S-4227, S-4228, and S-4229 shall conduct a district pre-approved source test within 120 days of modification of each unit, on each unit operating at maximum throughput levels listed above in order to demonstrate compliance with all emissions limits (NO_x, CO, SO₂, PM₁₀, POC, H₂S, and H₂SO₄) at maximum throughput levels. The 120-day deadline for this testing may be extended upon written approval of the APCO. The source test shall also note all operating parameters determined by the District as part of the source test pre-approval, which



may become enforceable permit conditions if the district determines that the parameters are required in order to comply with all emissions limits. The throughput levels above may be adjusted based on the District-approved results of the District-approved source test. The throughput levels may be subsequently adjusted up to the maximum levels listed in Parts 87a, b, and/or c based on the results of the subsequent source testing through the submittal of a District permit application. The results of these source tests shall be submitted to the district for approval no later than 60 days from the test date.

The owner/operator of each S-4227, S-4228, and S-4229 shall use oxygen enrichment (up to a maximum of 50% oxygen enrichment) at all times of operation above the following throughput levels of each SRU: S-4227 and S-4228 at 150 long tons per day, and S-4229 at 300 long tons per day. The owner/operator of each SRU may use oxygen enrichment at lower throughput levels.

88) The Owner/Operator of A-120, A-121, and A-122 shall achieve a minimum abatement efficiency of 90% by weight of both PM10 and Sulfuric Acid Mist. The owner/operator shall demonstrate continuous compliance with this abatement efficiency through the use of the following parametric monitoring parameters (Basis: Offsets, cumulative increase):

The owner/operator of A-120, A-121, and A-122 shall not exceed any of the following PM10 and Sulfuric Acid Mist limits as specified in parts 84, 90, 92, and 95 from each Wet ESP (A-120, A-121, and A-122):

The owner/operator of A-120 shall not exceed:

a. PM10 Limit 0.504 lb averaged over one hour as demonstrated using District approved source test method.

The owner/operator of A-121 shall not exceed:

b. PM10 Limit 0.450 lb averaged over one hour as demonstrated using District approved source test method.

The owner/operator of A-122 shall not exceed:

c. PM10 Limit 0.884 lb averaged over one hour as demonstrated using District approved source test method.

The owner/operator of Wet Electrostatic Precipitators (A-120, A-121, and A-122) shall abate at all times of operation of the SRUs (S-4227, S-4228, and S-4229) respectively with the properly maintained, properly operated, fully charged Wet Electrostatic Precipitators (A-120, A-121, and A-122). This shall include the following:

1). Continuously monitor and record the inlet water flow rate (in gallons per minute) to each scrubber and maintain a minimum inlet water flow rate of [TBD] in (gallons per minute).



2). Monitor and record Transformer Rectifier (TR) set secondary current readings on a daily basis.

3). Install a temperature monitor and recorder at the inlet of the Wet ESP. The inlet temperature of each Wet ESP shall be maintained at a maximum of [TBD] degrees F. An alarm shall be set in such a manner to indicate temperature excursions above [90% of TBD] degrees F.

4). The secondary current of any TR set shall not be less than [TBD] milliamps averaged over any three hour period, or the secondary current of up to two TR sets may be less than [TBD] milliamps, averaged over any three hour period, as long as the remaining TR sets maintain an average secondary current above [TBD] milliamps, averaged over any three hour period. An alarm shall be set in such a manner to indicate secondary current excursions below [TBD] milliamps.

The parametric conditions in this part may be re-evaluated or adjusted, if District-approved source test data demonstrate to the satisfaction of the APCO that alternate parametric conditions are necessary for or capable of maintaining compliance with an emission limit of PM10 and/or Sulfuric Acid Mist as determined by District-approved source test methods.

The annual PM10 and Sulfuric Acid Mist emissions rate shall be determined by District approved source test methods. The owner/operator shall hire a third-party source test firm to perform at least four source tests per calendar year to determine the hourly PM10 and Sulfuric Acid Mist emission rates. The results of each quarterly source test shall be used to estimate the emissions for that calendar quarter. The four quarterly mass emissions estimates shall be added together to determine compliance with the annual emissions limits of these permit conditions. Each source test shall be performed in accordance with the District's Manual of Procedures. The owner/operator shall notify the District Source Test Manager and the Engineering Division at least seven (7) days prior to the test, to provide the District staff the option of observing the test. Within 60 days of the test date, the owner/operator shall submit a comprehensive report of the test results to the District's Source Test Manager for review and approval.

The owner/operator of S-4227, S-4228, and S-4229 shall conduct at least one source test every quarter in order to demonstrate compliance with all emissions limits not covered by CEMs. If this source test window partially or completely overlaps a plant shutdown and its 7-day startup period, the owner/operator shall conduct a source test within 14 days of the date of the plant or source startup.

The Owner/Operator Of S-4227, S-4228, and S-4229 shall continue to conduct quarterly source tests for at least two years after the date of issuance of the Permit to Operate for the last Modernization Project source. After the quarterly source tests specified above in this part, the Owner/Operator may submit an application for District approval to request to change the frequency to semi-annual or bi-annual provided that all District-



approved source test results demonstrate that the emissions are less than 90% of any PM10 or sulfuric acid mist emissions limit.

The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 to 117. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the source test date. [Basis: Periodic Monitoring, cumulative increase, Regulation 1-523]

In order to demonstrate compliance with this part and part 84, 90, 92, and 95, the owner/operator shall maintain in a District-approved log, updated monthly, all of the following:

- 1). PM10 and Sulfuric Acid Mist emissions source test results, lb/hour.
- 2). Daily inlet water flowrate inspection records indicating working condition and repairs.
- 3). pH of water system
- 4). Daily ESP Transformer Rectifier (TR) set secondary current readings; and
- 5). Wet ESP inlet temperature records.

These records shall be retained for at least five years from date of entry and be made available to the BAAQMD upon request.

- a) (Placeholder) Install a temperature monitor and recorder at the inlets of each Wet ESP (A-120, A-121, and A-122). The inlet temperature of each Wet ESP shall be maintained at a maximum of 170 degrees F/TBD degrees Fahrenheit averaged over any one hour period. An alarm shall be set in such a manner as to indicate temperature excursions above 153 F.)
- b) (Placeholder) Monitoring and recordkeeping provisions to insure appropriate electric field strength.
- c) (Placeholder) Condition(s) to insure proper water flow.
- d) (Placeholder) pH of water system.

For each above "placeholder" or "TBD", the owner/operator shall provide the above vendor-supplied information within 60 days of the selection of the vendor.

89) The Owner/Operator of S-4227, S-4228, and S-4229 shall maintain a District-approved daily log with monthly summaries of all sulfur production, acid gas feedrate (in MMSCF/day), maximum hourly flow rate (in scfm), all CEM data, daily H₂S data and source test data at each S-4227, S-4228, and S-4229 to demonstrate compliance with parts 82, 84, 90, 92, and 95 and all Wet ESP parametric measurements to demonstrate compliance with parts 84, 90, 92, and 95. This log shall be kept on site for 5 years from the date of entry and be made available to District staff upon request.

90) The Owner/Operator of the S-4227, S-4228, and S-4229 Claus Plants (SRUs), S-4436, S-4437 and S-4438 (stack heaters), A-20, A-21, and A-22 (Tail Gas Units), and



A-120, A-121, A-122 (Wet ESP's) shall not exceed the following combined emission limits in any consecutive 12-month period:

[Basis: Cumulative Increase, Offsets]

Pollutant	Annual (tons/yr)
NOx	62.33
CO	113.80
SO2	86.70
PM10	5.34
POC	2.84

H2S 4.0 ppm, dry, corrected to 0% O2, averaging time based on District-approved source test Method

Sulfuric Acid Mist 1.856 lb/hour

The Owner/Operator of the S-4227, S-4228, and S-4229 shall each demonstrate compliance with parts 84, 90, 92, and 95 using District-approved CEMs Systems for NOx, CO, SO2, O2, and either exhaust gas flow meters (S-4229) or duct flow meters combined with a District approved flow calculation method and using District approved source testing and/or District-approved flow measurement and/or calculation method in order to demonstrate compliance with parts 84, 90, 92, and 95 for PM10, POC, H2S, and Sulfuric Acid Mist.

[Basis: Monitoring]

91) The Owner/Operator of the S-4227, S-4228, and S-4229 Claus Plants (SRUs) and S-4436, S-4437 and S-4438 (stack heaters) shall install, calibrate, maintain, and operate a District-approved continuous emission monitor and recorder at each emission point (P-0151, P-0152, and P-0153) for NOx, CO, SO2, O2, and District-approved exhaust gas flow rate (in scfm). [Basis: BACT, offsets, Rule 2-5]

a. The Owner/Operator of the S-4227, S-4228, and S-4229 Claus Plants (SRUs) and S-4436, S-4437 and S-4438 (stack heaters) shall conduct District-approved monitoring and recording on a monthly basis at each emission point (P-0151, P-0152, and P-0153) for hydrogen sulfide (H2S) (in ppmv and lb/day) in order to demonstrate compliance with the concentration and mass emission limits specified in parts 84, 90, 92, and 95. If the monthly monitoring window partially or completely overlaps a plant shutdown and its 7-day startup period, the owner/operator shall conduct monitoring within 14 days of the date of the plant or source startup. [Basis: BACT, Rule 2-5]

92) The Owner/Operator of the S-4227, S-4228, and S-4229 Claus Plants (SRUs) and S-4436, S-4437 and S-4438 (stack heaters) shall not exceed the following emission limits at each emission point (P-0151, P-0152, and P-0153) except during startup and shutdown:

The Owner/Operator of the S-4227 Claus Plant (SRU) and S-4436, (stack heater) shall not exceed the following emission limits in any consecutive 12 month period for the



tons/year limits, any calendar day for the daily limits and the averaging time as specified for the remaining limits:

Pollutant	(tons/yr)	(lb/day)
NOx	15.38	
CO	28.08	222.72
SO2	21.39	
PM10	1.44	9.8
POC	0.76	9.8

H2S 4.0 ppm averaging time based on District-approved source test method
Sulfuric Acid Mist 0.673 lb/hour

The Owner/Operator of S-4227 shall not exceed a maximum exhaust gas flowrate of 15,000 dry scfm, corrected to 0% O₂, averaged over any one hour period. [Basis: Rule 2-5, BACT]

The Owner/Operator of the S-4228 Claus Plant (SRU) and S-4437, (stack heater) shall not exceed the following emission limits in any consecutive 12 month period for the tons/year limits, any calendar day for the daily limits and the averaging time as specified for the remaining limits:

Pollutant	Annual (tons/yr)	(lb/day)
NOx	15.38	
CO	28.08	173.52
SO2	21.39	
PM10	1.30	9.8
POC	0.76	9.8

H2S 4.0 ppm averaging time based on District-approved source test Method
Sulfuric Acid Mist 0.425 lb/hour

The Owner/Operator of S-4228 shall not exceed a maximum exhaust gas flowrate of 15,000 dry scfm, corrected to 0% O₂, averaged over any one hour period. [Basis: Rule 2-5, BACT]

The Owner/Operator of the S-4229 Claus Plant (SRU) and S-4438, (stack heater) shall not exceed the following emission limits in any consecutive 12 month period for the tons/year limits, any calendar day for the daily limits and the averaging time as specified for the remaining limits:

Pollutant	Annual (tons/yr)	(lb/day)
NOx	31.57	
CO	57.64	325.44
SO2	43.92	



PM10	2.60	9.8
POC	1.32	9.8

H2S 4.0 ppm averaging time based on District-approved source test Method
Sulfuric Acid Mist 0.758 lb/hour

The Owner/Operator of S-4229 shall not exceed a maximum exhaust gas flowrate of 30,000 dry scfm, corrected to 0% O₂, averaged over any one hour period. [Basis: Rule 2-5, BACT]

[Basis: BACT, Cumulative Increase, Offsets]

93) The Owner/Operator of S-4227, S-4228, and S-4229 shall conduct a District-approved source test within 120 days of the date of initial startup of each unit to determine initial compliance with the limits in parts 84, 90, 92, and 95 for POC, H₂S, PM₁₀, Sulfuric Acid Mist, and ammonia and including the District-approved exhaust gas flowrates (measurement or combined measurement and calculation). The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 to 117. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the date of the source test. [Basis: Cumulative Increase, Offsets, BACT, Regulation 7]

94) After the initial source test specified in part 93 has been completed, the Owner/Operator of S-4227, S-4228, and S-4229 shall conduct quarterly District approved source tests to demonstrate compliance with the limits in parts 84, 90, 92, and 95 for POC, H₂S, PM₁₀, and Sulfuric Acid Mist, and District-approved exhaust gas flowrates (measurement or combined measurement and calculation). The Owner/Operator of S-4227, S-4228, and S-4229 shall continue to conduct quarterly source tests for at least two years after the date of issuance of the Permit to Operate for the last Modernization Project source (excluding the Power Plant Replacement Project). After the quarterly source tests specified above in this part, the Owner/Operator may submit an application for District approval to request to change the frequency to semi-annual source testing. The owner/operator of S-4227, 4228, and 4229 shall conduct the quarterly emissions source tests at least 2 months apart and not more than 4 months apart. The owner/operator may be required by the APCO to conduct more frequent source tests if source test results indicate emissions are within 90% of any emissions limit associated with any of these sources or exceeding any emissions limits associated with any of these sources. The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109-to 117. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the date of the source test. [Basis: Periodic Monitoring, cumulative increase]

95) The Owner/Operator of S-4227, S-4228, and S-4229 shall not exceed the following emission limits:
[Basis: Toxics]



S-4227 SRU 1

Sulfuric Acid Mist (stack) 0.673 lb/hr

H₂S (stack) 0.323 lb/hr

S-4228 SRU 2

Sulfuric Acid Mist (stack) 0.425 lb/hr

H₂S (stack) 0.323 lb/hr

S-4229 SRU 3

Sulfuric Acid Mist (stack) 0.758 lb/hr

H₂S (stack) 0.646 lb/hr

H₂S (fugitive) from Modernization Project components at S-4227, S-4228, and S-4229

H₂S (fugitive) 0.0994 lb/hr

96) Deleted.

FUEL GAS SYSTEM

97) The Owner/Operator of the three Fuel Gas Mix Drums V-475, V-870, and V-701 shall install and operate a District-approved continuous gaseous fuel monitors and recorder(s) in order to demonstrate compliance with both the H₂S limit and total sulfur limit of the refinery fuel gas at the outlets of each of the three fuel gas mix drums. The Owner/Operator shall calculate and record the following for each fuel gas mix drum of the refinery fuel gas system in order to demonstrate compliance with parts 98:

a) Each calendar day, the Owner/Operator of the three Refinery Fuel Gas Mix Drums shall record the following for each refinery fuel gas mix drum: daily fuel gas flow as measured by a District-approved fuel gas flowmeter at each drum, daily averaged calendar day H₂S content (in ppmv) of the refinery fuel gas, any consecutive 365 day average of H₂S concentration (ppmv), hourly maximum total sulfur content (in ppmv), daily averaged calendar day total sulfur content (in ppmv), any consecutive 365 day average of total sulfur content (in ppmv), and daily averaged HHV heat capacity as Btu/scf;

b) The owner/operator of the three refinery fuel gas mix drums shall calculate using District-approved methodology the total sulfur dioxide emissions in tons per year from the refinery fuel gas system for each calendar day with monthly totals. The owner/operator shall record the sulfur dioxide emissions in a District-approved log for at least five years from the date of entry and shall be made available to District staff upon request.

[Basis: BACT, cumulative increase, offsets, Regulations 1-522, 1-523]



98) The Owner/Operator of the three Refinery Fuel Gas Mix Drums shall not exceed the following limits at the outlet of each of the refinery fuel gas mix drums [Basis: BACT, cumulative increase, offsets, Regulations 1-522, 1-523]:

- a) 50 ppmv H₂S (at each drum), averaged over a calendar day;
- b) 18.83 ppmv H₂S (flow-weighted average of all three drums), averaged over any consecutive 12 month period;
- c) 100 ppmv total sulfur concentration (at each drum), averaged over a calendar day;
- d) 200 ppmv total sulfur (at each drum), averaged over any hour;
- e) 30.85 ppmv total sulfur concentration (flow-weighted average of all three drums) any consecutive 12-month period.

f) The owner/operator of the three Refinery Fuel Gas Mix Drums shall not exceed a combined total of 49.09 tons per year SO₂ from all refinery sources fired on refinery fuel gas (as measured at the outlet of each of the three drums using total sulfur in ppmv and District-approved measured fuel flow of each drum assuming 100% conversion of total sulfur to SO₂) using a District-approved calculation method.

99) DELETED

MODERNIZATION PROJECT COMMISSIONING PERIOD

100) The owner/operator of all sources of the Modernization Project shall comply with Parts 100, 103, 104 through 108 during the Modernization Project Commissioning Period. The Modernization Project Commissioning Period is defined as the period that begins when the first new or modified Modernization Project source commences operations, and terminates 180 calendar days after the last Modernization Project new or modified source commences operations.

[Basis: Cumulative Increase, PSD]

101) DELETED

102) DELETED

103) During the Modernization Project Commissioning Period, the Owner/Operator shall operate the first existing Hydrogen Train to be shut down (either S-4250 Train A or S-4250 Train B), its associated reaction furnace (either S-4170 or S-4171), the first new Hydrogen Plant (Either S-4449 or S-4450), and its associated reaction furnace (S-4471 or S-4472) simultaneously for up to a maximum of 90 days as long as the combined production rate of all operating hydrogen manufacturing plants remains below 181.1 million standard cubic feet per day.

The Owner/Operator shall operate the other existing Hydrogen Train, its associated reaction furnace, the other new Hydrogen Plant, and its reaction furnace simultaneously for up to a maximum of 90 days as long as the combined production rate of all operating hydrogen manufacturing plants remains below 181.1 million standard cubic feet per day.



[Basis: Cumulative Increase, Rule 2-2-410, PSD]

104) The Owner/Operator of S-4227, S-4228, and S-4229 Claus Plants (SRUs) shall not exceed any of the following total sulfur production levels until both of the following are met:

a) At least one of the new hydrogen plant trains (S-4471 or S-4472) has started to use refinery fuel gas or process gas as a feedstock, and

b) At least one of the SRUs has been modified or has completed its modification to satisfy BACT per this Authority to Construct.

- S-4227: 189.6 long tons in any calendar day and 150 long tons per day averaged over any consecutive 12-month period.

- S-4228: 179.0 long tons in any calendar day and 150 long tons per day averaged over any consecutive 12-month period.

- S-4229: 336.0 long tons in any calendar day and 292.7 long tons per day averaged over any consecutive 12-month period.

After each of the SRUs (S-4227, S-4228, and S-4229) is modified, the Owner/Operator shall operate only the modified SRU up to the maximum new total sulfur production limit specified in Part 87.

[Basis: Cumulative Increase, PSD]

105) DELETED

106) The owner/operator of all sources covered by this permit application (A/N 12842) shall determine the Modernization Project net emissions increase for PSD purposes using the District-approved calculation method specified in the federal PSD regulations at 40 CFR 52.21. The owner/operator shall ensure that the Modernization Project net emissions increase does not exceed any of the following PSD net emissions increase thresholds:

• NOx	40 tons/year
• CO	100 tons/year
• SOx	40 tons/year
• PM10	15 tons/year
• Hydrogen Sulfide	10 tons/year
• Total Reduced Sulfur	10 tons/year
• Reduced Sulfur Compounds	10 tons/year
• Sulfuric Acid Mist	7 tons/year

[Basis: Cumulative Increase, Rule 2-2-306, federal PSD regulations at 40 CFR 52.21]

107) The Owner/Operator of the sources listed in this part shall use the following District-approved data in order to demonstrate that the total Modernization Project net emissions increases do not exceed the PSD thresholds listed in part 106:



- a) NO_x and O₂: District-approved continuous emissions monitors (CEMs) data and District-approved flow rate data for S-4471, S-4472, S-4436/S-4227, S-4437/S-4228, and S-4438/S-4229, or the permitted emissions rate, whichever is greater. Part 27 emission factor for S-6021 multiplied by flare gas flow.
- b) CO and O₂: District-approved continuous emissions monitors (CEMs) data and District-approved flow rate data for S-4471, S-4472, S-4436/S-4227, S-4437/S-4228, and S-4438/S-4229, or the permitted emissions rate, whichever is greater. Part 27 emission factor for S-6021 multiplied by flare gas flow.
- c) SO₂ (as SO₂) and O₂: District-approved continuous emissions monitors (CEMs) data and District-approved flow rate data for S-4436/S-4227, S-4437/S-4228, and S-4438/S-4229, or the permitted emissions rate, whichever is greater. Calculated per part 9c for S-4471 and S-4472. Part 27 emission calculation method (total sulfur in the vent gas multiplied by the flare gas flow assuming 100% conversion of TS to SO₂ plus the flare pilot TS to SO₂).
- d) PM₁₀: The owner/operator shall perform District-approved source tests for S-4471, S-4472, S-4436/S-4227, S-4437/S-4228, and S-4438/S-4229 under variable load conditions in order to demonstrate compliance with the permitted emissions rates and levels. The source test procedures including loads run per source shall be pre-approved by the District in accordance with the applicable parts of 109 through 117. In addition, for S-6021, PM₁₀ emissions shall be calculated using the Part 27 emissions factors multiplied by District-approved flare gas flow
- e) For Sulfuric Acid Mist, Hydrogen Sulfide, Total Sulfur, the Modernization Project will result in a net emission reductions from pre-project baseline. [Basis: Cumulative Increase, PSD]

108) The Owner/Operator of all of the Modernization Project sources shall submit a report to the District no later than 30 days from the end of each calendar month that demonstrates that the higher of either the permitted or actual total Modernization Project source net emissions increases do not exceed the PSD thresholds specified in part 106. [Basis: Reporting Requirements, PSD]

GENERAL RECORDKEEPING CONDITIONS

109) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall maintain a District-approved log that contains all CEM and source test records and all records of fuel usage rates, fuel types, quantity of each type of fuel used at each source, heat content HHV of fuel (in Btu/scf), TS levels in fuels used, hours of operation (including each mode (dryout/warmup, commissioning, startup, shutdown), District-approved flow rate used in emissions estimates (scf/hour), hourly, daily and annual emissions estimates, and other records as specified by the APCO for the last 5 years of operation to verify compliance with Modernization Project permit conditions. [Basis: Recordkeeping]

110) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall maintain the following in a District-approved log and shall keep these



records on site for a period of at least 5 years from date of entry and make the records available to District staff upon request (note the Hydrogen Plant Replacement Project is covered by similar conditions in parts 37 and 38). [Basis: Regulation 2-1-301, Recordkeeping]

In order to demonstrate compliance with part 77, the Owner/Operator of S-4454 #6H2S Plant Recycle Amine Regenerator shall maintain calendar day, monthly, and consecutive 12-month total H2S produced, in MMSCF, for the S-4454 Plant/Recycle Amine Regenerator;

In order to demonstrate compliance with part 80, the Owner/Operator of S-4253 shall maintain calendar day, monthly, and consecutive 12-month total material feed throughputs for the S-4253 TKC/FCC Feed Hydrotreater; and

DELETED (Superseded by permit condition 25814)

(Sulfur Loading Rack S-4490 was issued a separate ATC under Application 25793 in June 2014 and its operation is governed by permit condition 25814)

In order to demonstrate compliance with parts 81 through 95, the Owner/Operator of each Sulfur Recovery Units S-4227 through S-4229 shall maintain calendar day, monthly, and consecutive 12-month total material throughputs (in long tons) for each SRU, acid gas feed rates (MMscf), CEM data, H2S emissions, PM10 Sulfuric Acid Mist, records for work performed in part 86, source test results, combined annual emissions for part 90, the individual emissions limits for part 92, sulfuric acid mist from each stack for part 95, and fugitive H2S for part 95 for the S-4227 through S-4229

111) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall submit a quarterly report to both the Compliance and Enforcement Division and Engineering Division no later than 60 days following the end of each calendar quarter addressing compliance with parts 9, 90, 92, and 95. Each quarterly report shall include for each source the source test dates in which limits of these conditions were exceeded. The District shall use this information to determine any periods of non-compliance with the emission limits.[Basis: Reporting Requirements]

112) In the absence of any specific permit condition, the owner/operator of all sources covered by this permit application (A/N 12842) shall maintain adequate records in order to demonstrate compliance with all parts of these conditions.

GENERAL SOURCE TESTING CONDITIONS

113) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall provide District pre-approved stack sampling ports and platforms, the locations of which shall be subject to the pre-approval of the District. The owner/operator shall conduct only District pre-approved source tests using District pre-approved methods for all source tests to be approved by the District.



[Basis: Regulation 1-501]

114) Upon successful completion of the requirements of parts 109 through 111, the owner/operator of sources subject to parts 19, 90, 91, and 92 shall satisfy the TAC source test requirements by compliance with part 112. [Basis: Rule 2-5]

TAC/HAP SOURCE TESTING CONDITIONS

115) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall conduct initial District-approved source tests to demonstrate compliance with the TAC mass emissions rates (including a full metals test) specified in parts 19, (not including benzene fugitives), and 95 (not including H₂S fugitives). Each initial test shall be taken no later than 120 days from the date of initial startup of each source. The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 to 117. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the date of the source test. [Basis: Rule 2-5, Source Tests]

116) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall conduct a District-approved source test annually following completion of each initial source test in part 115 to demonstrate compliance with the emission limits (including a full metals test) specified in parts 19, (not including benzene fugitives), and 95 (not including H₂S fugitives). The owner/operator may be required by the APCO to conduct more frequent source tests if source test results indicate emissions are within 90% or exceeds any emissions or concentrations limits or any emissions limit associated with any of these sources. The Owner/Operator shall conduct the District approved source tests in accordance with the applicable parts of 109 to 117. The owner/operator shall conduct the annual emissions source tests at least 9 months apart. The owner/operator shall use maximum permitted annual throughput rates and the source test results in order to demonstrate compliance with annual limits, and maximum hourly throughput rates and the source test results in order to demonstrate compliance with hourly limits subject to District approval. The Owner/Operator shall submit the source test results to the District staff no later than 60 days from the date of the source test. Should any of these values exceed a part 19 (not including benzene fugitives), or 95 (not including H₂S fugitives) emission limit, the current health risk screening assessment (HRSA) on file with the District for the Modernization Project demonstrating compliance that each source remains less than or equal to 0.20 chronic non-cancer hazard index and that each source's cancer risk remains less than or equal to 1.0 in a million, the owner/operator shall re-run the HRSA subject to District approval in order to determine compliance that each source remains less than or equal to 0.20 chronic non-cancer hazard index and that each source's cancer risk remains less than or equal to 1.0 in a million.

Within 60 calendar days from the date of the source test results, the owner/operator shall submit the results of the re-run HRSA to the District for approval. If the results of



the re-run HRSA demonstrate non-compliance with the originally approved Rule 2-5 HRSA (which did not require TBACT and that each source remains less than or equal to 0.20 chronic non-cancer hazard index and that each source's cancer risk remains less than or equal to 1.0 in a million) on file at the District for the Modernization Project, then the owner/operator shall be considered to be in violation of both Rule 2-5 and 2-1-307 back to the date of the test.

If the results of the re-run HRSA demonstrate compliance that each source remains less than or equal to 0.20 chronic non-cancer hazard index and that each source's cancer risk remains less than or equal to 1.0 in a million, then the owner/operator shall submit a permit application to the District in order to change the TAC emission limit permit conditions, within 30 calendar days from the date of the re-run submittal.

[Basis: Rule 2-5, Source Tests]

117) The Owner/Operator of all sources covered by this permit application (A/N 12842) shall submit source test procedures to the District's Source Test Section at least 14 calendar days prior to conducting any source test required by these conditions. The Owner/Operator shall comply with all applicable testing requirements for continuous emissions monitors. The Owner/Operator shall notify the District's Source Test Section, in writing, of the source test protocols and projected test dates at least 7 days prior to testing. [Basis: cumulative increase, Rule 2-5]

118) Within 60-days after the issuance of the first building permit for the Hydrogen Plant Replacement following approval of the Conditional Use Permit for the Chevron Modernization Project (PLN11-089), the Owner/Operator of all sources covered by this permit application (# 12842) shall file a complete application with the BAAQMD to cause the Facility's Title V permit to be amended to reduce the maximum annual permitted throughout limit for the Solvent Deasphalting (SDA) plant (S-4251) from 56,000 barrels per day to 50,000 barrels per day on an annual average basis. [Basis: Condition B.2 in City of Richmond Conditional Use Permit Resolution Number 67-14 dated July 29, 2014]

S-6021/A-6021 FLARE SUPPLEMENTAL NATURAL GAS CONDITIONS

119. The owner/operator shall use only natural gas as a supplemental gas at flare S-6021/A-6021 in order to comply with the minimum Net Heating Value at combustion zone (NHVcz) of 270 Btu/scf, or a value approved by US-EPA. (Basis: NESHAP 40 CFR 63.670(e) - effective January 30, 2019 or the date of the APCO's approval of the facility's time extension request per 40 CFR 63.6(i)(6))

120. The owner/operator of the S-6021/A-6021 flare shall comply with all applicable requirements in 40 CFR 63.670 to ensure the S-6021/A-6021 flare operates in a manner that ensures that the S-6021/A-6021 flare achieves a hydrocarbon destruction



efficiency of at least 98 wt.% POC on a mass basis. (Basis: NESHAP 40 CFR 63.670, Regulation 2-1-403)

121. The owner/operator shall limit the use of natural gas as supplemental gas to 97.8 MMscf in any consecutive 12-month period. Supplemental gas is the combined total of sweep and assist gas. (Basis: Regulation 2-1-320, 2-1-403)

122. To demonstrate compliance with part 121 of this permit condition, the owner/operator shall install a dedicated gas flow rate monitor for flare S-6021/A-6021 to measure the supplemental gas usage. (Basis: Regulation 2-1-403)

123. Where applicable, the owner/operator shall update and maintain the Flare Minimization Plan (FMP) as required by Regulation 12-12-404. (Basis: Regulation 12, Rule 12)

124. The owner/operator shall install and operate a continuous parametric monitoring system (CPMS) along with a CPMS monitoring plan as required by and consistent with 40 CFR 63.671(b). (Basis: NESHAP 40 CFR 63.671, Regulation 1-523)

125. The owner/operator of S-6021/A-6021 shall maintain all records and reports required by this permit condition in a District-approved log. The following records shall be kept on site and shall be made available for District inspection for a period of at least 5 years from the date on which a record is made. (Basis: Cumulative Increase, NESHAP 40 CFR 63.670(e), Regulation 2-1-403)

a. Total daily flow of supplemental gas and vent gas to the flare, summarized on a consecutive 12-month period basis.

b. Daily net heating value of the flare vent gas (NHVvg) and calculation of net heating value in the combustion zone (NHVcz).

c. Daily flare steam to vent gas ratio for S-6021/A-6021.

End of Conditions

ATTACHMENT 2

Monthly Safety Training and Implementation Reports
Operational Year 2019

Chevron Modernization MM 4.13-2b

January 2019

Introduction

This summary is provided as a monthly update per Mitigation Measure 4.13-2b for training provided to contractors during demolition and construction activities. The training obligations have not changed since commencement of construction.

Summary

In accordance with standard Refinery procedures and requirements, workers are being trained on applicable requirements and Refinery Instructions, including, but not limited to, emergency response, hot work, and contractor refinery instructions.

RI-366 Contractor Safety is the Refinery's guiding document for contractor management. Section 5 describes contractor training requirements. Section 10 describes CHESM audit requirements. The CHESM Database contains audit results. Undocumented audits are conducted regularly by many different parties including Company Reps, Field Safety Coordinators, Supervisors and Management. These audits are intended to insure safe work practices are being executed to Chevron Standards. Documented Field/Site audits (WIP – Work In Progress) are conducted and recorded in the CHESM Database. Appendix IV in RI-366 contains the Field Audit form. Contractor Office HES Audits are conducted at least annually for Medium and High Risk contractors and the results are recorded in the CHESM Database. Appendix VI in RI-366 contains the Office HES Audit form which includes training records. Audit Participants are defined in Section 10 of RI-366, and typically include a Contract Owner and a CVX rep familiar with the work being conducted.

The contractor must complete three training elements for entry. There are two proctored Bay Area Refinery and Richmond Refinery Computer Based Training (CBT) that are delivered through a number of independent companies. The majority of our contractors use OSCA in Martinez. A two-hour instructor led course (IIFI) is conducted at the refinery. To receive a Chevron badge for refinery entry, the three courses must be completed, and they can be found printed on the back of a contractor's badge. These CBTs and the instructor led training focus on Safe Work Practices, Plant Entry, Emergency Response, Refinery Safety Rules, etc.

Each contractor has prepared a Construction Safety, Health, Environmental and Security Plan. These plans are highly detailed and provide specific information on a number of important and relevant topics. These plans are updated as necessary to address new issues and/or incorporate new or revised regulatory or Chevron requirements. Contractor personnel have been and will continue to be trained on standard Chevron procedures and Refinery Instructions, and on Construction Safety, Health, Environmental and Security Plan.

Leak Response Protocol (LRP) training will not be provided to any contractors. The Leak Response Protocol is a Chevron-owned and executed process. The contractors' only connection to the LRP is to act in a HAZWOPER Awareness Level role. They are trained to report any

Chevron Modernization MM 4.13-2b

January 2019

evidence of leaks or spills through their Company Supervision, Chevron contact, Refinery Emergency call numbers, or their orange radio button, if they are issued a refinery radio.

All contractors working on site have received this training. Through February 7, 2019, more than 2,649 contractors have been trained.

Chevron Modernization MM 4.13-2b

February 2019

Introduction

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Chevron Modernization MM 4.13-2b

February 2019

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Chevron Modernization MM 4.13-2b

March 2019

Introduction

This summary is provided as a monthly update per Mitigation Measure 4.13-2b for training provided to contractors during demolition and construction activities. The training obligations have not changed since commencement of construction.

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Chevron Modernization MM 4.13-2b

March 2019

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All contractors working on site have received this training. Through April 7, 2019, more than 2,649 contractors have been trained.

ATTACHMENT 3

Quarterly Crude Fire Corrective Action Status Reports
Operational Year 2019

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM, SECTION 4.13-13d
FIFTEENTH QUARTERLY REPORT**

JANUARY 3, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

I. INTRODUCTION

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with Mitigation Measure 4.13-13d, which provides:

Chevron will report to the City quarterly, and shall provide a copy of this report to the County, after Project approval on the status of the corrective actions taken to implement agency recommendations to Chevron resulting from the August 6, 2012 fire, as well as any corrective actions taken by Chevron as a result of its own investigation. To the extent that Chevron elects not to implement a recommendation made by an agency, Chevron shall include in these quarterly reports a detailed explanation of its rationale for doing so.

This is the fifteenth report prepared under the quarterly reporting requirement.

II. BACKGROUND

The Richmond Refinery experienced an accidental release from the atmospheric distillation column of the No. 4 Crude Unit on August 6, 2012. The failure involved an 8” carbon-steel piping component in the No. 4 sidecut that carried light gas oil. The approximate duration of the release was 7 hours, 24 minutes.

All required agency notifications were made. Responding agencies included Cal/OSHA, CCHS, Bay Area Air Quality Management District, California Office of Spill Prevention and Response, the U.S. Environmental Protection Agency, the Richmond Police Department, and the U.S. Chemical Safety and Hazard Investigation Board (“CSB”). The CSB conducted an investigation concerning the fire. In April 2013, the CSB issued its Interim Investigation Report: Chevron Richmond Refinery Fire (“Interim Report”), which included two recommendations to CUSA. In January 2015, the CSB issued its Final Investigation Report Chevron Richmond Refinery Pipe Rupture and Fire (“Final Report”), which included three recommendations to CUSA. CUSA conducted its own investigation into the August 6, 2012 incident (“CUSA Investigation”), and identified a series of recommended actions to address what had been identified as causal factors and additional considerations.

III. STATUS OF CORRECTIVE ACTIONS TAKEN TO IMPLEMENT AGENCY RECOMMENDATIONS

The CSB issued two recommendations (2012-03-I-CA-R1 and 2013-03-I-CA-R2) to CUSA in its Interim Report. The CSB issued an additional three recommendations (2012-03-I-CA-R33, 2012-03-I-CA-R34, and 2012-03-I-CA-R35) to CUSA in its Final Report.

Set forth below are the CSB's recommendations from the Interim Report and Final Report, and CUSA's response to each recommendation.

Recommendation No. 2012-03-I-CA-R1: At all Chevron U.S. refineries, engage a diverse team of qualified personnel to perform a documented damage mechanism hazard review. This review shall be an integral part of the Process Hazard Analysis cycle and shall be conducted on all PSM-covered process piping circuits and process equipment. The damage mechanism hazard review shall identify potential process damage mechanisms and consequences of failure, and shall ensure safeguards are in place to control hazards presented by those damage mechanisms. Analyze and incorporate into this review applicable industry best practices, Chevron Energy Technology Company findings and recommendations, and inherently safer systems to the greatest extent feasible.

CUSA's Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis ("PHA") schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

In 2013, the Richmond Refinery took a lead role in piloting DMRs as this work process was developed. In 2014, the Refinery began adopting the DMR program by conducting selected DMRs prior to completing the applicable PHA. The Refinery employed the learnings from these initial DMRs and PHAs, and information from internal and external subject matter experts, to further develop its DMR work processes. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

The Refinery has now completed DMRs for applicable PSM-covered process piping and process equipment.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard (“Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525,” or “MFG 525”). This standard sets expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate losses of containment in fixed equipment. A project is underway at the Refinery to create asset strategies per MFG 525.

Recommendation 2012-03-I-CA-R2: At all California Chevron U.S. refineries, report leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to the federal, state, and local regulatory agencies that have chemical release prevention authority.

CUSA’s Response: The subject of process safety indicators is complex and has been the focus of prior agency recommendations (e.g., Recommendation No. 2005-4-I-TX-6 to the API and United Steelworkers). Despite many years of effort by a diverse group of interested parties, including individual companies, safety and industry groups, organized labor, and regulators, there is no consensus on process safety indicators. The CSB acknowledged this lack of consensus during a Safety Performance Indicators public hearing it held in Houston, Texas on July 23 and 24, 2012. CUSA understands the CSB’s interest in continuing to drive this process forward.

The Refinery already internally tracks numerous leading and lagging indicators through its Operational Excellence and Reliability Intelligence (“OERI”) system. OERI is a reporting system that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery’s information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

In addition to other tracking mechanisms, the Refinery uses OERI to provide organizational visibility of the Refinery's maintenance, reliability, and process safety performance, and overdue and upcoming safety, maintenance, and regulatory compliance items. Refinery personnel have ready access to OERI and it is reviewed by the Refinery's management on a routine basis.

OERI also is used during Unit Reliability Briefs ("URBs"), which are cross-functional meetings attended by management, reliability analysts, maintenance, operations, technical, and other relevant internal stakeholders. URBs are regularly conducted by each business area to manage process safety and reliability performance threats in a risk-informed manner. OERI is utilized during URBs to track and prioritize reliability threats.

To further address the CSB's recommendation, however, CUSA played a major role in coordination with multiple interested parties, including the CSB, USW, Contra Costa Health Services ("CCHS"), and others in industry to develop "consensus" process safety indicators during the CCHS Industrial Safety Ordinance ("ISO") and the City of Richmond ISO revision process. As part of these discussions, the parties conferred on the selection of appropriate indicators, potential reporting format, and the frequency of reporting, among other items. These revisions to the ISO and RISO became effective on September 30, 2014.

Consistent with the revised ordinances, the Refinery, along with industry and the County, is tracking process safety indicators in connection with CCHS's annual reporting obligation, which comes due on June 30 of each year. ISO and RISO process safety performance indicator requirements include reporting on overdue inspections for piping and pressure vessels, overdue PHA recommendations, overdue incident investigations recommendations, and overdue API and American Chemistry Counsel Tier I and II incident investigation recommendations.

On July 15, 2016, the Department of Industrial Relations released its proposed new regulation for Process Safety Management for Petroleum Refineries for public review, substantially completing the current work of the California PSM Advisory Committee. CUSA has and will continue to remain involved with other PSM reform groups and will continue to participate in the development of consensus process safety indicators at the state, local, and federal level.

Recommendation No. 2012-03-I-CA-R33: *Develop a method to assign accountability at Chevron to determine whether any new Energy Technology Company (ETC) recommended program or industry best practice, such as API guidance must be followed to ensure process safety or employee personal safety. This method shall include monitoring of these practices and guidance at a refining system level and at the refinery level. Develop a tracking system to monitor the progress of implementing these selected practices and guidance to completion.*

CUSA's Response: CUSA previously recognized the value of providing for the uniform implementation of recommended programs or industry best practices. For this reason, CUSA has developed and implemented a "Manufacturing Technical Authority Process" ("MTA Process") to assess mechanical integrity and other process safety-related ETC advisories, as well as industry standards, guidance, and best practices (collectively, "Advisories and Standards"). The MTA Process is designed to determine which Advisories and Standards are applicable and appropriate for CUSA's Manufacturing facilities to develop those Advisories and Standards into new Manufacturing Standards, and to direct and monitor their subsequent implementation by appropriate personnel. The MTA Process engages senior executives and managers with process safety and operational experience.

A brief overview of the MTA Process is as follows:

- Under the MTA Process, new Advisories and Standards are identified from a wide variety of sources.
- If new Advisories and Standards are applicable to Manufacturing facilities and are not already adequately addressed, the new Advisories and Standards will move forward in the process.
- The MTA Process assigns the new Advisories and Standards to the appropriate Manufacturing organization or SMEs to develop the methods and milestones for implementation, and to track and verify that implementation is completed according to plan.
- The appropriate refinery leadership team (e.g., Operations, Maintenance and Reliability, or Technical) assigns responsibility for executing the Manufacturing Standards.
- For Manufacturing Standards that the MTA Process determines to be critical for the prevention of fatalities and high-consequence loss of containment events, any extensions and exceptions will require approval of the President of Manufacturing.
- The MTA Process also uses a centralized database to track and monitor the development and implementation of Manufacturing Standards developed pursuant to the MTA process.

Recommendation No. 2012-03-I-CA-R34: *Develop an auditable process to be available for all recommended turnaround work items necessary to address mechanical integrity deficiencies or inspection recommendations that are denied or deferred. This process shall provide the submitter of the denied or deferred recommendation with the option to seek further review by his or her manager, who can further elevate and discuss the recommendation with higher level management, such as the Area Business Unit Manager. Maintain an auditable log of each of these potential turnaround work items, including the ultimate determination of approval, deferral, or rejection, justification determination, and the person or team responsible for that decision.*

CUSA's Response: CUSA's Richmond Refinery has developed and implemented a process for tracking turnaround work items necessary to address inspection recommendations concerning fixed equipment (*e.g.*, process piping) identified by the Company's API certified inspectors, including any turnaround work items that are denied or deferred.

On September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA "[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, *that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.*" Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. CUSA encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, CUSA has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce CUSA's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

Recommendation No. 2012-03-I-CA-R35: *Develop an approval process that includes a technical review that must be implemented prior to resetting the minimum alert thickness to a lower value in the inspection database.*

CUSA's Response: This recommendation was made in the CSB's final report released January 2015. CUSA developed and distributed a manufacturing instruction ("Manufacturing Instruction for Establishing Piping Minimum Alert Thickness" or "MFG 540") in May 2016 (revised July 2018), which includes a documented technical review and approval process when a piping minimum alert thickness is changed to a lower value within the inspection database.

IV. CORRECTIVE ACTIONS IMPLEMENTED BY CUSA IN RESPONSE TO ITS OWN INVESTIGATION

The Richmond Refinery's own investigation team identified a series of recommended actions to address what had been identified as causal factors and additional considerations. Operational and process changes that resulted from this investigation are set forth below.

A. RECOMMENDATIONS TO ADDRESS CAUSAL FACTORS ("CF")

CF Recommendation 1: *Revise Refinery policies and checklists to ensure appropriate information—including Process Safety and Inspection information—is considered when evaluating leaks and addressing the issue of whether to shut down or continue operation of equipment.*

CUSA's Response: The Refinery has implemented an updated protocol for evaluating process leaks with simple guidance to assist in making necessary and rapid decisions concerning leak response and further enhancing situational awareness skills. This protocol identifies scenarios that trigger the use of the protocol and recognizes that there may be other scenarios in high consequence services where a leak has not yet occurred but has a potential for loss of containment if conditions are not addressed.

Pursuant to the protocol, subject matter experts ("SMEs") from various disciplines, including process safety and inspections, gather to evaluate the leak. The protocol provides discussion questions about process safety information, including information related to past inspections, for the SMEs to consider when determining the response plan. The type of process safety information to consider includes the identity of the leaking material, location, temperature and emergency shutdown procedures, as well as an understanding of the potential damage mechanism involved.

The protocol is published on the Company's internal Manufacturing website under Manufacturing Standards, and a training program has been developed that tracks completion of required training.

The leak response protocol was shared with CCHS, Cal/OSHA, CSB, as well as other refineries and industrial facilities in the County and beyond.

CF Recommendation 2: *Enhance the Refinery's Mechanical Integrity program to ensure the Refinery properly identifies and monitors piping circuits for appropriate damage mechanisms using a standardized methodology and documentation system.*

CUSA's Response: The Refinery is strengthening its reliability program for piping and equipment in an effort to ensure it covers potential damage mechanisms applicable to those systems. As part of this effort, the Refinery is implementing an enhanced process for regular DMRs of piping circuits in applicable units in order to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms. As discussed in response to CSB Recommendation 2012-03-I-CA-R1, CUSA issued a standard, MFG 520, for conducting DMRs to assess corrosion threats and other applicable damage mechanisms. MFG 520 establishes a DMR work process that will, where appropriate, be completed for piping circuits and equipment in applicable units using the applicable damage mechanism information outlined in the API Recommended Practice 571.

The Refinery modified its PHA procedures to better integrate DMRs into the PHA review process. MFG 520 requires alignment of the DMR schedule with the PHA schedules for piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs. The Refinery took a lead role in piloting DMRs as this work process was developed. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

MFG 520 recognizes that the DMR work process will undergo continuous improvement as internal and external guidance is developed. Concurrent with development of the DMR work process and in response to a corrective action from its own investigation, CUSA has developed an asset strategy standard, MFG 525, which is used where applicable. As described above in CUSA's response to CSB Recommendation 2012-03-I-CA-R1, MFG 525 sets the expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate losses of containment in fixed equipment. MFG 525 defines an asset strategy as the documented plan for operating, monitoring, and maintaining fixed equipment to preserve its integrity (pressure containment) function and sustain its process (service) function. An asset strategy identifies applicable damage mechanisms; determines the need for and defines operating limits known as integrity operating windows; and prescribes inspection, testing and preventative maintenance, including tasks and frequencies, required to manage the integrity and process functions.

As described above, the MTA Process prioritizes and acts upon mechanical integrity-related recommendations from internal and external technical experts, including industry standards and alerts. CUSA's response to CSB Recommendation 2012-03-I-CA-R33, describes the MTA Process, which was established for the purpose of assessing new Advisories and Standards, determining which are applicable and appropriate for CUSA's Manufacturing facilities, and monitoring their subsequent implementation.

The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

CF Recommendation 3: Review and enhance the requirements for inspector training and competency.

CUSA's Response: The Refinery is improving its mechanical integrity training as a way to further support our leaders, inspectors, operating groups, and engineers. To that end, the Refinery has developed a standard to guide and promote the establishment of essential training and competencies for individuals who are performing a Fixed Equipment Inspector or Analyst role.

The specific training for each Fixed Equipment Inspector position is defined for that specific position based on a training plan that is developed in an effort to ensure that the needed competencies are developed within an established timeframe per certification or training from start of a new position. The implementation of the training plan is tracked through the individual's annual performance monitoring plan and monitored by the individual's supervisor. Additionally, the Refinery maintains a matrix for each inspector that tracks completion of required certifications and training. Recognizing that Fixed Equipment Inspector training is an ongoing process, and new or updated trainings are regularly required, all personnel in Fixed Equipment Inspector positions are current in the trainings identified for the inspections they perform or perform those inspections under the supervision of someone with the necessary certifications and/or training. The training standard, as well as the compliance matrices, are housed on the Refinery's intranet.

CF Recommendations 4 and 5: Develop and implement a process for additional oversight of mechanical integrity-related recommendations and inspection plans, and the escalation of recommendations. Develop and implement a process to review and act upon mechanical integrity-related recommendations from industry alerts, ETC, and other subject-matter experts.

CUSA's Response: The Refinery is implementing a manufacturing instruction for addressing mechanical integrity-related inspection recommendations, including development of mitigation plans, timelines for completion, and the assignment of roles and responsibilities. MFG 530, Fixed Equipment Integrity Threat Recommendation and Resolution Instruction, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. Under MFG 530, a fully developed integrity threat recommendation, among other things:

- Is a high-quality, data-driven recommendation for deficiencies discovered on in-scope fixed equipment.
- Includes a resolution plan with agreed-upon completion dates.

- Includes a mitigation plan if mitigation is required to enable continued Operation until final resolution can be achieved.
- Defines clear handoffs to work prioritization, planning, and execution processes.
- Verifies and documents completion of resolution and mitigation plans.
- Provides input to maintain evergreen asset strategies for fixed equipment.

MFG 530 is applicable to most types of fixed equipment used in the refinery process, including pressure vessels, boilers, on-plot and off-plot piping, atmospheric storage tanks, and furnaces. The objective is to guide the development of integrity threat recommendations to prevent loss of containment events of higher consequence. The instruction and supporting procedures provide detail to support the mechanical integrity program.

Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager (“FEIM”). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor’s manager, or may use their personal stop work authority.

In addition to the actions CUSA has taken in response to its own investigation, CUSA’s responses to CSB Recommendation 2012-03-I-R34 and CSB Recommendation 2012-03-I-CA-R35, described above, are also enhancing the Refinery’s assessment, decision-making, and oversight of mechanical integrity-related inspection recommendations.

Further, the response to CSB Recommendation 2012-03-I-R33 above describes how new Advisories and Standards are considered, developed into manufacturing instructions as appropriate, implemented, and tracked.

CF Recommendations 6 and 7: Inspect 4CU piping that falls under the ETC Sulfidation Inspection Guidelines criteria for sulfidation corrosion prior to restarting the 4CU. Implement the ETC Sulfidation Inspection Guidelines for the remainder of the Refinery.

CUSA’s Response: The Refinery conducted 100% component inspection of carbon steel piping systems identified as potentially susceptible to sulfidation corrosion. Over 12,000 individual piping components were inspected. As part of these inspections, the Refinery implemented inspections to identify components of carbon steel piping circuits that did not have sufficient thickness to remain in service until the next scheduled turnaround; implemented generally accepted engineering practices with respect to components of insufficient thickness;

documented solutions with respect to components of insufficient thickness; established an inspection frequency for carbon steel piping circuits based upon measured corrosion rates, remaining life calculations, and current process conditions, including sulfur content and temperature; and maintained records of all carbon steel piping circuits potentially susceptible to sulfidation corrosion.

CF Recommendation 8: *Ensure relevant technical studies and inspection data are considered for the Refinery's equipment reliability plans and incorporated into the ROI/IPR [Reliability Opportunity Identification/Intensive Process Review] process.*

CUSA's Response: The ROI/IPR process has been revised to include known failure mechanisms, relevant technical studies and industry incidents in the pre-read for ROI/IPR study. Impacted employees are being trained on these changes.

B. RECOMMENDATIONS TO ADDRESS ADDITIONAL CONSIDERATIONS ("AC")

AC Recommendation 1: *Review the Pre-Fire Plan to ensure sufficient guidance is provided on equipment positioning.*

CUSA's Response: The Refinery reviewed and updated its Pre-Incident Scenario Analysis with apparatus placement modifications and shared the revised plans with CUSA Industrial Fire Chiefs.

AC Recommendation 2: *Review company/industry loss history on large fractionating towers to determine if internal Engineering Standard FRS-DU-5267 (Emergency Isolation and Depressuring Valves) adequately addresses mitigation of accidental releases from these systems. Revise the standard as warranted by the findings of this review.*

CUSA's Response: The Company completed a review of loss history for large fractionating towers. No revisions to FRS-DU-5267 were warranted by this review.

AC Recommendation 3: *Ensure Refinery business plans provide for the appropriate implementation of Process Safety recommendations (such as the ETC Sulfidation Inspection Guidelines).*

CUSA's Response: See the response above to CSB Recommendation No. 2012-03-I-CA-R33, which describes the MTA Process.

AC Recommendation 4: *Ensure sufficient organizational capacity and competency for minimum thickness Fitness for Service determinations.*

CUSA's Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness ("MFG 510") was revised in March 2018. This instruction "outlines the work process and calculation

methods for determining minimum *required* pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” MFG 510 also addresses the qualification and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using CUSA’s ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

AC Recommendation 5: Consider additional training on expectations under the “Richmond Refinery Piping Inspection Guidelines” and “RFMS Piping Data Entry (Reliability Focused Maintenance System) and ACD (Add/Change/Delete) Guideline.”

CUSA’s Response: See the response above to the third CUSA Investigation CF recommendation, which discusses inspector training and competency.

AC Recommendation 6: Review and modify the PHA procedures to ensure that teams consider known corrosion threats/mechanisms.

CUSA’s Response: See the responses above to CSB Recommendation 2012-03-I-CA-R1 and the second CUSA Investigation CF recommendation, which discuss the DMR work process.

AC Recommendation 7: Consider a project to evaluate the purpose and methods of various project safety management (PSM) reviews (PHA, ROI/IPR, AOA, COA, sRCM, RBI, etc.) to determine if these activities can be combined or better sequenced to improve risk understanding across the various functions and promote better process safety outcomes.

CUSA’s Response: The Refinery has mapped out the work processes under PSM and other safety standards to identify potential efficiencies that can be gained or outcomes enhanced by re-sequencing, combining, or modifying processes.

V. CONCLUSION

Operating safely is one of CUSA’s core values. CUSA is also committed to learning from the August 6, 2012 fire to prevent a recurrence. To this end, CUSA has worked closely and cooperatively with local, state, and federal agencies, including the City, to determine the root

causes of the fire. CUSA is committed to considering recommendations from all agency investigations, and taking appropriate actions in response.

CUSA's efforts to improve safety and reliability at its refineries are ongoing. CUSA is continues to evaluate and undertake efforts to enhance mechanical integrity and safe operations at the Refinery.

APPENDIX A – ACRONYMS

ACC	American Chemistry Counsel
API	American Petroleum Institute
BIN	Business Improvement Network
Cal/OSHA	California Division of Occupational Safety and Health
CCHS	Contra Costa Health Services
CCHMP	Contra Costa County Hazardous Materials Program
CSB	U.S. Chemical Safety Board
CUSA	Chevron U.S.A. Inc.
DMR	Damage Mechanism Review
EIR	Environmental Impact Report
ETC	Energy Technology Company
ISO	Industrial Safety Ordinance
MFG	Manufacturing Standard
MM	Mitigation Measure
MTA	Manufacturing Technical Authority
OERI	Operational Excellence and Reliability Intelligence
PHA	Process Hazard Analysis
PSM	Process Safety Management
RISO	City of Richmond Industrial Safety Ordinance
S.B.	Senate Bill
SME	Subject Matter Expert
URB	Unit Reliability Brief
USW	United Steelworkers

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM, SECTION 4.13-13d
SIXTEENTH QUARTERLY REPORT**

APRIL 3, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

I. INTRODUCTION

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with Mitigation Measure 4.13-13d, which provides:

Chevron will report to the City quarterly, and shall provide a copy of this report to the County, after Project approval on the status of the corrective actions taken to implement agency recommendations to Chevron resulting from the August 6, 2012 fire, as well as any corrective actions taken by Chevron as a result of its own investigation. To the extent that Chevron elects not to implement a recommendation made by an agency, Chevron shall include in these quarterly reports a detailed explanation of its rationale for doing so.

This is the sixteenth report prepared under the quarterly reporting requirement.

II. BACKGROUND

The Richmond Refinery experienced an accidental release from the atmospheric distillation column of the No. 4 Crude Unit on August 6, 2012. The failure involved an 8” carbon-steel piping component in the No. 4 sidecut that carried light gas oil. The approximate duration of the release was 7 hours, 24 minutes.

All required agency notifications were made. Responding agencies included Cal/OSHA, CCHS, Bay Area Air Quality Management District, California Office of Spill Prevention and Response, the U.S. Environmental Protection Agency, the Richmond Police Department, and the U.S. Chemical Safety and Hazard Investigation Board (“CSB”). The CSB conducted an investigation concerning the fire. In April 2013, the CSB issued its Interim Investigation Report: Chevron Richmond Refinery Fire (“Interim Report”), which included two recommendations to CUSA. In January 2015, the CSB issued its Final Investigation Report Chevron Richmond Refinery Pipe Rupture and Fire (“Final Report”), which included three recommendations to CUSA. CUSA conducted its own investigation into the August 6, 2012 incident (“CUSA Investigation”), and identified a series of recommended actions to address what had been identified as causal factors and additional considerations.

III. STATUS OF CORRECTIVE ACTIONS TAKEN TO IMPLEMENT AGENCY RECOMMENDATIONS

The CSB issued two recommendations (2012-03-I-CA-R1 and 2013-03-I-CA-R2) to CUSA in its Interim Report. The CSB issued an additional three recommendations (2012-03-I-CA-R33, 2012-03-I-CA-R34, and 2012-03-I-CA-R35) to CUSA in its Final Report.

Set forth below are the CSB's recommendations from the Interim Report and Final Report, and CUSA's response to each recommendation.

Recommendation No. 2012-03-I-CA-R1: At all Chevron U.S. refineries, engage a diverse team of qualified personnel to perform a documented damage mechanism hazard review. This review shall be an integral part of the Process Hazard Analysis cycle and shall be conducted on all PSM-covered process piping circuits and process equipment. The damage mechanism hazard review shall identify potential process damage mechanisms and consequences of failure, and shall ensure safeguards are in place to control hazards presented by those damage mechanisms. Analyze and incorporate into this review applicable industry best practices, Chevron Energy Technology Company findings and recommendations, and inherently safer systems to the greatest extent feasible.

CUSA's Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis ("PHA") schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

In 2013, the Richmond Refinery took a lead role in piloting DMRs as this work process was developed. In 2014, the Refinery began adopting the DMR program by conducting selected DMRs prior to completing the applicable PHA. The Refinery employed the learnings from these initial DMRs and PHAs, and information from internal and external subject matter experts, to further develop its DMR work processes. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

The Refinery has now completed DMRs for applicable PSM-covered process piping and process equipment.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard ("Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525," or "MFG 525"). This standard sets expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. A project is underway at the Refinery to create asset strategies per MFG 525.

Recommendation 2012-03-I-CA-R2: *At all California Chevron U.S. refineries, report leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to the federal, state, and local regulatory agencies that have chemical release prevention authority.*

CUSA's Response: The subject of process safety indicators is complex and has been the focus of prior agency recommendations (e.g., Recommendation No. 2005-4-I-TX-6 to the API and United Steelworkers). Despite many years of effort by a diverse group of interested parties, including individual companies, safety and industry groups, organized labor, and regulators, there is no consensus on process safety indicators. The CSB acknowledged this lack of consensus during a Safety Performance Indicators public hearing it held in Houston, Texas on July 23 and 24, 2012. CUSA understands the CSB's interest in continuing to drive this process forward.

The Refinery already internally tracks numerous leading and lagging indicators through its Operational Excellence and Reliability Intelligence ("OERI") system. OERI is a reporting system that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery's information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

In addition to other tracking mechanisms, the Refinery uses OERI to provide organizational visibility of the Refinery's maintenance, reliability, and process safety performance, and overdue and upcoming safety, maintenance, and regulatory compliance items. Refinery personnel have ready access to OERI and it is reviewed by the Refinery's management on a routine basis.

OERI also is used during Unit Reliability Briefs ("URBs"), which are cross-functional meetings attended by management, reliability analysts, maintenance, operations, technical, and other relevant internal stakeholders. URBs are regularly conducted by each business area to manage process safety and reliability performance threats in a risk-informed manner. OERI is utilized during URBs to track and prioritize reliability threats.

To further address the CSB's recommendation, however, CUSA played a major role in coordination with multiple interested parties, including the CSB, USW, Contra Costa Health Services ("CCHS"), and others in industry to develop "consensus" process safety indicators during the CCHS Industrial Safety Ordinance ("ISO") and the City of Richmond ISO revision process. As part of these discussions, the parties conferred on the selection of appropriate indicators, potential reporting format, and the frequency of reporting, among other items. These revisions to the ISO and RISO became effective on September 30, 2014.

Consistent with the revised ordinances, the Refinery, along with industry and the County, is tracking process safety indicators in connection with CCHS's annual reporting obligation, which comes due on June 30 of each year. ISO and RISO process safety performance indicator requirements include reporting on overdue inspections for piping and pressure vessels, overdue PHA recommendations, overdue incident investigations recommendations, and overdue API and American Chemistry Counsel Tier I and II incident investigation recommendations.

On July 15, 2016, the Department of Industrial Relations released its proposed new regulation for Process Safety Management for Petroleum Refineries for public review, substantially completing the current work of the California PSM Advisory Committee. CUSA has and will continue to remain involved with other PSM reform groups and will continue to participate in the development of consensus process safety indicators at the state, local, and federal level.

Recommendation No. 2012-03-I-CA-R33: *Develop a method to assign accountability at Chevron to determine whether any new Energy Technology Company (ETC) recommended program or industry best practice, such as API guidance must be followed to ensure process safety or employee personal safety. This method shall include monitoring of these practices and guidance at a refining system level and at the refinery level. Develop a tracking system to monitor the progress of implementing these selected practices and guidance to completion.*

CUSA's Response: CUSA previously recognized the value of providing for the uniform implementation of recommended programs or industry best practices. For this reason, CUSA has developed and implemented a "Manufacturing Technical Authority Process" ("MTA Process") to assess mechanical integrity and other process safety-related ETC advisories, as well as industry standards, guidance, and best practices (collectively, "Advisories and Standards"). The MTA Process is designed to determine which Advisories and Standards are applicable and appropriate for CUSA's Manufacturing facilities to develop those Advisories and Standards into new Manufacturing Standards, and to direct and monitor their subsequent implementation by appropriate personnel. The MTA Process engages senior executives and managers with process safety and operational experience.

A brief overview of the MTA Process is as follows:

- Under the MTA Process, new Advisories and Standards are identified from a wide variety of sources.
- If new Advisories and Standards are applicable to Manufacturing facilities and are not already adequately addressed, the new Advisories and Standards will move forward in the process.
- The MTA Process assigns the new Advisories and Standards to the appropriate Manufacturing organization or SMEs to develop the methods and milestones for implementation, and to track and verify that implementation is completed according to plan.
- The appropriate refinery leadership team (e.g., Operations, Maintenance and Reliability, or Technical) assigns responsibility for executing the Manufacturing Standards.
- For Manufacturing Standards that the MTA Process determines to be critical for the prevention of fatalities and high-consequence loss of containment events, any extensions and exceptions will require approval of the President of Manufacturing.
- The MTA Process also uses a centralized database to track and monitor the development and implementation of Manufacturing Standards developed pursuant to the MTA process.

Recommendation No. 2012-03-I-CA-R34: *Develop an auditable process to be available for all recommended turnaround work items necessary to address mechanical integrity deficiencies or inspection recommendations that are denied or deferred. This process shall provide the submitter of the denied or deferred recommendation with the option to seek further review by his or her manager, who can further elevate and discuss the recommendation with higher level management, such as the Area Business Unit Manager. Maintain an auditable log of each of these potential turnaround work items, including the ultimate determination of approval, deferral, or rejection, justification determination, and the person or team responsible for that decision.*

CUSA's Response: CUSA's Richmond Refinery has developed and implemented a process for tracking turnaround work items necessary to address inspection recommendations concerning fixed equipment (*e.g.*, process piping) identified by the Company's API certified inspectors, including any turnaround work items that are denied or deferred.

On September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA "[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, *that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.*" Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. CUSA encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, CUSA has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce CUSA's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

Recommendation No. 2012-03-I-CA-R35: Develop an approval process that includes a technical review that must be implemented prior to resetting the minimum alert thickness to a lower value in the inspection database.

CUSA's Response: This recommendation was made in the CSB's final report released January 2015. CUSA developed and distributed a manufacturing instruction ("Manufacturing Instruction for Establishing Piping Minimum Alert Thickness" or "MFG 540") in May 2016 (revised July 2018), which includes a documented technical review and approval process when a piping minimum alert thickness is changed to a lower value within the inspection database.

IV. CORRECTIVE ACTIONS IMPLEMENTED BY CUSA IN RESPONSE TO ITS OWN INVESTIGATION

The Richmond Refinery's own investigation team identified a series of recommended actions to address what had been identified as causal factors and additional considerations. Operational and process changes that resulted from this investigation are set forth below.

A. RECOMMENDATIONS TO ADDRESS CAUSAL FACTORS ("CF")

CF Recommendation 1: *Revise Refinery policies and checklists to ensure appropriate information—including Process Safety and Inspection information—is considered when evaluating leaks and addressing the issue of whether to shut down or continue operation of equipment.*

CUSA's Response: The Refinery has implemented an updated protocol for evaluating process leaks with simple guidance to assist in making necessary and rapid decisions concerning leak response and further enhancing situational awareness skills. This protocol identifies scenarios that trigger the use of the protocol and recognizes that there may be other scenarios in high consequence services where a leak has not yet occurred but has a potential for loss of containment if conditions are not addressed.

Pursuant to the protocol, subject matter experts ("SMEs") from various disciplines, including process safety and inspections, gather to evaluate the leak. The protocol provides discussion questions about process safety information, including information related to past inspections, for the SMEs to consider when determining the response plan. The type of process safety information to consider includes the identity of the leaking material, location, temperature and emergency shutdown procedures, as well as an understanding of the potential damage mechanism involved.

The protocol is published on the Company's internal Manufacturing website under Manufacturing Standards, and a training program has been developed that tracks completion of required training.

The leak response protocol was shared with CCHS, Cal/OSHA, CSB, as well as other refineries and industrial facilities in the County and beyond.

CF Recommendation 2: *Enhance the Refinery's Mechanical Integrity program to ensure the Refinery properly identifies and monitors piping circuits for appropriate damage mechanisms using a standardized methodology and documentation system.*

CUSA's Response: The Refinery is strengthening its reliability program for piping and equipment in an effort to ensure it covers potential damage mechanisms applicable to those systems. As part of this effort, the Refinery is implementing an enhanced process for regular DMRs of piping circuits in applicable units in order to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms. As discussed in response to CSB Recommendation 2012-03-I-CA-R1, CUSA issued a standard, MFG 520, for conducting DMRs to assess corrosion threats and other applicable damage mechanisms. MFG 520 establishes a DMR work process that will, where appropriate, be completed for piping circuits and equipment in applicable units using the applicable damage mechanism information outlined in the API Recommended Practice 571.

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The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

CF Recommendation 3: Review and enhance the requirements for inspector training and competency.

CUSA's Response: The Refinery is improving its mechanical integrity training as a way to further support our leaders, inspectors, operating groups, and engineers. To that end, the Refinery has developed a standard to guide and promote the establishment of essential training and competencies for individuals who are performing a Fixed Equipment Inspector or Analyst role.

The specific training for each Fixed Equipment Inspector position is defined for that specific position based on a training plan that is developed in an effort to ensure that the needed competencies are developed within an established timeframe per certification or training from start of a new position. The implementation of the training plan is tracked through the individual's annual performance monitoring plan and monitored by the individual's supervisor. Additionally, the Refinery maintains a matrix for each inspector that tracks completion of required certifications and training. Recognizing that Fixed Equipment Inspector training is an ongoing process, and new or updated trainings are regularly required, all personnel in Fixed Equipment Inspector positions are current in the trainings identified for the inspections they perform or perform those inspections under the supervision of someone with the necessary certifications and/or training. The training standard, as well as the compliance matrices, are housed on the Refinery's intranet.

CF Recommendations 4 and 5: Develop and implement a process for additional oversight of mechanical integrity-related recommendations and inspection plans, and the escalation of recommendations. Develop and implement a process to review and act upon mechanical integrity-related recommendations from industry alerts, ETC, and other subject-matter experts.

CUSA's Response: The Refinery is implementing a manufacturing instruction for addressing mechanical integrity-related inspection recommendations, including development of mitigation plans, timelines for completion, and the assignment of roles and responsibilities. MFG 530, Fixed Equipment Integrity Threat Recommendation and Resolution Instruction, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. Under MFG 530, a fully developed integrity threat recommendation, among other things:

- Is a high-quality, data-driven recommendation for deficiencies discovered on in-scope fixed equipment.
- Includes a resolution plan with agreed-upon completion dates.

- Includes a mitigation plan if mitigation is required to enable continued Operation until final resolution can be achieved.
- Defines clear handoffs to work prioritization, planning, and execution processes.
- Verifies and documents completion of resolution and mitigation plans.
- Provides input to maintain evergreen asset strategies for fixed equipment.

MFG 530 is applicable to most types of fixed equipment used in the refinery process, including pressure vessels, boilers, on-plot and off-plot piping, atmospheric storage tanks, and furnaces. The objective is to guide the development of integrity threat recommendations to prevent loss of containment events of higher consequence. The instruction and supporting procedures provide detail to support the mechanical integrity program.

Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager ("FEIM"). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor's manager, or may use their personal stop work authority.

In addition to the actions CUSA has taken in response to its own investigation, CUSA's responses to CSB Recommendation 2012-03-I-R34 and CSB Recommendation 2012-03-I-CA-R35, described above, are also enhancing the Refinery's assessment, decision-making, and oversight of mechanical integrity-related inspection recommendations.

Further, the response to CSB Recommendation 2012-03-I-R33 above describes how new Advisories and Standards are considered, developed into manufacturing instructions as appropriate, implemented, and tracked.

CF Recommendations 6 and 7: Inspect 4CU piping that falls under the ETC Sulfidation Inspection Guidelines criteria for sulfidation corrosion prior to restarting the 4CU. Implement the ETC Sulfidation Inspection Guidelines for the remainder of the Refinery.

CUSA's Response: The Refinery conducted 100% component inspection of carbon steel piping systems identified as potentially susceptible to sulfidation corrosion. Over 12,000 individual piping components were inspected. As part of these inspections, the Refinery implemented inspections to identify components of carbon steel piping circuits that did not have sufficient thickness to remain in service until the next scheduled turnaround; implemented generally accepted engineering practices with respect to components of insufficient thickness;

documented solutions with respect to components of insufficient thickness; established an inspection frequency for carbon steel piping circuits based upon measured corrosion rates, remaining life calculations, and current process conditions, including sulfur content and temperature; and maintained records of all carbon steel piping circuits potentially susceptible to sulfidation corrosion.

CF Recommendation 8: *Ensure relevant technical studies and inspection data are considered for the Refinery's equipment reliability plans and incorporated into the ROI/IPR [Reliability Opportunity Identification/Intensive Process Review] process.*

CUSA's Response: The ROI/IPR process has been revised to include known failure mechanisms, relevant technical studies and industry incidents in the pre-read for ROI/IPR study. Impacted employees are being trained on these changes.

B. RECOMMENDATIONS TO ADDRESS ADDITIONAL CONSIDERATIONS ("AC")

AC Recommendation 1: *Review the Pre-Fire Plan to ensure sufficient guidance is provided on equipment positioning.*

CUSA's Response: The Refinery reviewed and updated its Pre-Incident Scenario Analysis with apparatus placement modifications and shared the revised plans with CUSA Industrial Fire Chiefs.

AC Recommendation 2: *Review company/industry loss history on large fractionating towers to determine if internal Engineering Standard FRS-DU-5267 (Emergency Isolation and Depressuring Valves) adequately addresses mitigation of accidental releases from these systems. Revise the standard as warranted by the findings of this review.*

CUSA's Response: The Company completed a review of loss history for large fractionating towers. No revisions to FRS-DU-5267 were warranted by this review.

AC Recommendation 3: *Ensure Refinery business plans provide for the appropriate implementation of Process Safety recommendations (such as the ETC Sulfidation Inspection Guidelines).*

CUSA's Response: See the response above to CSB Recommendation No. 2012-03-I-CA-R33, which describes the MTA Process.

AC Recommendation 4: *Ensure sufficient organizational capacity and competency for minimum thickness Fitness for Service determinations.*

CUSA's Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness ("MFG 510") was revised in March 2018. This instruction "outlines the work process and calculation

methods for determining minimum *required* pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” MFG 510 also addresses the qualification and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using CUSA’s ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

AC Recommendation 5: Consider additional training on expectations under the “Richmond Refinery Piping Inspection Guidelines” and “RFMS Piping Data Entry (Reliability Focused Maintenance System) and ACD (Add/Change/Delete) Guideline.”

CUSA’s Response: See the response above to the third CUSA Investigation CF recommendation, which discusses inspector training and competency.

AC Recommendation 6: Review and modify the PHA procedures to ensure that teams consider known corrosion threats/mechanisms.

CUSA’s Response: See the responses above to CSB Recommendation 2012-03-I-CA-R1 and the second CUSA Investigation CF recommendation, which discuss the DMR work process.

AC Recommendation 7: Consider a project to evaluate the purpose and methods of various project safety management (PSM) reviews (PHA, ROI/IPR, AOA, COA, sRCM, RBI, etc.) to determine if these activities can be combined or better sequenced to improve risk understanding across the various functions and promote better process safety outcomes.

CUSA’s Response: The Refinery has mapped out the work processes under PSM and other safety standards to identify potential efficiencies that can be gained or outcomes enhanced by re-sequencing, combining, or modifying processes.

V. CONCLUSION

Operating safely is one of CUSA’s core values. CUSA is also committed to learning from the August 6, 2012 fire to prevent a recurrence. To this end, CUSA has worked closely and cooperatively with local, state, and federal agencies, including the City, to determine the root

causes of the fire. CUSA is committed to considering recommendations from all agency investigations, and taking appropriate actions in response.

CUSA's efforts to improve safety and reliability at its refineries are ongoing. CUSA is continues to evaluate and undertake efforts to enhance mechanical integrity and safe operations at the Refinery.

APPENDIX A – ACRONYMS

ACC	American Chemistry Council
API	American Petroleum Institute
BIN	Business Improvement Network
Cal/OSHA	California Division of Occupational Safety and Health
CCHS	Contra Costa Health Services
CCHMP	Contra Costa County Hazardous Materials Program
CSB	U.S. Chemical Safety Board
CUSA	Chevron U.S.A. Inc.
DMR	Damage Mechanism Review
EIR	Environmental Impact Report
ETC	Energy Technology Company
ISO	Industrial Safety Ordinance
MFG	Manufacturing Standard
MM	Mitigation Measure
MTA	Manufacturing Technical Authority
OERI	Operational Excellence and Reliability Intelligence
PHA	Process Hazard Analysis
PSM	Process Safety Management
RISO	City of Richmond Industrial Safety Ordinance
S.B.	Senate Bill
SME	Subject Matter Expert
URB	Unit Reliability Brief
USW	United Steelworkers

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM, SECTION 4.13-13d
SEVENTEENTH QUARTERLY REPORT**

June 12, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

I. INTRODUCTION

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with Mitigation Measure 4.13-13d, which provides:

Chevron will report to the City quarterly, and shall provide a copy of this report to the County, after Project approval on the status of the corrective actions taken to implement agency recommendations to Chevron resulting from the August 6, 2012 fire, as well as any corrective actions taken by Chevron as a result of its own investigation. To the extent that Chevron elects not to implement a recommendation made by an agency, Chevron shall include in these quarterly reports a detailed explanation of its rationale for doing so.

This is the seventeenth report prepared under the quarterly reporting requirement.

II. BACKGROUND

The Richmond Refinery experienced an accidental release from the atmospheric distillation column of the No. 4 Crude Unit on August 6, 2012. The failure involved an 8” carbon-steel piping component in the No. 4 sidecut that carried light gas oil. The approximate duration of the release was 7 hours, 24 minutes.

All required agency notifications were made. Responding agencies included Cal/OSHA, CCHS, Bay Area Air Quality Management District, California Office of Spill Prevention and Response, the U.S. Environmental Protection Agency, the Richmond Police Department, and the U.S. Chemical Safety and Hazard Investigation Board (“CSB”). The CSB conducted an investigation concerning the fire. In April 2013, the CSB issued its Interim Investigation Report: Chevron Richmond Refinery Fire (“Interim Report”), which included two recommendations to CUSA. In January 2015, the CSB issued its Final Investigation Report Chevron Richmond Refinery Pipe Rupture and Fire (“Final Report”), which included three recommendations to CUSA. CUSA conducted its own investigation into the August 6, 2012 incident (“CUSA Investigation”), and identified a series of recommended actions to address what had been identified as causal factors and additional considerations.

III. STATUS OF CORRECTIVE ACTIONS TAKEN TO IMPLEMENT AGENCY RECOMMENDATIONS

The CSB issued two recommendations (2012-03-I-CA-R1 and 2013-03-I-CA-R2) to CUSA in its Interim Report. The CSB issued an additional three recommendations (2012-03-I-CA-R33, 2012-03-I-CA-R34, and 2012-03-I-CA-R35) to CUSA in its Final Report.

Set forth below are the CSB's recommendations from the Interim Report and Final Report, and CUSA's response to each recommendation.

Recommendation No. 2012-03-I-CA-R1: At all Chevron U.S. refineries, engage a diverse team of qualified personnel to perform a documented damage mechanism hazard review. This review shall be an integral part of the Process Hazard Analysis cycle and shall be conducted on all PSM-covered process piping circuits and process equipment. The damage mechanism hazard review shall identify potential process damage mechanisms and consequences of failure, and shall ensure safeguards are in place to control hazards presented by those damage mechanisms. Analyze and incorporate into this review applicable industry best practices, Chevron Energy Technology Company findings and recommendations, and inherently safer systems to the greatest extent feasible.

CUSA's Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis ("PHA") schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

In 2013, the Richmond Refinery took a lead role in piloting DMRs as this work process was developed. In 2014, the Refinery began adopting the DMR program by conducting selected DMRs prior to completing the applicable PHA. The Refinery employed the learnings from these initial DMRs and PHAs, and information from internal and external subject matter experts, to further develop its DMR work processes. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

The Refinery has now completed DMRs for applicable PSM-covered process piping and process equipment.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard (“Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525,” or “MFG 525”). This standard sets expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. A project is underway at the Refinery to create asset strategies per MFG 525.

Recommendation 2012-03-I-CA-R2: *At all California Chevron U.S. refineries, report leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to the federal, state, and local regulatory agencies that have chemical release prevention authority.*

CUSA’s Response: The subject of process safety indicators is complex and has been the focus of prior agency recommendations (e.g., Recommendation No. 2005-4-I-TX-6 to the API and United Steelworkers). Despite many years of effort by a diverse group of interested parties, including individual companies, safety and industry groups, organized labor, and regulators, there is no consensus on process safety indicators. The CSB acknowledged this lack of consensus during a Safety Performance Indicators public hearing it held in Houston, Texas on July 23 and 24, 2012. CUSA understands the CSB’s interest in continuing to drive this process forward.

The Refinery already internally tracks numerous leading and lagging indicators through its Operational Excellence and Reliability Intelligence (“OERI”) system. OERI is a reporting system that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery’s information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

In addition to other tracking mechanisms, the Refinery uses OERI to provide organizational visibility of the Refinery's maintenance, reliability, and process safety performance, and overdue and upcoming safety, maintenance, and regulatory compliance items. Refinery personnel have ready access to OERI and it is reviewed by the Refinery's management on a routine basis.

OERI also is used during Unit Reliability Briefs ("URBs"), which are cross-functional meetings attended by management, reliability analysts, maintenance, operations, technical, and other relevant internal stakeholders. URBs are regularly conducted by each business area to manage process safety and reliability performance threats in a risk-informed manner. OERI is utilized during URBs to track and prioritize reliability threats.

To further address the CSB's recommendation, however, CUSA played a major role in coordination with multiple interested parties, including the CSB, USW, Contra Costa Health Services ("CCHS"), and others in industry to develop "consensus" process safety indicators during the CCHS Industrial Safety Ordinance ("ISO") and the City of Richmond ISO revision process. As part of these discussions, the parties conferred on the selection of appropriate indicators, potential reporting format, and the frequency of reporting, among other items. These revisions to the ISO and RISO became effective on September 30, 2014.

Consistent with the revised ordinances, the Refinery, along with industry and the County, is tracking process safety indicators in connection with CCHS's annual reporting obligation, which comes due on June 30 of each year. ISO and RISO process safety performance indicator requirements include reporting on overdue inspections for piping and pressure vessels, overdue PHA recommendations, overdue incident investigations recommendations, and overdue API and American Chemistry Council Tier I and II incident investigation recommendations.

On July 15, 2016, the Department of Industrial Relations released its proposed new regulation for Process Safety Management for Petroleum Refineries for public review, substantially completing the current work of the California PSM Advisory Committee. CUSA has and will continue to remain involved with other PSM reform groups and will continue to participate in the development of consensus process safety indicators at the state, local, and federal level.

Recommendation No. 2012-03-I-CA-R33: *Develop a method to assign accountability at Chevron to determine whether any new Energy Technology Company (ETC) recommended program or industry best practice, such as API guidance must be followed to ensure process safety or employee personal safety. This method shall include monitoring of these practices and guidance at a refining system level and at the refinery level. Develop a tracking system to monitor the progress of implementing these selected practices and guidance to completion.*

CUSA's Response: CUSA previously recognized the value of providing for the uniform implementation of recommended programs or industry best practices. For this reason, CUSA has developed and implemented a "Manufacturing Technical Authority Process" ("MTA Process") to assess mechanical integrity and other process safety-related ETC advisories, as well as industry standards, guidance, and best practices (collectively, "Advisories and Standards"). The MTA Process is designed to determine which Advisories and Standards are applicable and appropriate for CUSA's Manufacturing facilities to develop those Advisories and Standards into new Manufacturing Standards, and to direct and monitor their subsequent implementation by appropriate personnel. The MTA Process engages senior executives and managers with process safety and operational experience.

A brief overview of the MTA Process is as follows:

- Under the MTA Process, new Advisories and Standards are identified from a wide variety of sources.
- If new Advisories and Standards are applicable to Manufacturing facilities and are not already adequately addressed, the new Advisories and Standards will move forward in the process.
- The MTA Process assigns the new Advisories and Standards to the appropriate Manufacturing organization or SMEs to develop the methods and milestones for implementation, and to track and verify that implementation is completed according to plan.
- The appropriate refinery leadership team (e.g., Operations, Maintenance and Reliability, or Technical) assigns responsibility for executing the Manufacturing Standards.
- For Manufacturing Standards that the MTA Process determines to be critical for the prevention of fatalities and high-consequence loss of containment events, any extensions and exceptions will require approval of the President of Manufacturing.
- The MTA Process also uses a centralized database to track and monitor the development and implementation of Manufacturing Standards developed pursuant to the MTA process.

Recommendation No. 2012-03-I-CA-R34: *Develop an auditable process to be available for all recommended turnaround work items necessary to address mechanical integrity deficiencies or inspection recommendations that are denied or deferred. This process shall provide the submitter of the denied or deferred recommendation with the option to seek further review by his or her manager, who can further elevate and discuss the recommendation with higher level management, such as the Area Business Unit Manager. Maintain an auditable log of each of these potential turnaround work items, including the ultimate determination of approval, deferral, or rejection, justification determination, and the person or team responsible for that decision.*

CUSA's Response: CUSA's Richmond Refinery has developed and implemented a process for tracking turnaround work items necessary to address inspection recommendations concerning fixed equipment (*e.g.*, process piping) identified by the Company's API certified inspectors, including any turnaround work items that are denied or deferred.

On September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA "[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, *that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.*" Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. CUSA encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, CUSA has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce CUSA's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

Recommendation No. 2012-03-I-CA-R35: *Develop an approval process that includes a technical review that must be implemented prior to resetting the minimum alert thickness to a lower value in the inspection database.*

CUSA's Response: This recommendation was made in the CSB's final report released January 2015. CUSA developed and distributed a manufacturing instruction ("Manufacturing Instruction for Establishing Piping Minimum Alert Thickness" or "MFG 540") in May 2016 (revised July 2018), which includes a documented technical review and approval process when a piping minimum alert thickness is changed to a lower value within the inspection database.

IV. CORRECTIVE ACTIONS IMPLEMENTED BY CUSA IN RESPONSE TO ITS OWN INVESTIGATION

The Richmond Refinery's own investigation team identified a series of recommended actions to address what had been identified as causal factors and additional considerations. Operational and process changes that resulted from this investigation are set forth below.

A. RECOMMENDATIONS TO ADDRESS CAUSAL FACTORS ("CF")

CF Recommendation 1: *Revise Refinery policies and checklists to ensure appropriate information—including Process Safety and Inspection information—is considered when evaluating leaks and addressing the issue of whether to shut down or continue operation of equipment.*

CUSA's Response: The Refinery has implemented an updated protocol for evaluating process leaks with simple guidance to assist in making necessary and rapid decisions concerning leak response and further enhancing situational awareness skills. This protocol identifies scenarios that trigger the use of the protocol and recognizes that there may be other scenarios in high consequence services where a leak has not yet occurred but has a potential for loss of containment if conditions are not addressed.

Pursuant to the protocol, subject matter experts ("SMEs") from various disciplines, including process safety and inspections, gather to evaluate the leak. The protocol provides discussion questions about process safety information, including information related to past inspections, for the SMEs to consider when determining the response plan. The type of process safety information to consider includes the identity of the leaking material, location, temperature and emergency shutdown procedures, as well as an understanding of the potential damage mechanism involved.

The protocol is published on the Company's internal Manufacturing website under Manufacturing Standards, and a training program has been developed that tracks completion of required training.

The leak response protocol was shared with CCHS, Cal/OSHA, CSB, as well as other refineries and industrial facilities in the County and beyond.

CF Recommendation 2: Enhance the Refinery's Mechanical Integrity program to ensure the Refinery properly identifies and monitors piping circuits for appropriate damage mechanisms using a standardized methodology and documentation system.

CUSA's Response: The Refinery is strengthening its reliability program for piping and equipment in an effort to ensure it covers potential damage mechanisms applicable to those systems. As part of this effort, the Refinery is implementing an enhanced process for regular DMRs of piping circuits in applicable units in order to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms. As discussed in response to CSB Recommendation 2012-03-I-CA-R1, CUSA issued a standard, MFG 520, for conducting DMRs to assess corrosion threats and other applicable damage mechanisms. MFG 520 establishes a DMR work process that will, where appropriate, be completed for piping circuits and equipment in applicable units using the applicable damage mechanism information outlined in the API Recommended Practice 571.

The Refinery modified its PHA procedures to better integrate DMRs into the PHA review process. MFG 520 requires alignment of the DMR schedule with the PHA schedules for piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs. The Refinery took a lead role in piloting DMRs as this work process was developed. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

MFG 520 recognizes that the DMR work process will undergo continuous improvement as internal and external guidance is developed. Concurrent with development of the DMR work process and in response to a corrective action from its own investigation, CUSA has developed an asset strategy standard, MFG 525, which is used where applicable. As described above in CUSA's response to CSB Recommendation 2012-03-I-CA-R1, MFG 525 sets the expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. MFG 525 defines an asset strategy as the documented plan for operating, monitoring, and maintaining fixed equipment to preserve its integrity (pressure containment) function and sustain its process (service) function. An asset strategy identifies applicable damage mechanisms; determines the need for and defines operating limits known as integrity operating windows; and prescribes inspection, testing and preventative maintenance, including tasks and frequencies, required to manage the integrity and process functions.

As described above, the MTA Process prioritizes and acts upon mechanical integrity-related recommendations from internal and external technical experts, including industry standards and alerts. CUSA's response to CSB Recommendation 2012-03-I-CA-R33, describes the MTA Process, which was established for the purpose of assessing new Advisories and Standards, determining which are applicable and appropriate for CUSA's Manufacturing facilities, and monitoring their subsequent implementation.

The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

CF Recommendation 3: Review and enhance the requirements for inspector training and competency.

CUSA's Response: The Refinery is improving its mechanical integrity training as a way to further support our leaders, inspectors, operating groups, and engineers. To that end, the Refinery has developed a standard to guide and promote the establishment of essential training and competencies for individuals who are performing a Fixed Equipment Inspector or Analyst role.

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Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager ("FEIM"). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor's manager, or may use their personal stop work authority.

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Further, the response to CSB Recommendation 2012-03-I-R33 above describes how new Advisories and Standards are considered, developed into manufacturing instructions as appropriate, implemented, and tracked.

CF Recommendations 6 and 7: Inspect 4CU piping that falls under the ETC Sulfidation Inspection Guidelines criteria for sulfidation corrosion prior to restarting the 4CU. Implement the ETC Sulfidation Inspection Guidelines for the remainder of the Refinery.

CUSA's Response: The Refinery conducted 100% component inspection of carbon steel piping systems identified as potentially susceptible to sulfidation corrosion. Over 12,000 individual piping components were inspected. As part of these inspections, the Refinery implemented inspections to identify components of carbon steel piping circuits that did not have sufficient thickness to remain in service until the next scheduled turnaround; implemented generally accepted engineering practices with respect to components of insufficient thickness;

documented solutions with respect to components of insufficient thickness; established an inspection frequency for carbon steel piping circuits based upon measured corrosion rates, remaining life calculations, and current process conditions, including sulfur content and temperature; and maintained records of all carbon steel piping circuits potentially susceptible to sulfidation corrosion.

CF Recommendation 8: *Ensure relevant technical studies and inspection data are considered for the Refinery’s equipment reliability plans and incorporated into the ROI/IPR [Reliability Opportunity Identification/Intensive Process Review] process.*

CUSA’s Response: The ROI/IPR process has been revised to include known failure mechanisms, relevant technical studies and industry incidents in the pre-read for ROI/IPR study. Impacted employees are being trained on these changes.

B. RECOMMENDATIONS TO ADDRESS ADDITIONAL CONSIDERATIONS (“AC”)

AC Recommendation 1: *Review the Pre-Fire Plan to ensure sufficient guidance is provided on equipment positioning.*

CUSA’s Response: The Refinery reviewed and updated its Pre-Incident Scenario Analysis with apparatus placement modifications and shared the revised plans with CUSA Industrial Fire Chiefs.

AC Recommendation 2: *Review company/industry loss history on large fractionating towers to determine if internal Engineering Standard FRS-DU-5267 (Emergency Isolation and Depressuring Valves) adequately addresses mitigation of accidental releases from these systems. Revise the standard as warranted by the findings of this review.*

CUSA’s Response: The Company completed a review of loss history for large fractionating towers. No revisions to FRS-DU-5267 were warranted by this review.

AC Recommendation 3: *Ensure Refinery business plans provide for the appropriate implementation of Process Safety recommendations (such as the ETC Sulfidation Inspection Guidelines).*

CUSA’s Response: See the response above to CSB Recommendation No. 2012-03-I-CA-R33, which describes the MTA Process.

AC Recommendation 4: *Ensure sufficient organizational capacity and competency for minimum thickness Fitness for Service determinations.*

CUSA’s Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness (“MFG 510”) was revised in March 2018. This instruction “outlines the work process and calculation

methods for determining minimum *required* pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” MFG 510 also addresses the qualification and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using CUSA’s ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

AC Recommendation 5: Consider additional training on expectations under the “Richmond Refinery Piping Inspection Guidelines” and “RFMS Piping Data Entry (Reliability Focused Maintenance System) and ACD (Add/Change/Delete) Guideline.”

CUSA’s Response: See the response above to the third CUSA Investigation CF recommendation, which discusses inspector training and competency.

AC Recommendation 6: Review and modify the PHA procedures to ensure that teams consider known corrosion threats/mechanisms.

CUSA’s Response: See the responses above to CSB Recommendation 2012-03-I-CA-R1 and the second CUSA Investigation CF recommendation, which discuss the DMR work process.

AC Recommendation 7: Consider a project to evaluate the purpose and methods of various project safety management (PSM) reviews (PHA, ROI/IPR, AOA, COA, sRCM, RBI, etc.) to determine if these activities can be combined or better sequenced to improve risk understanding across the various functions and promote better process safety outcomes.

CUSA’s Response: The Refinery has mapped out the work processes under PSM and other safety standards to identify potential efficiencies that can be gained or outcomes enhanced by re-sequencing, combining, or modifying processes.

V. CONCLUSION

Operating safely is one of CUSA’s core values. CUSA is also committed to learning from the August 6, 2012 fire to prevent a recurrence. To this end, CUSA has worked closely and cooperatively with local, state, and federal agencies, including the City, to determine the root

causes of the fire. CUSA is committed to considering recommendations from all agency investigations, and taking appropriate actions in response.

CUSA's efforts to improve safety and reliability at its refineries are ongoing. CUSA is continues to evaluate and undertake efforts to enhance mechanical integrity and safe operations at the Refinery.

APPENDIX A – ACRONYMS

ACC	American Chemistry Council
API	American Petroleum Institute
BIN	Business Improvement Network
Cal/OSHA	California Division of Occupational Safety and Health
CCHS	Contra Costa Health Services
CCHMP	Contra Costa County Hazardous Materials Program
CSB	U.S. Chemical Safety Board
CUSA	Chevron U.S.A. Inc.
DMR	Damage Mechanism Review
EIR	Environmental Impact Report
ETC	Energy Technology Company
ISO	Industrial Safety Ordinance
MFG	Manufacturing Standard
MM	Mitigation Measure
MTA	Manufacturing Technical Authority
OERI	Operational Excellence and Reliability Intelligence
PHA	Process Hazard Analysis
PSM	Process Safety Management
RISO	City of Richmond Industrial Safety Ordinance
S.B.	Senate Bill
SME	Subject Matter Expert
URB	Unit Reliability Brief
USW	United Steelworkers

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM, SECTION 4.13-13d
EIGHTEENTH QUARTERLY REPORT**

October 3, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

I. INTRODUCTION

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with Mitigation Measure 4.13-13d, which provides:

Chevron will report to the City quarterly, and shall provide a copy of this report to the County, after Project approval on the status of the corrective actions taken to implement agency recommendations to Chevron resulting from the August 6, 2012 fire, as well as any corrective actions taken by Chevron as a result of its own investigation. To the extent that Chevron elects not to implement a recommendation made by an agency, Chevron shall include in these quarterly reports a detailed explanation of its rationale for doing so.

This is the eighteenth report prepared under the quarterly reporting requirement.

II. BACKGROUND

The Richmond Refinery experienced an accidental release from the atmospheric distillation column of the No. 4 Crude Unit on August 6, 2012. The failure involved an 8” carbon-steel piping component in the No. 4 sidecut that carried light gas oil. The approximate duration of the release was 7 hours, 24 minutes.

All required agency notifications were made. Responding agencies included Cal/OSHA, CCHS, Bay Area Air Quality Management District, California Office of Spill Prevention and Response, the U.S. Environmental Protection Agency, the Richmond Police Department, and the U.S. Chemical Safety and Hazard Investigation Board (“CSB”). The CSB conducted an investigation concerning the fire. In April 2013, the CSB issued its Interim Investigation Report: Chevron Richmond Refinery Fire (“Interim Report”), which included two recommendations to CUSA. In January 2015, the CSB issued its Final Investigation Report Chevron Richmond Refinery Pipe Rupture and Fire (“Final Report”), which included three recommendations to CUSA. CUSA conducted its own investigation into the August 6, 2012 incident (“CUSA Investigation”), and identified a series of recommended actions to address what had been identified as causal factors and additional considerations.

III. STATUS OF CORRECTIVE ACTIONS TAKEN TO IMPLEMENT AGENCY RECOMMENDATIONS

The CSB issued two recommendations (2012-03-I-CA-R1 and 2013-03-I-CA-R2) to CUSA in its Interim Report. The CSB issued an additional three recommendations (2012-03-I-CA-R33, 2012-03-I-CA-R34, and 2012-03-I-CA-R35) to CUSA in its Final Report.

Set forth below are the CSB's recommendations from the Interim Report and Final Report, and CUSA's response to each recommendation.

Recommendation No. 2012-03-I-CA-R1: At all Chevron U.S. refineries, engage a diverse team of qualified personnel to perform a documented damage mechanism hazard review. This review shall be an integral part of the Process Hazard Analysis cycle and shall be conducted on all PSM-covered process piping circuits and process equipment. The damage mechanism hazard review shall identify potential process damage mechanisms and consequences of failure, and shall ensure safeguards are in place to control hazards presented by those damage mechanisms. Analyze and incorporate into this review applicable industry best practices, Chevron Energy Technology Company findings and recommendations, and inherently safer systems to the greatest extent feasible.

CUSA's Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis ("PHA") schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

In 2013, the Richmond Refinery took a lead role in piloting DMRs as this work process was developed. In 2014, the Refinery began adopting the DMR program by conducting selected DMRs prior to completing the applicable PHA. The Refinery employed the learnings from these initial DMRs and PHAs, and information from internal and external subject matter experts, to further develop its DMR work processes. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

The Refinery has now completed DMRs for applicable PSM-covered process piping and process equipment.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard (“Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525,” or “MFG 525”). This standard sets expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. A project is underway at the Refinery to create asset strategies per MFG 525.

Recommendation 2012-03-I-CA-R2: *At all California Chevron U.S. refineries, report leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to the federal, state, and local regulatory agencies that have chemical release prevention authority.*

CUSA’s Response: The subject of process safety indicators is complex and has been the focus of prior agency recommendations (e.g., Recommendation No. 2005-4-I-TX-6 to the API and United Steelworkers). Despite many years of effort by a diverse group of interested parties, including individual companies, safety and industry groups, organized labor, and regulators, there is no consensus on process safety indicators. The CSB acknowledged this lack of consensus during a Safety Performance Indicators public hearing it held in Houston, Texas on July 23 and 24, 2012. CUSA understands the CSB’s interest in continuing to drive this process forward.

The Refinery already internally tracks numerous leading and lagging indicators through its Operational Excellence and Reliability Intelligence (“OERI”) system. OERI is a reporting system that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery’s information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

In addition to other tracking mechanisms, the Refinery uses OERI to provide organizational visibility of the Refinery's maintenance, reliability, and process safety performance, and overdue and upcoming safety, maintenance, and regulatory compliance items. Refinery personnel have ready access to OERI, and it is reviewed by the Refinery's management on a routine basis.

OERI also is used during Unit Reliability Briefs ("URBs"), which are cross-functional meetings attended by management, reliability analysts, maintenance, operations, technical, and other relevant internal stakeholders. URBs are regularly conducted by each business area to manage process safety and reliability performance threats in a risk-informed manner. OERI is utilized during URBs to track and prioritize reliability threats.

To further address the CSB's recommendation, however, CUSA played a major role in coordination with multiple interested parties, including the CSB, USW, Contra Costa Health Services ("CCHS"), and others in industry to develop "consensus" process safety indicators during the CCHS Industrial Safety Ordinance ("ISO") and the City of Richmond ISO revision process. As part of these discussions, the parties conferred on the selection of appropriate indicators, potential reporting format, and the frequency of reporting, among other items. These revisions to the ISO and RISO became effective on September 30, 2014.

Consistent with the revised ordinances, the Refinery, along with industry and the County, is tracking process safety indicators in connection with CCHS's annual reporting obligation, which comes due on June 30 of each year. ISO and RISO process safety performance indicator requirements include reporting on overdue inspections for piping and pressure vessels, overdue PHA recommendations, overdue incident investigations recommendations, and overdue API and American Chemistry Council Tier I and II incident investigation recommendations.

On July 15, 2016, the Department of Industrial Relations released its proposed new regulation for Process Safety Management for Petroleum Refineries for public review, substantially completing the current work of the California PSM Advisory Committee. CUSA has and will continue to remain involved with other PSM reform groups and will continue to participate in the development of consensus process safety indicators at the state, local, and federal level.

Recommendation No. 2012-03-I-CA-R33: *Develop a method to assign accountability at Chevron to determine whether any new Energy Technology Company (ETC) recommended program or industry best practice, such as API guidance must be followed to ensure process safety or employee personal safety. This method shall include monitoring of these practices and guidance at a refining system level and at the refinery level. Develop a tracking system to monitor the progress of implementing these selected practices and guidance to completion.*

CUSA's Response: CUSA previously recognized the value of providing for the uniform implementation of recommended programs or industry best practices. For this reason, CUSA has developed and implemented a "Manufacturing Technical Authority Process" ("MTA Process") to assess mechanical integrity and other process safety-related ETC advisories, as well as industry standards, guidance, and best practices (collectively, "Advisories and Standards"). The MTA Process is designed to determine which Advisories and Standards are applicable and appropriate for CUSA's Manufacturing facilities to develop those Advisories and Standards into new Manufacturing Standards, and to direct and monitor their subsequent implementation by appropriate personnel. The MTA Process engages senior executives and managers with process safety and operational experience.

A brief overview of the MTA Process is as follows:

- Under the MTA Process, new Advisories and Standards are identified from a wide variety of sources.
- If new Advisories and Standards are applicable to Manufacturing facilities and are not already adequately addressed, the new Advisories and Standards will move forward in the process.
- The MTA Process assigns the new Advisories and Standards to the appropriate Manufacturing organization or SMEs to develop the methods and milestones for implementation, and to track and verify that implementation is completed according to plan.
- The appropriate refinery leadership team (e.g., Operations, Maintenance and Reliability, or Technical) assigns responsibility for executing the Manufacturing Standards.
- For Manufacturing Standards that the MTA Process determines to be critical for the prevention of fatalities and high-consequence loss of containment events, any extensions and exceptions will require approval of the President of Manufacturing.
- The MTA Process also uses a centralized database to track and monitor the development and implementation of Manufacturing Standards developed pursuant to the MTA process.

Recommendation No. 2012-03-I-CA-R34: *Develop an auditable process to be available for all recommended turnaround work items necessary to address mechanical integrity deficiencies or inspection recommendations that are denied or deferred. This process shall provide the submitter of the denied or deferred recommendation with the option to seek further review by his or her manager, who can further elevate and discuss the recommendation with higher level management, such as the Area Business Unit Manager. Maintain an auditable log of each of these potential turnaround work items, including the ultimate determination of approval, deferral, or rejection, justification determination, and the person or team responsible for that decision.*

CUSA's Response: CUSA's Richmond Refinery has developed and implemented a process for tracking turnaround work items necessary to address inspection recommendations concerning fixed equipment (*e.g.*, process piping) identified by the Company's API certified inspectors, including any turnaround work items that are denied or deferred.

On September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA "[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, *that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.*" Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. CUSA encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, CUSA has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce CUSA's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

Recommendation No. 2012-03-I-CA-R35: *Develop an approval process that includes a technical review that must be implemented prior to resetting the minimum alert thickness to a lower value in the inspection database.*

CUSA's Response: This recommendation was made in the CSB's final report released January 2015. CUSA developed and distributed a manufacturing instruction ("Manufacturing Instruction for Establishing Piping Minimum Alert Thickness" or "MFG 540") in May 2016 (revised July 2018), which includes a documented technical review and approval process when a piping minimum alert thickness is changed to a lower value within the inspection database.

IV. CORRECTIVE ACTIONS IMPLEMENTED BY CUSA IN RESPONSE TO ITS OWN INVESTIGATION

The Richmond Refinery's own investigation team identified a series of recommended actions to address what had been identified as causal factors and additional considerations. Operational and process changes that resulted from this investigation are set forth below.

A. RECOMMENDATIONS TO ADDRESS CAUSAL FACTORS ("CF")

CF Recommendation 1: *Revise Refinery policies and checklists to ensure appropriate information—including Process Safety and Inspection information—is considered when evaluating leaks and addressing the issue of whether to shut down or continue operation of equipment.*

CUSA's Response: The Refinery has implemented an updated protocol for evaluating process leaks with simple guidance to assist in making necessary and rapid decisions concerning leak response and further enhancing situational awareness skills. This protocol identifies scenarios that trigger the use of the protocol and recognizes that there may be other scenarios in high consequence services where a leak has not yet occurred but has a potential for loss of containment if conditions are not addressed.

Pursuant to the protocol, subject matter experts ("SMEs") from various disciplines, including process safety and inspections, gather to evaluate the leak. The protocol provides discussion questions about process safety information, including information related to past inspections, for the SMEs to consider when determining the response plan. The type of process safety information to consider includes the identity of the leaking material, location, temperature and emergency shutdown procedures, as well as an understanding of the potential damage mechanism involved.

The protocol is published on the Company's internal Manufacturing website under Manufacturing Standards, and a training program has been developed that tracks completion of required training.

The leak response protocol was shared with CCHS, Cal/OSHA, CSB, as well as other refineries and industrial facilities in the County and beyond.

CF Recommendation 2: *Enhance the Refinery's Mechanical Integrity program to ensure the Refinery properly identifies and monitors piping circuits for appropriate damage mechanisms using a standardized methodology and documentation system.*

CUSA's Response: The Refinery is strengthening its reliability program for piping and equipment in an effort to ensure it covers potential damage mechanisms applicable to those systems. As part of this effort, the Refinery is implementing an enhanced process for regular DMRs of piping circuits in applicable units in order to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms. As discussed in response to CSB Recommendation 2012-03-I-CA-R1, CUSA issued a standard, MFG 520, for conducting DMRs to assess corrosion threats and other applicable damage mechanisms. MFG 520 establishes a DMR work process that will, where appropriate, be completed for piping circuits and equipment in applicable units using the applicable damage mechanism information outlined in the API Recommended Practice 571.

The Refinery modified its PHA procedures to better integrate DMRs into the PHA review process. MFG 520 requires alignment of the DMR schedule with the PHA schedules for piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs. The Refinery took a lead role in piloting DMRs as this work process was developed. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

MFG 520 recognizes that the DMR work process will undergo continuous improvement as internal and external guidance is developed. Concurrent with development of the DMR work process and in response to a corrective action from its own investigation, CUSA has developed an asset strategy standard, MFG 525, which is used where applicable. As described above in CUSA's response to CSB Recommendation 2012-03-I-CA-R1, MFG 525 sets the expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. MFG 525 defines an asset strategy as the documented plan for operating, monitoring, and maintaining fixed equipment to preserve its integrity (pressure containment) function and sustain its process (service) function. An asset strategy identifies applicable damage mechanisms; determines the need for and defines operating limits known as integrity operating windows; and prescribes inspection, testing and preventative maintenance, including tasks and frequencies, required to manage the integrity and process functions.

As described above, the MTA Process prioritizes and acts upon mechanical integrity-related recommendations from internal and external technical experts, including industry standards and alerts. CUSA's response to CSB Recommendation 2012-03-I-CA-R33, describes the MTA Process, which was established for the purpose of assessing new Advisories and Standards, determining which are applicable and appropriate for CUSA's Manufacturing facilities, and monitoring their subsequent implementation.

The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

CF Recommendation 3: Review and enhance the requirements for inspector training and competency.

CUSA's Response: The Refinery is improving its mechanical integrity training as a way to further support our leaders, inspectors, operating groups, and engineers. To that end, the Refinery has developed a standard to guide and promote the establishment of essential training and competencies for individuals who are performing a Fixed Equipment Inspector or Analyst role.

The specific training for each Fixed Equipment Inspector position is defined for that specific position based on a training plan that is developed in an effort to ensure that the needed competencies are developed within an established timeframe per certification or training from start of a new position. The implementation of the training plan is tracked through the individual's annual performance monitoring plan and monitored by the individual's supervisor. Additionally, the Refinery maintains a matrix for each inspector that tracks completion of required certifications and training. Recognizing that Fixed Equipment Inspector training is an ongoing process, and new or updated trainings are regularly required, all personnel in Fixed Equipment Inspector positions are current in the trainings identified for the inspections they perform or perform those inspections under the supervision of someone with the necessary certifications and/or training. The training standard, as well as the compliance matrices, are housed on the Refinery's intranet.

CF Recommendations 4 and 5: Develop and implement a process for additional oversight of mechanical integrity-related recommendations and inspection plans, and the escalation of recommendations. Develop and implement a process to review and act upon mechanical integrity-related recommendations from industry alerts, ETC, and other subject-matter experts.

CUSA's Response: The Refinery is implementing a manufacturing instruction for addressing mechanical integrity-related inspection recommendations, including development of mitigation plans, timelines for completion, and the assignment of roles and responsibilities. MFG 530, Fixed Equipment Integrity Threat Recommendation and Resolution Instruction, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. Under MFG 530, a fully developed integrity threat recommendation, among other things:

- Is a high-quality, data-driven recommendation for deficiencies discovered on in-scope fixed equipment.
- Includes a resolution plan with agreed-upon completion dates.

- Includes a mitigation plan if mitigation is required to enable continued Operation until final resolution can be achieved.
- Defines clear handoffs to work prioritization, planning, and execution processes.
- Verifies and documents completion of resolution and mitigation plans.
- Provides input to maintain evergreen asset strategies for fixed equipment.

MFG 530 is applicable to most types of fixed equipment used in the refinery process, including pressure vessels, boilers, on-plot and off-plot piping, atmospheric storage tanks, and furnaces. The objective is to guide the development of integrity threat recommendations to prevent loss of containment events of higher consequence. The instruction and supporting procedures provide detail to support the mechanical integrity program.

Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager ("FEIM"). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor's manager, or may use their personal stop work authority.

In addition to the actions CUSA has taken in response to its own investigation, CUSA's responses to CSB Recommendation 2012-03-I-R34 and CSB Recommendation 2012-03-I-CA-R35, described above, are also enhancing the Refinery's assessment, decision-making, and oversight of mechanical integrity-related inspection recommendations.

Further, the response to CSB Recommendation 2012-03-I-R33 above describes how new Advisories and Standards are considered, developed into manufacturing instructions as appropriate, implemented, and tracked.

CF Recommendations 6 and 7: Inspect 4CU piping that falls under the ETC Sulfidation Inspection Guidelines criteria for sulfidation corrosion prior to restarting the 4CU. Implement the ETC Sulfidation Inspection Guidelines for the remainder of the Refinery.

CUSA's Response: The Refinery conducted 100% component inspection of carbon steel piping systems identified as potentially susceptible to sulfidation corrosion. Over 12,000 individual piping components were inspected. As part of these inspections, the Refinery implemented inspections to identify components of carbon steel piping circuits that did not have sufficient thickness to remain in service until the next scheduled turnaround; implemented generally accepted engineering practices with respect to components of insufficient thickness;

documented solutions with respect to components of insufficient thickness; established an inspection frequency for carbon steel piping circuits based upon measured corrosion rates, remaining life calculations, and current process conditions, including sulfur content and temperature; and maintained records of all carbon steel piping circuits potentially susceptible to sulfidation corrosion.

CF Recommendation 8: *Ensure relevant technical studies and inspection data are considered for the Refinery's equipment reliability plans and incorporated into the ROI/IPR [Reliability Opportunity Identification/Intensive Process Review] process.*

CUSA's Response: The ROI/IPR process has been revised to include known failure mechanisms, relevant technical studies and industry incidents in the pre-read for ROI/IPR study. Impacted employees are being trained on these changes.

B. RECOMMENDATIONS TO ADDRESS ADDITIONAL CONSIDERATIONS ("AC")

AC Recommendation 1: *Review the Pre-Fire Plan to ensure sufficient guidance is provided on equipment positioning.*

CUSA's Response: The Refinery reviewed and updated its Pre-Incident Scenario Analysis with apparatus placement modifications and shared the revised plans with CUSA Industrial Fire Chiefs.

AC Recommendation 2: *Review company/industry loss history on large fractionating towers to determine if internal Engineering Standard FRS-DU-5267 (Emergency Isolation and Depressuring Valves) adequately addresses mitigation of accidental releases from these systems. Revise the standard as warranted by the findings of this review.*

CUSA's Response: The Company completed a review of loss history for large fractionating towers. No revisions to FRS-DU-5267 were warranted by this review.

AC Recommendation 3: *Ensure Refinery business plans provide for the appropriate implementation of Process Safety recommendations (such as the ETC Sulfidation Inspection Guidelines).*

CUSA's Response: See the response above to CSB Recommendation No. 2012-03-I-CA-R33, which describes the MTA Process.

AC Recommendation 4: *Ensure sufficient organizational capacity and competency for minimum thickness Fitness for Service determinations.*

CUSA's Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness ("MFG 510") was revised in March 2018. This instruction "outlines the work process and calculation

methods for determining minimum *required* pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” MFG 510 also addresses the qualification and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using CUSA’s ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

AC Recommendation 5: Consider additional training on expectations under the “Richmond Refinery Piping Inspection Guidelines” and “RFMS Piping Data Entry (Reliability Focused Maintenance System) and ACD (Add/Change/Delete) Guideline.”

CUSA’s Response: See the response above to the third CUSA Investigation CF recommendation, which discusses inspector training and competency.

AC Recommendation 6: Review and modify the PHA procedures to ensure that teams consider known corrosion threats/mechanisms.

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CUSA’s Response: The Refinery has mapped out the work processes under PSM and other safety standards to identify potential efficiencies that can be gained, or outcomes enhanced by re-sequencing, combining, or modifying processes.

V. CONCLUSION

Operating safely is one of CUSA’s core values. CUSA is also committed to learning from the August 6, 2012 fire to prevent a recurrence. To this end, CUSA has worked closely and cooperatively with local, state, and federal agencies, including the City, to determine the root

causes of the fire. CUSA is committed to considering recommendations from all agency investigations, and taking appropriate actions in response.

CUSA's efforts to improve safety and reliability at its refineries are ongoing. CUSA is continues to evaluate and undertake efforts to enhance mechanical integrity and safe operations at the Refinery.

APPENDIX A – ACRONYMS

ACC	American Chemistry Council
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Cal/OSHA	California Division of Occupational Safety and Health
CCHS	Contra Costa Health Services
CCHMP	Contra Costa County Hazardous Materials Program
CSB	U.S. Chemical Safety Board
CUSA	Chevron U.S.A. Inc.
DMR	Damage Mechanism Review
EIR	Environmental Impact Report
ETC	Energy Technology Company
ISO	Industrial Safety Ordinance
MFG	Manufacturing Standard
MM	Mitigation Measure
MTA	Manufacturing Technical Authority
OERI	Operational Excellence and Reliability Intelligence
PHA	Process Hazard Analysis
PSM	Process Safety Management
RISO	City of Richmond Industrial Safety Ordinance
S.B.	Senate Bill
SME	Subject Matter Expert
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**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM, SECTION 4.13-13d
NINETEENTH QUARTERLY REPORT**

December 19, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

I. INTRODUCTION

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with Mitigation Measure 4.13-13d, which provides:

Chevron will report to the City quarterly, and shall provide a copy of this report to the County, after Project approval on the status of the corrective actions taken to implement agency recommendations to Chevron resulting from the August 6, 2012 fire, as well as any corrective actions taken by Chevron as a result of its own investigation. To the extent that Chevron elects not to implement a recommendation made by an agency, Chevron shall include in these quarterly reports a detailed explanation of its rationale for doing so.

This is the nineteenth report prepared under the quarterly reporting requirement.

II. BACKGROUND

The Richmond Refinery experienced an accidental release from the atmospheric distillation column of the No. 4 Crude Unit on August 6, 2012. The failure involved an 8” carbon-steel piping component in the No. 4 sidecut that carried light gas oil. The approximate duration of the release was 7 hours, 24 minutes.

All required agency notifications were made. Responding agencies included Cal/OSHA, CCHS, Bay Area Air Quality Management District, California Office of Spill Prevention and Response, the U.S. Environmental Protection Agency, the Richmond Police Department, and the U.S. Chemical Safety and Hazard Investigation Board (“CSB”). The CSB conducted an investigation concerning the fire. In April 2013, the CSB issued its Interim Investigation Report: Chevron Richmond Refinery Fire (“Interim Report”), which included two recommendations to CUSA. In January 2015, the CSB issued its Final Investigation Report Chevron Richmond Refinery Pipe Rupture and Fire (“Final Report”), which included three recommendations to CUSA. CUSA conducted its own investigation into the August 6, 2012 incident (“CUSA Investigation”), and identified a series of recommended actions to address what had been identified as causal factors and additional considerations.

III. STATUS OF CORRECTIVE ACTIONS TAKEN TO IMPLEMENT AGENCY RECOMMENDATIONS

The CSB issued two recommendations (2012-03-I-CA-R1 and 2013-03-I-CA-R2) to CUSA in its Interim Report. The CSB issued an additional three recommendations (2012-03-I-CA-R33, 2012-03-I-CA-R34, and 2012-03-I-CA-R35) to CUSA in its Final Report.

Set forth below are the CSB's recommendations from the Interim Report and Final Report, and CUSA's response to each recommendation.

Recommendation No. 2012-03-I-CA-R1: At all Chevron U.S. refineries, engage a diverse team of qualified personnel to perform a documented damage mechanism hazard review. This review shall be an integral part of the Process Hazard Analysis cycle and shall be conducted on all PSM-covered process piping circuits and process equipment. The damage mechanism hazard review shall identify potential process damage mechanisms and consequences of failure, and shall ensure safeguards are in place to control hazards presented by those damage mechanisms. Analyze and incorporate into this review applicable industry best practices, Chevron Energy Technology Company findings and recommendations, and inherently safer systems to the greatest extent feasible.

CUSA's Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis ("PHA") schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

In 2013, the Richmond Refinery took a lead role in piloting DMRs as this work process was developed. In 2014, the Refinery began adopting the DMR program by conducting selected DMRs prior to completing the applicable PHA. The Refinery employed the learnings from these initial DMRs and PHAs, and information from internal and external subject matter experts, to further develop its DMR work processes. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

The Refinery has now completed DMRs for applicable PSM-covered process piping and process equipment.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard (“Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525,” or “MFG 525”). This standard sets expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. A project is underway at the Refinery to create asset strategies per MFG 525.

Recommendation 2012-03-I-CA-R2: *At all California Chevron U.S. refineries, report leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to the federal, state, and local regulatory agencies that have chemical release prevention authority.*

CUSA’s Response: The subject of process safety indicators is complex and has been the focus of prior agency recommendations (e.g., Recommendation No. 2005-4-I-TX-6 to the API and United Steelworkers). Despite many years of effort by a diverse group of interested parties, including individual companies, safety and industry groups, organized labor, and regulators, there is no consensus on process safety indicators. The CSB acknowledged this lack of consensus during a Safety Performance Indicators public hearing it held in Houston, Texas on July 23 and 24, 2012. CUSA understands the CSB’s interest in continuing to drive this process forward.

The Refinery already internally tracks numerous leading and lagging indicators through its Operational Excellence and Reliability Intelligence (“OERI”) system. OERI is a reporting system that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery’s information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

In addition to other tracking mechanisms, the Refinery uses OERI to provide organizational visibility of the Refinery's maintenance, reliability, and process safety performance, and overdue and upcoming safety, maintenance, and regulatory compliance items. Refinery personnel have ready access to OERI, and it is reviewed by the Refinery's management on a routine basis.

OERI also is used during Unit Reliability Briefs ("URBs"), which are cross-functional meetings attended by management, reliability analysts, maintenance, operations, technical, and other relevant internal stakeholders. URBs are regularly conducted by each business area to manage process safety and reliability performance threats in a risk-informed manner. OERI is utilized during URBs to track and prioritize reliability threats.

To further address the CSB's recommendation, however, CUSA played a major role in coordination with multiple interested parties, including the CSB, USW, Contra Costa Health Services ("CCHS"), and others in industry to develop "consensus" process safety indicators during the CCHS Industrial Safety Ordinance ("ISO") and the City of Richmond ISO revision process. As part of these discussions, the parties conferred on the selection of appropriate indicators, potential reporting format, and the frequency of reporting, among other items. These revisions to the ISO and RISO became effective on September 30, 2014.

Consistent with the revised ordinances, the Refinery, along with industry and the County, is tracking process safety indicators in connection with CCHS's annual reporting obligation, which comes due on June 30 of each year. ISO and RISO process safety performance indicator requirements include reporting on overdue inspections for piping and pressure vessels, overdue PHA recommendations, overdue incident investigations recommendations, and overdue API and American Chemistry Council Tier I and II incident investigation recommendations.

On July 15, 2016, the Department of Industrial Relations released its proposed new regulation for Process Safety Management for Petroleum Refineries for public review, substantially completing the current work of the California PSM Advisory Committee. CUSA has and will continue to remain involved with other PSM reform groups and will continue to participate in the development of consensus process safety indicators at the state, local, and federal level.

Recommendation No. 2012-03-I-CA-R33: *Develop a method to assign accountability at Chevron to determine whether any new Energy Technology Company (ETC) recommended program or industry best practice, such as API guidance must be followed to ensure process safety or employee personal safety. This method shall include monitoring of these practices and guidance at a refining system level and at the refinery level. Develop a tracking system to monitor the progress of implementing these selected practices and guidance to completion.*

CUSA's Response: CUSA previously recognized the value of providing for the uniform implementation of recommended programs or industry best practices. For this reason, CUSA has developed and implemented a "Manufacturing Technical Authority Process" ("MTA Process") to assess mechanical integrity and other process safety-related ETC advisories, as well as industry standards, guidance, and best practices (collectively, "Advisories and Standards"). The MTA Process is designed to determine which Advisories and Standards are applicable and appropriate for CUSA's Manufacturing facilities to develop those Advisories and Standards into new Manufacturing Standards, and to direct and monitor their subsequent implementation by appropriate personnel. The MTA Process engages senior executives and managers with process safety and operational experience.

A brief overview of the MTA Process is as follows:

- Under the MTA Process, new Advisories and Standards are identified from a wide variety of sources.
- If new Advisories and Standards are applicable to Manufacturing facilities and are not already adequately addressed, the new Advisories and Standards will move forward in the process.
- The MTA Process assigns the new Advisories and Standards to the appropriate Manufacturing organization or SMEs to develop the methods and milestones for implementation, and to track and verify that implementation is completed according to plan.
- The appropriate refinery leadership team (e.g., Operations, Maintenance and Reliability, or Technical) assigns responsibility for executing the Manufacturing Standards.
- For Manufacturing Standards that the MTA Process determines to be critical for the prevention of fatalities and high-consequence loss of containment events, any extensions and exceptions will require approval of the President of Manufacturing.
- The MTA Process also uses a centralized database to track and monitor the development and implementation of Manufacturing Standards developed pursuant to the MTA process.

Recommendation No. 2012-03-I-CA-R34: *Develop an auditable process to be available for all recommended turnaround work items necessary to address mechanical integrity deficiencies or inspection recommendations that are denied or deferred. This process shall provide the submitter of the denied or deferred recommendation with the option to seek further review by his or her manager, who can further elevate and discuss the recommendation with higher level management, such as the Area Business Unit Manager. Maintain an auditable log of each of these potential turnaround work items, including the ultimate determination of approval, deferral, or rejection, justification determination, and the person or team responsible for that decision.*

CUSA's Response: CUSA's Richmond Refinery has developed and implemented a process for tracking turnaround work items necessary to address inspection recommendations concerning fixed equipment (*e.g.*, process piping) identified by the Company's API certified inspectors, including any turnaround work items that are denied or deferred.

On September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA "[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, *that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.*" Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. CUSA encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, CUSA has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce CUSA's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

Recommendation No. 2012-03-I-CA-R35: *Develop an approval process that includes a technical review that must be implemented prior to resetting the minimum alert thickness to a lower value in the inspection database.*

CUSA's Response: This recommendation was made in the CSB's final report released January 2015. CUSA developed and distributed a manufacturing instruction ("Manufacturing Instruction for Establishing Piping Minimum Alert Thickness" or "MFG 540") in May 2016 (revised July 2018), which includes a documented technical review and approval process when a piping minimum alert thickness is changed to a lower value within the inspection database.

IV. CORRECTIVE ACTIONS IMPLEMENTED BY CUSA IN RESPONSE TO ITS OWN INVESTIGATION

The Richmond Refinery's own investigation team identified a series of recommended actions to address what had been identified as causal factors and additional considerations. Operational and process changes that resulted from this investigation are set forth below.

A. RECOMMENDATIONS TO ADDRESS CAUSAL FACTORS ("CF")

CF Recommendation 1: *Revise Refinery policies and checklists to ensure appropriate information—including Process Safety and Inspection information—is considered when evaluating leaks and addressing the issue of whether to shut down or continue operation of equipment.*

CUSA's Response: The Refinery has implemented an updated protocol for evaluating process leaks with simple guidance to assist in making necessary and rapid decisions concerning leak response and further enhancing situational awareness skills. This protocol identifies scenarios that trigger the use of the protocol and recognizes that there may be other scenarios in high consequence services where a leak has not yet occurred but has a potential for loss of containment if conditions are not addressed.

Pursuant to the protocol, subject matter experts ("SMEs") from various disciplines, including process safety and inspections, gather to evaluate the leak. The protocol provides discussion questions about process safety information, including information related to past inspections, for the SMEs to consider when determining the response plan. The type of process safety information to consider includes the identity of the leaking material, location, temperature and emergency shutdown procedures, as well as an understanding of the potential damage mechanism involved.

The protocol is published on the Company's internal Manufacturing website under Manufacturing Standards, and a training program has been developed that tracks completion of required training.

The leak response protocol was shared with CCHS, Cal/OSHA, CSB, as well as other refineries and industrial facilities in the County and beyond.

CF Recommendation 2: Enhance the Refinery's Mechanical Integrity program to ensure the Refinery properly identifies and monitors piping circuits for appropriate damage mechanisms using a standardized methodology and documentation system.

CUSA's Response: The Refinery is strengthening its reliability program for piping and equipment in an effort to ensure it covers potential damage mechanisms applicable to those systems. As part of this effort, the Refinery is implementing an enhanced process for regular DMRs of piping circuits in applicable units in order to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms. As discussed in response to CSB Recommendation 2012-03-I-CA-R1, CUSA issued a standard, MFG 520, for conducting DMRs to assess corrosion threats and other applicable damage mechanisms. MFG 520 establishes a DMR work process that will, where appropriate, be completed for piping circuits and equipment in applicable units using the applicable damage mechanism information outlined in the API Recommended Practice 571.

The Refinery modified its PHA procedures to better integrate DMRs into the PHA review process. MFG 520 requires alignment of the DMR schedule with the PHA schedules for piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs. The Refinery took a lead role in piloting DMRs as this work process was developed. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

MFG 520 recognizes that the DMR work process will undergo continuous improvement as internal and external guidance is developed. Concurrent with development of the DMR work process and in response to a corrective action from its own investigation, CUSA has developed an asset strategy standard, MFG 525, which is used where applicable. As described above in CUSA's response to CSB Recommendation 2012-03-I-CA-R1, MFG 525 sets the expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. MFG 525 defines an asset strategy as the documented plan for operating, monitoring, and maintaining fixed equipment to preserve its integrity (pressure containment) function and sustain its process (service) function. An asset strategy identifies applicable damage mechanisms; determines the need for and defines operating limits known as integrity operating windows; and prescribes inspection, testing and preventative maintenance, including tasks and frequencies, required to manage the integrity and process functions.

As described above, the MTA Process prioritizes and acts upon mechanical integrity-related recommendations from internal and external technical experts, including industry standards and alerts. CUSA's response to CSB Recommendation 2012-03-I-CA-R33, describes the MTA Process, which was established for the purpose of assessing new Advisories and Standards, determining which are applicable and appropriate for CUSA's Manufacturing facilities, and monitoring their subsequent implementation.

The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

CF Recommendation 3: Review and enhance the requirements for inspector training and competency.

CUSA's Response: The Refinery is improving its mechanical integrity training as a way to further support our leaders, inspectors, operating groups, and engineers. To that end, the Refinery has developed a standard to guide and promote the establishment of essential training and competencies for individuals who are performing a Fixed Equipment Inspector or Analyst role.

The specific training for each Fixed Equipment Inspector position is defined for that specific position based on a training plan that is developed in an effort to ensure that the needed competencies are developed within an established timeframe per certification or training from start of a new position. The implementation of the training plan is tracked through the individual's annual performance monitoring plan and monitored by the individual's supervisor. Additionally, the Refinery maintains a matrix for each inspector that tracks completion of required certifications and training. Recognizing that Fixed Equipment Inspector training is an ongoing process, and new or updated trainings are regularly required, all personnel in Fixed Equipment Inspector positions are current in the trainings identified for the inspections they perform or perform those inspections under the supervision of someone with the necessary certifications and/or training. The training standard, as well as the compliance matrices, are housed on the Refinery's intranet.

CF Recommendations 4 and 5: Develop and implement a process for additional oversight of mechanical integrity-related recommendations and inspection plans, and the escalation of recommendations. Develop and implement a process to review and act upon mechanical integrity-related recommendations from industry alerts, ETC, and other subject-matter experts.

CUSA's Response: The Refinery is implementing a manufacturing instruction for addressing mechanical integrity-related inspection recommendations, including development of mitigation plans, timelines for completion, and the assignment of roles and responsibilities. MFG 530, Fixed Equipment Integrity Threat Recommendation and Resolution Instruction, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. Under MFG 530, a fully developed integrity threat recommendation, among other things:

- Is a high-quality, data-driven recommendation for deficiencies discovered on in-scope fixed equipment.
- Includes a resolution plan with agreed-upon completion dates.

- Includes a mitigation plan if mitigation is required to enable continued Operation until final resolution can be achieved.
- Defines clear handoffs to work prioritization, planning, and execution processes.
- Verifies and documents completion of resolution and mitigation plans.
- Provides input to maintain evergreen asset strategies for fixed equipment.

MFG 530 is applicable to most types of fixed equipment used in the refinery process, including pressure vessels, boilers, on-plot and off-plot piping, atmospheric storage tanks, and furnaces. The objective is to guide the development of integrity threat recommendations to prevent loss of containment events of higher consequence. The instruction and supporting procedures provide detail to support the mechanical integrity program.

Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager ("FEIM"). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor's manager, or may use their personal stop work authority.

In addition to the actions CUSA has taken in response to its own investigation, CUSA's responses to CSB Recommendation 2012-03-I-R34 and CSB Recommendation 2012-03-I-CA-R35, described above, are also enhancing the Refinery's assessment, decision-making, and oversight of mechanical integrity-related inspection recommendations.

Further, the response to CSB Recommendation 2012-03-I-R33 above describes how new Advisories and Standards are considered, developed into manufacturing instructions as appropriate, implemented, and tracked.

CF Recommendations 6 and 7: Inspect 4CU piping that falls under the ETC Sulfidation Inspection Guidelines criteria for sulfidation corrosion prior to restarting the 4CU. Implement the ETC Sulfidation Inspection Guidelines for the remainder of the Refinery.

CUSA's Response: The Refinery conducted 100% component inspection of carbon steel piping systems identified as potentially susceptible to sulfidation corrosion. Over 12,000 individual piping components were inspected. As part of these inspections, the Refinery implemented inspections to identify components of carbon steel piping circuits that did not have sufficient thickness to remain in service until the next scheduled turnaround; implemented generally accepted engineering practices with respect to components of insufficient thickness;

documented solutions with respect to components of insufficient thickness; established an inspection frequency for carbon steel piping circuits based upon measured corrosion rates, remaining life calculations, and current process conditions, including sulfur content and temperature; and maintained records of all carbon steel piping circuits potentially susceptible to sulfidation corrosion.

CF Recommendation 8: *Ensure relevant technical studies and inspection data are considered for the Refinery's equipment reliability plans and incorporated into the ROI/IPR [Reliability Opportunity Identification/Intensive Process Review] process.*

CUSA's Response: The ROI/IPR process has been revised to include known failure mechanisms, relevant technical studies and industry incidents in the pre-read for ROI/IPR study. Impacted employees are being trained on these changes.

B. RECOMMENDATIONS TO ADDRESS ADDITIONAL CONSIDERATIONS ("AC")

AC Recommendation 1: *Review the Pre-Fire Plan to ensure sufficient guidance is provided on equipment positioning.*

CUSA's Response: The Refinery reviewed and updated its Pre-Incident Scenario Analysis with apparatus placement modifications and shared the revised plans with CUSA Industrial Fire Chiefs.

AC Recommendation 2: *Review company/industry loss history on large fractionating towers to determine if internal Engineering Standard FRS-DU-5267 (Emergency Isolation and Depressuring Valves) adequately addresses mitigation of accidental releases from these systems. Revise the standard as warranted by the findings of this review.*

CUSA's Response: The Company completed a review of loss history for large fractionating towers. No revisions to FRS-DU-5267 were warranted by this review.

AC Recommendation 3: *Ensure Refinery business plans provide for the appropriate implementation of Process Safety recommendations (such as the ETC Sulfidation Inspection Guidelines).*

CUSA's Response: See the response above to CSB Recommendation No. 2012-03-I-CA-R33, which describes the MTA Process.

AC Recommendation 4: *Ensure sufficient organizational capacity and competency for minimum thickness Fitness for Service determinations.*

CUSA's Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness ("MFG 510") was revised in March 2018. This instruction "outlines the work process and calculation

methods for determining minimum *required* pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” MFG 510 also addresses the qualification and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using CUSA’s ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

AC Recommendation 5: Consider additional training on expectations under the “Richmond Refinery Piping Inspection Guidelines” and “RFMS Piping Data Entry (Reliability Focused Maintenance System) and ACD (Add/Change/Delete) Guideline.”

CUSA’s Response: See the response above to the third CUSA Investigation CF recommendation, which discusses inspector training and competency.

AC Recommendation 6: Review and modify the PHA procedures to ensure that teams consider known corrosion threats/mechanisms.

CUSA’s Response: See the responses above to CSB Recommendation 2012-03-I-CA-R1 and the second CUSA Investigation CF recommendation, which discuss the DMR work process.

AC Recommendation 7: Consider a project to evaluate the purpose and methods of various project safety management (PSM) reviews (PHA, ROI/IPR, AOA, COA, sRCM, RBI, etc.) to determine if these activities can be combined or better sequenced to improve risk understanding across the various functions and promote better process safety outcomes.

CUSA’s Response: The Refinery has mapped out the work processes under PSM and other safety standards to identify potential efficiencies that can be gained, or outcomes enhanced by re-sequencing, combining, or modifying processes.

V. CONCLUSION

Operating safely is one of CUSA’s core values. CUSA is also committed to learning from the August 6, 2012 fire to prevent a recurrence. To this end, CUSA has worked closely and cooperatively with local, state, and federal agencies, including the City, to determine the root

causes of the fire. CUSA is committed to considering recommendations from all agency investigations, and taking appropriate actions in response.

CUSA's efforts to improve safety and reliability at its refineries are ongoing. CUSA continues to evaluate and undertake efforts to enhance mechanical integrity and safe operations at the Refinery.

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ATTACHMENT 4

Quarterly Construction Emissions Reports
Operational Year 2019

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Construction Emissions Report
First Quarter 2019

April 25, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Pursuant to the Chevron Richmond Refinery Modernization Project (Project) Mitigation Monitoring and Reporting Program (MMRP), Chevron is required to provide quarterly compliance reports for emissions of NO_x (mitigation measure (MM) 4.3-2a), ROG (MM 4.3-2b), and greenhouse gases (GHG) (MM 4.8-1) during Project construction. This is the Construction Emissions Report for construction activity that occurred through the first quarter 2019 (1Q2019).¹

Chevron tracks construction emissions using the Construction Emissions Module (Module) developed in conjunction with the City of Richmond's environmental consultant, Ramboll Environ, Inc. (Ramboll). The Module calculates emissions from On-Road Onsite Only vehicle use, On-Road Onsite and Offsite vehicle use, Off-Road Equipment, and Architectural Coating and Paving activities. Chevron has been working with Ramboll to refine the Module to ensure that the data generated is accurate. The latest update to the Module, version 7.0, was issued to Chevron on January 23, 2017 with an additional revision to version 7.0 in 1Q2019 to include years 2019 through 2023 for data entry. Data from the Module is available for review at the Refinery.

Construction on the new Hydrogen Plant is nearing completion. Decommissioning activities, including blinding, cleaning and removal of catalyst, for the old Hydrogen Plant began in 1Q2019. Additionally, construction of 6H2S and TKC is currently scheduled to be complete by the end of 2Q2019. Chevron anticipates that active construction of the hydrogen plant and sulfur removal improvements, exclusive of demolition and dismantling of the existing hydrogen plant and tank doming, will be complete by the end of 2019.

As explained further below, based on current data and projections, Chevron anticipates that emissions of NO_x and ROG will be significantly lower than projected in the EIR. As the Project is still under construction, Chevron does not have enough data to predict whether the average daily emissions of NO_x and ROG will exceed the thresholds of significance once Project construction is complete.² Therefore, the Project is implementing MM 4.3-2a and MM 4.3-2b, as described below. For GHG emissions, Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. Chevron continues to evaluate alternatives to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Chevron recently presented a proposed alternative to the City in April for input and will continue to work with the City to finalize an alternative aligned with this measure.

Construction Emissions Summary

Several factors are contributing to actual emissions from Project construction being lower than projected in the EIR.

First, when estimating construction emissions from the Project, the EIR conservatively assumed that all Project components would be constructed during a two-year construction period. (Draft EIR, p. 3-39; see also Table 3-2.) Chevron has elected to defer construction of the FCC FHT improvements (Draft EIR, p. 3-25) and

¹ Pursuant to Impact 4.3-3 of the Environmental Impact Report (EIR) prepared for the Project, emissions of PM₁₀ and PM_{2.5} from construction activities are less than significant without mitigation, though the EIR includes Improvement Measure 4.3-3 requiring certain best practices to be implemented. Further, the EIR did not analyze or require tracking or mitigation of CO during construction activities. However, Chevron uses the Construction Emissions Module to track PM₁₀, PM_{2.5}, and CO emissions, and maintains this data at the Refinery.

² For purposes of assessing potential impacts from the Project's construction-related emissions, the EIR utilized the California Environmental Air Quality Act Air Quality Guidelines promulgated by the Bay Area Air Quality Management District (BAAQMD CEQA Guidelines).³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

improvements to one of the sulfur recovery units (SRU), resulting in less intensive construction during the initial construction period than was estimated in the EIR.³ Further, the construction for the remaining Project components, exclusive of the demolition and dismantling of the existing Hydrogen Plant and tank doming, is scheduled to be complete by the end of 2019.⁴ This means the total number of days during the construction period by which total emissions of NO_x and ROG will be divided to determine the respective average daily emissions will be greater than used in the EIR.

Further, because the EIR did not have specific data concerning the fleet to be used during construction, it made a conservative assumption that the majority of engines were Tier 2 and Tier 3. In the case of off-road equipment, emissions from equipment with higher tier engines (i.e., of equal horsepower) are generally less than emissions from equipment with lower tier engines⁵. Higher tier engines are associated with a lower emission factor, resulting in lower emissions when compared to emissions from lower tier engines. Actual data shows that ~88% of engines in the cumulative fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final.⁶ Of the remaining ~12% of the engines, 9.6% are Tier 3, and 1.7% are Tier 2, with a negligible quantity of Tier 1 engines in the fleet (i.e., below 1%). Therefore, the Project's use of Tier 4 Interim and Tier 4 Final engines, where possible, has contributed to actual Project construction emissions that are lower than the emissions projected in the EIR.⁷

Ozone Precursors

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of NO_x and ROG is assessed by comparing the total average daily emissions from the Project to the threshold of significance. In order to calculate total average daily emissions, total Project construction-related emissions will be divided by the total number of days during the construction period. The total daily average is then compared to the threshold of significance. Based on current data from the Module, as well as Chevron's projected construction schedule and levels of activity, Chevron believes that emissions of NO_x and ROG will be significantly lower than those projected in the EIR. Nevertheless, as the project is still under construction, it is impossible to predict with certainty whether total emissions of NO_x and ROG over the life of construction will result in the Project exceeding the thresholds of significance. Chevron is therefore implementing MM 4.3-2a and MM 4.3-2b, as follows:

MM 4.3-2a Implementation	
MM 4.3-2a Part(s)	Implementation Status
Chevron shall reduce construction-related NO _x emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of	

³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

⁴ The SRU improvements are the final Project component scheduled to be constructed during the initial construction period, and Chevron anticipates construction of these improvements will be complete by the end of 2019. Chevron has also yet to determine exactly when it will begin dismantling the existing Hydrogen Plant.

⁵ Source: CalEEMod User Guide. OFFROAD Emission Factor Based on Engine Tier. <http://caleemod.com/>

⁶ The calculation for percentage of equipment associated with each engine tier is based on actual weekly contractor equipment counts received from May 9, 2016 through March 31, 2019.

⁷ This likelihood was recognized in the EIR, Appendix 4.3-CST, p. 6, n. 2: "Chevron Data Transmittal #36O (Rev#3), 2014 provides equipment data for eight consecutive quarters. Because the exact start date of future construction is uncertain, the emissions analysis conservatively uses emission factors for 2014 for the first four quarters of construction, and 2015 emission factors for the last four quarters of construction. A construction start date later than January 2014 would lead to lower emissions than predicted here as the emissions profile of the construction fleet is cleaner, due to the implementation of regulations requiring lower emissions engines."

MM 4.3-2a Implementation	
which have been found to result in emissions reduction for construction projects:	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~88% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the initial construction period from two years.
Reducing operations and/or emissions from portable generators at the Facility during the construction period, and thereby reducing NO_x emissions;	The number of portable diesel generators used during construction has been reduced by, for example, utilizing solar-powered light standards for certain work areas. Approximately 2% of the cumulative hours for light plants since the beginning of project construction are attributed to light plants operating on solar power.
Installing the low-NO_x burners included in the Modernization Project in the first 6 months of the construction period, thereby reducing net NO_x emissions from the Facility while construction of the Modernization Project continues;	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate NO_x emissions to less-than-significant.
Retiring permanent NO_x emission reduction credits to offset this temporary NO_x construction increase, in an amount sufficient to offset construction period NO_x emissions; or	Chevron is prepared to retire NO_x emissions reduction credits as necessary to mitigate NO_x emissions.
Implementing a combination of two or more of the above measures in an amount sufficient to offset construction-period NO_x emissions to less-than-significant levels.	See above.

MM 4.3-2b Implementation	
MM 4.3-2b Part(s)	Implementation Status
Chevron shall reduce construction-related ROG emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Installing the tank dome Project Design Feature, and installing one additional tank dome, in the first 6 months of Project construction, thereby reducing net ROG emissions from the Facility before completing construction of the hydrogen plant or sulfur removal components of the Modernization Project;	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate ROG emissions to less-than-significant.
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily	As described above, ~88% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4

MM 4.3-2b Implementation	
commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. Chevron has extended the construction period from two years.
Retiring permanent ROG emission reduction credits to offset this temporary ROG construction increase, in an amount sufficient to offset construction-period ROG emissions; or	Chevron is prepared to retire ROG emissions reduction credits as necessary to mitigate ROG emissions to less-than-significant.
Implementing a combination of the above measures, in an amount sufficient to offset construction-period ROG emissions to less-than-significant levels.	See above.

Details concerning implementation of the above measures can be found in Chevron's Compliance Plan, revised in October 7, 2016, as well as responses to the quarterly ANTEA reports, submitted with this report for first quarter 2019.

GHG

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of GHG is assessed by comparing total annual emissions of GHG to the threshold of significance (10,000 MTCO₂e per year). Table 1Q2019-GHG shows total construction-related GHG emissions for years 2016 through 2019 not including reductions associated with implementation of MM 4.8-1a – 4.8-1k. Because GHGs are tracked on an annual basis, the cumulative total for construction-related GHG emissions resets to zero at the beginning of each calendar year.

Table 1Q2019– GHG Emissions from Construction		
Year	Cumulative Total (in MT CO₂e/yr)	BAAQMD Threshold of Significance (in MT CO₂e/yr)
2016¹	1,195.8	10,000
2017	7,638.1	10,000
2018²	11,959.0	10,000
2019³	935.4	10,000
¹ Based on data collected beginning May 9, 2016 and ending December 31, 2016 ² For data collected through December 30, 2018. ³ Based on data collected March 31, 2019. This value also includes the GHG emissions calculated by the Construction Emissions Module for the week of December 31, 2018 through January 6, 2019, as the majority of work days for that week occurred in 2019.		

Total construction-related GHG emissions in 2016 and 2017 did not exceed the threshold of significance. For GHG emissions, the Project exceeded the annual threshold for 2018 due to construction intensity. Chevron anticipates 2019 construction-related GHG emissions will be below the annual threshold based on Project construction activities. Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. Chevron continues to evaluate alternatives to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l.

Chevron recently presented a proposed alternative to the City in April for input and will continue to work with the City to finalize an alternative aligned with this measure.

MM 4.8-1 Implementation	
MM 4.8.1 Part(s)	Implementation Status¹
Consistent with air quality mitigation measures for construction activities, Chevron would be required to implement the following mitigation measures to reduce its Project construction emissions. Implementation of the mitigation measures would result in further reductions in greenhouse gas emissions.	
a. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.	• Done
b. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxic Control Measure (Title 13 of California Code of Regulations [CCR], Section 2485). Clear signage shall be provided for construction workers at all access points.	• Done
c. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.	• Done
d. The idling time of diesel-powered construction equipment shall be limited to 2 minutes.	• Done
e. The Project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in construction (i.e., owned, leased, and subcontractor vehicles) would achieve a Project-wide fleet-average 20% nitrogen oxide reduction and 45% particulate matter reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, Low-emission diesel products, Alternative fuels, Engine retrofit technology, After-treatment products, Add-on devices such as particular filters, and/or Other options as such become available. (Several of these measures would also reduce greenhouse gas emissions.)	• Done
f. All contractors shall be required to use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines.	• Done
g. Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).	• Done
h. Enforce and follow limits on idling time for commercial vehicles, including delivery and construction vehicles.	• Done

MM 4.8-1 Implementation	
i. Using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment on at least 15% of the fleet.	• Done
j. Using local building materials of at least 10%.	• Done
k. Recycling or reusing at least 50% of construction waste or demolition materials.	• Done
l. For each year of Project construction, Chevron shall hire, at commercially reasonable rates and at Chevron's expense, a qualified third-party entity reasonably acceptable to the City to quantify and verify in writing whether the reductions achieved from the above described construction greenhouse gas mitigation measures for that year of Project construction adequately mitigated this potentially significant impact, which report shall be subject to City's reasonably approval. For any year of construction for which construction-related diesel emissions are not reduced to or below the 10,000-MT CO₂e per year significance threshold, Chevron shall implement one or more of the following measures in an amount sufficient to reduce construction period greenhouse gas emissions to less-than-significant levels: (i) Reduce diesel emissions from other equipment at the Facility, such as a diesel-powered generator, in an amount equal to the construction-related greenhouse gas emissions in excess of 10,000 MT CO₂e per year for any calendar year of Project construction, which reduced emission level Chevron shall maintain for the following two years. (ii) Permanently retire, or retrofit from diesel to electric power, one or more Facility sources that emit more than 300 MT CO₂e per year.	• Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. Chevron continues to evaluate alternatives to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Chevron recently presented a proposed alternative to the City in April for input and will continue to work with the City to finalize an alternative aligned with this measure.

Details concerning implementation of the above measures can be found in Chevron's Compliance Plan, revised in October 7, 2016, as well as responses to the quarterly ANTEA reports, submitted with this report for first quarter 2019.

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Construction Emissions Report
Second Quarter 2019

July 30, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Pursuant to the Chevron Richmond Refinery Modernization Project (Project) Mitigation Monitoring and Reporting Program (MMRP), Chevron is required to provide quarterly compliance reports for emissions of NO_x (mitigation measure (MM) 4.3-2a), ROG (MM 4.3-2b), and greenhouse gases (GHG) (MM 4.8-1) during Project construction. This is the Construction Emissions Report for construction activity that occurred through the second quarter 2019 (2Q2019).¹

Chevron tracks construction emissions using the Construction Emissions Module (Module) developed in conjunction with the City of Richmond's environmental consultant, Ramboll Environ, Inc. (Ramboll). The Module calculates emissions from On-Road Onsite Only vehicle use, On-Road Onsite and Offsite vehicle use, Off-Road Equipment, and Architectural Coating and Paving activities. Chevron has been working with Ramboll to refine the Module to ensure that the data generated is accurate. The latest update to the Module, version 7.0, was issued to Chevron on January 23, 2017 with an additional revision to version 7.0 in 1Q2019 to include years 2019 through 2023 for data entry. Data from the Module is available for review at the Refinery.

Primary construction of the new Hydrogen Plant and sulfur removal improvements is nearing completion, though Chevron continues to undertake work to address operational issues associated with placing new plants and equipment into service. The first full day of operations was April 18 for the new Hydrogen Plant, May 30 for SRU2, and June 1 for 6H2S and TKC. Decommissioning activities at the old Hydrogen Plant are ongoing. Chevron anticipates that primary construction of the hydrogen plant and sulfur removal improvements, exclusive of demolition and dismantling of the existing hydrogen plant, tank doming, and work on operational issues will be completed in 3Q2019.

As explained further below, based on current data and projections, Chevron anticipates that emissions of NO_x and ROG will be significantly lower than projected in the EIR. As the Project is still under construction, Chevron does not have enough data to predict whether the average daily emissions of NO_x and ROG will exceed the thresholds of significance once Project construction is complete.² Therefore, the Project is implementing MM 4.3-2a and MM 4.3-2b, as described below. For GHG emissions, Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. In May, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Chevron continues to work with the City to finalize details regarding this project.

Construction Emissions Summary

Several factors are contributing to actual emissions from Project construction being lower than projected in the EIR.

First, when estimating construction emissions from the Project, the EIR conservatively assumed that all Project components would be constructed during a two-year construction period. (Draft EIR, p. 3-39; see also Table 3-

¹ Pursuant to Impact 4.3-3 of the Environmental Impact Report (EIR) prepared for the Project, emissions of PM₁₀ and PM_{2.5} from construction activities are less than significant without mitigation, though the EIR includes Improvement Measure 4.3-3 requiring certain best practices to be implemented. Further, the EIR did not analyze or require tracking or mitigation of CO during construction activities. However, Chevron uses the Construction Emissions Module to track PM₁₀, PM_{2.5}, and CO emissions, and maintains this data at the Refinery.

² For purposes of assessing potential impacts from the Project's construction-related emissions, the EIR utilized the California Environmental Air Quality Act Air Quality Guidelines promulgated by the Bay Area Air Quality Management District (BAAQMD CEQA Guidelines).³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

2.) Chevron has elected to defer construction of the FCC FHT improvements (Draft EIR, p. 3-25) and improvements to one of the sulfur recovery units (SRU), resulting in less intensive construction during the initial construction period than was estimated in the EIR.³ Further, the construction for the remaining Project components, exclusive of the demolition and dismantling of the existing Hydrogen Plant, tank doming, and work on operational issues, is scheduled to be completed in 3Q 2019.⁴ This means the total number of days during the construction period by which total emissions of NO_x and ROG will be divided to determine the respective average daily emissions will be greater than used in the EIR.

Further, because the EIR did not have specific data concerning the fleet to be used during construction, it made a conservative assumption that the majority of engines were Tier 2 and Tier 3. In the case of off-road equipment, emissions from equipment with higher tier engines (i.e., of equal horsepower) are generally less than emissions from equipment with lower tier engines⁵. Higher tier engines are associated with a lower emission factor, resulting in lower emissions when compared to emissions from lower tier engines. Actual data shows that ~88% of engines in the cumulative fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final.⁶ Of the remaining ~12% of the engines, 9.5% are Tier 3, and 1.7% are Tier 2, with a negligible quantity of Tier 1 engines in the fleet (i.e., below 1%). Therefore, the Project's use of Tier 4 Interim and Tier 4 Final engines, where possible, has contributed to actual Project construction emissions that are lower than the emissions projected in the EIR.⁷

Ozone Precursors

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of NO_x and ROG is assessed by comparing the total average daily emissions from the Project to the threshold of significance. In order to calculate total average daily emissions, total Project construction-related emissions will be divided by the total number of days during the construction period. The total daily average is then compared to the threshold of significance. Based on current data from the Module, as well as Chevron's projected construction schedule and levels of activity, Chevron believes that emissions of NO_x and ROG will be significantly lower than those projected in the EIR. Nevertheless, as the project is still under construction, it is impossible to predict with certainty whether total emissions of NO_x and ROG over the life of construction will result in the Project exceeding the thresholds of significance. Chevron is therefore implementing MM 4.3-2a and MM 4.3-2b, as follows:

³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

⁴ The SRU improvements are the final Project component scheduled to be constructed during the initial construction period, and Chevron anticipates construction of these improvements will be complete by the end of 2019. Chevron has also yet to determine exactly when it will begin dismantling the existing Hydrogen Plant.

⁵ Source: CalEEMod User Guide. OFFROAD Emission Factor Based on Engine Tier. <http://caleemod.com/>

⁶ The calculation for percentage of equipment associated with each engine tier is based on actual weekly contractor equipment counts received from May 9, 2016 through June 30, 2019.

⁷ This likelihood was recognized in the EIR, Appendix 4.3-CST, p. 6, n. 2: "Chevron Data Transmittal #360 (Rev#3), 2014 provides equipment data for eight consecutive quarters. Because the exact start date of future construction is uncertain, the emissions analysis conservatively uses emission factors for 2014 for the first four quarters of construction, and 2015 emission factors for the last four quarters of construction. A construction start date later than January 2014 would lead to lower emissions than predicted here as the emissions profile of the construction fleet is cleaner, due to the implementation of regulations requiring lower emissions engines."

MM 4.3-2a Implementation	
MM 4.3-2a Part(s)	Implementation Status
Chevron shall reduce construction-related NO _x emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~88% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the initial construction period from two years.
Reducing operations and/or emissions from portable generators at the Facility during the construction period, and thereby reducing NO_x emissions;	The number of portable diesel generators used during construction has been reduced by, for example, utilizing solar-powered light standards for certain work areas. Approximately 2% of the cumulative hours for light plants since the beginning of project construction are attributed to light plants operating on solar power.
Installing the low-NO_x burners included in the Modernization Project in the first 6 months of the construction period, thereby reducing net NO_x emissions from the Facility while construction of the Modernization Project continues;	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate NO_x emissions to less-than-significant.
Retiring permanent NO_x emission reduction credits to offset this temporary NO_x construction increase, in an amount sufficient to offset construction period NO_x emissions; or	Chevron is prepared to retire NO_x emissions reduction credits as necessary to mitigate NO_x emissions.
Implementing a combination of two or more of the above measures in an amount sufficient to offset construction-period NO_x emissions to less-than-significant levels.	See above.

MM 4.3-2b Implementation	
MM 4.3-2b Part(s)	Implementation Status
Chevron shall reduce construction-related ROG emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Installing the tank dome Project Design Feature, and installing one additional tank dome, in the first 6 months of Project construction, thereby reducing net ROG emissions from the Facility	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate ROG emissions to less-than-significant.

before completing construction of the hydrogen plant or sulfur removal components of the Modernization Project;	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~88% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the construction period from two years.
Retiring permanent ROG emission reduction credits to offset this temporary ROG construction increase, in an amount sufficient to offset construction-period ROG emissions; or	Chevron is prepared to retire ROG emissions reduction credits as necessary to mitigate ROG emissions to less-than-significant.
Implementing a combination of the above measures, in an amount sufficient to offset construction-period ROG emissions to less-than-significant levels.	See above.

Details concerning implementation of the above-measures can be found in Chevron's Annual Compliance Report, most recently submitted to the City on March 31, 2019 and accepted by the City's Planning Commission on June 6, 2019.

GHG

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of GHG is assessed by comparing total annual emissions of GHG to the threshold of significance (10,000 MTCO_{2e} per year). Table 2Q2019-GHG shows total construction-related GHG emissions for years 2016 through 2019 not including reductions associated with implementation of MM 4.8-1a – 4.8-1k. Because GHGs are tracked on an annual basis, the cumulative total for construction-related GHG emissions resets to zero at the beginning of each calendar year.

Table 2Q2019– GHG Emissions from Construction		
Year	Cumulative Total (in MT CO_{2e}/yr)	BAAQMD Threshold of Significance (in MT CO_{2e}/yr)
2016 ¹	1,195.8	10,000
2017	7,638.1	10,000
2018 ²	11,959.0	10,000
2019 ³	1,734.7	10,000
¹ Based on data collected beginning May 9, 2016 and ending December 31, 2016 ² For data collected through December 30, 2018. ³ Based on data collected through June 30, 2019. This value also includes the GHG emissions calculated by the Construction Emissions Module for the week		

of December 31, 2018 through January 6, 2019, as the majority of work days for that week occurred in 2019.

Total construction-related GHG emissions in 2016 and 2017 did not exceed the threshold of significance. For GHG emissions, the Project exceeded the annual threshold for 2018 due to construction intensity. Chevron anticipates 2019 construction-related GHG emissions will be below the annual threshold based on Project construction activities. Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. Chevron continues to work with the City to finalize details regarding Chevron’s proposed project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l.

MM 4.8-1 Implementation	
MM 4.8.1 Part(s)	Implementation Status ¹
Consistent with air quality mitigation measures for construction activities, Chevron would be required to implement the following mitigation measures to reduce its Project construction emissions. Implementation of the mitigation measures would result in further reductions in greenhouse gas emissions.	
a. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.	• Done
b. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxic Control Measure (Title 13 of California Code of Regulations [CCR], Section 2485). Clear signage shall be provided for construction workers at all access points.	• Done
c. All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. All equipment shall be checked by a certified visible emissions evaluator.	• Done
d. The idling time of diesel-powered construction equipment shall be limited to 2 minutes.	• Done
e. The Project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in construction (i.e., owned, leased, and subcontractor vehicles) would achieve a Project-wide fleet-average 20% nitrogen oxide reduction and 45% particulate matter reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, Low-emission diesel products, Alternative fuels, Engine retrofit technology, After-treatment products, Add-on devices such as particular filters, and/or Other options as such become available. (Several of these measures would also reduce greenhouse gas emissions.)	• Done

MM 4.8-1 Implementation	
f. All contractors shall be required to use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines.	• Done
g. Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).	• Done
h. Enforce and follow limits on idling time for commercial vehicles, including delivery and construction vehicles.	• Done
i. Using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment on at least 15% of the fleet.	• Done
j. Using local building materials of at least 10%.	• Done
k. Recycling or reusing at least 50% of construction waste or demolition materials.	• Done
l. For each year of Project construction, Chevron shall hire, at commercially reasonable rates and at Chevron's expense, a qualified third-party entity reasonably acceptable to the City to quantify and verify in writing whether the reductions achieved from the above described construction greenhouse gas mitigation measures for that year of Project construction adequately mitigated this potentially significant impact, which report shall be subject to City's reasonably approval. For any year of construction for which construction-related diesel emissions are not reduced to or below the 10,000-MT CO₂e per year significance threshold, Chevron shall implement one or more of the following measures in an amount sufficient to reduce construction period greenhouse gas emissions to less-than-significant levels: (i) Reduce diesel emissions from other equipment at the Facility, such as a diesel-powered generator, in an amount equal to the construction-related greenhouse gas emissions in excess of 10,000 MT CO₂e per year for any calendar year of Project construction, which reduced emission level Chevron shall maintain for the following two years. (ii) Permanently retire, or retrofit from diesel to electric power, one or more Facility sources that emit more than 300 MT CO₂e per year.	• Chevron is implementing MM 4.8-1a – 4.8-1k. Chevron continues to work with the City to finalize details regarding Chevron's proposed project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l.

Details concerning implementation of the above-measures can be found in Chevron's Annual Compliance Report, most recently submitted to the City on March 31, 2019 and accepted by the City's Planning Commission on June 6, 2019.

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Construction Emissions Report
Third Quarter 2019

October 30, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Pursuant to the Chevron Richmond Refinery Modernization Project (Project) Mitigation Monitoring and Reporting Program (MMRP), Chevron is required to provide quarterly compliance reports for emissions of NO_x (mitigation measure (MM) 4.3-2a), ROG (MM 4.3-2b), and greenhouse gases (GHG) (MM 4.8-1) during Project construction. This is the Construction Emissions Report for construction activity that occurred through the third quarter 2019 (3Q2019).¹

Chevron tracks construction emissions using the Construction Emissions Module (Module) developed in conjunction with the City of Richmond's environmental consultant, Ramboll Environ, Inc. (Ramboll). The Module calculates emissions from On-Road Onsite Only vehicle use, On-Road Onsite and Offsite vehicle use, Off-Road Equipment, and Architectural Coating and Paving activities. Chevron has been working with Ramboll to refine the Module to ensure that the data generated is accurate. The latest update to the Module, version 7.0, was issued to Chevron on January 23, 2017 with an additional revision to version 7.0 in 1Q2019 to include years 2019 through 2023 for data entry. Data from the Module is available for review at the Refinery.

Chevron has completed primary construction of the new Hydrogen Plant and sulfur removal improvements, though as referenced in the 2Q2019 Construction Emissions Report, Chevron continues to undertake work to address operational issues associated with placing new plants and equipment into service. Project modifications were complete at SRU1, and the first full day of operation was September 3. Decommissioning activities, including blinding, cleaning, and removal of catalyst, at the old Hydrogen Plant completed in third quarter. Doming of tank T-3202 also completed in third quarter. Construction of smaller discrete Project elements, including work at tank T-3202, demolition of the old sulfur loading racks and work at the boiler feedwater plant and sodium bisulfite plant, will continue through 4Q2019.

As explained further below, based on current data and projections, Chevron anticipates that emissions of NO_x and ROG will be significantly lower than projected in the EIR. As the Project is still under construction, Chevron does not have enough data to predict whether the average daily emissions of NO_x and ROG will exceed the thresholds of significance once Project construction is complete.² Therefore, the Project is implementing MM 4.3-2a and MM 4.3-2b, as described below. For GHG emissions, Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. In May, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Chevron continues to work with the City to finalize details regarding this project.

Construction Emissions Summary

Several factors are contributing to actual emissions from Project construction being lower than projected in the EIR.

First, when estimating construction emissions from the Project, the EIR conservatively assumed that all Project components would be constructed during a two-year construction period. (Draft EIR, p. 3-39; see also Table 3-

¹ Pursuant to Impact 4.3-3 of the Environmental Impact Report (EIR) prepared for the Project, emissions of PM₁₀ and PM_{2.5} from construction activities are less than significant without mitigation, though the EIR includes Improvement Measure 4.3-3 requiring certain best practices to be implemented. Further, the EIR did not analyze or require tracking or mitigation of CO during construction activities. However, Chevron uses the Construction Emissions Module to track PM₁₀, PM_{2.5}, and CO emissions, and maintains this data at the Refinery.

² For purposes of assessing potential impacts from the Project's construction-related emissions, the EIR utilized the California Environmental Air Quality Act Air Quality Guidelines promulgated by the Bay Area Air Quality Management District (BAAQMD CEQA Guidelines).³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

2.) Chevron has elected to defer construction of the FCC FHT improvements (Draft EIR, p. 3-25) and improvements to one of the sulfur recovery units (SRU), resulting in less intensive construction during the initial construction period than was estimated in the EIR.³ Further, the construction for the remaining Project components, exclusive of the demolition and dismantling of the existing Hydrogen Plant, tank doming, and work on operational issues, is scheduled to continue through 4Q2019.⁴ This means the total number of days during the construction period by which total emissions of NO_x and ROG will be divided to determine the respective average daily emissions will be greater than used in the EIR.

Further, because the EIR did not have specific data concerning the fleet to be used during construction, it made a conservative assumption that the majority of engines were Tier 2 and Tier 3. In the case of off-road equipment, emissions from equipment with higher tier engines (i.e., of equal horsepower) are generally less than emissions from equipment with lower tier engines⁵. Higher tier engines are associated with a lower emission factor, resulting in lower emissions when compared to emissions from lower tier engines. Actual data shows that ~89% of engines in the cumulative fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final.⁶ Of the remaining ~11% of the engines, 9.4% are Tier 3, and 1.7% are Tier 2, with a negligible quantity of Tier 1 engines in the fleet (i.e., below 1%). Therefore, the Project's use of Tier 4 Interim and Tier 4 Final engines, where possible, has contributed to actual Project construction emissions that are lower than the emissions projected in the EIR.⁷

Ozone Precursors

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of NO_x and ROG is assessed by comparing the total average daily emissions from the Project to the threshold of significance. In order to calculate total average daily emissions, total Project construction-related emissions will be divided by the total number of days during the construction period. The total daily average is then compared to the threshold of significance. Based on current data from the Module, as well as Chevron's projected construction schedule and levels of activity, Chevron believes that emissions of NO_x and ROG will be significantly lower than those projected in the EIR. Nevertheless, as the project is still under construction, it is impossible to predict with certainty whether total emissions of NO_x and ROG over the life of construction will result in the Project exceeding the thresholds of significance. Chevron is therefore implementing MM 4.3-2a and MM 4.3-2b, as follows:

³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

⁴ The SRU improvements are the final Project component scheduled to be constructed during the initial construction period, and Chevron anticipates construction of these improvements will be complete by the end of 2019. Chevron has also yet to determine exactly when it will begin dismantling the existing Hydrogen Plant.

⁵ Source: CalEEMod User Guide. OFFROAD Emission Factor Based on Engine Tier. <http://caleemod.com/>

⁶ The calculation for percentage of equipment associated with each engine tier is based on actual weekly contractor equipment counts received from May 9, 2016 through October 7, 2019.

⁷ This likelihood was recognized in the EIR, Appendix 4.3-CST, p. 6, n. 2: "Chevron Data Transmittal #36O (Rev#3), 2014 provides equipment data for eight consecutive quarters. Because the exact start date of future construction is uncertain, the emissions analysis conservatively uses emission factors for 2014 for the first four quarters of construction, and 2015 emission factors for the last four quarters of construction. A construction start date later than January 2014 would lead to lower emissions than predicted here as the emissions profile of the construction fleet is cleaner, due to the implementation of regulations requiring lower emissions engines."

MM 4.3-2a Implementation	
MM 4.3-2a Part(s)	Implementation Status
Chevron shall reduce construction-related NO _x emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~89% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the initial construction period from two years.
Reducing operations and/or emissions from portable generators at the Facility during the construction period, and thereby reducing NO_x emissions;	The number of portable diesel generators used during construction has been reduced by, for example, utilizing solar-powered light standards for certain work areas. Approximately 2% of the cumulative hours for light plants since the beginning of project construction are attributed to light plants operating on solar power.
Installing the low-NO_x burners included in the Modernization Project in the first 6 months of the construction period, thereby reducing net NO_x emissions from the Facility while construction of the Modernization Project continues;	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate NO_x emissions to less-than-significant.
Retiring permanent NO_x emission reduction credits to offset this temporary NO_x construction increase, in an amount sufficient to offset construction period NO_x emissions; or	Chevron is prepared to retire NO_x emissions reduction credits as necessary to mitigate NO_x emissions.
Implementing a combination of two or more of the above measures in an amount sufficient to offset construction-period NO_x emissions to less-than-significant levels.	See above.

MM 4.3-2b Implementation	
MM 4.3-2b Part(s)	Implementation Status
Chevron shall reduce construction-related ROG emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Installing the tank dome Project Design Feature, and installing one additional tank dome, in the first 6 months of Project construction, thereby reducing net ROG emissions from the Facility before completing construction of the hydrogen	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate ROG emissions to less-than-significant.

plant or sulfur removal components of the Modernization Project;	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~89% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the construction period from two years.
Retiring permanent ROG emission reduction credits to offset this temporary ROG construction increase, in an amount sufficient to offset construction-period ROG emissions; or	Chevron is prepared to retire ROG emissions reduction credits as necessary to mitigate ROG emissions to less-than-significant.
Implementing a combination of the above measures, in an amount sufficient to offset construction-period ROG emissions to less-than-significant levels.	See above.

Details concerning implementation of the above-measures can be found in Chevron's Annual Compliance Report, most recently submitted to the City on March 31, 2019 and accepted by the City's Planning Commission on June 6, 2019.

GHG

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of GHG is assessed by comparing total annual emissions of GHG to the threshold of significance (10,000 MT CO₂e per year). Table 3Q2019-GHG shows total construction-related GHG emissions for years 2016 through 2019 not including reductions associated with implementation of MM 4.8-1a – 4.8-1k. Because GHGs are tracked on an annual basis, the cumulative total for construction-related GHG emissions resets to zero at the beginning of each calendar year.

Table 3Q2019– GHG Emissions from Construction		
Year	Cumulative Total (in MT CO₂e/yr)	BAAQMD Threshold of Significance (in MT CO₂e/yr)
2016¹	1,195.8	10,000
2017	7,638.1	10,000
2018²	11,959.0	10,000
2019³	2,116.0	10,000
¹ Based on data collected beginning May 9, 2016 and ending December 31, 2016 ² For data collected through December 30, 2018. ³ Based on data collected through October 7, 2019. This value also includes the GHG emissions calculated by the Construction Emissions Module for the week of December 31, 2018 through January 6, 2019, as the majority of work days for that week occurred in 2019.		

Total construction-related GHG emissions in 2016 and 2017 did not exceed the threshold of significance. For GHG emissions, the Project exceeded the annual threshold for 2018 due to construction intensity. Chevron anticipates 2019 construction-related GHG emissions will be below the annual threshold based on Project construction activities. Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. Chevron continues to work with the City to finalize details regarding Chevron’s proposed project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l.

MM 4.8-1 Implementation	
MM 4.8.1 Part(s)	Implementation Status¹
Consistent with air quality mitigation measures for construction activities, Chevron would be required to implement the following mitigation measures to reduce its Project construction emissions. Implementation of the mitigation measures would result in further reductions in greenhouse gas emissions.	
a. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.	• Done
b. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxic Control Measure [CCR], Section 2485). Clear signage shall be provided for construction workers at all access points.	• Done
c. All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. All equipment shall be checked by a certified visible emissions evaluator.	• Done
d. The idling time of diesel-powered construction equipment shall be limited to 2 minutes.	• Done
e. The Project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in construction (i.e., owned, leased, and subcontractor vehicles) would achieve a Project-wide fleet-average 20% nitrogen oxide reduction and 45% particulate matter reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, Low-emission diesel products, Alternative fuels, Engine retrofit technology, After-treatment products, Add-on devices such as particular filters, and/or Other options as such become available. (Several of these measures would also reduce greenhouse gas emissions.)	• Done
f. All contractors shall be required to use equipment that meets CARB’s most recent certification standard for off-road heavy-duty diesel engines.	• Done
g. Reuse and recycle construction and demolition waste (including, but not limited to, soil,	• Done

MM 4.8-1 Implementation	
vegetation, concrete, lumber, metal, and cardboard).	
h. Enforce and follow limits on idling time for commercial vehicles, including delivery and construction vehicles.	• Done
i. Using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment on at least 15% of the fleet.	• Done
j. Using local building materials of at least 10%.	• Done
k. Recycling or reusing at least 50% of construction waste or demolition materials.	• Done
l. For each year of Project construction, Chevron shall hire, at commercially reasonable rates and at Chevron's expense, a qualified third-party entity reasonably acceptable to the City to quantify and verify in writing whether the reductions achieved from the above described construction greenhouse gas mitigation measures for that year of Project construction adequately mitigated this potentially significant impact, which report shall be subject to City's reasonably approval. For any year of construction for which construction-related diesel emissions are not reduced to or below the 10,000-MT CO₂e per year significance threshold, Chevron shall implement one or more of the following measures in an amount sufficient to reduce construction period greenhouse gas emissions to less-than-significant levels: (i) Reduce diesel emissions from other equipment at the Facility, such as a diesel-powered generator, in an amount equal to the construction-related greenhouse gas emissions in excess of 10,000 MT CO₂e per year for any calendar year of Project construction, which reduced emission level Chevron shall maintain for the following two years. (ii) Permanently retire, or retrofit from diesel to electric power, one or more Facility sources that emit more than 300 MT CO₂e per year.	• Chevron is implementing MM 4.8-1a – 4.8-1k. Chevron continues to work with the City to finalize details regarding Chevron's proposed project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l.

Details concerning implementation of the above-measures can be found in Chevron's Annual Compliance Report, most recently submitted to the City on March 31, 2019 and accepted by the City's Planning Commission on June 6, 2019.

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Construction Emissions Report
Fourth Quarter 2019

January 30, 2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Pursuant to the Chevron Richmond Refinery Modernization Project (Project) Mitigation Monitoring and Reporting Program (MMRP), Chevron is required to provide quarterly compliance reports for emissions of NO_x (mitigation measure (MM) 4.3-2a), ROG (MM 4.3-2b), and greenhouse gases (GHG) (MM 4.8-1) during Project construction. This is the Construction Emissions Report for construction activity that occurred through the fourth quarter 2019 (4Q2019).¹

Chevron tracks construction emissions using the Construction Emissions Module (Module) developed in conjunction with the City of Richmond's environmental consultant, Ramboll Environ, Inc. (Ramboll). The Module calculates emissions from On-Road Onsite Only vehicle use, On-Road Onsite and Offsite vehicle use, Off-Road Equipment, and Architectural Coating and Paving activities. The latest update to the Module, version 7.0, was issued to Chevron on January 23, 2017 with an additional revision to version 7.0 in 1Q2019 to include years 2019 through 2023 for data entry. Data from the Module is available for review at the Refinery.

In 2019, Chevron completed primary construction of the new Hydrogen Plant and sulfur removal improvements, though Chevron continues to undertake work to address operational issues associated with placing new plants and equipment into service. In fourth quarter, Chevron completed construction modifications at the SRU. Additionally, Chevron completed construction of smaller discrete Project elements, including demolition of the old sulfur loading racks and work at the boiler feedwater plant and sodium bisulfite plant. Secondary construction work scope at tank T-3202 also occurred in fourth quarter and will extend into 2020. Modernization construction is ongoing, as it includes demolition and dismantling of the existing Hydrogen Plant, tank doming, and work on operational issues, and Chevron continues to track construction-related emissions accordingly.

As explained further below, based on current data and projections, Chevron anticipates that emissions of NO_x and ROG will be significantly lower than projected in the EIR. As secondary construction work is still underway, Chevron does not have enough data to predict whether the average daily emissions of NO_x and ROG will exceed the thresholds of significance once Project construction is complete.² Therefore, the Project is implementing MM 4.3-2a and MM 4.3-2b, as described below. For GHG emissions, Chevron is implementing MM 4.8-1a – 4.8-1k, as described below. In May 2019, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l and worked with the City to finalize details and gain concurrence from the City. Project planning and implementation is underway.

Construction Emissions Summary

Several factors are contributing to actual emissions from Project construction being lower than projected in the EIR.

First, when estimating construction emissions from the Project, the EIR conservatively assumed that all Project components would be constructed during a two-year construction period. (Draft EIR, p. 3-39; see also Table 3-2.) Chevron has elected to defer construction of the FCC FHT improvements (Draft EIR, p. 3-25) and

¹ Pursuant to Impact 4.3-3 of the Environmental Impact Report (EIR) prepared for the Project, emissions of PM₁₀ and PM_{2.5} from construction activities are less than significant without mitigation, though the EIR includes Improvement Measure 4.3-3 requiring certain best practices to be implemented. Further, the EIR did not analyze or require tracking or mitigation of CO during construction activities. However, Chevron uses the Construction Emissions Module to track PM₁₀, PM_{2.5}, and CO emissions, and maintains this data at the Refinery.

² For purposes of assessing potential impacts from the Project's construction-related emissions, the EIR utilized the California Environmental Air Quality Act Air Quality Guidelines promulgated by the Bay Area Air Quality Management District (BAAQMD CEQA Guidelines).

improvements to one of the sulfur recovery units (SRU), resulting in less intensive construction during the initial construction period than was estimated in the EIR.³ Further, the construction for the remaining Project components, exclusive of the demolition and dismantling of the existing Hydrogen Plant, tank doming, and work on operational issues, continued through 4Q2019.⁴ This means the total number of days during the construction period by which total emissions of NO_x and ROG will be divided to determine the respective average daily emissions will be greater than used in the EIR.

Further, because the EIR did not have specific data concerning the fleet to be used during construction, it made a conservative assumption that the majority of engines were Tier 2 and Tier 3. In the case of off-road equipment, emissions from equipment with higher tier engines (i.e., of equal horsepower) are generally less than emissions from equipment with lower tier engines⁵. Higher tier engines are associated with a lower emission factor, resulting in lower emissions when compared to emissions from lower tier engines. Actual data shows that ~89% of engines in the cumulative fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final.⁶ Of the remaining ~11% of the engines, 9.4% are Tier 3, and 1.7% are Tier 2, with a negligible quantity of Tier 1 engines in the fleet (i.e., below 1%). Therefore, the Project's use of Tier 4 Interim and Tier 4 Final engines, where possible, has contributed to actual Project construction emissions that are lower than the emissions projected in the EIR.⁷

Ozone Precursors

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of NO_x and ROG is assessed by comparing the total average daily emissions from the Project to the threshold of significance. In order to calculate total average daily emissions, total Project construction-related emissions will be divided by the total number of days during the construction period. The total daily average is then compared to the threshold of significance. Based on current data from the Module, as well as Chevron's projected construction schedule and levels of activity, Chevron believes that emissions of NO_x and ROG will be significantly lower than those projected in the EIR. Nevertheless, as the project is still under construction, it is impossible to predict with certainty whether total emissions of NO_x and ROG over the life of construction will result in the Project exceeding the thresholds of significance. Chevron is therefore implementing MM 4.3-2a and MM 4.3-2b, as follows:

³ Pursuant to Condition A7 of the Condition Use Permit (CUP), Chevron has ten (10) years in which to complete construction of the Project, with one automatic, two-year extension. Chevron has not yet determined when it might pursue construction of the remaining Project components.

⁴ The SRU improvements are the final Project component scheduled to be constructed during the initial construction period, and Chevron completed construction of these improvements in 2019. Chevron has also yet to determine exactly when it will begin dismantling the existing Hydrogen Plant.

⁵ Source: CalEEMod User Guide. OFFROAD Emission Factor Based on Engine Tier. <http://caleemod.com/>

⁶ The calculation for percentage of equipment associated with each engine tier is based on actual weekly contractor equipment counts received from May 9, 2016 through December 29, 2019.

⁷ This likelihood was recognized in the EIR, Appendix 4.3-CST, p. 6, n. 2: "Chevron Data Transmittal #36O (Rev#3), 2014 provides equipment data for eight consecutive quarters. Because the exact start date of future construction is uncertain, the emissions analysis conservatively uses emission factors for 2014 for the first four quarters of construction, and 2015 emission factors for the last four quarters of construction. A construction start date later than January 2014 would lead to lower emissions than predicted here as the emissions profile of the construction fleet is cleaner, due to the implementation of regulations requiring lower emissions engines."

MM 4.3-2a Implementation	
MM 4.3-2a Part(s)	Implementation Status
Chevron shall reduce construction-related NO _x emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~89% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the initial construction period from two years.
Reducing operations and/or emissions from portable generators at the Facility during the construction period, and thereby reducing NO_x emissions;	The number of portable diesel generators used during construction has been reduced by, for example, utilizing solar-powered light standards for certain work areas. Approximately 2% of the cumulative hours for light plants since the beginning of project construction are attributed to light plants operating on solar power.
Installing the low-NO_x burners included in the Modernization Project in the first 6 months of the construction period, thereby reducing net NO_x emissions from the Facility while construction of the Modernization Project continues;	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate NO_x emissions to less-than-significant.
Retiring permanent NO_x emission reduction credits to offset this temporary NO_x construction increase, in an amount sufficient to offset construction period NO_x emissions; or	Chevron is prepared to retire NO_x emissions reduction credits as necessary to mitigate NO_x emissions.
Implementing a combination of two or more of the above measures in an amount sufficient to offset construction-period NO_x emissions to less-than-significant levels.	See above.

MM 4.3-2b Implementation	
MM 4.3-2b Part(s)	Implementation Status
Chevron shall reduce construction-related ROG emissions to less-than-significant levels by implementing one or more of the following feasible mitigation measures, all of which have been found to result in emissions reduction for construction projects:	
Installing the tank dome Project Design Feature, and installing one additional tank dome, in the first 6 months of Project construction, thereby reducing net ROG emissions from the Facility before completing construction of the hydrogen	Chevron elected not to pursue this option as it does not believe it will be necessary to mitigate ROG emissions to less-than-significant.

plant or sulfur removal components of the Modernization Project;	
Using lower emitting construction equipment, increasing carpooling or otherwise reducing construction-worker automobile use in daily commutes, extending the duration of construction by 1 year by delaying the modifications required to increase the throughput capacity of the FCC FHT until after construction of the hydrogen plant and amine contractor, or reducing the hours of use of construction equipment;	- As described above, ~89% of the engines in the cumulative construction fleet since the beginning of project construction are Tier 4 Interim or Tier 4 Final, compared to the EIR, which assumed the majority of the fleet would have engines in Tiers 2 and 3. - Chevron has extended the construction period from two years.
Retiring permanent ROG emission reduction credits to offset this temporary ROG construction increase, in an amount sufficient to offset construction-period ROG emissions; or	Chevron is prepared to retire ROG emissions reduction credits as necessary to mitigate ROG emissions to less-than-significant.
Implementing a combination of the above measures, in an amount sufficient to offset construction-period ROG emissions to less-than-significant levels.	See above.

Details concerning implementation of the above-measures can be found in Chevron's Annual Compliance Report, most recently submitted to the City on March 31, 2019 and accepted by the City's Planning Commission on June 6, 2019.

GHG

Pursuant to the BAAQMD CEQA Guidelines, the potential significance of construction-related emissions of GHG is assessed by comparing total annual emissions of GHG to the threshold of significance (10,000 MT CO₂e per year). Table 4Q2019-GHG shows total construction-related GHG emissions for years 2016 through 2019 not including reductions associated with implementation of MM 4.8-1a – 4.8-1k. Because GHGs are tracked on an annual basis, the cumulative total for construction-related GHG emissions resets to zero at the beginning of each calendar year.

Table 4Q2019– GHG Emissions from Construction		
Year	Cumulative Total (in MT CO₂e/yr)	BAAQMD Threshold of Significance (in MT CO₂e/yr)
2016¹	1,195.8	10,000
2017	7,638.1	10,000
2018²	11,959.0	10,000
2019³	2,196.0	10,000
¹ Based on data collected beginning May 9, 2016 and ending December 31, 2016 ² For data collected through December 30, 2018. ³ Based on data collected through December 29, 2019. This value also includes the GHG emissions calculated by the Construction Emissions Module for the week of December 31, 2018 through January 6, 2019, as the majority of work days for that week occurred in 2019.		

Total construction-related GHG emissions in 2016, 2017, and 2019 did not exceed the annual threshold of significance. The Project exceeded the annual threshold for GHG emissions in 2018 due to construction intensity. In May 2019, Chevron proposed a project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l and worked with the City to finalize details and gain concurrence from the City. Project planning and implementation is underway. Additionally, Chevron is implementing MM 4.8-1a – 4.8-1k, as described below.

MM 4.8-1 Implementation	
MM 4.8.1 Part(s)	Implementation Status¹
Consistent with air quality mitigation measures for construction activities, Chevron would be required to implement the following mitigation measures to reduce its Project construction emissions. Implementation of the mitigation measures would result in further reductions in greenhouse gas emissions.	
a. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.	• Done
b. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxic Control Measure (Title 13 of California Code of Regulations [CCR], Section 2485). Clear signage shall be provided for construction workers at all access points.	• Done
c. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.	• Done
d. The idling time of diesel-powered construction equipment shall be limited to 2 minutes.	• Done
e. The Project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in construction (i.e., owned, leased, and subcontractor vehicles) would achieve a Project-wide fleet-average 20% nitrogen oxide reduction and 45% particulate matter reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions include the use of late model engines, Low-emission diesel products, Alternative fuels, Engine retrofit technology, After-treatment products, Add-on devices such as particular filters, and/or Other options as such become available. (Several of these measures would also reduce greenhouse gas emissions.)	• Done
f. All contractors shall be required to use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines.	• Done

MM 4.8-1 Implementation	
g. Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).	• Done
h. Enforce and follow limits on idling time for commercial vehicles, including delivery and construction vehicles.	• Done
i. Using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment on at least 15% of the fleet.	• Done
j. Using local building materials of at least 10%.	• Done
k. Recycling or reusing at least 50% of construction waste or demolition materials.	• Done
l. For each year of Project construction, Chevron shall hire, at commercially reasonable rates and at Chevron's expense, a qualified third-party entity reasonably acceptable to the City to quantify and verify in writing whether the reductions achieved from the above described construction greenhouse gas mitigation measures for that year of Project construction adequately mitigated this potentially significant impact, which report shall be subject to City's reasonably approval. For any year of construction for which construction-related diesel emissions are not reduced to or below the 10,000-MT CO₂e per year significance threshold, Chevron shall implement one or more of the following measures in an amount sufficient to reduce construction period greenhouse gas emissions to less-than-significant levels: (i) Reduce diesel emissions from other equipment at the Facility, such as a diesel-powered generator, in an amount equal to the construction-related greenhouse gas emissions in excess of 10,000 MT CO₂e per year for any calendar year of Project construction, which reduced emission level Chevron shall maintain for the following two years. (ii) Permanently retire, or retrofit from diesel to electric power, one or more Facility sources that emit more than 300 MT CO₂e per year.	• Chevron is implementing MM 4.8-1a – 4.8-1k. Chevron worked with the City to finalize details regarding Chevron's proposed project to mitigate 2018 construction-related GHG emissions consistent with MM 4.8-1l. Project planning and implementation is underway.

Details concerning implementation of the above-measures can be found in Chevron's Annual Compliance Report, most recently submitted to the City on March 31, 2019 and accepted by the City's Planning Commission on June 6, 2019.

ATTACHMENT 5

Semi-Annual Construction Progress Reports
Operational Year 2019

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Condition of Approval H3 Semi-Annual Construction Report

March 28, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

INTRODUCTION

This report is submitted pursuant to the Conditional Use Permit (CUP) for the Chevron Modernization Project, Section H, Monitoring, Record Keeping, Reporting and Public Notification, Condition of Approval H3, which states:

“Chevron shall submit semi-annual construction progress reports to the Planning and Building Services Department on March 31 and October 31 during all phases of project construction.”

This is the sixth semi-annual construction progress report and provides a general overview on the status of construction for the Modernization Project.

REPORT

Construction Summary

Construction is nearing completion on the new Hydrogen Plant, and commissioning activities are in progress. Construction continues on the Sulfur Removal Improvements (including the 6H2S plant and the SRUs) and project tie-in components (e.g. pipe racks). A total of 203 building, fire, instrumentation and electrical (I&E), and significant temporary construction permit packages have been issued by the City of Richmond, and special inspections are ongoing daily. Chevron continues to work with the City to prioritize and coordinate permitting to support construction.

Over 296,000 man hours have been worked year to date. Approximately 700 personnel are supporting the Project. Personnel have continued to decrease from 1,600, as reported in the October 2018 Semi-Annual Construction Report, as the new Hydrogen Plant transitions from construction to commissioning activities.

Decommissioning activities, including blinding, cleaning, and removal of catalyst, for the old Hydrogen Plant also began in first quarter 2019.

As initially reported to the City on June 16, 2016, and quarterly thereafter via the City’s Antea software, Chevron is implementing all construction-related mitigation measures from the Chevron Modernization Project Environmental Impact Report certified by the City on July 29, 2014, with oversight from the City. The Fourth Quarter 2018 Modernization Construction Questionnaire was submitted to the City via Antea software on January 28, 2019.

More than 50% of total waste project streams are being recycled or reused, as required by Mitigation Measure 4.8-1k. The construction equipment fleet is exceeding targets for reduced emissions of oxides of nitrogen (NOx) and particulate matter (PM) compared to CARB fleet averages, as required by Mitigation Measure 4.8-1e. Chevron continues to track construction emissions using the Construction Emissions module provided by the City’s consultant, Ramboll. Pursuant to the MMRP, a separate quarterly construction emissions report is submitted to the City as part of the ANTEA quarterly update.

Chevron anticipates construction will continue through 2019.

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Condition of Approval H3 Semi-Annual Construction Report

October 30, 2019

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

INTRODUCTION

This report is submitted pursuant to the Conditional Use Permit (CUP) for the Chevron Modernization Project, Section H, Monitoring, Record Keeping, Reporting and Public Notification, Condition of Approval H3, which states:

“Chevron shall submit semi-annual construction progress reports to the Planning and Building Services Department on March 31 and October 31 during all phases of project construction.”

This is the seventh semi-annual construction progress report and provides a general overview on the status of construction for the Modernization Project.

REPORT

Construction Summary

Chevron has completed primary construction of the new Hydrogen Plant, sulfur removal improvements, though Chevron continues to undertake work to address operational issues associated with placing new plants and equipment into service. The first full day of operation for new or modified units was April 18 for the new Hydrogen Plant, May 30 for SRU2, June 1 for 6H2S and TKC, and September 3 for SRU1. Doming of tank T-3202 and decommissioning activities, including blinding, cleaning, and removal of catalyst, at the old Hydrogen Plant completed in third quarter. Construction of smaller discrete Project elements, including work at tank T-3202, demolition of the old sulfur loading racks and work at the boiler feedwater plant and sodium bisulfite plant, will continue through 4Q2019.

A total of 203 building, fire, instrumentation and electrical (I&E), and significant temporary construction permit packages have been issued by the City of Richmond. Closure of permits has been ongoing as work has completed. To date, there are 8 permits remaining to be closed.

Over 785,000 man hours have been worked year to date. Approximately 110 personnel are supporting the Project. Personnel have continued to decrease from 700, as reported in the March 2019 Semi-Annual Construction Report.

As initially reported to the City on June 16, 2016, and quarterly thereafter, Chevron is implementing all construction-related mitigation measures from the Chevron Modernization Project Environmental Impact Report certified by the City on July 29, 2014, with oversight from the City. Effective 2Q2019, the submittals of the Construction Questionnaire are made to the City via email, replacing use of the City's Antea software. The Third Quarter 2019 Modernization Construction Questionnaire was submitted to the City via email on October 30, 2019.

More than 50% of total waste project streams are being recycled or reused, as required by Mitigation Measure 4.8-1k. The construction equipment fleet is exceeding targets for reduced emissions of oxides of nitrogen (NOx) and particulate matter (PM) compared to CARB fleet averages, as required by Mitigation Measure 4.8-1e. Chevron continues to track construction emissions using the Construction Emissions module provided by the City's consultant, Ramboll. Pursuant to the MMRP, a separate quarterly construction emissions report is submitted to the City as part of the quarterly Construction Questionnaire responses.

ATTACHMENT 6

Annual Reliability Program Report

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Mitigation Measure 4.13-7a Annual Report Regarding Implementation of the
Modernization Project Reliability Program

August 31, 2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

INTRODUCTION

This report is submitted pursuant to section IV.H of the Modernization Project Reliability Program (Program), as incorporated by mitigation measure (MM) 4.13-7a of the Modernization Project Mitigation Monitoring and Reporting Program (MMRP). Pursuant to section IV.H:

“As part of its ongoing reporting obligation under the [MMRP] adopted by the City, Chevron shall report on the status of all requirements of this Reliability Program on an annual basis in a form acceptable to the City.”

Pursuant to MM 4.13-7a, “an initial Reliability Program report shall be submitted to the City and County prior to Project construction. Annual reports shall be submitted thereafter, including a report prior to the commencement of Project operations...”

Chevron submitted its initial Program report on June 16, 2016 and provided an update to that report on October 7, 2016. Chevron submitted its second, third and fourth Program reports on June 14, 2017, September 4, 2018, and December 11, 2019, respectively. This report is the fifth annual Program report and provides a general overview regarding the status of Chevron’s implementation of Sections II – IV of the Program.¹ A copy of the Program is submitted herewith for purposes of tracking the responses below with the Program commitments. See Attachment 1.

Chevron also recognizes that there are Reliability Program-related CUP and MMRP obligations which are to be included as part of this Reliability Program report. Attachment 2 includes the status of Chevron’s implementation of these requirements.

REPORT

II. General Recommendations and Refinery Actions to Address

Chevron’s actions to implement the general recommendations are described in Attachment 3. Contra Costa Health Services (CCHS) reviewed Chevron’s implementation of the general recommendations as part of its 2018 pre-startup review of the Reliability Program components and no further action was required.

III. Project Recommendations

Section III includes project-specific recommendations that are being implemented as a result of the Reliability Analysis.

A. Schedule and Report on Upgrades to Identified Piping Circuits

Chevron separately submitted the final report to the City pursuant to this requirement on August 15, 2018. CCHS verified implementation of this measure in August 2018. A copy of this report was included with the 2018 Reliability Program report. No further action is required.

¹ Section I of the Reliability Program is the Introduction and does not contain any recommendations or action items.

B. Installation and Monitoring of Additional Permasense® Monitors on Identified Circuits

As part of the work to upgrade the piping circuits per III.C.2 of this Reliability Program, which included identification of new locations for Permasense® monitors on 4CU piping circuits, Chevron completed an upgrade of the Permasense® monitors and system for the upgraded and existing piping circuits. Hot work for installation of the upgraded Permasense® monitors was completed during the 4CU turnaround in 4Q2016. These installations include a total of 118 monitoring locations, of which 9 are located on the outlet piping of F-1100A/B to C-1100. CCHS reviewed records demonstrating compliance with this measure in August 2018.

The Refinery also committed to the installation of 25 additional Permasense® monitors on carbon steel circuits in the Solvent De-Asphalter (SDA). Pursuant to letter dated July 31, 2018, Chevron requested the authority to install these monitors during its next scheduled SDA turnaround. The City approved this request on August 30, 2018. The monitors were successfully installed during the SDA turnaround. Chevron notified the City of the completion of installation on August 14, 2019. A copy of the City approval and notification of completion was included in the 2019 Report. CCHS reviewed records demonstrating completion of this condition in June 2020.

C. Crude Unit Recommendations

The following preventative measures were included in the Program based on the belief that operational and feedstock changes from the Project could result in increased damage mechanism activity in the Crude Unit post-Project:

1. Since the Modernization Project did not commence operation prior to the referenced “2017 turnaround”, this obligation is moot.
2. Chevron separately submitted a report to the City pursuant to this requirement on August 15, 2018. CCHS verified completion of this measure in August 2018. A copy of this report was included with the 2018 Reliability Program report.
3. Chevron has separately submitted a report to the City pursuant to this requirement on August 15, 2018. CCHS verified completion of this measure in May 2018. A copy of this report was included with the 2018 Reliability Program report.
4. Tests have been run by Chevron on crude samples and crude blends to improve our understanding of the effects of sulfur speciation and H₂S evolution on sulfidation corrosion. The results of this testing are considered Confidential Business Information and were reviewed by CCHS as part of its pre-operations verification in August 2018.
5. The integrity operating window (IOW) program has been implemented for critical Crude Unit parameters per API 584, with IOW table, alarm and alert structure, corrective actions, required bypass mitigations, and training. CCHS reviewed records demonstrating compliance with this measure in May 2018.

6. This obligation requires that Crude Splitter software predicted results be verified when identified trigger points (2.25 wt% and 2.75 wt % sulfur on an annual average) are reached. Chevron is monitoring crude sulfur content on a monthly basis, and is implementing a Crude Sulfur Monitoring process that alerts Reliability Program task owners when crude sulfur triggers of 2.25 wt% or 2.75% are forecasted and reached. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.
7. Chevron has revised the Asset Integrity Plans for V-1100 Crude Unit Atmospheric Column Reflux Drum, V-1190 Stabilizer Column Reflux Drum, and V-1160 Vacuum Column Overhead Seal Drum, to include inspection for Wet H₂S damage. Chevron has completed an external Automatic Ultrasonic Testing (AUT) inspection of representative sections of the “water wet” portions of V-1100, V-1160, and V-1190 vessels. Records demonstrating completion of this condition were reviewed by CCHS in May 2018. Post-modernization AUT inspections of V-1100, V-1190, and V-1160 were completed in first quarter 2020. A one-time internal inspection of each vessel is currently scheduled for the next major turnaround.
8. Chevron has developed and implemented the following process monitoring and sampling plans in the Crude Unit overhead to observe impacts of increased sulfur levels post-startup of the Modernization Project. Records demonstrating completion of this condition were reviewed by CCHS in May 2018.
 - The Crude Unit atmospheric column overhead accumulator, V-1100, is sampled for pH, chlorides, iron, and H₂S (sulfides) which are recorded and monitored in the Crude Unit Process Monitoring and Optimization (PMO) workbook. In addition, IOWs are currently in place for these parameters.
 - The Crude Unit desalter, V-1102, is monitored for pH pursuant to a contract with Nalco, a specialty chemicals contractor, reported to the Crude Unit Process Engineer and other unit personnel on a periodic basis, and discussed as needed monthly in the Unit Reliability Brief (URB) meetings. URB meetings are attended by Area Business Unit management and subject matter experts in the areas of reliability and operations to review reliability topics relative to current operation.
 - Measuring H₂S (sulfides) in the water of V-1100 and monitoring in the PMO workbook will allow Chevron to analyze the atmospheric tower post-Modernization to quantify if there is increased H₂S in the overhead system.
 - Pursuant to condition III.C10, Chevron conducted a historical review of mercaptan in jet cuts of crude and crude blends to establish flags in the crude acceptance tool. The refinery’s crude acceptance tool includes flags in the jet cut for high mercaptans. If a flag is reached, Materials Engineering reviews the asset integrity plan and consider the potential for increased corrosion. While this condition references a “kerosene cut”, the Refinery’s Crude Unit does not produce kerosene and no “kerosene cut” was identified in the Environmental Impact Report (EIR).

- The asset integrity plan for the Crude Unit identifies the locations of the Permasense® probes installed pursuant to condition III.B. The data collected from these probes is considered as part of Chevron’s review of the asset integrity plan per MFG 525.
9. Chevron currently has the following controls and processes to assure carbon steel piping components downstream of high sulfur streams operating > 500F are not inadvertently placed into continuous service. Records demonstrating implementation of this condition were reviewed by CCHS in May 2018.
- Manufacturing 520 (or MFG 520), Damage Mechanism Review Instruction, sets forth work processes to identify applicable damage mechanisms per equipment and piping class metallurgy. This standard incorporates industry practices and recommendations including API Recommended Practice 571, Damage Mechanisms Affecting Fixed Equipment in the Refinery Industry and API Recommended Practice 584, Integrity Operating Windows.
 - Manufacturing 525 (or MFG 525), Fixed Equipment Asset Strategies Standard sets expectations for asset strategies designed to prevent and mitigate losses of containment in fixed equipment and describes the process for creating and maintaining these strategies.
 - Refinery Instruction, RI-302, Color Identification and Labeling of Equipment and Pipelines, requires all drop out spools and temporary piping to be painted with purpose colored bands for easy identification.
 - One of the Phase 4 deliverables in the IMPACT process is the development of the Temporary Connections List. Each item on the list is also tracked on the turnaround blind list and the Quality Control database to ensure removal prior to startup after a maintenance turnaround event. Chevron utilizes the IMPACT process to schedule, plan, and execute maintenance activities for planned maintenance turnaround events for each process unit.
 - Refinery Instruction, RI-370, Management of Change, requires an MOC be reviewed by appropriate subject matter experts when any type of metallurgy change is requested.
10. In 2017, Chevron conducted a 10-year historical review of purchased crudes and processed crude blends. Maximum mercaptan concentrations for jet cuts were calculated for the representative year of 2016. A review of the Permasense® data for the historical periods of time when these maximum concentrations were exceeded noted no increases in corrosion rates. As a result of this analysis, Chevron elected to incorporate a mercaptan flag for jet cut into its crude acceptance tool which would trigger an MOC action item to perform a lookback on the period of time where higher mercaptans in jet cut were processed. The MOC action item specifies that the Materials Engineer complete a review of the Permasense® data for the period of time. This is recorded in an MOC addendum called the “MOC for Crude Review [Required for RMP Compliance Plan]”. Records are attached to the MOC. Records were reviewed by CCHS in May 2018, August 2018 and June 2020.

11. The Crude Unit atmospheric overhead piping was metallurgically upgraded in 4Q 2016, so that all piping is now either Hastelloy clad/overlay or solid Hastelloy, from the outlet of C-1100 to the inlet of E-1101s.

The other piping circuit in the Crude Unit having a dissimilar metal interface (similar to that of the overhead line prior to the upgrade), is the transfer line from the atmospheric furnace to the atmospheric column. This piping has an interface between 316 SS and 5CR as it heads towards the atmospheric column. The inspection plan for this circuit includes multiple CMLs immediately downstream of the interface in order to monitor for corrosion in that location.

Records demonstrating completion of this condition were reviewed by CCHS in May 2018.

D. Hydroprocessing Recommendations

1. Chevron has committed to monitoring post-Project sulfur content of crudes being fed to the crude unit and uses 2.25% sulfur content of feed as a trigger to conduct a review of “inspections plans for the distillation section of the hydroprocessing units where sulfidation corrosion rates have been ‘erratic’ and uncertain, per API 939-C”. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.
2. Chevron has separately submitted a letter to the City pursuant to this requirement on August 3, 2017. Records demonstrating completion of this condition were reviewed by CCHS in May 2018. A copy of this report was included with the 2018 Reliability Program report.
3. Chevron has developed and implemented the process monitoring and sampling plans in the hydroprocessing units to observe applicable damage mechanisms as identified in the EIR post-startup of the Modernization Project. The hydroprocessing units implicated by this measure are: NHT, JHT, DHT, TKN, TKC, LNC, and HNC. Process conditions are monitored to adhere to equipment metallurgical limits with respect to ammonium bisulfide corrosion in the reactor effluent air coolers (REAC) of hydroprocessing units. These process conditions are monitored through the Refinery’s IOW program.

Process parameters which effect ammonium bisulfide corrosion include H₂S partial pressure, ammonium bisulfide concentration, water dew point temperature upstream of wash water injection, water fluid phase of water at injection site, and fluid velocity downstream of wash water injection. Records demonstrating implementation of this condition were reviewed by CCHS in May 2018.

4. The integrity operating windows (IOWs) program has been implemented for critical hydroprocessing reliability variables such as the wash water rate for NH₄HS corrosion

control with IOW table, alarm and alert structure, corrective actions, required bypass mitigations, and training. Records demonstrating implementation of this condition were reviewed by CCHS in May 2018.

5. The REAC Corrosion Control Project was substantially completed during the 2014 TKN turnaround, resulting in extensive metallurgy upgrades. Current operations of certain TKN systems not modified by the Modernization Project are being managed per the HP-002 Reactor Effluent Air Cooler (REAC) Piping and Equipment Corrosion Control Guidelines (i.e., the “REAC best practice guidelines”) through ongoing inspections to help ensure corrosion rates will remain under the REAC best practice guidelines and, if determined to be necessary, targeted upgrades during the next TKN turnaround. Records demonstrating completion of this condition were reviewed by CCHS in May 2018.

E. SDA Recommendations

1. A wet H₂S inspection, using Surface Eddy Current techniques, was completed on SDA vessel V-2531 on July 3, 2019.
2. This condition requires that a water boot analysis of corrosive constituents be conducted in the SDA upon triggering 2.25 wt% and 2.75 wt% sulfur of crude oil processed at the Refinery. Chevron is monitoring crude sulfur content on a monthly basis, and is implementing a Crude Sulfur Monitoring process that alerts Reliability Program task owners when crude sulfur triggers of 2.25 wt% or 2.75% are forecasted and reached. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.
3. This obligation requires that predicted results be verified for the SDA when identified trigger points (2.25 wt% and 2.75 wt % sulfur) are reached. Chevron is monitoring crude sulfur content on a monthly basis, and is implementing a Crude Sulfur Monitoring process that alerts Reliability Program task owners when crude sulfur triggers of 2.25 wt% or 2.75% are forecasted and reached. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.
4. Chevron has scheduled a follow-up smart pig inspection of F-100 and F-120 furnace tubes for the first planned maintenance after the SDA has seen at least 1 year of post-Modernization Project operating conditions. Because the SDA turnaround occurred in 2Q2019, which is not in the timeframe that will reflect post-project operating conditions, this obligation will be completed during the next SDA turnaround.
5. The Refinery committed to the installation of 25 additional Permasense® monitors on carbon steel circuits in the Solvent De-Asphalter (SDA). Pursuant to letter dated July 31,

2018, Chevron requested the authority to install these monitors during its next scheduled SDA turnaround. The City approved this request on August 30, 2018. The monitors were successfully installed during the SDA turnaround and Chevron notified the City of the completion of installation on August 14, 2019. A copy of the City approval and notification of completion was included in the 2019 Report. CCHS reviewed records demonstrating completion of this condition in June 2020.

6. The integrity operating windows (IOWs) program for the SDA unit has been implemented consistent with API RP-584 for the identified damage mechanisms in the SDA unit as referenced in Appendix 4.13-REL with IOW table, alarm and alert structure, corrective actions, required bypass mitigations, and training. CCHS reviewed documents demonstrating implementation of this condition in May 2018.
7. Chevron has developed and implemented process monitoring and sampling plans for the SDA to observe applicable damage mechanisms as identified in the EIR post-startup of the Modernization Project. These plans include feed sulfur monitoring as well as sour water pH and sulfide content. Records demonstrating implementation of this condition were reviewed by CCHS in May 2018 and June 2020. Chevron continues post-modernization process monitoring and sampling.

F. Amine Systems Recommendation

Chevron continues to monitor amine loading and heat stable amine salts (HSAS) in the amine system to determine if post-Project amine loading and HSAS are impacted by any increase in H₂S to the TKC Unit. Pre-project data was collected prior to commencement of Project operations for purposes of comparison. Records demonstrating implementation of this condition were reviewed by CCHS in May 2018.

G. Sulfur Recovery Unit Recommendation

The new liquid and gaseous oxygen piping installed as part of the Richmond Modernization Project were designed consistent with applicable design codes. Chevron developed the asset strategy for the Chevron-owned/operated gaseous oxygen piping system downstream of the Pressure Control Skid and applied Chevron's Inspection Strategy for oxygen piping (IS-65). Prior to commissioning, all liquid and gaseous oxygen piping systems were cleaned according to Chevron's pre-commissioning cleaning work instruction, which are consistent with the Air Products instructions for commissioning cleaning. CCHS reviewed documents demonstrating implementation of this condition in March 2019 and June 2020.

H. Sour Gas System Recommendations

Chevron has developed its implementation strategy for the sour gas system recommendations which mature following commencement of Project operations. Chevron has completed reviews and developed its Fixed Equipment Asset Strategies for each refinery process unit, including the sour gas systems. The development of these strategies followed Chevron's Manufacturing Standard (MFG-525) which is intended to prevent and mitigate loss of containment in fixed

equipment, by identifying damage mechanisms, establishing IOWs, and prescribing inspection plans. Chevron intends to utilize this program implementation to meet the elements of this requirement.

1. This obligation requires a review of post-Project assumptions regarding ammonium bisulfide concentrations, dew points and potential for salt condensation in the sour gas piping if identified crude trigger points (2.25 wt% and 2.75 wt % average annual sulfur content) are reached. Chevron is monitoring crude sulfur content on a monthly basis, and is implementing a Crude Sulfur Monitoring process that alerts Reliability Program task owners when crude sulfur triggers of 2.25 wt% or 2.75% are forecasted and reached. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.
2. The integrity operating windows (IOWs) program for the sour gas system has been implemented per API RP 584 for the identified damage mechanisms in the sour gas system as referenced in Appendix 4.13-REL with IOW table, alarm and alert structure, corrective actions, required bypass mitigations, and training. CCHS reviewed documents demonstrating implementation of this condition in May 2018.

I. Sour Water System Recommendations

1. Chevron completed a P&ID and Inspection Isometric level review of the existing inspections plans for the applicable sour water piping systems. Inspection plans were reviewed against applicable damage mechanisms as well as applicable Chevron standards, including HP-002 REAC Piping and Equipment Corrosion Control Guidelines to ensure appropriateness of CML placement and selected NDE methods. In addition, sour water piping within identified process units including WWT, TKC, TKN, LNC, HNC, and SWC, has been analyzed according to the Chevron Manufacturing Standard MFG-525 for Fixed Equipment Asset Strategies (FEAS). Inspection plans for these piping circuits were updated to align with the inspection strategy for ammonium bisulfide corrosion. CCHS reviewed records demonstrating compliance with this measure in August 2018 and June 2020.
2. This obligation requires that monitoring and sampling of ammonium bisulfide concentrations and velocities in the sour water piping and H₂S concentrations in the H₂S Stripper and NH₃ Stripper overhead systems be conducted if identified crude trigger points (2.25 wt% and 2.75 wt % average annual sulfur content) are reached. Chevron is monitoring crude sulfur content on a monthly basis, and is implementing a Crude Sulfur Monitoring process that alerts Reliability Program task owners when crude sulfur triggers of 2.25 wt% or 2.75% are forecasted and reached. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.

3. The Wet H₂S program categorization for the H₂S stripper, NH₃ stripper, ammonia stripper overhead condenser, and ammonia stripper reflux drum was re-evaluated by the plant Material Engineer in first quarter 2020. No changes to the categorization were warranted, and all equipment remains Category 2 Wet H₂S vessels, per the Chevron Wet H₂S Program, “Risk Management of Wet H₂S, Amine, and Carbonate Cracking of Pressure Vessels in Process Plants.”
4. Chevron is continuing existing inspection techniques for all the overhead piping from the NH₃ stripper to the reflux drum regardless of metallurgy. CCHS reviewed records demonstrating compliance with this measure in August 2018.
5. The integrity operating windows (IOWs) program for the sour water system has been implemented per API RP 584 for the identified damage mechanisms in the sour water system as referenced in Appendix 4.13-REL with IOW table, alarm and alert structure, corrective actions, required bypass mitigations, and training. CCHS reviewed documents demonstrating implementation of this condition in May 2018.

J. Recovered Oil Recommendations

Chevron reviewed CML locations at the C-710 injection nozzle and adjacent C-710 tower shell. Chevron utilized existing CML locations on the C-710 injection nozzle and modified CML locations on the C-710 tower shell. These changes have been implemented to inform inspections post-Project startup. CCHS reviewed records demonstrating compliance with this measure in May 2018.

IV. Ongoing Regulatory Review and Reporting

A. Re-evaluate and Report Post-Project Operating Assumptions from Reliability Review

Chevron is monitoring crude sulfur content on a monthly basis, and is implementing a Crude Sulfur Monitoring process that alerts Reliability Program task owners when crude sulfur triggers of 2.25 wt% or 2.75 wt% are forecasted and reached. This process assigns responsibilities across various organizations, including Strategic Planning, Oils Planning, Finance, Technical, and OE/PSM, and includes periodic checks by key process owners within these organizations. Since commencement of Project operations, average sulfur content of crude has not reached this trigger point.

B. Report Inspection Results for Identified Circuits in Service Susceptible to High-Temperature Sulfidation Corrosion and other Damage Mechanisms Effectuated by the Project

The first annual report summarizing monitoring and inspections results for all piping circuits in service susceptible to high temperature sulfidation corrosion, including those pursuant to III.A is included in this Reliability Program Report, as Attachment 4.

C. Process Hazard Analyses (PHA) Revalidation

Chevron has completed pre-construction Process Hazard Analyses (PHAs) inclusive of inherently safer systems analyses (ISSAs), damage mechanism reviews (DMRs) and layers of protection analyses (LOPAs) for Modernization Project components which were reviewed by CCHS in August 2016. Reviews and updates were made to PHAs, ISSAs, DMRs and LOPAs for the New Hydrogen Plant, Sulfur Removal Improvements to the FCC FHT (also referred to as the TKC), Modifications to the Sulfur Recovery Units (SRU), New No. 6 H2S Plant, and Hydrogen Compressor Upgrade Project (HYCUP) were made in 2018 and reviewed by CCHS in August 2018. Chevron completed a post-project PHA for the New Hydrogen Plant in 2020.

D. Share Schedule for and Report Results of Process Hazard Analyses (PHAs) Considering Damage Mechanisms

Chevron separately submitted a report pursuant to this requirement on December 12, 2019. See Attachment 5 of this report.

The next report will be submitted by December 2020.

E. Updated Safety Program List

A list of programs, procedures, and other Refinery documentation used to implement this Reliability Program, or the corrective actions described in Section II has been updated. Chevron maintains this list at the Refinery and will make it available to the County during audits, inspections, or upon request.

F. Other Reporting Obligations

1. Probation Terms Reporting

Pursuant to the conditions of probation, the probationary period ended in February 2017. During the probationary period, Chevron did not receive any notices from the State or Cal/OSHA that Chevron was in violation of any term of probation. Therefore, no further annual reports are necessary. CCHS verified compliance with this measure in May 2018.

2. RISO Audits

A report summarizing 2019 (post-commencement of project operations) agency-related audits performed pursuant to the Richmond Industrial Safety Ordinance is included in this Reliability Program Report as Attachment 6.

G. Community Engagement

Chevron has separately submitted an email to the City pursuant to the employee and community townhall requirement on August 13, 2020. See Attachment 7.

H. Reporting Obligation

This annual Reliability Program Report has been prepared to provide the status of all requirements of this Reliability Program. This report is being submitted to meet the annual reporting obligation. Subsequent reports will continue to be submitted annually.

Attachments

- Attachment 1. Modernization Project Reliability Program
- Attachment 2. Reliability Program-Related CUP and MMRP Commitments
- Attachment 3. Reliability Program Implementation of General Recommendations
- Attachment 4. Reliability Program Report IV.B
- Attachment 5. Reliability Program Update for Condition IV.D
- Attachment 6. Reliability Program Report IV.F.2
- Attachment 7. Reliability Program Update for Condition IV.G

ATTACHMENT 1
Modernization Project Reliability Program



Modernization Project Reliability Program

Richmond Refinery

2014 Revision

MODERNIZATION PROJECT RELIABILITY PROGRAM

I. INTRODUCTION

Chevron U.S.A. Inc. (“Chevron”) has proposed this Reliability Program (“Program”) to mitigate potentially significant effects to public safety that might arise from implementation of the Modernization Project at Chevron’s Richmond Refinery. Among other things, the Modernization Project would increase the Facility’s sulfur removal capacity from 600 to 900 long tons per day (LT/d), which has the potential to increase the sulfur level of crude oil blends and gas oils processed by the Refinery. Sulfur is a naturally occurring element in crude and must be removed to produce the end-products processed at the Refinery. The processing of sulfur can lead to corrosion (“sulfidation corrosion”) of piping and equipment, and must be effectively monitored and managed. Sulfidation corrosion is identified as a damage mechanism by *American Petroleum Institute (API) Recommended Practice 571 – Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*.

The Project would increase the sulfur content of crude oil blends and gas oils processed at the Refinery. Therefore, the City of Richmond, with technical support from an independent expert retained by the City and Chevron, undertook a Reliability Analysis to assess the potential for increased risk of damage occurring from the physical, operational, and feedstock changes proposed as part of the Project, including from sulfidation corrosion, and makes recommendations on steps to be taken to mitigate the risks from these changes. The results of this Reliability Analysis are presented in the Modernization Project Environmental Impact Report (EIR), *Appendix 4.13 – Reliability Analysis of Modernization Project Changes* (Reliability Analysis).

The Reliability Analysis makes several general observations and recommendations concerning the Refinery’s overall mechanical integrity program, as well as specific recommendations to monitor and address the potential effects of the Project. Section II of this Program generally describes the actions the Refinery is in the process of implementing to enhance its mechanical-integrity program and overall Refinery safety, which Chevron believes address the general recommendations from the Reliability Analysis.¹ Section III of this Program sets forth the Project-specific recommendations that will be implemented as a result of the Reliability Analysis. Section IV of the Program describes the ongoing regulatory review and reporting obligations committed to in this Program that will ensure that the actions identified in this Program is implemented.

II. GENERAL RECOMMENDATIONS AND REFINERY ACTIONS TO ADDRESS

The Reliability Analysis includes the following five general recommendations (*Appendix 4.13, pp. 123-124*):

¹ While these actions are being developed and implemented throughout Chevron U.S.A. Inc.’s refining system, the discussion focuses primarily on development and implementation at the Richmond refinery.

- **Recommendation:** Chevron should ensure that its organizational communication procedures and work processes incorporate mechanisms by which risk concerns, corrective actions, and recommendations that are identified (e.g., during inspections, turnarounds, audits, PHAs, etc.) by personnel (or contractors) are addressed, reviewed and authorized by management as appropriate, tracked, and closed out, and that the rationale for any decision not to implement a recommendation or corrective action, or otherwise address a risk concern, are clearly documented.
- **Recommendation:** Chevron should further clarify and incorporate into their mechanical integrity program and program documents periodic reviews of work processes, procedures, inspection strategies, etc. to account for physical, operational and organizational changes over time that could affect the assumptions that went into the original decisions. Examples that illustrate this include: (1) periodic reviews of inspection CML densities and placements to ensure that unpredictable damage mechanisms can be detected and (2) reviews of wet H₂S damage risk, based on crude feed constituent changes. Chevron reports that it is developing "asset strategy plans" for each process unit, and that the development of the asset strategy plans will address this recommendation by including review of inspection procedures, working documents, CMLs, and damage mechanisms, and that the asset strategy plans will identify and implement changes needed to each as a result of the review. Whether called an "asset strategy plan" or otherwise included in another safety program (e.g., included as part of the Richmond Industrial Safety Ordinance documentation), Chevron should clarify its implementation tracking process for changes needed as a result of these periodic reviews.
- **Recommendation:** Chevron should leverage its existing infrastructure and technology to lessen the reliance on human interaction in responding to potential risks, including for example Chevron's current pilot project to implement Integrity Operating Windows per the guidelines of the draft API 584 Recommended Practice for the crude unit. Chevron should extend the pilot project to the remaining operating units.
- **Recommendation:** Chevron should review their Positive Material Identification (PMI) Procedure for compliance with API 578, *Material Verification Program for New and Existing Alloy Piping Systems*, based on PMI inspection of equipment and piping during shutdown/ dismantling/disassembly, and make revisions, as warranted, to ensure that Chevron's PMI Procedure conforms to API 578.
- **Recommendation:** Chevron should review and modify their Piping Inspection Procedure to incorporate an engineering review of thickness inspection data with near term "Flag" dates for high risk equipment/piping to assure that the actual minimum thickness associated with the Flag date has either been verified through inspection or, alternatively, the inspection data analyzed with techniques such as a statistical analysis (95% CL or extreme value analysis) to evaluate what risk is involved if the actual minimum thickness was not measured.

Regarding the general recommendations, the Refinery is already implementing numerous actions to enhance safety, resulting in new or improved process safety work processes. Changes have

also been made in the reliability organization to provide more mechanical integrity oversight. Chevron believes these and other actions, described in detail in the EIR, *Chapter 4.13 – Public Safety*, § 4.13.2.4.3.2.2², generally address these recommendations.

For example, the first recommendation calls for Chevron to ensure its organizational communication procedures and work processes adequately identify, track, and close out concerns and recommendations regarding risk. The Refinery is already taking the following actions to enhance organizational communication and competency concerning general and specific mechanical-integrity related recommendations:

- Developing and implementing a new process for additional oversight of general mechanical-integrity related recommendations from industry, Chevron’s Energy Technology Company, and other subject matter experts.
- Development and deployment of an Integrity Threat Process to address inspection recommendations for equipment and piping that could significantly impact safety, or environmental or plant operations, including tracking recommendations by target completion date using the refinery’s MERIDIUM and OERI databases until it is resolved.
- Updating its internal work instructions in 2013 to address inspection results that indicate that equipment or piping will reach “flag” or “alert” thickness prior to the next scheduled turnaround and to include immediate notification of any field measures that indicate a remaining life of one year or less. This update also addresses the last general recommendation above to review and modify the piping inspection procedures.
- Enhancing the requirements for training and competency for leadership, inspections, and technical assessments, including specifically training for determining minimum thickness and fitness for service of individual piping components.
- With regard to turnaround planning, tracking and documenting any decision to defer or not to implement a fixed equipment inspection recommendation to approval by the Refinery Business Manager for the process unit for which the recommendation was made.

Further, the second and third general recommendations provide that Chevron should clarify and modify its mechanical integrity program to, among other things, consider physical, operational and organizational changes over time, and to leverage its existing infrastructure and technology to lessen the reliance on human interaction in responding to potential risks. The Refinery is already implementing enhancements to its mechanical-integrity program. For example:

- The Refinery has added a Fixed Equipment Integrity Manager, who is responsible for developing, implementing, and stewarding the refinery’s Fixed Equipment Integrity program with a goal of achieving zero process safety incidents and improving mechanical availability.
- The Refinery has developed and piloted in its crude unit a Damage Mechanism Review (DMR) process that is consistent with *API 571* and which requires a team of subject

² While these actions are being developed and implemented throughout Chevron U.S.A. Inc.’s refining system, the discussion focuses primarily on development and implementation at the Richmond refinery.

matter experts to review, analyze, and make recommendations concerning damage mechanisms and how to mitigate the effects of damage mechanisms on each process unit. This process has now been made a required element in the Process Safety Management (PSM) process at the refinery for identified process units, and is being undertaken on an ongoing basis.

- The Refinery has piloted in its crude unit a process to create and utilize asset strategy plans for each process unit at the piping circuit level, which will be integrated into the DMR process and will include, among other things, integrity operating windows consistent with draft *API 584 – Integrity Operating Windows* and consideration of process conditions, inspections techniques and frequency, mixing and injection points, and corrosion monitoring locations (CML). These asset strategy plans will be implemented for all processing units on an ongoing basis.

The Refinery reports the status of the above-identified actions to CalOSHA as part of the August 5, 2013 terms of probation described in *Chapter 4.13 – Public Safety* of the environmental impact report, and has also committed to providing quarterly updates to the City pursuant to Mitigation Measure 4.13-CUM-1d. As part of this process, Chevron will work with the County, the City, and its consultants, to ensure that the above-stated general recommendations from the Reliability Analysis have been addressed.

In addition, Chevron will undertake a review of its Positive Material Identification (PMI) Procedure for compliance with API 578, *Material Verification Program for New and Existing Alloy Piping Systems*, based on PMI inspection of equipment and piping during shutdown/dismantling/disassembly, and make revisions, as warranted, to ensure that Chevron's PMI Procedure conforms to API 578.

III. PROJECT RECOMMENDATIONS

The enhanced safety measures described above will provide the foundation for the management of damage mechanisms in the refinery, including sulfidation corrosion, on a go-forward basis. In particular, the damage mechanism review process, the updated PHA process, and development and deployment the asset strategy plans, including integrity operating windows, will be used post-Project for all refinery units to manage risks from all damage mechanisms. In addition to this process, which provides for ongoing evaluation of risks and resulting recommendations, the Reliability Analysis has identified numerous Project-specific recommendations, which Chevron is committing to implement as part of this Reliability Program.

In order to identify Project-related recommendations, the Reliability Analysis assumed certain post-Project operating conditions. The assumptions and analytical method are described more fully in the EIR, Appendix 4.13-REL. The recommendations below, including piping circuit upgrades and installation of additional corrosion monitoring equipment, are tiered to this analysis, meaning that these measures will be implemented well before they would be triggered by actual projected post-Project operations.

A. Schedule and Report on Upgrades to Identified Piping Circuits

The Reliability Analysis for the Modernization Project has identified seventeen (17) piping circuits in the Crude Unit that warrant replacement based on the Reliability Analysis. The Refinery has committed to accelerating the replacement of these circuits during the next scheduled turnaround for the Crude Unit, no later than end-of-year (EOY) 2017, as follows:

Equipment number	Equipment description	Existing Metallurgy	New Material	Replacement Date
0955-002-008	V-1103 Desalted Crude	CS	9 Chrome	EOY 2017
0955-002-014	V-1103 Desalted Crude	CS	9 Chrome	EOY 2017
0955-002-015	V-1103 Desalted Crude	CS	9 Chrome	EOY 2017
0955-002-016	V-1103 Desalted Crude	CS	9 Chrome	EOY 2017
0955-002-017	V-1103 Desalted Crude	CS	9 Chrome	EOY 2017
0955-002-018	V-1103 Desalted Crude	CS	9 Chrome	EOY 2017
0955-002-030	Desalted Crude From E-1165A To F-1100A/B	CS	9 Chrome	EOY 2017
0955-002-031	Desalted Crude From E-1165B To F-1100A/B	CS	9 Chrome	EOY 2017
0955-002-032	Desalted Crude From E-1116's to E-1165C	CS	9 Chrome	EOY 2017
0955-007-009	#4 Sidecut Circ Reflux	CS	9 Chrome	EOY 2017
0955-007-017	#4 Sidecut Circ Reflux	CS	9 Chrome	EOY 2017
0955-009-003	C-1100 Bottoms to F-1160	5Cr	9 Chrome	EOY 2017
0955-012-001	C-1160 Outlet #7 Sidecut	CS	9 Chrome	EOY 2017
0955-012-002	#7 Sidecut	CS	9 Chrome	EOY 2017
0955-013-007	C-1160 OUTLET: #8 Sidecut to E-1188	CS	9 Chrome	EOY 2017
0955-013-008	C-1160 Outlet: #8 Sidecut to C-1160	CS	9 Chrome	EOY 2017
0955-013-009	C-1160 Outlet: #8 Sidecut to E-1114	CS	9 Chrome	EOY 2017

The Reliability Analysis for the Modernization Project has also identified four partial piping and valve replacements in the Crude Unit that warrant replacement based on reasonably foreseeable post-Project operating conditions. The Refinery has committed to accelerating the replacement of these partial components during the next scheduled turnaround for the Crude Unit, no later than end-of-year (EOY) 2017, as follows:

Equipment number	Equipment description	Existing Metallurgy	New Material	Replacement Date
0955-015-002	C-1160 OUTLET to E-1165 A/B/C	9Cr/5Cr/ (2) 10" spool piece and drain valves CS	Replace 5Cr and CS with 9CR; existing 9Cr remains in place	EOY 2017
0955-015-017	K-1165A/B Pump Out	9Cr/5Cr/CS	Replace short 5Cr deadleg immediately off filters with 9 Cr. CS is either free-draining, isolated, or cool wash oil service, so no need to replace because do not see regular service	EOY 2017
0955-019-034	P-1165/A Case Vents to C-1160	SS/CS	CS is downstream of single SS block valve. Upgrade the 3/4" CS pump case vents with SS to double block and bleed design.	EOY 2017
0955-019-017	Pump Vents	9Cr/5Cr/CS	Replace 5Cr with 9Cr and add a second block valve and bleeder. CS component is downstream of 5Cr single block valve; no project impact on CS portion downstream of the valve.	EOY 2017

Chevron shall obtain all required permits for replacement of these piping circuits pursuant to the California Building Standards Code, inclusive of the California Fire Code, and, once the piping circuits are replaced, shall submit copies of closed permits to the Planning Department to demonstrate compliance with this commitment.

B. Installation and Monitoring of Additional Permasense® Monitors on Identified Circuits

Since the beginning of 2013, the Refinery has installed a total of 117 Permasense® probes in the Crude Unit on six piping systems consisting of carbon steel, 5 Chrome, and 9 Chrome materials. Permasense® is the trade name of a type of high-temperature ultrasonic device that is mounted on a pipe or vessel, and penetrates through insulation. It has wireless sensors that provide periodic equipment thickness readings (at variable intervals, but currently set to collect thickness data twice a day) to monitor a system. Due to noise and sensitivity, the technology is limited to longer-term trending (days and months vs. hours) which is appropriate for piping subject to sulfidation conditions with its predictable rates.

The six piping circuits on which the sensors were installed were chosen based on past and anticipated projected future operating conditions. The wireless probes collect pipe wall thickness data while the plant is operating, and are used to monitor corrosion rates. This long-term online monitoring program will be part of the reliability program to ensure safe operation of equipment after the Modernization Project commences operations. Thirteen of these piping circuits with Permasense® monitors installed have been identified for replacement and will be upgraded to 9 Chrome pursuant to the piping circuit upgrades planned as a part of this Reliability Program and the Permasense® monitors will not be reinstalled on these circuits. In addition, as part of the Project, the Refinery will install at least 25 additional Permasense® monitors on carbon steel circuits in the Solvent De-Asphalter (SDA). These sensors are being installed to confirm the predictive model results that there will be little-to-no sulfidation corrosion in the SDA post-Project.

Data from the Permasense® monitors will be utilized in the reporting obligations set forth in section IV below.

C. Crude Unit Recommendations

The operational and feedstock changes contemplated by the Modernization Project, specifically increases in sulfur content of feedstocks, increased hydrogen purity produced by the new hydrogen plant, increased H₂S partial pressures in hydroprocessing plants recycle streams, or potentially higher temperatures in the crude unit based on API gravity ratings, could all contribute to increased damage mechanism activity post-Modernization Project, thereby warranting the implementation of the following preventive measures.

1. Based on the marginal results from the F-1100 radiant tube sulfidation analysis, Chevron should monitor the post-Modernization Project sulfur content being fed to the crude unit and use a 2.0 wt.% sulfur content of feed as a trigger to conduct a review of the F-1100 crude charge furnace to study whether the 5 Chrome radiant tubes are safe to operate until the 2017 shutdown.

2. Chevron's analysis of the atmospheric column furnace F-1100 does not include conclusive evidence as to the present creep/stress-rupture condition of the tubes. Therefore, it is believed that some additional actions are required in order to lower the risk of a creep/stress-rupture or sulfidation failure in a F-1100 tube under post-Modernization Project operating conditions. Acceptable options to lower the risk of heater tube failures include:
 - Furnace F-1100: Option 1, complete all of the following actions:
 - Complete a full internal tube inspection for F-1100 during the 4th quarter 2017 crude unit turnaround using intelligent pigs.
 - Conduct testing on the two currently available, radiant section tubes from the F-1100 Furnace to verify their existing metallurgical, physical and mechanical properties, plus remaining creep life using accelerated Omega creep testing as an input to decide whether the F-1100 furnace should be retubed during the 2017 shutdown.
 - Conduct additional metallurgical, physical, mechanical and Omega creep testing on radiant furnace tube samples to be removed during the 2017 shutdown, depending on the results of the Omega testing planned for the 2012 furnace tube samples.
 - In 2017, replace tubes as needed in F-1100, per Chevron's replacement criteria for furnace tubes. The replacement criteria are based on the minimum furnace tube thickness on the furnace Safety Instruction Sheet and remaining wall thickness collected by intelligent pig data.
 - Install at least three Permasense® continuous monitoring ultrasonic thickness gauge monitors in each of the furnace outlet systems. If the monitors indicate an increase in corrosion rates greater than 5 mpy, review the need for additional mitigation actions.
 - Furnace F-1100: Option 2:
 - Retube the F-1100A/B furnace during the 2017 turnaround with 9Cr or higher alloy tubes.
3. The vacuum column furnace, F-1160, is constructed of 5Cr radiant furnace tubes. The recommended actions for this furnace are as follows:
 - Complete a full internal tube inspection for F-1160 during the 2017 crude unit turnaround using intelligent pigs.
 - In 2017, replace tubes as needed in F-1160 per Chevron's replacement criteria for furnace tubes. The replacement criteria are based on the minimum furnace tube thickness on the furnace Safety Instruction Sheet and remaining wall thickness collected by intelligent pig data.
4. Conduct laboratory analyses to more accurately determine crude and crude blend sulfur speciation and H₂S evolution, which could be used to predict likely crude corrosion rates. Timing: 4Q2015

5. Develop integrity operating windows (IOWs) for critical crude unit operating parameters per the guidelines in the draft version of API 584. 3Q2014
6. The Crude Splitter software is used to predict the distribution of the sulfur in the atmospheric tower sidecut and bottom streams. Verify the Crude Splitter predicted sulfur results with post-Modernization data on the sulfur containing streams within the first year of operation following the implementation of the Modernization project if the trigger points (2.25 wt.% sulfur and 2.75 wt. % sulfur) noted in § IV.A below are reached.
7. Revise the asset integrity plans for the Crude Unit Atmospheric Column Reflux Drum, V-1100, the Stabilizer Column Reflux Drum, V-1190, and the Vacuum Column Overhead Seal Drum, V-1160, to include inspection for Wet H₂S damage. An external Automatic Ultrasonic Testing inspection of representative sections of the "water wet" portions of V-1100, V-1160 and V-1190 vessels should be conducted as a baseline before the start of post-Modernization conditions, then checked externally again approximately one year after the start of the Modernization conditions. In addition, a one-time internal inspection should be conducted of these vessels during the scheduled maintenance turnaround after the start of Modernization conditions, using eddy current or other approved internal inspection techniques per the Chevron Wet H₂S program.
8. Develop a process monitoring plan for the crude unit overhead to confirm any impacts of the increased sulfur levels. The monitoring plan should be implemented post-Modernization and should include:
 - Process sampling of the accumulator for pH, chlorides, iron and H₂S content. Compare to established integrity operating windows (IOWs);
 - Monitor Desalter pH;
 - Analyze the atmospheric tower post-Modernization to quantify if, and how much, increased H₂S is in the overhead system resulting from the increased sulfur feed to the unit;
 - Higher mercaptan crudes could lead to increased sulfidation corrosion rates in the jet or kerosene cuts. Modify asset integrity plans to monitor for potential increased corrosion if higher mercaptan crudes are run compared with current and historical crude and crude blends; and
 - Review the asset integrity plan to ensure that the Permasense continuous ultrasonic monitoring locations are properly placed to ensure early detection should corrosion rates increase significantly beyond expectations per the McConomy curve predicted rates.
9. Develop and implement physical or administrative controls to assure that carbon steel piping components downstream of high sulfur streams operating > 500F are not inadvertently placed into continuous (e.g., placement of a warning tag, locked valve, double-block-and-bleed valves or other measures). This should be completed prior to the commencement of Modernization Project operations.
10. Higher mercaptan crudes could lead to increased sulfidation corrosion rates in the jet or kerosene cuts. Conduct a historical review of purchased crudes and processed crude blends for the 90% confidence level of highest mercaptans processed and use

this statistical number to set a review flag in the crude and gas oil acceptance procedure. If higher mercaptans crudes are run at the Richmond Refinery, review the Permasense® corrosion rate data from this time period as part of the crude management of change lookback. This should be completed prior to the commencement of Modernization Project operations.

11. Add corrosion monitoring locations (CMLs) to the crude unit atmospheric column overhead piping (circuit 0955-003-001) at the termination of the Hastelloy internal overlay. This should include the termination of cladding in the vertical section of piping, as well as the termination point at the inlet to the E- 1101's. Review other, similar locations in the crude unit for missing dissimilar metal interface thickness monitoring locations (TMLs). This should be completed prior to the commencement of Modernization Project operations.

D. Hydroprocessing Recommendations

1. At the 2.25% wt. % sulfur in crude feed trigger point, evaluate and modify as warranted, based on any increased sulfur in this section of the unit, inspection plans (what, where and how often) for the distillation section of the hydroprocessing units where sulfidation corrosion rates have been “erratic” and uncertain, per API 939-C.
2. Report on the progress of the project to compare the HP-002 Best Practice Guideline regarding water wash to API 932-B recommendations to ensure that the HP-002 document is consistent with 932-B guidelines. This report should be submitted prior to the commencement of Modernization Project operations.
3. Conduct process monitoring and sampling for post-Modernization Project operations for all hydroprocessing units, to develop process data to confirm assumptions made during the damage mechanism review regarding amounts of H₂S and ammonium bisulfide in the overhead systems. This shall be completed after commencement of Modernization Project operations.
4. Develop integrity operating windows (IOWs) for the hydroprocessing units to incorporate existing critical reliability variables such as the wash water rate for Nh₄HS corrosion control. The IOWs shall be established prior to the startup of Modernization Project operations.
5. If the REAC Corrosion Control Project (TKN) is not completed pre-Modernization Project, conduct a review of current operations to ensure that corrosion rates will remain under REAC best practice guidelines with any increase in sulfur to the unit. This shall be completed prior to the startup of Modernization Project operations.

E. SDA Recommendations

1. Verify post-Modernization Project conditions regarding H₂S content in the SDA overheads and target one or more “water wet” vessels for inspection using internal eddy current, external automatic ultrasonics (AUT) or other non-destructive evaluation (NDE) techniques appropriate for wet H₂S cracking detection within one year of operation under post-Modernization Project conditions.
2. Conduct water boot analysis for corrosive constituents similar to that conducted in the crude unit on the unit overhead accumulator drums, including cyanides. This should

be conducted at the 2.25 wt.% and 2.75 wt. % sulfur trigger points identified in § IV.A below.

3. When the sulfur wt.% of crude oil processed at the Facility reaches 2.25 wt.% sulfur on an annual average, and the again when it reaches 2.75 wt.% sulfur annual average, the Facility shall trigger the same responses for the SDA plant as described in the recommendation section for the crude unit.
4. Conduct a follow-up smart pig inspection of F-100 and F-120 furnace tubes during the first planned maintenance after the unit has seen at least 1 year of post-Modernization Project operating conditions.
5. Install at least 25 additional Permasense® monitors on carbon steel circuits in the Solvent De-Asphalter (SDA) including sulfidation “dead legs,” based on a critical review of historical corrosion rates. These sensors will confirm the predictive model results that there will be little-to-no increase in sulfidation corrosion in the SDA post-Modernization Project. These installations should be completed prior to the commencement of Modernization Project operations.
6. Develop integrity operating windows (IOWs) per draft API RP-584 for identified damage mechanisms in the SDA unit. The IOWs should be established prior to the commencement of Modernization Project operations.
7. Develop process monitoring and sampling plans for post-Modernization Project operating conditions to confirm assumptions made during the damage mechanism review project. The monitoring and sampling plans should be developed prior to the commencement of Modernization Project operations, and should be implemented after commencement of Project operations following an increase in sulfur content to the SDA unit.

F. Amine Systems Recommendations.

It is recommended that Chevron review ongoing sampling results (per Best Practice timing plus vendor sampling and reports) to determine if post-Modernization Project amine loading and heat stable amine salts (HSAS) are impacted by any increase in H₂S to the TKC Unit. This should be done prior to the commencement of Modernization Project operations.

G. Sulfur Recovery Unit Recommendations

Associated with the new liquid oxygen piping, the Facility shall typically design and build new construction in conformance with the special design and installation precautions associated with oxygen piping systems, i.e., design and installation best practice details common in industry for oxygen piping systems, including pre-commissioning cleaning of the piping interior to remove harmful materials such as dirt, debris, iron, grease and other contaminants known to cause ignition of pure liquid and gaseous oxygen.

H. Sour Gas System Recommendations

Based on the potential risk of ammonium bisulfide corrosion in carbon steel due to the possibility of the sour gas condensing at locally cool portions of piping, Chevron should develop and implement a mitigation plan for this eventuality. The mitigation plan is to

include reviewing sour gas P&IDs and isometric drawings to locate low points where water could accumulate, locate dead legs and establish inspection/monitoring plans for verifying if and where water is condensing out of the vapor phase. This should be conducted within 1 year of commencement of Modernization Project start-up.

1. Chevron should conduct a review to confirm their post-Modernization assumptions made during this review regarding ammonium bisulfide concentrations, dew points and potential for salt condensation in the sour gas piping, at the 2.25 wt. % and 2.75 wt. % average annual sulfur content trigger points.
2. Develop integrity operating windows (IOWs) per draft API RP-584 for identified damage mechanisms for the sour gas system. These IOWs should be established prior to the commencement of Modernization Project operations.

I. Sour Water System Recommendations

1. The block diagrams shown in Figure A4.13-REL-16 and Figure A4.13-REL-17 do not include detailed information at the “P&ID” level. Also, information is lacking on the sour gas streams in the overhead of the H₂S and NH₃ strippers in the SWS unit. (However, for purposes of the review the overhead systems of the WWT plants were deemed to be out of scope.) The impact of post-Modernization Project corrosion from sour water corrosion should be minimal, based on the Reviewer’s analysis of the sour water streams. However, based on a lack of detail at the P&ID level Chevron should conduct a review of their sour water piping inspection programs at the P&ID/Inspection Isometric level (including to ensure that low points, galvanic metal couple locations and CMLs are properly captured) to ensure that their program is sufficient to detect any ammonium bisulfide corrosion in the system. This should be completed prior to the commencement of Modernization Project operations.
2. Chevron should be monitoring and sampling to confirm their assumptions regarding the ammonium bisulfide concentrations and velocities in the sour water piping and H₂S concentrations in the H₂S Stripper and NH₃ Stripper overhead systems. This review should be conducted when average annual sulfur content levels reach 2.25 wt. % and again at 2.75 wt. %.
3. The H₂S stripper, NH₃ stripper, ammonia stripper overhead condenser, and ammonia stripper reflux drum are all Category 2 Wet H₂S vessels and therefore are included in Chevron’s wet H₂S program. If a post-Modernization Project review of the assumptions regarding the severity of wet H₂S damage in the overhead systems warrants a change in the categorization of the overhead wet H₂S vessels, then a wet H₂S cracking inspection should be conducted. This should be conducted within one year after the commencement of Modernization Project operations.
4. Continue as with the existing condition inspection, the X-ray and/or close-grid UT inspection techniques for all of the overhead piping from the NH₃ stripper to the reflux drum regardless of metallurgy.
5. Develop integrity operating windows (IOWs) per draft API RP-584 for identified damage mechanisms for the sour water system. The IOWs should be established prior to the commencement of Modernization Project operations.

J. Recovered Oil Recommendations

If not already present, add CML locations to the C-710 injection nozzle and adjacent C-710 tower shell so that the assumptions regarding post-Modernization Project corrosion rates not increasing in severity can be verified. Implement prior to the operational startup of the Modernization Project.

IV. ONGOING REGULATORY REVIEW AND REPORTING

In order to demonstrate compliance with the recommendation above, as well as to provide the City regular update concerning the implementation of the corrective actions described in § II above, the Refinery will undertake the following reporting obligations.

A. Re-evaluate and Report on Post-Project Operating Assumptions from Reliability Review

The Reliability Analysis for the Modernization Project assumed certain operating conditions once the Project is implemented, including projected temperatures, sulfur levels, and corrosion rates for various process units and individual piping circuits. These assumptions were based on a conservative 3.3 wt% sulfur case. In order to verify that the assumptions made during the reliability review were accurate, the Refinery will undertake the following actions:

- When the sulfur weight percent of crude oil processed at the Refinery reaches 2.25 wt% sulfur on an annual average, and the again when it reaches 2.75 wt% sulfur annual average, the Refinery shall:
 - Assemble a reliability review team that will be made up of appropriate subject matter experts (SMEs), including a Senior Process Engineer, Senior ETC Materials and Corrosion Engineer, Refinery Materials Engineer and Process Operator.
 - For all damage mechanisms identified as being affected by the Project, and using then-current inspection and/or monitoring data, the reliability review team shall review, analyze, and, as necessary, update, the data and conclusions prepared during the reliability review for the Modernization Project to determine whether the assumptions made and conclusions reached during the reliability review accurately reflect actual post-Project operating conditions.
 - Use the data from the laboratory tests described above to consider any potential post-Project impacts from sulfur speciation.
 - Review any operational or process changes that have occurred post-Project.
 - Make recommendations concerning material upgrades and /or enhanced inspection opportunities as necessary based on the re-evaluation.
 - Report on the results of the this re-evaluation and any resulting recommendation to Contra Costa Health Services, the expert agency charged with implementing the Richmond Industrial Safety Ordinance, as well as one or more Refinery workforce representatives from any process units impacted by the re-evaluation and recommendations and who shall have the necessary subject matter expertise to engage in a Project-level reliability review.

B. Report Inspection Results for Identified Circuits in Service Susceptible to High-Temperature Sulfidation Corrosion and other Damage Mechanisms Effected by the Project

All piping circuits in the Refinery, including the new 9 Chrome circuits being installed pursuant to § III.A of this Reliability Program, are regularly monitored and inspected. Beginning one year from commencement of Project operations, and annually thereafter, the Refinery will provide reports to the City summarizing the monitoring and inspection results for the identified circuits. These reports shall at a minimum include the following information:

- A list of all piping circuits identified as potentially susceptible to sulfidation corrosion, including specifically piping circuits identified during the reliability review for the Modernization Project as being susceptible to sulfidation corrosion and subject to potential process changes.
- A list of components identified through the 100% component inspection conducted following the August 6, 2012 incident pursuant to the methodologies set forth in the API 939-C - Guidelines for Avoiding Sulfidation (Sulfidic) Corrosion Failures in Oil Refineries and Updated Inspection Strategies for Preventing Sulfidation Corrosion Failures in Chevron Refineries (Sept. 30, 2009) that may lack sufficient thickness to remain in service until the next scheduled turnaround.
- A description of the solutions implemented with respect to components of insufficient thickness identified above.
- A description of the current fixed inspection frequency for carbon steel piping circuits identified as potentially susceptible to sulfidation corrosion.
- A description of any findings from inspection and monitoring of the piping circuits identified during the reliability review for the Modernization Project as being susceptible to sulfidation corrosion and subject to potential process changes that indicate that any of these circuits lack sufficient thickness to remain in service until the next turnaround and a description of the solution to be implemented with respect to these circuits.
- Chevron shall obtain all required permits for replacement of these piping circuits pursuant to the California Building Standards Code, inclusive of the California Fire Code, and, once the piping circuits are replaced, shall submit copies of closed permits to the Planning Department to demonstrate compliance with this commitment.

C. Process Hazard Analyses (PHA) Revalidation

Chevron shall work with Contra Costa Health Services (CCHS) to update and revalidate the process hazard analyses (PHA) prepared for the Project components consistent with the requirements of the Richmond Industrial Safety Ordinance (Richmond Municipal Code Ch. 6.43). This revalidation shall occur prior to commencement of Project construction, and again after construction but before startup of Project operations for any changes that may have arisen during construction that could affect the earlier PHA. The PHAs shall include inherently safer

systems analyses (ISSAs), damage mechanism reviews and evaluation of the consequences thereof resulting from the Project, and Layers of Protection Analyses (LOPA).

Chevron will notify CCHS and the City of the availability of these PHAs, and make these PHAs available for review by CCHS. The PHAs (initial and updates/revalidations, inherently safer systems analysis, damage mechanisms review, and LOPAs) shall be consistent with proposed amendments to the RISO. Chevron shall conduct the LOPAs and submit written LOPA reports, prepared in accordance with industry best practices (such as those issued by the Center for Chemical Process Safety (CCPS)) to CCHS for review prior to construction (and post-construction, for those LOPAs warranted based on changes that arise during construction).

D. Share Schedule for and Report Results of Process Hazard Analyses (PHAs) Considering Damage Mechanisms.

Chevron shall provide annual reports to the City summarizing the PHAs/revalidated PHAs completed during the preceding calendar year to account for consideration of damage mechanisms, and shall include a list of fixed equipment inspection recommendations submitted for each turnaround, indicating which recommendations were accepted, and for those that were not accepted, the reason the recommendation was rejected. All PHAs shall be available for agency review pursuant to the terms of the RISO.

E. Updated Safety Program List

Chevron shall maintain a list of programs, procedures, and/or other Refinery documentation that are updated to implement this Reliability Program or the corrective actions described in § II above. Chevron shall maintain this list at the Refinery and make it available to the County during audits, inspections, or upon request.

F. Other Reporting Obligations

1. Probation Terms Reporting

Prior to Project start-up, Chevron shall provide the City a status report on the refinery's compliance with the terms of probation entered into on August 5, 2013, and shall thereafter provide the City reports substantively similar to the reports filed with Cal/OSHA under the terms of probation once per year as necessary until such time as the terms of probation end, including a copy of any response documents provided by CalOSHA, or a detailed summary of any CalOSHA responses if CalOSHA does not approve sharing the response documents with the City. Chevron will work with CalOSHA to pursue their approval to share the Chevron CalOSHA response documents. The original reports and related documents shall be made available at the Refinery upon request by the City or County and during any audits or inspections conducted under the RISO.

2. RISO Audits

Following commencement of Project operations, Chevron shall provide the City an annual report informing the City of any agency-initiated audits performed pursuant to the Richmond Industrial Safety Ordinance during the previous calendar year, and shall update the City concerning the findings from and status of implementation of any recommendation that come out of such audits.

G. Community Engagement

On an annual basis following Project approval until such time as the City determines that such meetings are no longer required, Chevron shall hold town halls for its workforce and for the community to provide updates concerning:

1. The status of the enhanced safety measures being implemented by the Refinery following the August 6, 2012 fire, including actions taken to implement the recommendations made by public agencies that investigated the August 6 incident.
2. The status and/or results of the material upgrades, inspection and monitoring program, and ongoing compliance with the Richmond Industrial Safety Ordinance, including Project-related PHAs, DMRs, LOPAs, and ISSAs.
3. When triggered, the results of the reliability review revalidation and the status of any recommendations made as a result of this review.

H. Reporting Obligation

As part of its ongoing reporting obligation under the Mitigation Monitoring and Reporting Program adopted by the City, Chevron shall report on the status of all requirements of this Reliability Program on an annual basis in a form acceptable to the City. All reporting obligations herein shall be subject to the protection for trade secrets provided in Richmond Municipal Code § 6.43.110 and California Health and Safety Code section 25538 incorporated therein.

ATTACHMENT 2
Reliability Program-Related CUP and MMRP Commitments

Reliability Program Recommendations

Attachment 2. Reliability Program-Related CUP and MMRP Commitments

Section	Sub	Item	Description	Program Report 2020
MMRP				
4	13	13f	Chevron shall designate a Facility Area Business Unit Manager as the management level position bearing responsibility for any and all decisions to not implement a recommendation made during an inspection or turnaround. Chevron shall also designate a Facility Area Business Unit Manager as the management level position bearing responsibility for the establishment of the parameters in the Integrity Operating Window program, as well as for any decisions to override, bypass, or otherwise disregard an alert or flag that arises through the Integrity Operating Window program. The annual Reliability Program reports shall include clear identification of the individuals acting as Area Business Unit Managers to whom these accountabilities have been assigned. If the management position bearing any of these responsibilities changes within Chevron from the Area Business Unit Manager to another management-level job title, Chevron shall notify the City and include an update to this effect in its Reliability Program annual report.	Chevron currently has the following controls and processes that designate the Facility Area Business Unit Manager (ABUM), now titled Refinery Business Manager (RBM), as the management level position bearing responsibility for decisions regarding recommendations made during an inspection or turnaround. • Manufacturing 530 (or MFG 530), Fixed Equipment Integrity Threat Recommendation and Resolution, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. MFG 530 specifies that "Operations Management", which for the purposes of the Richmond Refinery is the RBM, has the role and responsibility to provide final approval on all business unit integrity threat resolution and mitigation plans and is accountable for ensuring resolution and mitigation activities are completed by due dates. • Further the Richmond Refinery Fixed Equipment Integrity Threat Recommendation Standard specifies that the RBM provides the final approval on all Business Unit Integrity Threat resolution and mitigation plans and is accountable for ensuring resolution and mitigation activities are completed by due dates. Chevron has the following controls and processes that address the Integrity Operating Windows (IOW) program and management. • Manufacturing 526 (or MFG 526), Integrity Operating Windows Standard, released in March 2019, establishes a process for the development and management of Integrity Operating Windows. The standard designates the RBM as the responsible position to approve any additions, changes, or deletions to the IOW program as well as how bypasses of IOWs are managed. Note, the RBM may also designate the Refinery Shift Leader (RSL) to approve how bypasses of IOWs are managed. The RBM may also rely on the Operating Assistant to manage the change management process for IOW-related changes. • Refinery Instruction, RI-372, Bypassing Critical Protections establishes the protocol which includes process control alarms including Safe Operating Limits (SOL) established by the IOW program. The instruction designates the RBM as the responsible person to approve implementation of the bypass. • As part of the monthly Unit Reliability Brief (URB) meetings, attended by the RBM and subject matter experts in the areas of reliability and operations, reliability topics, such as IOW alerts, are reviewed relative to current operation.
4	13	13h	Chevron shall establish Integrity Operating Windows (IOWs) to monitor process temperatures, for purposes of identifying process temperature increases above the baseline period (2008-2010) for any individual circuit affected by the Modernization Project (as indicated in the Reliability Analysis Appendix 4.13-REL). The IOW shall establish temperature "flags" for each temperature monitoring location based on industry-standard damage curves. Prior to implementation of the IOW temperature flags, Chevron shall provide information to the City and County regarding the flag trigger temperature levels and the basis for them, and provide the City and County an opportunity to review and comment on them before they are implemented. The IOW-2 temperature flag shall be triggered if the process temperature exceeds the established temperature for a cumulative 365 days, and shall require Chevron to perform a reliability analysis to evaluate, among other things, existing process conditions, flag dates for wall thickness, monitoring and inspection data, expected corrosion rates, metallurgy, existing damage mechanism reviews, and monitoring and inspection frequency. Chevron shall report the results of these reliability analyses in its annual Reliability Program report, and shall make process temperature data for all temperature monitoring locations within each process unit and circuit included in the Reliability Analysis (Appendix 4.13-REL) available for review by the City or County at the refinery. Chevron also shall include in its annual Reliability Program reports a listing of all events relating to process temperatures reaching levels that triggered an IOW-level 2 (defined by Chevron as a "slower acting event that requires technical evaluation and recommendations within one week") alert during the calendar year that is the subject of the annual report, as well as a description of the resolution of each such event. Chevron shall report to the City and County within one week of any IOW-level 1 (defined by Chevron as a "fast acting event that requires operator	Chevron has established Integrity Operating Windows (IOWs) which monitor process temperatures for the applicable damage mechanisms identified in the Reliability Analysis Appendix 4.13-REL which include sulfidation, high temperature sulfidation, and high temperature hydrogen attack for the applicable process units impacted by the Modernization Project. CCHS reviewed IOW tables establishing these temperature flags in May 2018. Since project operations began on April 17, 2019, IOW-level 1 alert events are reported to the City within one week, while IOW-level 2 alert events are tracked internally and listed in Exhibit A. No IOW-level 2 alert events have triggered the reliability analysis requirement (cumulative 365 days of exceeding established temperature flag).
4	13	4a	Chevron will implement its Modernization Project Reliability Program (Appendix 4.13-PROG) including updating the detailed PHAs prepared for the 2008 Project for all new and modified Modernization Project components, which shall include ISSAs, damage mechanism reviews, and evaluation of the consequences thereof resulting from the Project, and LOPA, as part of these PHAs, prior to recommencement of construction of the Modernization Project, and again post-construction but before startup of Project operations for any changes that arise during construction that may affect the earlier PHAs, ISSAs, and LOPAs. Chevron will notify CCHS and the City of the availability of these PHAs, and make these PHAs available for review by CCHS and the City. The PHAs (initial and updates/validations), ISSAs, damage mechanisms reviews, and LOPAs shall be consistent with (proposed) amendments to the RISO. Chevron shall conduct the LOPAs and submit written LOPA reports, prepared in accordance with industry best practices (such as those issued by the Center for Chemical Process Safety) to CCHS and the City for review prior to construction (and post-construction, for those LOPAs warranting changes based on changes that arise during construction). CCHS will work	See response to IV.C of the Reliability Program Annual Report.

Reliability Program Recommendations

Attachment 2. Reliability Program-Related CUP and MMRP Commitments

Section	Sub	Item	Description	Program Report 2020
4	13	7a	Chevron shall implement the Modernization Project Reliability Program for all units and processes affected by the Modernization Project, including written reports specified in the Modernization Project Reliability Program. An initial Reliability Program report shall be submitted to the City and County prior to Project construction. Annual reports shall be submitted thereafter, including a report prior to commencement of Project operations. For the PHAs (initial and revalidations) specified in the Modernization Project Reliability Program, Chevron would complete the PHAs prior to commencement of Project construction, and again after construction but before startup of Project operations for any changes that may have arisen during construction that could affect the earlier PHAs. Chevron will thereafter update and revalidate PHAs in accordance with the RISO but not less than once every 5 years. As indicated in Mitigation Measure 4.13-4a, the PHAs shall include LOPAs, and written LOPA reports must be submitted to the County prior to construction for review, and Chevron shall submit a copy to the City simultaneously. To the extent that any post-construction PHA revalidations are warranted, Chevron shall submit LOPA reports for the post-construction PHA revalidations to the County for review prior to the startup of Project operations, and Chevron shall submit a copy to the City simultaneously.	See response to IV.C of the Reliability Program Annual Report.
4	13	7b	Chevron shall complete an ISSA (as defined in the RISO), including review damage mechanisms and evaluation of their consequences, and LOPAs with written LOPA reports submitted by Chevron to the County for review, for new and modified Modernization Project components as part of the PHA revalidation process specified in the Modernization Project Reliability Program and Mitigation Measure 4.13-7a. Chevron will make the ISSA and PHAs available for review by the CCHS and the City, and will submit the LOPA reports to the County prior to construction for review.	See response to IV.C of the Reliability Program Annual Report.
4	13	7c	Chevron will continue to review its procedures and programs for evaluating the hazards of planned changes at the Facility, and update them to incorporate damage mechanism review, including the identification of applicable damage mechanisms as well as the evaluation of the potential impacts of the damage mechanisms in light of the proposed changes, and layers of protection analysis consistent with the Reliability Program. Chevron's review and update of programs and procedures shall include, at a minimum, the Facility's management of change program/procedure and its PHA program/procedure. Chevron shall include, in its annual Modernization Project Reliability Program reports to the City, a description of the status of this documentation review and update process, as well as how the changes to these programs/procedures are being implemented at the Facility.	Chevron currently has the following controls and processes that incorporate hazard evaluation of planned changes. • Manufacturing 520 (or MFG 520), Damage Mechanism Review Instruction, sets forth work processes to identify applicable damage mechanisms per equipment and piping class metallurgy. This standard incorporates industry practices and recommendations including API Recommended Practice 571, Damage Mechanisms Affecting Fixed Equipment in the Refinery Industry and API Recommended Practice 584, Integrity Operating Windows. • Refinery Instruction, RI-370, Management of Change (MOC) covers the processes used to evaluate planned changes and the revision incorporates damage mechanism reviews consistent with CalARP and CalOSHA requirements. Chevron has developed and implemented its Initial Risk Assessment (IRA) process which requires damage mechanism reviews for major changes. The IRA identifies if the MOC is a major change, the risks associated with the change and whether further study is needed (PHA), any mitigating measures that must be initiated, the necessary training/communication, and updates to affected Process Safety Information (PSI). Based upon the outcome of the assessment, additional evaluations and action items are assigned, and entered in to KMS to be tracked to completion. Prior to implementing a major change, the following actions are taken and documented in the MOC: 1. Perform an Inherently Safer Systems Analysis (ISSA) or Hierarchy of Hazard Control Analysis (HCA) per RI -398, Inherently Safer Systems 2. Review or conduct a Damage Mechanism Review (DMR) per MFG-520 3. PHA Facilitator review for possible What-if, HAZOP, etc. Refinery Instruction, RI-363, Process Hazard Analysis, reissued in December 2018, establishes the organized and systematic processes to evaluate potential hazards in the refinery. The revision to this RI will incorporate Chevron's current practices which include damage mechanism reviews for applicable process units as well as following new regulations and industry best practices.
4	13	7h	Chevron will fund the costs of a third-party expert to assist the County and the City with the review of the Reliability Program reports and other submittals required by the Reliability Program and related mitigation measures, as needed. The third-party expert will be selected and retained by the County or the City within the County's or City's discretion. This funding obligation survives any amendment of the RISO that may require funding of an inspector for the Facility.	Chevron continues to work with Contra Costa Health Services pursuant to the terms of the RISO, and will contribute funds when requested per this requirement.

Reliability Program Recommendations

Attachment 2. Reliability Program-Related CUP and MMRP Commitments

Section	Sub	Item	Description	Program Report 2020
4	13	7i	Chevron shall adhere to the total acid number (TAN) limits of 0.3 mg milligrams potassium hydroxide per gram (KOH/g) for crude, 1.5 mg KOH/g for sidecuts produced from the crude unit, and 1.0 for gas oils and blends processed through the fluid catalytic cracker, fluid catalytic cracker feed hydrotreater, hydrocracker, heavy neutral hydrocracker, and light neutral hydrocracker. If Chevron intends to process a feedstock for a short-term basis (i.e., up to 6 months) that exceeds these TAN limits, it must complete its Management of Change (MOC) process, which shall include a corrosion review, for the proposed deviation, and shall take into account any existing damage mechanism reviews as specified in Mitigation Measure 4.13-7c that have been prepared for the identified units and piping circuits. If Chevron intends to process a feedstock for a longer-term basis (i.e., more than 6 months) that exceeds these TAN limits, it must complete its MOC process for the proposed deviation, and the MOC shall include a reliability analysis to evaluate, among other things, existing process conditions, monitoring and inspection data, expected corrosion rates, metallurgy, existing damage mechanism reviews, and monitoring and inspection frequency. The MOC evaluation, for short or longer duration TAN deviations, shall include an evaluation of the potential hazards that could result from the TAN deviation in all affected units and piping circuits, including naphthenic acid corrosion impacts. Chevron shall designate a Facility Area Business Unit Manager with final decision-making authority to approve any TAN deviation from the TAN limits. Chevron shall provide the results of any TAN deviation MOC evaluation to the City and County before processing the feedstock that deviates from the established TAN limits. Chevron shall include in its annual Reliability Program reports: (a) details regarding the results of its MOC for any TAN deviations; (b) average annual TAN for crudes and gas oils/blends processed at the Facility for each calendar year starting with 2008; and (c) for any feedstock runs with TAN levels higher than established TAN limits, include the actual TAN levels of the deviating feeds and the duration of the deviating feedstock runs.	Chevron currently has the following controls and processes in place to meet its ongoing obligation for TAN. • The Crude Acceptance Tool is utilized to determine resulting crude blends and product quality for evaluating any new crude for potential purchase. The tool includes flags for crude blends and resulting sidecuts and FCC/hydrocracker feeds at TAN limits specified by this condition. • Refinery Instruction 370, Management of Change is required for all new crude evaluations. If flags are triggered as a result of the Crude Acceptance Tool, reviews are assigned within the MOC in the KMS software. These MOCs will include approval by the appropriate Area Business Unit Manager or their delegate. • Crude Monitoring Program outlines the roles and responsibilities for TAN monitoring and reporting. If the MOC is approved, the following actions items are assigned: o An MOC action item specifies that the Materials Engineer complete "Mercaptan TAN MOC Addendum". The Materials Engineer completes a corrosion review or reliability review, as appropriate, based on the planned crude processing duration. The review is recorded in a report titled "MOC for Crude Review [Required for RMP Compliance Plan]". Records will be permanently attached to the MOC in the KMS software. o The Compliance Specialist (or PSM Specialist) submits a TAN deviation MOC evaluation including corrosion review or reliability analysis, as appropriate, to the City prior to processing the crude or feedstock. o The Project and Permit Team Lead submits the Annual Reliability Program report which includes TAN reporting obligations. Since start of Project operations, there have been no TAN deviations. See Exhibit B for 2019 average annual TAN for crudes and gas oils/blends processed at the facility. Previous year's data was submitted with the 2019 Reliability Program Report as Attachment 2 Exhibit B.
4	13	7j	Chevron shall include in its annual Reliability Program reports the annual average sulfur content of feedstocks, including separate annual averages for crude oils/blends and gas oils/blends, processed at the Facility for each year since and including 2008.	See Exhibit C for annual average sulfur content of crude oils/blends and gas oils/blends processed as the Facility. Data from 2008 to 2010 was previously provided as part of the Environmental Impact Review for the "Baseline Period". See Exhibit C for 2019 sulfur for crudes and gas oils/blends processed at the facility. Previous year's data was submitted with the 2019 Reliability Program Report as Attachment 2 Exhibit C.
CUP				
B	10		Operation of the new hydrogen plant is subject to all mitigation measures, including those specified in the Reliability Program, set forth in the EIR and final Mitigation Monitoring and Reporting Program. For any future hydrogen export project supplied by hydrogen from the Hydrogen Plant Replacement, associated greenhouse gas emissions must be mitigated to a "No Net Increase" level relative to Baseline using the mitigation measures specified in Mitigation Measures 4.8-2 and 4.8-2B.	Chevron acknowledges this condition. The hydrogen export project referenced in this condition was proposed by Praxair, the previous owner and developer of the proposed new Hydrogen Plant. Chevron is now the owner of the Hydrogen Plant and has not proposed a hydrogen export project.
G	1		Chevron shall implement the Modernization Project Reliability Program (set forth as Appendix 4.13-PROG of the EIR) in its entirety as a condition of this Conditional Use Permit.	Chevron is implementing the Modernization Project Reliability Program (set forth as Appendix 4.13-PROG of the EIR) in its entirety. The Modernization Project Reliability Program recommendations are being tracked to ensure implementation by stated deadlines for each recommendation.
G	5		Within six months prior to commencing Project operations, Chevron shall review the corrosion data and flag dates of fixed equipment and piping in process units susceptible to high-temperature sulfidation identified in the Reliability Analysis (taking into account the most current actual conditions combined with post-Project projected corrosion rates predicted based on McConomy curves) and ensure that enhanced monitoring and inspection measures, including those identified in the Reliability Analysis and Reliability Program, are implemented after commencement of Project operations to periodically verify actual post-Project corrosion rates and adjust any flag dates or replacement plans as warranted. Pursuant to the Richmond Industrial Safety Ordinance, Chevron shall make all information relating to its verification, monitoring, and inspection activities available to the City and County and their respective third-party experts upon request, with review by a committee constituted of the dedicated full-time process safety inspector required by the Richmond Industrial Safety Ordinance and Mitigation Measure 4.13-7d, the Contra Costa County Health Services Chief Environmental Health and Hazardous Materials Officer, and a qualified third-party expert selected by the City.	In July 2018, Chevron utilized the most current actual conditions in conjunction with predicted post-project corrosion rates and completed a corrosion data and flag date review for each of the affected process units. For the Crude Unit and SDA, as per the Reliability Analysis, Chevron utilized McConomy Curves to estimate a conservative potential increase in sulfidation corrosion rates in Crude Unit and SDA Unit carbon steel systems of 5 mpy (using the conservative 3.3 wt% sulfur P90 crude blend case). [See Reliability Analysis p3 for P90 discussion, p73 for Crude, and p108 for SDA.] Remaining life (to flag date) was analyzed for all carbon steel piping and fixed equipment in affected areas of the Crude Unit and SDA Unit utilizing the most current measured thicknesses and increasing the currently observed corrosion rates by 5 mpy. Using this method, piping and fixed equipment components were identified for which the predicted remaining life (to flag date) based on project operating conditions was less than the interval to next scheduled inspection. Each of these components was flagged for a follow-up action (replace or reinspect) at either the predicted remaining life (to flag date) if less than 1 year, or within 1 year of commencement of project operations. For components actioned with a follow-up inspection, the remaining life will be re-evaluated based on the follow-up inspection findings, and flag dates or replacement plans will be adjusted accordingly. The observed corrosion rates will be utilized during this follow-up analysis, as the effect of higher sulfur levels will have been measured directly. For Hydroprocessing Units, as per the Reliability Analysis, there is no reasonably foreseeable impact to sulfidation corrosion rates. [See Reliability Analysis p93 and p122.] For Recovered Oil, as per the Reliability Analysis, the systems are not susceptible to sulfidation corrosion. [See Reliability Analysis p122.] Chevron has, however, implemented enhanced monitoring and inspection measures as described below to mitigate the possibility of any unforeseen corrosion impacts in these systems. Enhanced monitoring and inspection measures include: 1. Upgraded specific, highly susceptible carbon steel piping circuits to more resistant alloy materials (per III.A). 2. Completed 100% component inspection for all remaining carbon steel systems to ensure no components were corroding at significantly greater rates than adjacent components in the system. 3. Installed Permasense "continuous" on-line monitoring probes on numerous sulfidation circuits (per III.B, III.E.5). 4. Improved sulfidation inspection strategies (per Chevron best practice, MFG-535). 5. Established IOW limits and response protocol including Material Engineer/Reliability Team evaluation of corrosion impacts of deviations (per III.C.5, III.E.6). 6. Updated Crude Acceptance Process to include a sulfur trigger for a Reliability Review for affected units (per III.C.6, III.C.6, III.D.1).

IOW - Level 2 Alert Events - Attachment 2, Exhibit A

IOW Description/Tag	Date	Duration (days)	Response / Resolution
High-76TI7204.DAVG - IOW2 - NI ISO7 C720 BTMS - COR	2/11/2020	2.00	Process returned to normal operations in less than 7 days - no action required.
High-76TI7204.DAVG - IOW2 - NI ISO7 C720 BTMS - COR	2/24/2020	2.00	Process returned to normal operations in less than 7 days - no action required.
High-76TI7233.DAVG - IOW2 - NI ISO7 C732 BOTTOMS TO P736/A - COR	2/24/2020	1.00	Process returned to normal operations in less than 7 days - no action required.
High-76TI7232.DAVG - IOW2 - NI ISO7 E737 S/S OUT TO C732 - COR	2/24/2020	1.00	Process returned to normal operations in less than 7 days - no action required.
High-76TI7204.DAVG - IOW2 - NI ISO7 C720 BTMS - COR	6/6/2020	1.00	Process returned to normal operations in less than 7 days - no action required.

*List as of August 31, 2020

Annual Average TAN - Attachment 2 Exhibit B

MMRP 4.13-7i Annual Average TAN	
	2019
Crude	0.09
Gas oils/blends	0.08

Annual Average Sulfur Content - Attachment 2, Exhibit C

MMRP 4.13-7j Annual Average Sulfur Content	
	2019
Crude oils/blends	1.75
Gas oils/blends	1.23

ATTACHMENT 3
Reliability Program Implementation of General Recommendations

CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
Modernization Project Reliability Program
Implementation of General Recommendations

2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

INTRODUCTION

On July 29, 2014, the City of Richmond certified the Final Environmental Impact Report (EIR) for and approved Conditional Use Permit and Design Review Permit No. PLN11-089 (CUP) authorizing construction and operation of the Modernization Project. The EIR and CUP required implementation of the Modernization Project Reliability Program included as Appendix 4.13-PROG, which contains both general and project-specific recommendations identified in Appendix 4.13-REL – Reliability Analysis of Modernization Project Changes. The General Recommendations set forth in Section II of the Reliability Program reflected “several general observations and recommendations of broader applicability” related to the Refinery’s work process for managing identifying and addressing the potential impact of damage mechanisms on mechanical integrity.

As stated in Section I of the Reliability Program, at the time the EIR was certified and the Reliability Program adopted, the Refinery was already in the process of implementing various actions “to enhance its mechanical-integrity program and overall Refinery safety, which Chevron believes address the general recommendations.” Since that time, the Refinery has reported its progress on the implementation of these actions in quarterly reports required by section 4.13-13d of the mitigation monitoring and reporting program (MMRP). A copy of the twenty-first quarterly report is attached as Exhibit A. This report further summarizes the status of those actions in the context of the General Recommendations 1, 2, 3 and 5. Chevron has separately reported on its implementation of General Recommendation 4 concerning its Positive Material Identification (PMI) Procedure. A copy of that report was included with the 2018 Reliability Program Report submittal.

REPORT

II. General Recommendations and Refinery Actions to Address

General Recommendation 1: Chevron should ensure that its organizational communication procedures and work processes incorporate mechanisms by which risk concerns, corrective actions, and recommendations that are identified (e.g., during inspections, turnarounds, audits, PHAs, etc.) by personnel (or contractors) are addressed, reviewed and authorized by management as appropriate, tracked, and closed out, and that the rationale for any decision not to implement a recommendation or corrective action, or otherwise address a risk concern, are clearly documented.

Response: The Refinery has taken numerous steps to enhance its organizational communication procedures and work processes to address risk concerns and track implementation of corrective actions and recommendations.

In 2017, the Refinery implemented a manufacturing instruction for addressing mechanical integrity-related inspection recommendations, including development of mitigation plans,

timelines for completion, and the assignment of roles and responsibilities. MFG 530, Fixed Equipment Integrity Threat Recommendation and Resolution Instruction, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. Under MFG 530, a fully developed integrity threat recommendation, among other things:

- Is a high-quality, data-driven recommendation for deficiencies discovered on in-scope fixed equipment.
- Includes a resolution plan with agreed-upon completion dates.
- Includes a mitigation plan if mitigation is required to enable continued Operation until final resolution can be achieved.
- Defines clear handoffs to work prioritization, planning, and execution processes.
- Verifies and documents completion of resolution and mitigation plans.
- Provides input to maintain evergreen asset strategies for fixed equipment.

MFG 530 is applicable to most types of fixed equipment used in the refinery process, including pressure vessels, boilers, on-plot and off-plot piping, atmospheric storage tanks, and furnaces. The objective is to guide the development of integrity threat recommendations to prevent loss of containment events of higher consequence. The instruction and supporting procedures provide detail to support the mechanical integrity program.

Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager (“FEIM”). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor’s manager, or may use their personal stop work authority.

Further, on September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA “[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.” Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. Chevron encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, Chevron has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce Chevron's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

General Recommendation 2: Chevron should further clarify and incorporate into their mechanical integrity program and program documents periodic reviews of work processes, procedures, inspection strategies, etc. to account for physical, operational and organizational changes over time that could affect the assumptions that went into the original decisions. Examples that illustrate this include: (1) periodic reviews of inspection CML densities and placements to ensure that unpredictable damage mechanisms can be detected and (2) reviews of wet H₂S damage risk, based on crude feed constituent changes. Chevron reports that it is developing "asset strategy plans" for each process unit, and that the development of the asset strategy plans will address this recommendation by including review of inspection procedures, working documents, CMLs, and damage mechanisms, and that the asset strategy plans will identify and implement changes needed to each as a result of the review. Whether called an "asset strategy plan" or otherwise included in another safety program (e.g., included as part of the Richmond Industrial Safety Ordinance documentation), Chevron should clarify its implementation tracking process for changes needed as a result of these periodic reviews.

Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining*

Industry. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis (“PHA”) schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard (“Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525,” or “MFG 525”). This standard sets expectations for asset strategies designed to prevent and mitigate losses of containment in fixed equipment and describes the process for creating and maintaining these strategies.

Specifically, the Refinery modified its PHA procedures to better integrate DMRs into the PHA review process. MFG 520 requires alignment of the DMR schedule with the PHA schedules for piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs. The Refinery took a lead role in piloting DMRs as this work process was developed. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

MFG 520 recognizes that the DMR work process will undergo continuous improvement as internal and external guidance is developed. Concurrent with development of the DMR work process and in response to a corrective action from its own investigation, CUSA has developed an asset strategy standard, MFG 525, which is used where applicable. As described above in CUSA’s response to CSB Recommendation 2012-03-I-CA-R1, MFG 525 sets the expectations

for asset strategies designed to prevent and mitigate losses of containment in fixed equipment and to describe the process for creating and maintaining these strategies. MFG 525 defines an asset strategy as the documented plan for operating, monitoring, and maintaining fixed equipment so as to preserve its pressure boundary. As part of a living program for continual improvement, an asset strategy identifies damage mechanisms; determines the need for and defines operating limits known as integrity operating windows; and prescribes inspection plans, including tasks and frequencies required to manage identified damage mechanisms.

The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

General Recommendation 3: Chevron should leverage its existing infrastructure and technology to lessen the reliance on human interaction in responding to potential risks, including for example Chevron's current pilot project to implement Integrity Operating Windows per the guidelines of the draft API 584 Recommended Practice for the crude unit. Chevron should extend the pilot project to the remaining operating units.

Response: The Refinery has implemented a process to create and utilize asset strategy plans for each process unit at the piping circuit level, which is integrated into the DMR process and includes, among other things, integrity operating windows consistent with draft *API 584 – Integrity Operating Windows* and consideration of process conditions, inspections techniques and frequency, mixing and injection points, and corrosion monitoring locations (CML). These asset strategy plans will be implemented for all processing units on an ongoing basis. Further, the Refinery has significantly expanded and implemented its Integrity Operating Window (IOW) per API RP 584.

General Recommendation 5: Chevron should review and modify their Piping Inspection Procedure to incorporate an engineering review of thickness inspection data with near term “Flag” dates for high risk equipment/piping to assure that the actual minimum thickness associated with the Flag date has either been verified through inspection or, alternatively, the inspection data analyzed with techniques such as a statistical analysis (95% CL or extreme value analysis) to evaluate what risk is involved if the actual minimum thickness was not measured.

Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness (“MFG 510”) was revised in March 2018. This instruction “outlines the work process and calculation methods for determining minimum required pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” If thickness is at, or is projected to be, below minimum required thickness, then MFG 510 requires an approved integrity threat mitigation plan to document the technical basis for continued operation to a lower value. MFG 510 also addresses the training, qualification, and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day

of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using Chevron's ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

Attachment 3, Exhibit A

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT MITIGATION
MONITORING AND REPORTING PROGRAM, SECTION 4.13-13d TWENTY-
FIRST QUARTERLY REPORT**

July 1, 2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

I. INTRODUCTION

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with Mitigation Measure 4.13-13d, which provides:

Chevron will report to the City quarterly, and shall provide a copy of this report to the County, after Project approval on the status of the corrective actions taken to implement agency recommendations to Chevron resulting from the August 6, 2012 fire, as well as any corrective actions taken by Chevron as a result of its own investigation. To the extent that Chevron elects not to implement a recommendation made by an agency, Chevron shall include in these quarterly reports a detailed explanation of its rationale for doing so.

This is the twenty-first report prepared under the quarterly reporting requirement.

II. BACKGROUND

The Richmond Refinery experienced an accidental release from the atmospheric distillation column of the No. 4 Crude Unit on August 6, 2012. The failure involved an 8” carbon-steel piping component in the No. 4 sidecut that carried light gas oil. The approximate duration of the release was 7 hours, 24 minutes.

All required agency notifications were made. Responding agencies included Cal/OSHA, CCHS, Bay Area Air Quality Management District, California Office of Spill Prevention and Response, the U.S. Environmental Protection Agency, the Richmond Police Department, and the U.S. Chemical Safety and Hazard Investigation Board (“CSB”). The CSB conducted an investigation concerning the fire. In April 2013, the CSB issued its Interim Investigation Report: Chevron Richmond Refinery Fire (“Interim Report”), which included two recommendations to CUSA. In January 2015, the CSB issued its Final Investigation Report Chevron Richmond Refinery Pipe Rupture and Fire (“Final Report”), which included three recommendations to CUSA. CUSA conducted its own investigation into the August 6, 2012 incident (“CUSA Investigation”), and identified a series of recommended actions to address what had been identified as causal factors and additional considerations.

III. STATUS OF CORRECTIVE ACTIONS TAKEN TO IMPLEMENT AGENCY RECOMMENDATIONS

The CSB issued two recommendations (2012-03-I-CA-R1 and 2013-03-I-CA-R2) to CUSA in its Interim Report. The CSB issued an additional three recommendations (2012-03-I-CA-R33, 2012-03-I-CA-R34, and 2012-03-I-CA-R35) to CUSA in its Final Report.

Set forth below are the CSB's recommendations from the Interim Report and Final Report, and CUSA's response to each recommendation.

Recommendation No. 2012-03-I-CA-R1: At all Chevron U.S. refineries, engage a diverse team of qualified personnel to perform a documented damage mechanism hazard review. This review shall be an integral part of the Process Hazard Analysis cycle and shall be conducted on all PSM-covered process piping circuits and process equipment. The damage mechanism hazard review shall identify potential process damage mechanisms and consequences of failure, and shall ensure safeguards are in place to control hazards presented by those damage mechanisms. Analyze and incorporate into this review applicable industry best practices, Chevron Energy Technology Company findings and recommendations, and inherently safer systems to the greatest extent feasible.

CUSA's Response: The Richmond Refinery modified and further developed its work processes for the review of damage mechanisms. Specifically, CUSA issued a refinery standard ("Damage Mechanism Review Instruction – Manufacturing 520," or "MFG 520") for conducting a damage mechanism review ("DMR") to assess corrosion threats and other applicable damage mechanisms. MFG 520 sets forth a DMR work process that was designed in accordance with industry practices and recommendations, and American Petroleum Institute ("API") Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*. CUSA also considered API Recommended Practice 584, *Integrity Operating Windows*, while this recommended practice was in development. MFG 520 requires:

- Completion of a DMR work process for piping circuits and equipment in applicable units so as to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms;
- Development of CUSA standard templates for refinery-common units;
- Creation of a DMR schedule aligned with Process Hazard Analysis ("PHA") schedules for all piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs;
- Establishment of multi-disciplinary DMR teams;
- Evaluation of piping circuits and equipment in applicable units against potential damage mechanisms in connection with assessment triggers;
- Consideration of consequences of failures and safeguards identified by the DMR work process;
- Consideration of CUSA and applicable industry best practices;
- Creation of DMR reports, which includes recommendations as appropriate;
- Development of action plans to address DMR recommendations; and
- Provision of DMR work product to the applicable PHA team for consideration.

Inherently safer systems have been incorporated into the DMR template design and evaluated, as appropriate. For example, there are damage mechanism assessment questions that help determine whether or not a change or upgrade in metallurgy would be recommended to prevent or better manage a particular damage mechanism.

In 2013, the Richmond Refinery took a lead role in piloting DMRs as this work process was developed. In 2014, the Refinery began adopting the DMR program by conducting selected DMRs prior to completing the applicable PHA. The Refinery employed the learnings from these initial DMRs and PHAs, and information from internal and external subject matter experts, to further develop its DMR work processes. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

The Refinery has now completed DMRs for applicable PSM-covered process piping and process equipment.

Additionally, consistent with and building upon MFG 520, CUSA has developed an asset strategy standard (“Fixed Equipment Asset Strategies Standard--Manufacturing Standard 525,” or “MFG 525”). This standard sets expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. In 2019, CUSA completed reviews and developed Fixed Equipment Asset Strategies for each Refinery process unit per MFG 525.

Recommendation 2012-03-I-CA-R2: At all California Chevron U.S. refineries, report leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to the federal, state, and local regulatory agencies that have chemical release prevention authority.

CUSA’s Response: The subject of process safety indicators is complex and has been the focus of prior agency recommendations (e.g., Recommendation No. 2005-4-I-TX-6 to the API and United Steelworkers). Despite many years of effort by a diverse group of interested parties, including individual companies, safety and industry groups, organized labor, and regulators, there is no consensus on process safety indicators. The CSB acknowledged this lack of consensus during a Safety Performance Indicators public hearing it held in Houston, Texas on July 23 and 24, 2012. CUSA understands the CSB’s interest in continuing to drive this process forward.

The Refinery already internally tracks numerous leading and lagging indicators through its Operational Excellence and Reliability Intelligence (“OERI”) system. OERI is a reporting system that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery’s information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative

maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

In addition to other tracking mechanisms, the Refinery uses OERI to provide organizational visibility of the Refinery's maintenance, reliability, and process safety performance, and overdue and upcoming safety, maintenance, and regulatory compliance items. Refinery personnel have ready access to OERI, and it is reviewed by the Refinery's management on a routine basis.

OERI also is used during Unit Reliability Briefs ("URBs"), which are cross-functional meetings attended by management, reliability analysts, maintenance, operations, technical, and other relevant internal stakeholders. URBs are regularly conducted by each business area to manage process safety and reliability performance threats in a risk-informed manner. OERI is utilized during URBs to track and prioritize reliability threats.

To further address the CSB's recommendation, however, CUSA played a major role in coordination with multiple interested parties, including the CSB, USW, Contra Costa Health Services ("CCHS"), and others in industry to develop "consensus" process safety indicators during the CCHS Industrial Safety Ordinance ("ISO") and the City of Richmond ISO revision process. As part of these discussions, the parties conferred on the selection of appropriate indicators, potential reporting format, and the frequency of reporting, among other items. These revisions to the ISO and RISO became effective on September 30, 2014.

Consistent with the revised ordinances, the Refinery, along with industry and the County, is tracking process safety indicators in connection with CCHS's annual reporting obligation, which comes due on June 30 of each year. ISO and RISO process safety performance indicator requirements include reporting on overdue inspections for piping and pressure vessels, overdue PHA recommendations, overdue incident investigations recommendations, and overdue API and American Chemistry Council Tier I and II incident investigation recommendations.

On July 15, 2016, the Department of Industrial Relations released its proposed new regulation for Process Safety Management for Petroleum Refineries for public review, substantially completing the current work of the California PSM Advisory Committee. CUSA has and will continue to remain involved with other PSM reform groups and will continue to participate in the development of consensus process safety indicators at the state, local, and federal level.

Recommendation No. 2012-03-I-CA-R33: *Develop a method to assign accountability at Chevron to determine whether any new Energy Technology Company (ETC) recommended program or industry best practice, such as API guidance must be followed to ensure process safety or employee personal safety. This method shall include monitoring of these practices and guidance at a refining system level and at the refinery level. Develop a tracking system to monitor the progress of implementing these selected practices and guidance to completion.*

CUSA's Response: CUSA previously recognized the value of providing for the uniform implementation of recommended programs or industry best practices. For this reason, CUSA has developed and implemented a "Manufacturing Technical Authority Process" ("MTA Process") to assess mechanical integrity and other process safety-related ETC advisories, as well as industry standards, guidance, and best practices (collectively, "Advisories and Standards"). The MTA Process is designed to determine which Advisories and Standards are applicable and appropriate for CUSA's Manufacturing facilities to develop those Advisories and Standards into new Manufacturing Standards, and to direct and monitor their subsequent implementation by appropriate personnel. The MTA Process engages senior executives and managers with process safety and operational experience.

A brief overview of the MTA Process is as follows:

- Under the MTA Process, new Advisories and Standards are identified from a wide variety of sources.
- If new Advisories and Standards are applicable to Manufacturing facilities and are not already adequately addressed, the new Advisories and Standards will move forward in the process.
- The MTA Process assigns the new Advisories and Standards to the appropriate Manufacturing organization or SMEs to develop the methods and milestones for implementation, and to track and verify that implementation is completed according to plan.
- The appropriate refinery leadership team (e.g., Operations, Maintenance and Reliability, or Technical) assigns responsibility for executing the Manufacturing Standards.
- For Manufacturing Standards that the MTA Process determines to be critical for the prevention of fatalities and high-consequence loss of containment events, any extensions and exceptions will require approval of the President of Manufacturing.
- The MTA Process also uses a centralized database to track and monitor the development and implementation of Manufacturing Standards developed pursuant to the MTA process.

Recommendation No. 2012-03-I-CA-R34: *Develop an auditable process to be available for all recommended turnaround work items necessary to address mechanical integrity deficiencies or inspection recommendations that are denied or deferred. This process shall provide the submitter of the denied or deferred recommendation with the option to seek further review by his or her manager, who can further elevate and discuss the recommendation with higher level management, such as the Area Business Unit Manager. Maintain an auditable log of each of these potential turnaround work items, including the ultimate determination of approval, deferral, or rejection, justification determination, and the person or team responsible for that decision.*

CUSA's Response: CUSA's Richmond Refinery has developed and implemented a process for tracking turnaround work items necessary to address inspection recommendations concerning fixed equipment (*e.g.*, process piping) identified by the Company's API certified inspectors, including any turnaround work items that are denied or deferred.

On September 20, 2014, the State of California enacted Senate Bill 1300 that imposes on California refineries certain notification obligations regarding turnaround work. 2014 Cal. Stat. ch. 519 (S.B. 1300) (codified at Cal. Lab. Code § 7872). Among other provisions, S.B. 1300 requires a petroleum refinery employer to make available upon request to Cal/OSHA "[n]otification and description of all repairs, design modifications, or process changes described in a corrosion report, risk-based inspection report, process hazard analysis, boiler permit schedule, management of change record, work order, or other document listed in paragraphs (1) to (6), inclusive, *that the petroleum refinery employer has deferred to a subsequent operational period or turnaround.*" Cal. Lab. Code § 7872(c)(7) (emphasis added).

The Richmond Refinery's turnaround tracking process is consistent with S.B. 1300 and establishes the process by which the Refinery maintains the information required by California law. Among the information that the Refinery maintains is a Turnaround Database of potential turnaround work items that include the ultimate determination of deferral or rejection of the item. The Turnaround Database allows personnel to search the status of any turnaround work item, generate a report that demonstrates the approval status of turnaround work items, and review any denied or deferred work items. Additionally, the Turnaround Database identifies the name of the supervisor and the name of employee(s) who provided comments or made a determination regarding approval status. When action is taken on a Living Worklist ("LWL") item, the originator receives an email notification regarding the change in status. The notification includes the LWL item number, the status change, and a link to the Turnaround Database entry for viewing Decision Notes and Decision Attendees. CUSA encourages employees to raise any concerns about a denial or deferral with their supervisor or their supervisor's manager.

In addition, CUSA has implemented improvements to the Turnaround Database and improvements to guidance materials that further emphasize the ability of the originator to seek additional review of deferred or denied turnaround work items. The updated Turnaround Database Approval Process Flow Chart, which serves as an implementation guidance document for the Turnaround Database, and the revised turnaround work item status change email notification further reiterate and reinforce CUSA's policy that the originator of a work item has the option to seek further review of denied or deferred recommendations with higher level management.

Recommendation No. 2012-03-I-CA-R35: *Develop an approval process that includes a technical review that must be implemented prior to resetting the minimum alert thickness to a lower value in the inspection database.*

CUSA's Response: This recommendation was made in the CSB's final report released January 2015. CUSA developed and distributed a manufacturing instruction ("Manufacturing Instruction for Establishing Piping Minimum Alert Thickness" or "MFG 540") in May 2016 (revised July 2018), which includes a documented technical review and approval process when a piping minimum alert thickness is changed to a lower value within the inspection database.

IV. CORRECTIVE ACTIONS IMPLEMENTED BY CUSA IN RESPONSE TO ITS OWN INVESTIGATION

The Richmond Refinery's own investigation team identified a series of recommended actions to address what had been identified as causal factors and additional considerations. Operational and process changes that resulted from this investigation are set forth below.

A. RECOMMENDATIONS TO ADDRESS CAUSAL FACTORS ("CF")

CF Recommendation 1: *Revise Refinery policies and checklists to ensure appropriate information—including Process Safety and Inspection information—is considered when evaluating leaks and addressing the issue of whether to shut down or continue operation of equipment.*

CUSA's Response: The Refinery has implemented an updated protocol for evaluating process leaks with simple guidance to assist in making necessary and rapid decisions concerning leak response and further enhancing situational awareness skills. This protocol identifies scenarios that trigger the use of the protocol and recognizes that there may be other scenarios in high consequence services where a leak has not yet occurred but has a potential for loss of containment if conditions are not addressed.

Pursuant to the protocol, subject matter experts ("SMEs") from various disciplines, including process safety and inspections, gather to evaluate the leak. The protocol provides discussion questions about process safety information, including information related to past inspections, for the SMEs to consider when determining the response plan. The type of process safety information to consider includes the identity of the leaking material, location, temperature and emergency shutdown procedures, as well as an understanding of the potential damage mechanism involved.

The protocol is published on the Company's internal Manufacturing website under Manufacturing Standards, and a training program has been developed that tracks completion of required training.

The leak response protocol was shared with CCHS, Cal/OSHA, CSB, as well as other refineries and industrial facilities in the County and beyond.

CF Recommendation 2: *Enhance the Refinery's Mechanical Integrity program to ensure the Refinery properly identifies and monitors piping circuits for appropriate damage mechanisms using a standardized methodology and documentation system.*

CUSA's Response: The Refinery is strengthening its reliability program for piping and equipment in an effort to ensure it covers potential damage mechanisms applicable to those systems. As part of this effort, the Refinery is implementing an enhanced process for regular DMRs of piping circuits in applicable units in order to formalize the evaluation of known damage mechanisms, the consequences of a failure, and the safeguards necessary to mitigate failures and other potential risks from those damage mechanisms. As discussed in response to CSB Recommendation 2012-03-I-CA-R1, CUSA issued a standard, MFG 520, for conducting DMRs to assess corrosion threats and other applicable damage mechanisms. MFG 520 establishes a DMR work process that will, where appropriate, be completed for piping circuits and equipment in applicable units using the applicable damage mechanism information outlined in the API Recommended Practice 571.

The Refinery modified its PHA procedures to better integrate DMRs into the PHA review process. MFG 520 requires alignment of the DMR schedule with the PHA schedules for piping circuits and equipment in applicable units so that damage mechanisms can be considered during PHAs. The Refinery took a lead role in piloting DMRs as this work process was developed. On January 1, 2014, the Refinery instituted a requirement that all PHA teams consider applicable DMRs when conducting PHAs for covered plants.

MFG 520 recognizes that the DMR work process will undergo continuous improvement as internal and external guidance is developed. Concurrent with development of the DMR work process and in response to a corrective action from its own investigation, CUSA has developed an asset strategy standard, MFG 525, which is used where applicable. As described above in CUSA's response to CSB Recommendation 2012-03-I-CA-R1, MFG 525 sets the expectations for asset strategies that are designed to optimize mechanical availability and prevent and mitigate loss of containment in fixed equipment. MFG 525 defines an asset strategy as the documented plan for operating, monitoring, and maintaining fixed equipment to preserve its integrity (pressure containment) function and sustain its process (service) function. An asset strategy identifies applicable damage mechanisms; determines the need for and defines operating limits known as integrity operating windows; and prescribes inspection, testing and preventative maintenance, including tasks and frequencies, required to manage the integrity and process functions.

As described above, the MTA Process prioritizes and acts upon mechanical integrity-related recommendations from internal and external technical experts, including industry standards and alerts. CUSA's response to CSB Recommendation 2012-03-I-CA-R33, describes the MTA Process, which was established for the purpose of assessing new Advisories and Standards, determining which are applicable and appropriate for CUSA's Manufacturing facilities, and monitoring their subsequent implementation.

The Refinery also developed the Fixed Equipment Integrity Manager position, with responsibility for developing, implementing, and stewarding the fixed equipment program.

CF Recommendation 3: Review and enhance the requirements for inspector training and competency.

CUSA's Response: The Refinery is improving its mechanical integrity training as a way to further support our leaders, inspectors, operating groups, and engineers. To that end, the Refinery has developed a standard to guide and promote the establishment of essential training and competencies for individuals who are performing a Fixed Equipment Inspector or Analyst role.

The specific training for each Fixed Equipment Inspector position is defined for that specific position based on a training plan that is developed in an effort to ensure that the needed competencies are developed within an established timeframe per certification or training from start of a new position. The implementation of the training plan is tracked through the individual's annual performance monitoring plan and monitored by the individual's supervisor. Additionally, the Refinery maintains a matrix for each inspector that tracks completion of required certifications and training. Recognizing that Fixed Equipment Inspector training is an ongoing process, and new or updated trainings are regularly required, all personnel in Fixed Equipment Inspector positions are current in the trainings identified for the inspections they perform or perform those inspections under the supervision of someone with the necessary certifications and/or training. The training standard, as well as the compliance matrices, are housed on the Refinery's intranet.

CF Recommendations 4 and 5: Develop and implement a process for additional oversight of mechanical integrity-related recommendations and inspection plans, and the escalation of recommendations. Develop and implement a process to review and act upon mechanical integrity-related recommendations from industry alerts, ETC, and other subject-matter experts.

CUSA's Response: The Refinery is implementing a manufacturing instruction for addressing mechanical integrity-related inspection recommendations, including development of mitigation plans, timelines for completion, and the assignment of roles and responsibilities. MFG 530, Fixed Equipment Integrity Threat Recommendation and Resolution Instruction, establishes a process for identifying integrity threats and issuing recommendations, and developing associated resolution plans designed to prevent and mitigate loss of containment due to fixed equipment degradation. Under MFG 530, a fully developed integrity threat recommendation, among other things:

- Is a high-quality, data-driven recommendation for deficiencies discovered on in-scope fixed equipment.
- Includes a resolution plan with agreed-upon completion dates.

- Includes a mitigation plan if mitigation is required to enable continued Operation until final resolution can be achieved.
- Defines clear handoffs to work prioritization, planning, and execution processes.
- Verifies and documents completion of resolution and mitigation plans.
- Provides input to maintain evergreen asset strategies for fixed equipment.

MFG 530 is applicable to most types of fixed equipment used in the refinery process, including pressure vessels, boilers, on-plot and off-plot piping, atmospheric storage tanks, and furnaces. The objective is to guide the development of integrity threat recommendations to prevent loss of containment events of higher consequence. The instruction and supporting procedures provide detail to support the mechanical integrity program.

Pursuant to the process established in MFG 530, for integrity threats to fixed equipment, all resolutions and/or mitigation plans, if mitigation is required, and target completion dates, must be approved by both the Operations Management for the affected unit and Fixed Equipment Integrity Lead/Manager ("FEIM"). If Operations Management and the FEIM do not agree on the resolution/mitigation plan or the target completion dates, the FEIM shall escalate the decision to the Refinery General Manager. All open integrity threats are tracked in OERI in an effort to ensure the resolution/mitigation plan are implemented prior to the target completion date. Any employee may raise any concern about the resolution/mitigation plan or the target completion date with their supervisor or their supervisor's manager, or may use their personal stop work authority.

In addition to the actions CUSA has taken in response to its own investigation, CUSA's responses to CSB Recommendation 2012-03-I-R34 and CSB Recommendation 2012-03-I-CA-R35, described above, are also enhancing the Refinery's assessment, decision-making, and oversight of mechanical integrity-related inspection recommendations.

Further, the response to CSB Recommendation 2012-03-I-R33 above describes how new Advisories and Standards are considered, developed into manufacturing instructions as appropriate, implemented, and tracked.

CF Recommendations 6 and 7: Inspect 4CU piping that falls under the ETC Sulfidation Inspection Guidelines criteria for sulfidation corrosion prior to restarting the 4CU. Implement the ETC Sulfidation Inspection Guidelines for the remainder of the Refinery.

CUSA's Response: The Refinery conducted 100% component inspection of carbon steel piping systems identified as potentially susceptible to sulfidation corrosion. Over 12,000 individual piping components were inspected. As part of these inspections, the Refinery implemented inspections to identify components of carbon steel piping circuits that did not have sufficient thickness to remain in service until the next scheduled turnaround; implemented generally accepted engineering practices with respect to components of insufficient thickness;

documented solutions with respect to components of insufficient thickness; established an inspection frequency for carbon steel piping circuits based upon measured corrosion rates, remaining life calculations, and current process conditions, including sulfur content and temperature; and maintained records of all carbon steel piping circuits potentially susceptible to sulfidation corrosion.

CF Recommendation 8: *Ensure relevant technical studies and inspection data are considered for the Refinery's equipment reliability plans and incorporated into the ROI/IPR [Reliability Opportunity Identification/Intensive Process Review] process.*

CUSA's Response: The ROI/IPR process has been revised to include known failure mechanisms, relevant technical studies and industry incidents in the pre-read for ROI/IPR study. Impacted employees are being trained on these changes.

B. RECOMMENDATIONS TO ADDRESS ADDITIONAL CONSIDERATIONS ("AC")

AC Recommendation 1: *Review the Pre-Fire Plan to ensure sufficient guidance is provided on equipment positioning.*

CUSA's Response: The Refinery reviewed and updated its Pre-Incident Scenario Analysis with apparatus placement modifications and shared the revised plans with CUSA Industrial Fire Chiefs.

AC Recommendation 2: *Review company/industry loss history on large fractionating towers to determine if internal Engineering Standard FRS-DU-5267 (Emergency Isolation and Depressuring Valves) adequately addresses mitigation of accidental releases from these systems. Revise the standard as warranted by the findings of this review.*

CUSA's Response: The Company completed a review of loss history for large fractionating towers. No revisions to FRS-DU-5267 were warranted by this review.

AC Recommendation 3: *Ensure Refinery business plans provide for the appropriate implementation of Process Safety recommendations (such as the ETC Sulfidation Inspection Guidelines).*

CUSA's Response: See the response above to CSB Recommendation No. 2012-03-I-CA-R33, which describes the MTA Process.

AC Recommendation 4: *Ensure sufficient organizational capacity and competency for minimum thickness Fitness for Service determinations.*

CUSA's Response: Manufacturing Instruction for Minimum Required Pipe Wall Thickness ("MFG 510") was revised in March 2018. This instruction "outlines the work process and calculation

methods for determining minimum *required* pipe wall thickness of ferritic and austenitic steel piping systems within limits set by accepted piping codes and standards.” MFG 510 also addresses the qualification and documentation requirements for personnel involved in establishing minimum required pipe wall thickness. The Richmond Refinery maintains a record of engineers qualified to execute these calculations.

ETC facilitates an instructor-led course entitled “Fitness for Service – Level 1 Practitioner Training.” The course format is a two-day instruction/workshop followed by an additional day of testing and certification. The course is based on API 579-1/ASME FFS-1 and is structured as a workshop, using example problems to demonstrate FFS procedures using CUSA’s ETC Level 1 software. The training is designed for design engineers. Certifications are issued to those who complete the training course and pass the test. Only certified personnel are authorized to perform a second level review and approve FFS Level 1 assessments, and only ETC is authorized to perform FFS Level 2 and 3 assessments. Richmond Refinery keeps a log of the active personnel certified to perform a second level review and approve FFS Level 1 assessments.

AC Recommendation 5: Consider additional training on expectations under the “Richmond Refinery Piping Inspection Guidelines” and “RFMS Piping Data Entry (Reliability Focused Maintenance System) and ACD (Add/Change/Delete) Guideline.”

CUSA’s Response: See the response above to the third CUSA Investigation CF recommendation, which discusses inspector training and competency.

AC Recommendation 6: Review and modify the PHA procedures to ensure that teams consider known corrosion threats/mechanisms.

CUSA’s Response: See the responses above to CSB Recommendation 2012-03-I-CA-R1 and the second CUSA Investigation CF recommendation, which discuss the DMR work process.

AC Recommendation 7: Consider a project to evaluate the purpose and methods of various project safety management (PSM) reviews (PHA, ROI/IPR, AOA, COA, sRCM, RBI, etc.) to determine if these activities can be combined or better sequenced to improve risk understanding across the various functions and promote better process safety outcomes.

CUSA’s Response: The Refinery has mapped out the work processes under PSM and other safety standards to identify potential efficiencies that can be gained, or outcomes enhanced by re-sequencing, combining, or modifying processes.

V. CONCLUSION

Operating safely is one of CUSA’s core values. CUSA is also committed to learning from the August 6, 2012 fire to prevent a recurrence. To this end, CUSA has worked closely and cooperatively with local, state, and federal agencies, including the City, to determine the root

causes of the fire. CUSA is committed to considering recommendations from all agency investigations, and taking appropriate actions in response.

CUSA's efforts to improve safety and reliability at its refineries are ongoing. CUSA continues to evaluate and undertake efforts to enhance mechanical integrity and safe operations at the Refinery.

APPENDIX A – ACRONYMS

ACC	American Chemistry Council
API	American Petroleum Institute
BIN	Business Improvement Network
Cal/OSHA	California Division of Occupational Safety and Health
CCHS	Contra Costa Health Services
CCHMP	Contra Costa County Hazardous Materials Program
CSB	U.S. Chemical Safety Board
CUSA	Chevron U.S.A. Inc.
DMR	Damage Mechanism Review
EIR	Environmental Impact Report
ETC	Energy Technology Company
ISO	Industrial Safety Ordinance
MFG	Manufacturing Standard
MM	Mitigation Measure
MTA	Manufacturing Technical Authority
OERI	Operational Excellence and Reliability Intelligence
PHA	Process Hazard Analysis
PSM	Process Safety Management
RISO	City of Richmond Industrial Safety Ordinance
S.B.	Senate Bill
SME	Subject Matter Expert
URB	Unit Reliability Brief
USW	United Steelworkers

ATTACHMENT 4
Reliability Program Report IV.B

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
RELIABILITY PROGRAM § IV.B REPORT**

2020

**LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804**

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with section IV.B of Appendix 4.13-PROG – Modernization Project Reliability Program, which provides:

All piping circuits in the Refinery, including the new 9 Chrome circuits being installed pursuant to § III.A of this Reliability Program, are regularly monitored and inspected. Beginning one year from commencement of Project operations, and annually thereafter, the Refinery will provide reports to the City summarizing the monitoring and inspection results for the identified circuits. These reports shall at a minimum include the following information:

- A list of all piping circuits identified as potentially susceptible to sulfidation corrosion, including specifically piping circuits identified during the reliability review for the Modernization Project as being susceptible to sulfidation corrosion and subject to potential process changes.
- A list of components identified through the 100% component inspection conducted following the August 6, 2012 incident pursuant to the methodologies set forth in the API 939-C - Guidelines for Avoiding Sulfidation (Sulfidic) Corrosion Failures in Oil Refineries and Updated Inspection Strategies for Preventing Sulfidation Corrosion Failures in Chevron Refineries (Sept. 30, 2009) that may lack sufficient thickness to remain in service until the next scheduled turnaround.
- A description of the solutions implemented with respect to components of insufficient thickness identified above.
- A description of the current fixed inspection frequency for carbon steel piping circuits identified as potentially susceptible to sulfidation corrosion.
- A description of any findings from inspection and monitoring of the piping circuits identified during the reliability review for the Modernization Project as being susceptible to sulfidation corrosion and subject to potential process changes that indicate that any of these circuits lack sufficient thickness to remain in service until the next turnaround and a description of the solution to be implemented with respect to these circuits.
- Chevron shall obtain all required permits for replacement of these piping circuits pursuant to the California Building Standards Code, inclusive of the California Fire Code, and, once the piping circuits are replaced, shall submit copies of closed permits to the Planning Department to demonstrate compliance with this commitment.

A list of all piping circuits identified as potentially susceptible to sulfidation corrosion, including those identified during the reliability review for the Modernization Project, can be found in Appendix A, along with the current fixed inspection frequency.

The list of components identified through the 100% component inspection conducted following the August 6, 2012 incident was previously provided to U.S. EPA. Solutions implemented with respect to components of insufficient thickness identified above were also previously shared with U.S. EPA through the Annual Report pursuant to Paragraph XV of the Consent Decree. A copy of this Annual Report is maintained at the Richmond Refinery and can be made available upon request.

Findings from inspection and monitoring of the piping circuits identified during the reliability review for the Modernization Project were previously provided to Cal OSHA as part of the

Terms and Conditions of Probation. A copy of the most recent report is maintained at the Richmond Refinery and can be made available upon request.

Chevron previously reported on the replacement of 17 piping circuits and four partial piping and valve replacements identified in III.A of the Reliability Program. The City authorized the replacement work through the “Annual Provisional Construction Permit” (No. F14-06939), issued by the City of Richmond Fire Department. A final update on the status of these replacements was submitted in August 2018 and included in the 2018 Reliability Program Report as Attachment 4. CCHS reviewed documents demonstrating compliance in August 2018. Since the commencement of operations (April 17, 2019), no additional piping circuits have been replaced.

Appendix A

Piping Circuits Susceptible to Sulfidation Corrosion

Unit	Functional Location	Damage Mechanism	API Pipe Class	Inspection Frequency (Years)
FCC UNIT	0101-X001-100	Sulfidation (IS01)	2	10
FCC UNIT	0101-X002-010	Sulfidation (IS01)	2	2.5, 10
FCC UNIT	0101-X003-010	Sulfidation (IS01)	2	10
FCC UNIT	0101-X005-020	Sulfidation (IS01)	2	3, 10
FCC UNIT	0101-X005-J01	Sulfidation (IS01)	1	3
FCC UNIT	0101-X005-J02	Sulfidation (IS01)	1	3, 5
FCC UNIT	0101-X006-010	Sulfidation (IS01)	2	10
FCC UNIT	0101-X006-J01	Sulfidation (IS01)	2	3
FCC UNIT	0101-X007-010	Sulfidation (IS01)	1	2.5, 5
FCC UNIT	0101-X017-010	Sulfidation (IS01)	1	2.5, 5
FCC UNIT	0101-X017-020	Sulfidation (IS01)	2	10
FCC UNIT	0101-X017-030	Sulfidation (IS01)	1	5
FCC UNIT	0101-X017-040	Sulfidation (IS01)	1	5
FCC UNIT	0101-X017-050	Sulfidation (IS01)	1	5
FCC UNIT	0101-X017-060	Sulfidation (IS01)	1	2.5, 5
FCC UNIT	0101-X018-010	Sulfidation (IS01)	2	10
FCC UNIT	0101-X018-020	Sulfidation (IS01)	1	5
FCC UNIT	0101-X018-030	Sulfidation (IS01)	1	5
FCC UNIT	0101-X018-040	Sulfidation (IS01)	1	2.5, 5
FCC UNIT	0101-X018-050	Sulfidation (IS01)	1	2.5, 5
FCC UNIT	0101-X018-090	Sulfidation (IS01)	1	5
FCC UNIT	0101-X018-100	Sulfidation (IS01)	1	2.5, 5
FCC UNIT	0101-X018-130	Sulfidation (IS01)	2	10
FCC UNIT	0101-X044-010	Sulfidation (IS01)	2	10
PROPLYENE POLYMER	0110-X030-010	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X030-020	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X030-030	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X030-040	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X030-050	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X033-010	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X033-020	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X033-030	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X033-040	Sulfidation (IS01)	1	5
PROPLYENE POLYMER	0110-X037-020	Sulfidation (IS01)	2	10

NO 1 SRU - PLANT 2100	0125-X004-010	Sulfidation (IS01)	1	3
NO 1 SRU - PLANT 2100	0125-X006-030	Sulfidation (IS01)	2	10
NO 1 SRU - PLANT 2100	0125-X007-010	Sulfidation (IS01)	2	10
NO 2 SRU - PLANT 2200	0126-X004-010	Sulfidation (IS01)	1	3
NO 2 SRU - PLANT 2200	0126-X004-030	Sulfidation (IS01)	1	3
NO 2 SRU - PLANT 2200	0126-X004-060	Sulfidation (IS01)	1	3
NO 2 SRU - PLANT 2200	0126-X006-030	Sulfidation (IS01)	2	10
NO 2 SRU - PLANT 2200	0126-X007-010	Sulfidation (IS01)	2	10
NO 3 SRU - PLANT 2300	0127-X004-010	Sulfidation (IS01)	1	3
NO 3 SRU - PLANT 2300	0127-X004-030	Sulfidation (IS01)	1	3
NO 3 SRU - PLANT 2300	0127-X006-030	Sulfidation (IS01)	2	10
SDA	0401-X003-050	Sulfidation (IS01)	1	5
SDA	0401-X004-010	Sulfidation (IS01)	1	5
SDA	0401-X004-020	Sulfidation (IS01)	1	5
SDA	0401-X004-060	Sulfidation (IS01)	1	2.5, 5
SDA	0401-X005-010	Sulfidation (IS01)	1	5
SDA	0401-X005-J01	Sulfidation (IS01)	1	3
SDA	0401-X006-010	Sulfidation (IS01)	1	2.5, 5
SDA	0401-X006-020	Sulfidation (IS01)	1	5
SDA	0401-X006-030	Sulfidation (IS01)	1	5
SDA	0401-X006-040	Sulfidation (IS01)	1	2.5, 5
SDA	0401-X007-010	Sulfidation (IS01)	1	5
SDA	0401-X008-040	Sulfidation (IS01)	1	2.5, 5
SDA	0401-X008-J01	Sulfidation (IS01)	1	3
SDA	0401-X008-J02	Sulfidation (IS01)	1	3
SDA	0401-X009-010	Sulfidation (IS01)	2	10
SDA	0401-X009-020	Sulfidation (IS01)	2	2.5, 10
SDA	0401-X010-010	Sulfidation (IS01)	2	2.5, 10
SDA	0401-X010-020	Sulfidation (IS01)	2	2.5, 10
SDA	0401-X010-030	Sulfidation (IS01)	1	5
SDA	0401-X013-010	Sulfidation (IS01)	2	10
SDA	0401-X013-020	Sulfidation (IS01)	2	2.5, 10
SDA	0401-X013-030	Sulfidation (IS01)	2	10
SDA	0401-X015-010	Sulfidation (IS01)	2	2.5, 10
SDA	0401-X015-020	Sulfidation (IS01)	1	2.5, 5
SDA	0401-X015-030	Sulfidation (IS01)	1	5
SDA	0401-X015-040	Sulfidation (IS01)	1	2.5, 5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X002-030	High Temp H2/H2S Corrosion (IS04)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X002-040	High Temp H2/H2S Corrosion (IS04)	1	5

TKC REACT/DISTILL PLT 4/PLT 7	0403-X002-050	High Temp H2/H2S Corrosion (IS04)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X002-060	High Temp H2/H2S Corrosion (IS04)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X002-J01	High Temp H2/H2S Corrosion (IS04)	1	3, 5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X002-J02	High Temp H2/H2S Corrosion (IS04)	1	3, 5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X003-010	High Temp H2/H2S Corrosion (IS04)	1	3, 5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X003-020	High Temp H2/H2S Corrosion (IS04)	1	3, 5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X004-010	High Temp H2/H2S Corrosion (IS04)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X004-020	High Temp H2/H2S Corrosion (IS04)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X021-030	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X030-010	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X030-020	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X030-030	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X032-010	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X032-020	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X032-030	Sulfidation (IS01)	1	5
TKC REACT/DISTILL PLT 4/PLT 7	0403-X032-040	Sulfidation (IS01)	2	10
TKC REACT/DISTILL PLT 4/PLT 7	0403-X032-050	Sulfidation (IS01)	2	10
TKN REACTION PLT 5	0404-X001-070	Sulfidation (IS01)	2	2.5, 10
TKN REACTION PLT 5	0404-X001-080	Sulfidation (IS01)	2	10
TKN REACTION PLT 5	0404-X002-030	High Temp H2/H2S Corrosion (IS04)	1	5
TKN REACTION PLT 5	0404-X003-010	High Temp H2/H2S Corrosion (IS04)	1	5
TKN REACTION PLT 5	0404-X003-020	High Temp H2/H2S Corrosion (IS04)	1	5
TKN REACTION PLT 5	0404-X003-030	High Temp H2/H2S Corrosion (IS04)	1	2.5, 5
TKN REACTION PLT 5	0404-X003-040	High Temp H2/H2S Corrosion (IS04)	1	5

TKN REACTION PLT 5	0404-X007-010	High Temp H2/H2S Corrosion (IS04)	2	10
ISOCRKG REACTION PLT 6	0405-X001-010	Sulfidation (IS01)	2	2.5, 10
ISOCRKG REACTION PLT 6	0405-X002-010	High Temp H2/H2S Corrosion (IS04)	1	2.5, 3, 5
ISOCRKG REACTION PLT 6	0405-X002-020	High Temp H2/H2S Corrosion (IS04)	1	2.5, 5
ISOCRKG REACTION PLT 6	0405-X002-030	High Temp H2/H2S Corrosion (IS04)	1	2.5, 5
ISOCRKG REACTION PLT 6	0405-X003-020	High Temp H2/H2S Corrosion (IS04)	1	5
ISO DIST/GAS RECY PLT 7	0406-X001-020	Sulfidation (IS01)	1	5
ISO DIST/GAS RECY PLT 7	0406-X005-010	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X013-040	Sulfidation (IS01)	1	5
ISO DIST/GAS RECY PLT 7	0406-X013-050	Sulfidation (IS01)	1	5
ISO DIST/GAS RECY PLT 7	0406-X013-060	Sulfidation (IS01)	1	5
ISO DIST/GAS RECY PLT 7	0406-X013-070	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X013-080	Sulfidation (IS01)	1	5
ISO DIST/GAS RECY PLT 7	0406-X015-010	Sulfidation (IS01)	1	5
ISO DIST/GAS RECY PLT 7	0406-X015-020	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X015-030	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X015-040	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X015-050	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X015-060	Sulfidation (IS01)	1	2.5, 5
ISO DIST/GAS RECY PLT 7	0406-X015-070	Sulfidation (IS01)	1	5
LT NEUT H/CRKR PLT 11	0414-X001-040	Sulfidation (IS01)	2	2.5, 5, 10
LT NEUT H/CRKR PLT 11	0414-X001-050	Sulfidation (IS01)	2	2.5, 5, 10
LT NEUT H/CRKR PLT 11	0414-X002-010	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/CRKR PLT 11	0414-X002-020	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/CRKR PLT 11	0414-X002-030	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/CRKR PLT 11	0414-X003-010	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/CRKR PLT 11	0414-X003-020	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/CRKR PLT 11	0414-X005-040	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/CRKR PLT 11	0414-X008-030	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X001-010	High Temp H2/H2S Corrosion (IS04)	1	5

LT NEUT HC DIST PLT 12	0415-X001-020	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X006-010	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X006-020	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X006-050	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X006-060	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X006-070	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X007-010	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X007-020	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X007-030	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X007-040	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X008-010	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X008-020	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X008-030	High Temp H2/H2S Corrosion (IS04)	2	2.5, 10
LT NEUT HC DIST PLT 12	0415-X008-040	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X008-050	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT HC DIST PLT 12	0415-X013-010	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X013-020	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X013-030	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X013-050	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X013-060	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X013-070	High Temp H2/H2S Corrosion (IS04)	2	2.5, 10
LT NEUT HC DIST PLT 12	0415-X014-010	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X014-020	High Temp H2/H2S Corrosion (IS04)	2	10

LT NEUT HC DIST PLT 12	0415-X014-030	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X015-010	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT HC DIST PLT 12	0415-X015-020	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/FINISH PLT 13	0416-X002-030	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/FINISH PLT 13	0416-X002-J01	High Temp H2/H2S Corrosion (IS04)	1	3
LT NEUT H/FINISH PLT 13	0416-X003-010	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/FINISH PLT 13	0416-X003-J01	High Temp H2/H2S Corrosion (IS04)	1	3
LT NEUT H/FINISH PLT 13	0416-X013-030	High Temp H2/H2S Corrosion (IS04)	1	5
LT NEUT H/FINISH PLT 13	0416-X018-010	Sulfidation (IS01)	2	10
LT NEUT H/FINISH PLT 13	0416-X018-020	Sulfidation (IS01)	2	2.5, 10
LT NEUT H/FINISH PLT 13	0416-X018-030	Sulfidation (IS01)	2	10
LT NEUT H/FINISH PLT 13	0416-X018-040	Sulfidation (IS01)	2	2.5, 10
HV NEUT H/CRKR PLT 14	0417-X001-040	High Temp H2/H2S Corrosion (IS04)	2	10
HV NEUT H/CRKR PLT 14	0417-X002-010	High Temp H2/H2S Corrosion (IS04)	1	5
HV NEUT H/CRKR PLT 14	0417-X002-020	High Temp H2/H2S Corrosion (IS04)	1	5
HV NEUT H/CRKR PLT 14	0417-X003-010	High Temp H2/H2S Corrosion (IS04)	1	5
HV NEUT H/CRKR PLT 14	0417-X003-020	High Temp H2/H2S Corrosion (IS04)	1	5
HV NEUT H/CRKR PLT 14	0417-X004-010	High Temp H2/H2S Corrosion (IS04)	1	5
HV NEUT H/CRKR PLT 14	0417-X009-040	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X006-010	Sulfidation (IS01)	1	2.5, 5
HV NEUT HC DIST PLT 15	0418-X006-020	Sulfidation (IS01)	1	2.5, 5
HV NEUT HC DIST PLT 15	0418-X006-050	Sulfidation (IS01)	2	2.5, 10
HV NEUT HC DIST PLT 15	0418-X006-060	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X006-070	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X006-080	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X007-030	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X007-040	Sulfidation (IS01)	1	5

HV NEUT HC DIST PLT 15	0418-X008-010	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X008-020	Sulfidation (IS01)	1	2.5, 5
HV NEUT HC DIST PLT 15	0418-X008-030	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X008-040	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X014-010	Sulfidation (IS01)	2	10
HV NEUT HC DIST PLT 15	0418-X014-020	Sulfidation (IS01)	2	2.5, 10
HV NEUT HC DIST PLT 15	0418-X015-010	Sulfidation (IS01)	2	10
HV NEUT HC DIST PLT 15	0418-X015-020	Sulfidation (IS01)	2	2.5, 10
HV NEUT HC DIST PLT 15	0418-X015-030	Sulfidation (IS01)	2	10
HV NEUT HC DIST PLT 15	0418-X016-010	Sulfidation (IS01)	2	10
HV NEUT HC DIST PLT 15	0418-X016-020	Sulfidation (IS01)	1	5
HV NEUT HC DIST PLT 15	0418-X016-030	Sulfidation (IS01)	2	10
HC NEW H/C FINISH PLT 16	0419-X002-030	High Temp H2/H2S Corrosion (IS04)	1	5
HC NEW H/C FINISH PLT 16	0419-X003-020	High Temp H2/H2S Corrosion (IS04)	1	5
HC NEW H/C FINISH PLT 16	0419-X009-020	High Temp H2/H2S Corrosion (IS04)	1	5
HC NEW H/C FINISH PLT 16	0419-X009-030	High Temp H2/H2S Corrosion (IS04)	1	5
HC NEW H/C FINISH PLT 16	0419-X013-010	Sulfidation (IS01)	1	5
HC NEW H/C FINISH PLT 16	0419-X013-020	Sulfidation (IS01)	1	2.5, 5
HC NEW H/C FINISH PLT 16	0419-X013-030	Sulfidation (IS01)	1	5
HC NEW H/C FINISH PLT 16	0419-X017-010	Sulfidation (IS01)	2	10
HC NEW H/C FINISH PLT 16	0419-X017-020	Sulfidation (IS01)	2	10
HC NEW H/C FINISH PLT 16	0419-X023-010	Sulfidation (IS01)	2	10
HC NEW H/C FINISH PLT 16	0419-X023-020	Sulfidation (IS01)	2	2.5, 10
LT NEUT H/F DIST PLT 17	0420-X001-010	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X001-020	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X001-030	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X001-040	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X004-010	High Temp H2/H2S Corrosion (IS04)	2	10

LT NEUT H/F DIST PLT 17	0420-X004-020	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X004-030	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X005-010	High Temp H2/H2S Corrosion (IS04)	2	10
LT NEUT H/F DIST PLT 17	0420-X005-020	High Temp H2/H2S Corrosion (IS04)	2	10
GAS RCY UNIT PLT 19	0422-X030-010	Sulfidation (IS01)	2	2.5, 10
GAS RCY UNIT PLT 19	0422-X030-020	Sulfidation (IS01)	2	10
0441 HYDROGEN PLANT – TRAIN 1 SOUTH	0441-X001-020	Sulfidation (IS01)	2	3, 10
0441 HYDROGEN PLANT – TRAIN 1 SOUTH	0441-X001-030	Sulfidation (IS01)	2	10
0442 HYDROGEN PLANT – TRAIN 2 NORTH	0442-X001-020	Sulfidation (IS01)	2	3, 10
0442 HYDROGEN PLANT – TRAIN 2 NORTH	0442-X001-030	Sulfidation (IS01)	2	10
JET HYDROTREATER (JHT) PLT 2	0950-X026-010	High Temp H2/H2S Corrosion (IS04)	1	5
JET HYDROTREATER (JHT) PLT 2	0950-X026-060	High Temp H2/H2S Corrosion (IS04)	1	5
JET HYDROTREATER (JHT) PLT 2	0950-X026-070	High Temp H2/H2S Corrosion (IS04)	1	5
NO 5 NAPHTHA HYDROTREATER PLT 4	0951-X004-010	High Temp H2/H2S Corrosion (IS04)	1	5
NO 5 NAPHTHA HYDROTREATER PLT 4	0951-X005-010	High Temp H2/H2S Corrosion (IS04)	1	5
4 CRUDE UNIT PLT 11	0955-X003-080	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X003-090	Sulfidation (IS01)	1	2.5, 5
4 CRUDE UNIT PLT 11	0955-X004-030	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X004-040	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X004-050	Sulfidation (IS01)	1	1, 5
4 CRUDE UNIT PLT 11	0955-X004-060	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X004-070	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X012-010	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X012-030	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X012-040	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X012-080	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X014-010	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X014-020	Sulfidation (IS01)	2	10
4 CRUDE UNIT PLT 11	0955-X014-030	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X014-040	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X015-010	Sulfidation (IS01)	1	5

4 CRUDE UNIT PLT 11	0955-X015-020	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X015-050	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X015-060	Sulfidation (IS01)	2	10
4 CRUDE UNIT PLT 11	0955-X016-010	Sulfidation (IS01)	1	2.5, 5
4 CRUDE UNIT PLT 11	0955-X016-020	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X017-010	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X017-020	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X017-030	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X017-040	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X017-050	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X017-J01	Sulfidation (IS01)	1	3, 5
4 CRUDE UNIT PLT 11	0955-X020-010	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X020-020	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X021-010	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X021-020	Sulfidation (IS01)	1	2.5, 5
4 CRUDE UNIT PLT 11	0955-X021-040	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X021-050	Sulfidation (IS01)	1	2.5, 5
4 CRUDE UNIT PLT 11	0955-X021-090	Sulfidation (IS01)	2	10
4 CRUDE UNIT PLT 11	0955-X022-010	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X022-020	Sulfidation (IS01)	1	2.5, 5
4 CRUDE UNIT PLT 11	0955-X022-030	Sulfidation (IS01)	1	5
4 CRUDE UNIT PLT 11	0955-X022-040	Sulfidation (IS01)	2	10
DIESEL HYDROTREATER (DHT) PLT 16	0956-X002-020	High Temp H ₂ /H ₂ S Corrosion (IS04)	1	5
DIESEL HYDROTREATER (DHT) PLT 16	0956-X002-030	High Temp H ₂ /H ₂ S Corrosion (IS04)	1	5
DIESEL HYDROTREATER (DHT) PLT 16	0956-X003-010	High Temp H ₂ /H ₂ S Corrosion (IS04)	1	5
GAS HYDROTREATER PLANT (GHT) 16.7	0963-X005-020	High Temp H ₂ /H ₂ S Corrosion (IS04)	1	5
GAS HYDROTREATER PLANT (GHT) 16.7	0963-X006-010	High Temp H ₂ /H ₂ S Corrosion (IS04)	1	5
GAS HYDROTREATER PLANT (GHT) 16.7	0963-X006-020	High Temp H ₂ /H ₂ S Corrosion (IS04)	1	5

ATTACHMENT 5
Reliability Program Update for Condition IV.D

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
RELIABILITY PROGRAM § IV.D REPORT**

December 12, 2019

**LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804**

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with section IV.D of Appendix 4.13-PROG – Modernization Project Reliability Program, which provides:

Chevron shall provide annual reports to the City summarizing the PHAs/revalidated PHAs completed during the preceding calendar year to account for consideration of damage mechanisms, and shall include a list of fixed equipment inspection recommendations submitted for each turnaround, indicating which recommendations were accepted, and for those that were not accepted, the reason the recommendation was rejected. All PHAs shall be available for agency review pursuant to the terms of the RISO.

As reported in the 2017 IV.D report, pursuant to sections 4.13-4a, 4.13-7a, and 4.13-7b of the Monitoring Mitigation and Reporting Program (MMRP) and section IV.C of the Reliability Program prepared for the Refinery Modernization Project (Project), Process Hazard Analyses (PHAs), inclusive of inherently safer systems analyses (ISSAs), damage mechanism reviews (DMRs) and layers of protection analyses (LOPAs), were completed or revalidated for the following Project components in 2016:

- New Hydrogen Plant
- Modification to the FCC FHT (also referred to as the TKC)
- Modifications to the Sulfur Recovery Units (SRU)
- New No. 6 H₂S Plant
- Hydrogen Compressor Upgrade project (HYCUP)

Chevron informed the City and CCHS of the availability of the PHAs and related materials via letter dated October 7, 2016. The PHAs and related materials from the Hydrogen Plant, TKC modifications, and No. 6 H₂S Plant were reviewed by Contra Costa Health Services during an on-site visit and review of MMRP and Reliability Program requirements in August 2016. The PHA and related materials for the SRU modifications and HYCUP are available for review by the City and CCHS at the Refinery.

As previously stated in the 2018 report, reviews and updates were made to PHAs, ISSAs, DMRs, and LOPAs (or regulatory equivalent) for the following Project components in 2018:

- New Hydrogen Plant
- Modifications to TKC
- Hydrogen Compressor Upgrade project (HYCUP)
- Modifications to SRUs
- New 6H₂S unit

The PHAs and related materials were reviewed by CCHS during on-site visits in May and August 2018, and CCHS verified that conditions MM 4.13-4a, MM 4.13-7a, MM 4.13-7b, and IV.C have been satisfied for purposes of commencement of Project operations. The documents are available for further review by the City and CCHS at the Refinery. No PHAs/PHA revalidations were required since the CCHS on-site visit in August 2018.

In the preceding year, planned turnarounds were completed at the TKC, as well as both SRU #1 and #2 Trains. A list of fixed equipment inspection recommendations for turnarounds is available for review by the City and CCHS at the Refinery.

ATTACHMENT 6
Reliability Program Report IV.F.2

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
RELIABILITY PROGRAM § IV.F.2 REPORT**

2020

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Chevron U.S.A. Inc. (“CUSA” or “the Company”) submits this report to comply with section IV.F.2 of Appendix 4.13-PROG – Modernization Project Reliability Program, which provides:

Following commencement of Project operations, Chevron shall provide the City an annual report informing the City of any agency-initiated audits performed pursuant to the Richmond Industrial Safety Ordinance during the previous calendar year, and shall update the City concerning the findings from and status of implementation of any recommendation that come out of such audits.

In 2019, Contra Costa Health Services (CCHS) performed a Richmond Industrial Safety Ordinance audit at the Richmond Refinery from June 3 – July 2, 2019. The final report, including findings and status of implementation of recommendations, is published and maintained at the Refinery and can be made available upon request.

ATTACHMENT 7
Reliability Program Update for Condition IV.G

Falvey, Shauna K

From: Falvey, Shauna K
Sent: Thursday, August 13, 2020 2:58 PM
To: Lina Velasco
Cc: Demcsak, Ashley
Subject: 2020 Community and Employee Town Halls

Hi Lina,

Pursuant to Section IV.G of the Modernization Project Reliability Program (Program) and Condition G1 of the Conditional Use Permit PLN-11-089, Chevron committed to hold town halls for its workforce and for the community on an annual basis to provide updates concerning:

1. The status of the enhanced safety measures being implemented by the Refinery following the August 6, 2012 fire, including actions taken to implement the recommendations made by public agencies that investigated the August 6 incident.
2. The status and/or results of the material upgrades, inspection and monitoring program, and ongoing compliance with the Richmond Industrial Safety Ordinance, including Project-related PHAs, DMRs, LOPAs, and ISSAs.
3. When triggered, the results of the reliability review revalidation and the status of any recommendations made as a result of this review.

This email provides an update concerning Chevron's compliance with this obligation for 2020. Note that these events were delayed due to the Covid-19 pandemic and associated logistical challenges.

On Wednesday, August 12, 2020, the Refinery held a telephone town hall regarding the Modernization Project and the status of enhanced safety measures and implementation of the Program. Participants from Chevron included Paul Meline, Lily Rahnema and me. The call initiating the Town Hall was broadcast to 9,954 phone numbers in Richmond. The event was promoted via a Facebook marketing campaign that reached 843 people. 1,185 total residents accepted the phone call for the event, and peak participation was 517. Three questions were submitted by the public and answered live.

Chevron's presentation specifically addressed the status of the enhanced safety measures being implemented by the Refinery following the August 6, 2012 fire, including actions taken to implement the recommendations made by public agencies that investigated the August 6 incident. We also provided an update concerning the status and/or results of the material upgrades, inspection and monitoring program, and ongoing compliance with the Richmond Industrial Safety Ordinance, including Project-related PHAs, DMRs, LOPAs, and ISSAs. Item 3 above was not addressed because a reliability review revalidation as not yet been required. The complete transcript, including poll results, of the Town Hall is not yet available, but will be provided as soon as possible.

Additionally, on Wednesday, August 5, 2020, I presented to Refinery employees during our weekly Refinery-wide call to share the same information presented at the Community Town Hall. Employees were able to submit questions throughout the presentation, and contact information and additional resources were provided for employees seeking more information.

Please let me know if you have any questions.

Thank you,

Shauna Falvey

Environmental Specialist

ShaunaFalvey@Chevron.com

Chevron Richmond Refinery

Tel 510 242 2942

Mobile 661 334 0962

ATTACHMENT 7

Modernization MM 4.13-13a Pre-Operations Report

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM, SECTION 4.13-13a
PRE-OPERATIONS REPORT**

August 13, 2018

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

Introduction

The Chevron Richmond Refinery (“CUSA”) submits this report to comply with the pre-operation reporting requirement in mitigation measure (“MM”) 4.13-13a of the Richmond Modernization Project Mitigation Monitoring and Reporting Program. MM 4.13-13a provides:

Prior to restarting construction of the Modernization Project, and again prior to commencement of Project operations, Chevron shall submit to the City a report describing the status of its compliance with all corrective action measures (including, but not limited to, compliance with probationary terms) imposed or agreed to as a result of the agency proceedings relating to the August 6, 2012 fire. As part of this report, Chevron shall describe its ongoing consultations with the agencies that investigated the August 6, 2012 fire, including Cal/OSHA, the CSB, and Contra Costa County, including any feedback or direction that has been provided by those agencies concerning implementation of the corrective action and agency recommendations and Chevron’s response thereto.

CUSA has previously submitted reports to comply with MM 4.13-13d updating the City concerning the corrective actions taken by CUSA to address recommendations from the U.S. Chemical Safety Board (“CSB”), as well as in response to CUSA’s own investigation. The most recent report, which was submitted on July 3, 2018 and is attached hereto, describes the status of compliance with corrective actions taken to implement agency recommendations and corrective actions implemented by CUSA in response to its own investigation.

This report updates the City concerning CUSA’s ongoing consultations with the California Department of Industrial Relations, Division of Occupational Safety and Health (“Cal/OSHA”), as well as CUSA’s ongoing implementation of the terms and conditions of probation in the case of *People v. Chevron U.S.A. Inc.*, No. 162745-4 (Cal. Sup. Ct, Aug. 5, 2013).

Cal/OSHA

In an Aug. 22, 2016 email from Clyde Trombettas of Cal-OSHA to Lina Velasco of the City of Richmond, Mr. Trombettas confirmed that, “... Chevron has abated both sets of citations, addressed Cal/OSHA’s concerns regarding any related hazards, and that I am satisfied with the proof of abatement”. No further action is necessary.

***People v. Chevron U.S.A. Inc.*, No. 162745-4 (Cal. Sup. Ct, Aug. 5, 2013)**

Pursuant to the conditions of probation, the probationary period ended in February 2017. During the probationary period, Chevron did not receive any notices from the State or Cal/OSHA that Chevron was in violation of any term of probation.

ATTACHMENT 8

Monthly Local Hire Reports
Operational Year 2019

Attachment 8

2019 Monthly Local Hire Reports



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modernization project monthly hires report

chevron richmond refinery
January 2019

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Table 8: Total Engineers/Project Team Modernization Hires.....	8

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1 purpose

In accordance with the Local Content Agreement and Environmental and Community Investment Agreement dated August 4, 2014, for the Richmond Refinery Modernization Project, Chevron U.S.A. Inc. ("CUSA") is providing this monthly update on local hiring.

2 training and workforce readiness programs

Chevron continues to support programs to train residents of Richmond and unincorporated North Richmond for work at the Richmond Refinery and on the Modernization Project.

3 local hiring

Chevron continues to work with construction contractors and non-construction suppliers in attempt to employ Richmond residents on the Modernization Project. Section 4. A. (3) (c) of the ECIA states, "The requirements of sections (a) and (b) shall not apply to hours of work performed by residents of states other than the State of California, and such hours shall not be considered determining satisfaction of percentage requirements described herein.". Therefore, the following metrics are for the State of California.

3.1 Metrics

Below are the ECIA, Section 4. A. (3) (b) metrics for the State of California.

Table 1: Modernization Hires

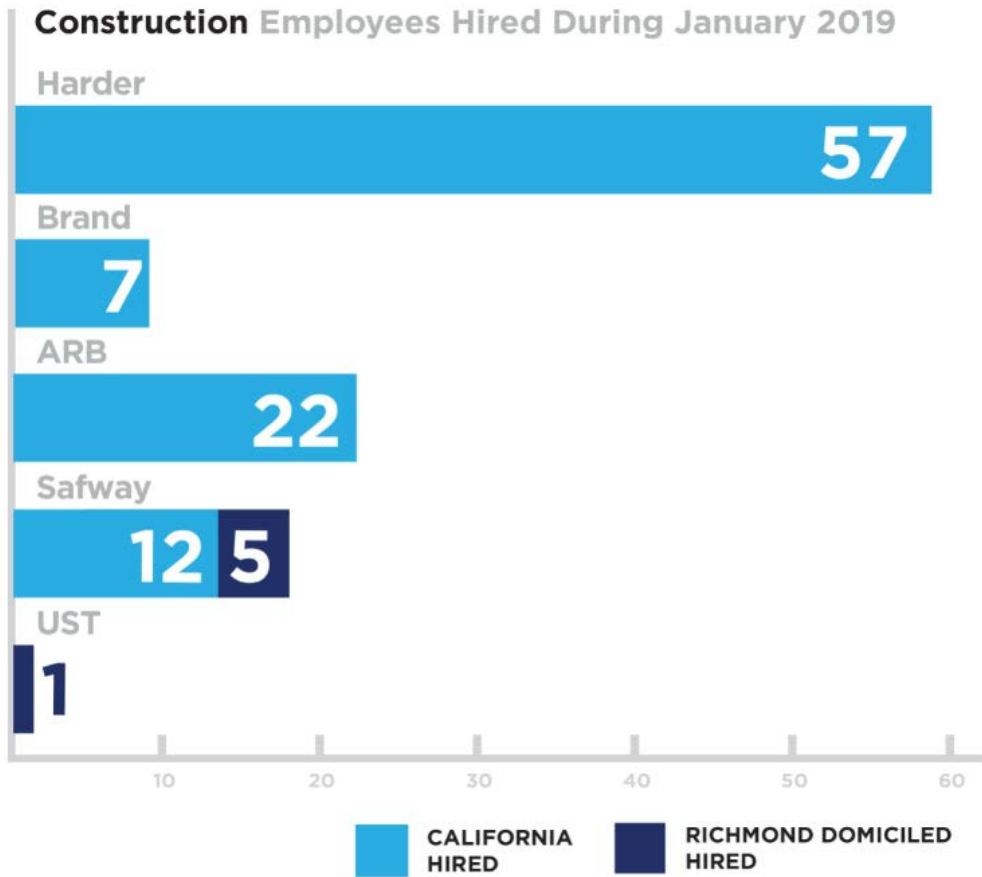


Table 2: Percentage Richmond Domiciled Modernization Hires

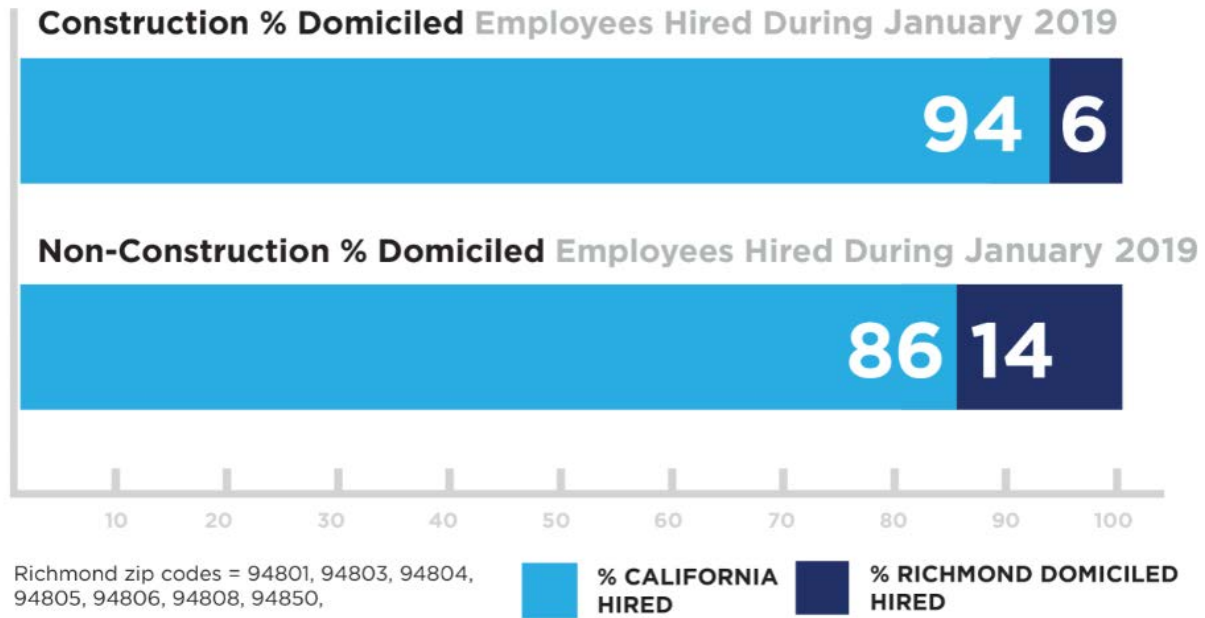


Table 3: Modernization Project Jobs

Modernization Project Job Descriptions

 5 boilermaker 2 foreman 3 journeyman	 67 fitter 19 general foreman 32 journeyman 16 apprentice	 7 laborer 2 foreman 5 journeyman	 18 carpenter 12 journeyman 6 apprentice	 6 painter 3 journeyman 3 apprentice	
 2 quality control	 1 purchasing	 1 ironworker 1 journeyman	 2 safety manager	 1 superintendent	 1 project controls

Table 4: Wage Bill



Table 5: Community Programs

Community Programs

\$31,000,000

Contributions to date (Of \$90 million total investment over 10 years)



richmond promise



solar one



job training



**greenhouse gas
reduction**



public safety programs



**competitive grant
program**



free internet access

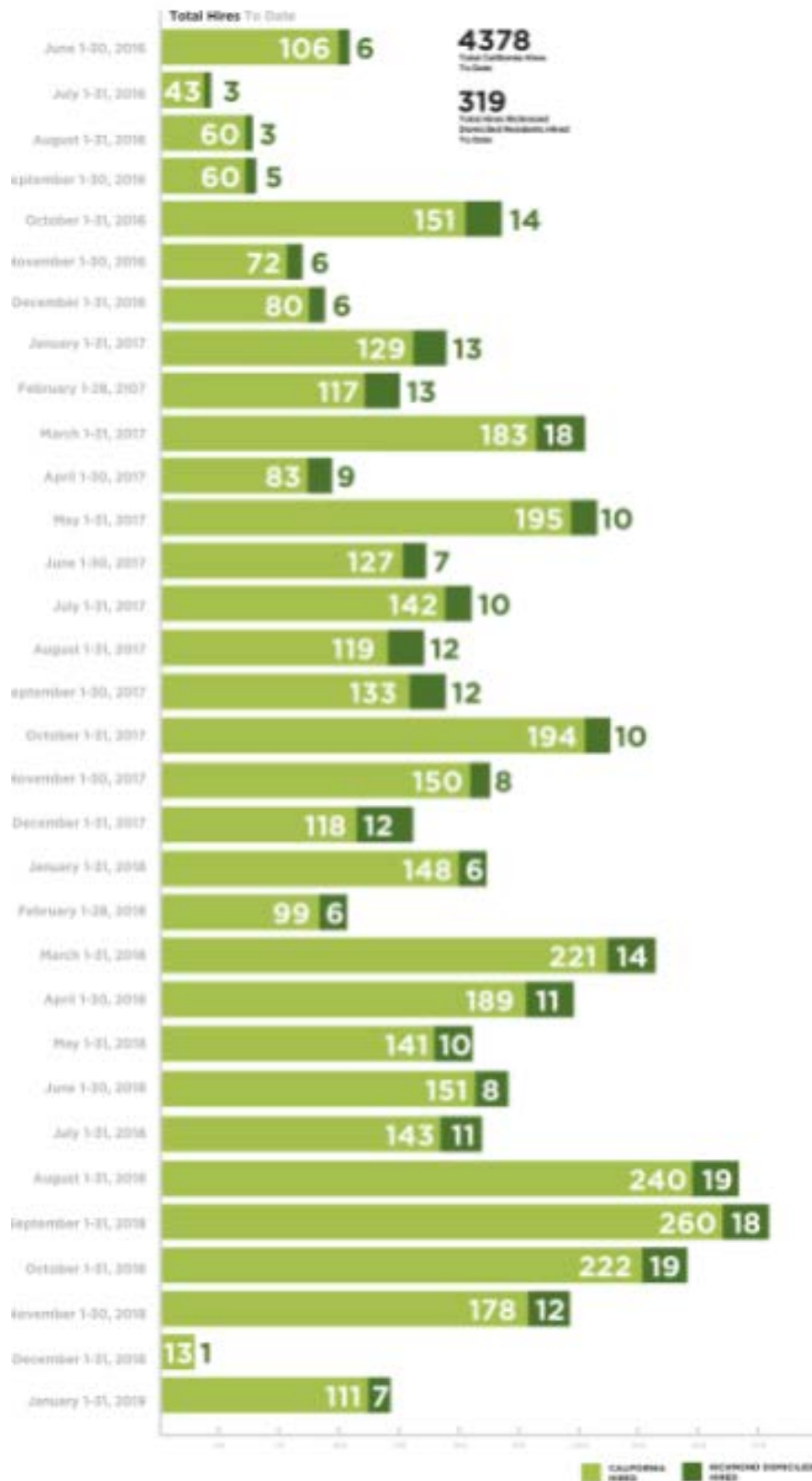
Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



Table 8: Total Modernization Hires





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modernization project monthly hires report

chevron richmond refinery
February 2019

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2 training and workforce readiness programs

Chevron continues to support programs to train residents of Richmond and unincorporated North Richmond for work at the Richmond Refinery and on the Modernization Project.

3 local hiring

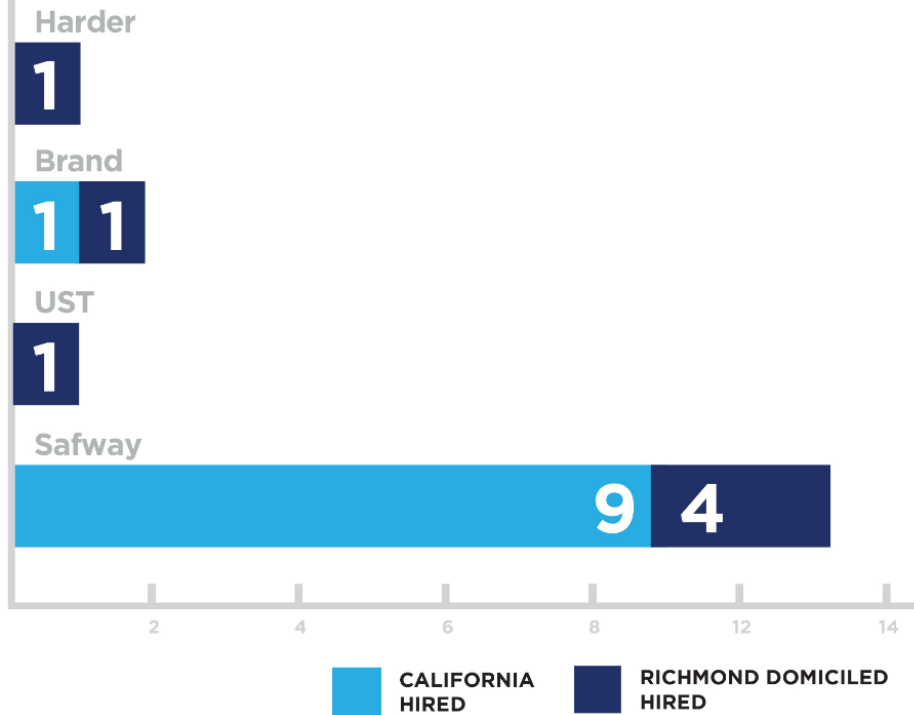
Chevron continues to work with construction contractors and non-construction suppliers in attempt to employ Richmond residents on the Modernization Project. Section 4. A. (3) (c) of the ECIA states, "The requirements of sections (a) and (b) shall not apply to hours of work performed by residents of states other than the State of California, and such hours shall not be considered determining satisfaction of percentage requirements described herein.". Therefore, the following metrics are for the State of California.

3.1 Metrics

Below are the ECIA, Section 4. A. (3) (b) metrics for the State of California.

Table 1: Modernization Hires

Construction Employees Hired During February 2019



Construction Employees Hired During February 2019



Non-Construction Employees Hired During February 2019



Richmond zip codes = 94801, 94803, 94804, 94805, 94806, 94808, 94850,

CALIFORNIA HIRED (light blue) RICHMOND DOMICILED HIRED (dark blue)

Table 2: Percentage Richmond Domiciled Modernization Hires

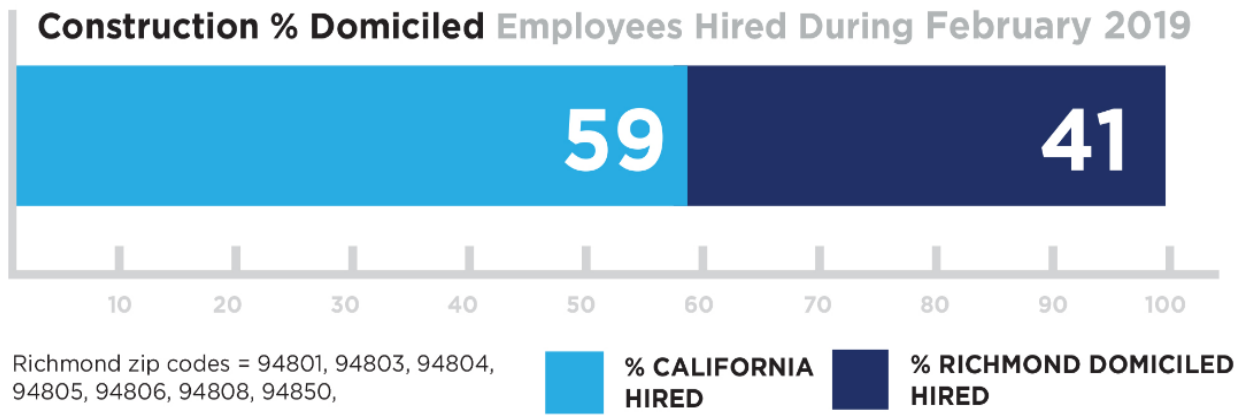


Table 3: Modernization Project Jobs

Modernization Project Job Descriptions

 5 boilermaker 2 foreman 3 journeyman	 67 fitter 19 general foreman 32 journeyman 16 apprentice	 7 laborer 2 foreman 5 journeyman	 18 carpenter 12 journeyman 6 apprentice	 6 painter 3 journeyman 3 apprentice	
 2 quality control	 1 purchasing	 1 ironworker 1 journeyman	 2 safety manager	 1 superintendent	 1 project controls

Table 4: Wage Bill



These amounts are for all our core construction contractors, primary subcontractors and non-construction contractors which includes Richmond Domiciled and California hires from June 2016 to the current reporting month.

Table 5: Community Programs

Community Programs

\$31,000,000

Contributions to date (Of \$90 million total investment over 10 years)



richmond promise



solar one



job training



**greenhouse gas
reduction**



public safety programs



**competitive grant
program**



free internet access

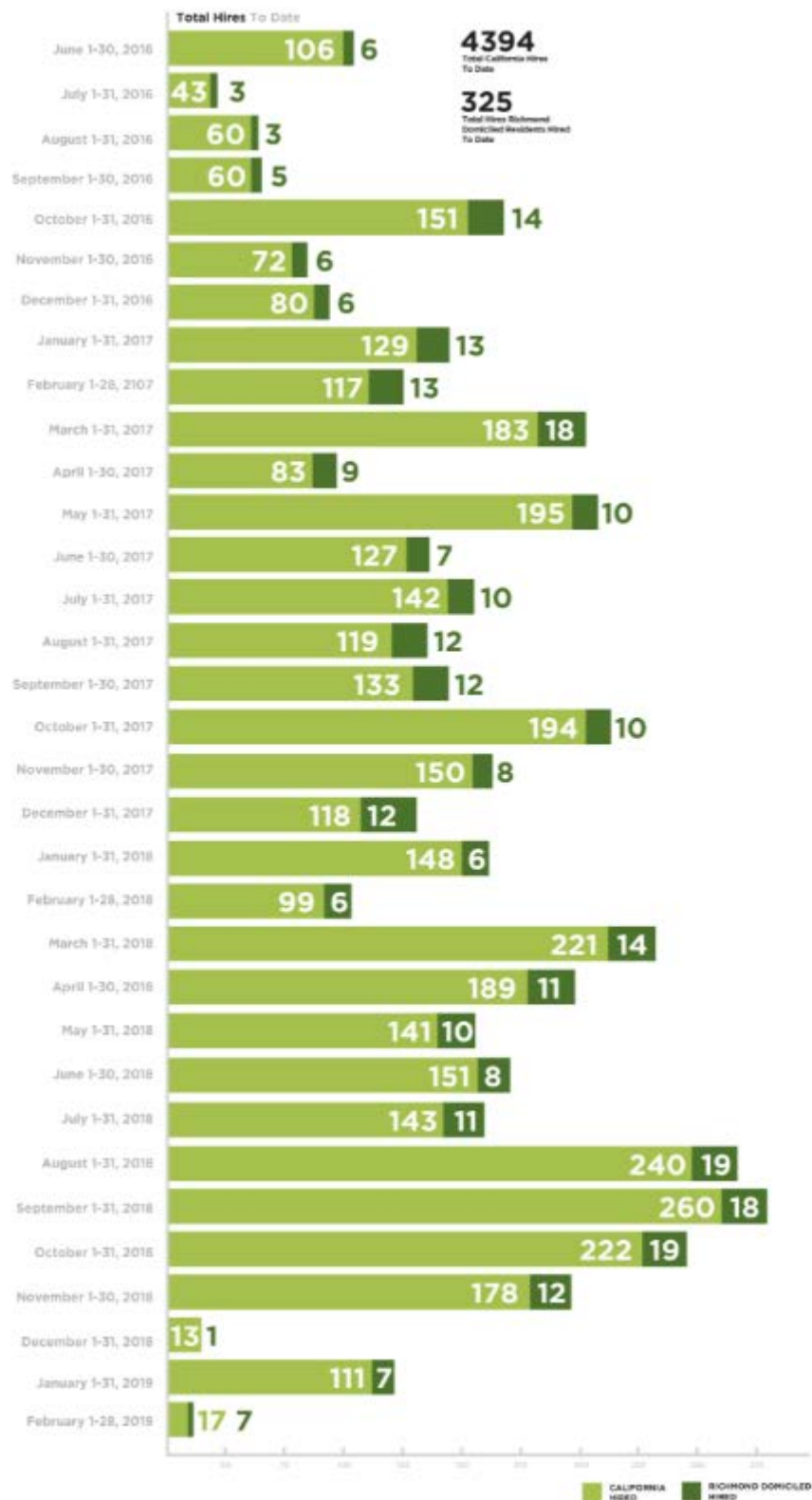
Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



Table 8: Total Modernization Hires





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March 2019

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3.1 Metrics

Below are the ECIA, Section 4. A. (3) (b) metrics for the State of California.

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Table 2: Percentage Richmond Domiciled Modernization Hires



Table 3: Modernization Project Jobs

Modernization Project Job Descriptions

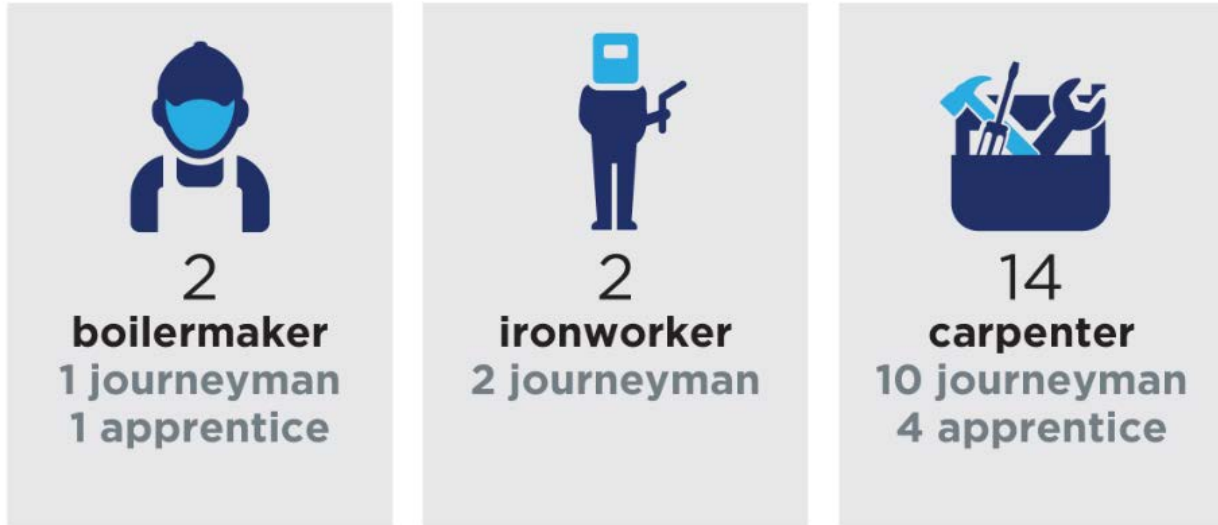


Table 4: Wage Bill



Table 5: Community Programs

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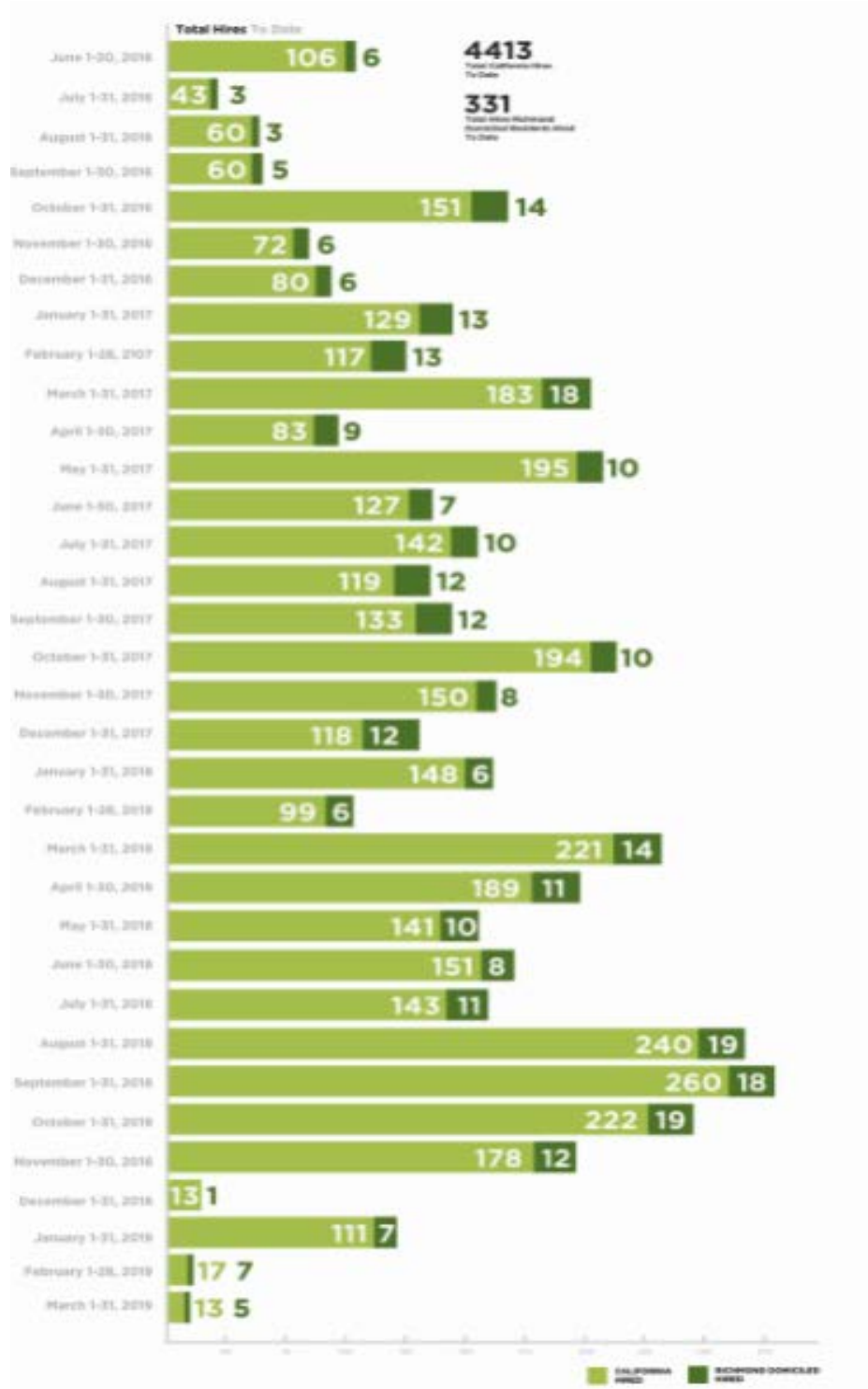
Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



Table 8: Total Modernization Hires





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April 2019

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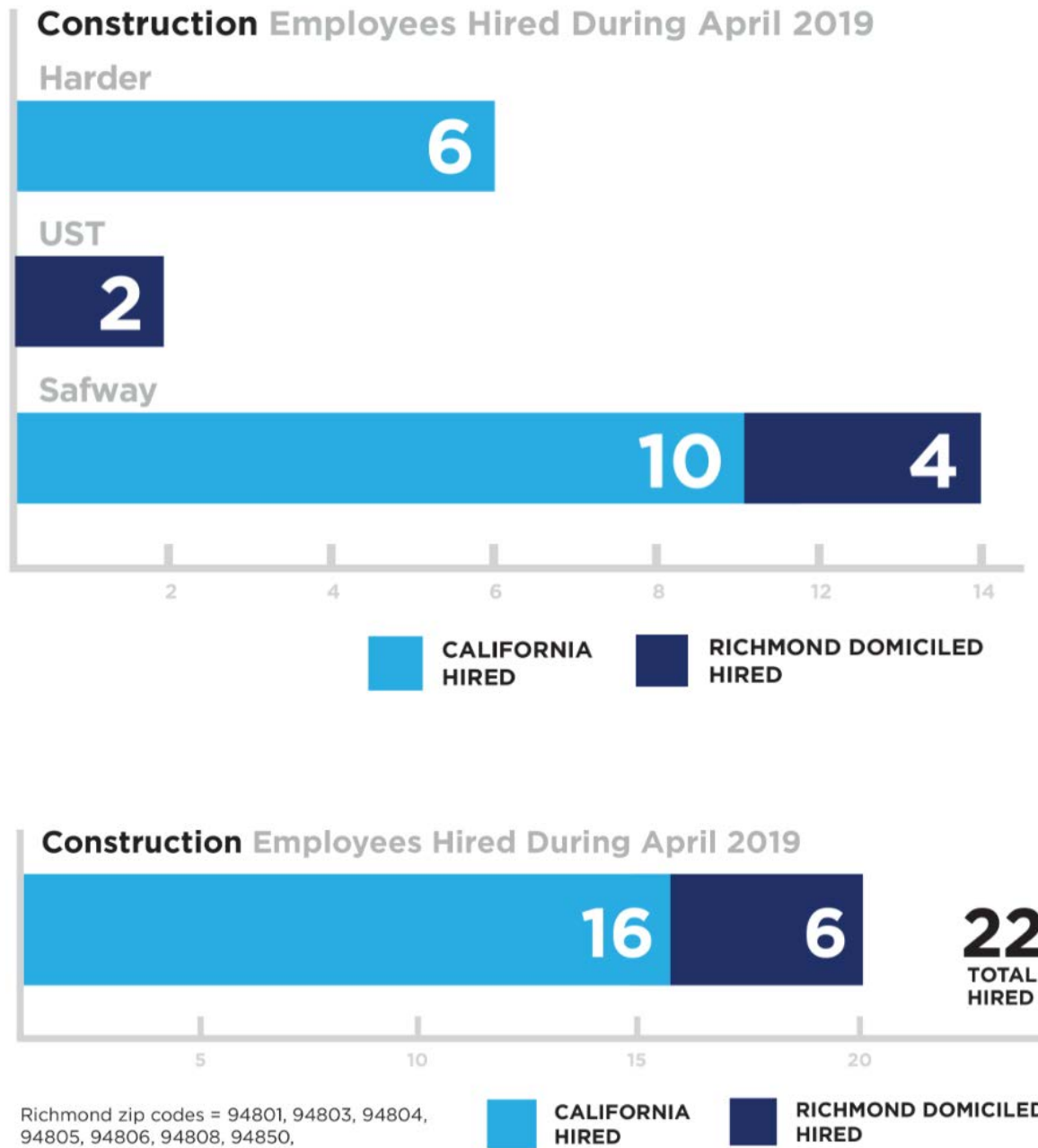


Table 2: Percentage Richmond Domiciled Modernization Hires



Table 3: Modernization Project Jobs

Modernization Project Job Descriptions

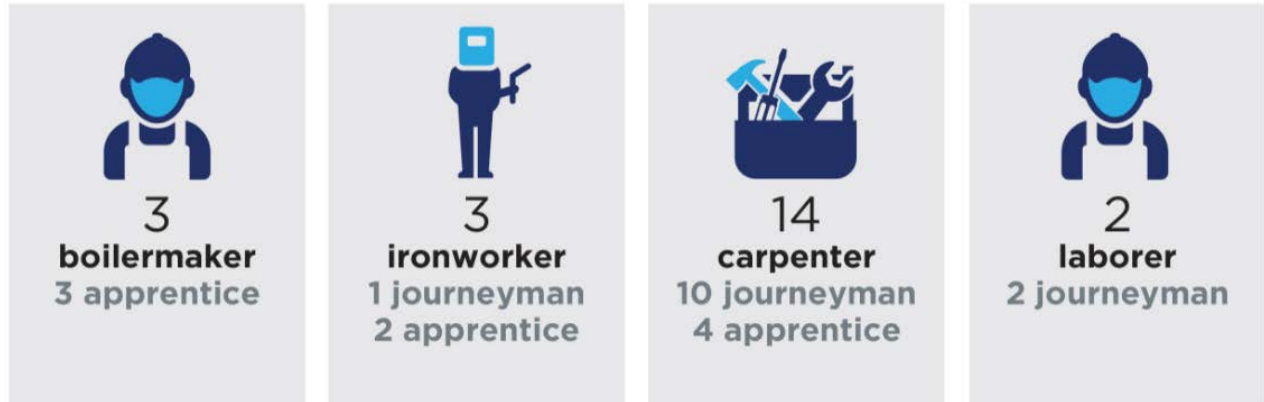


Table 4: Wage Bill

Table 4: Wage Bill



Table 5: Community Programs

Community Programs

\$31,000,000

Contributions to date (Of \$90 million total investment over 10 years)



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job training



**greenhouse gas
reduction**



public safety programs



**competitive grant
program**



free internet access

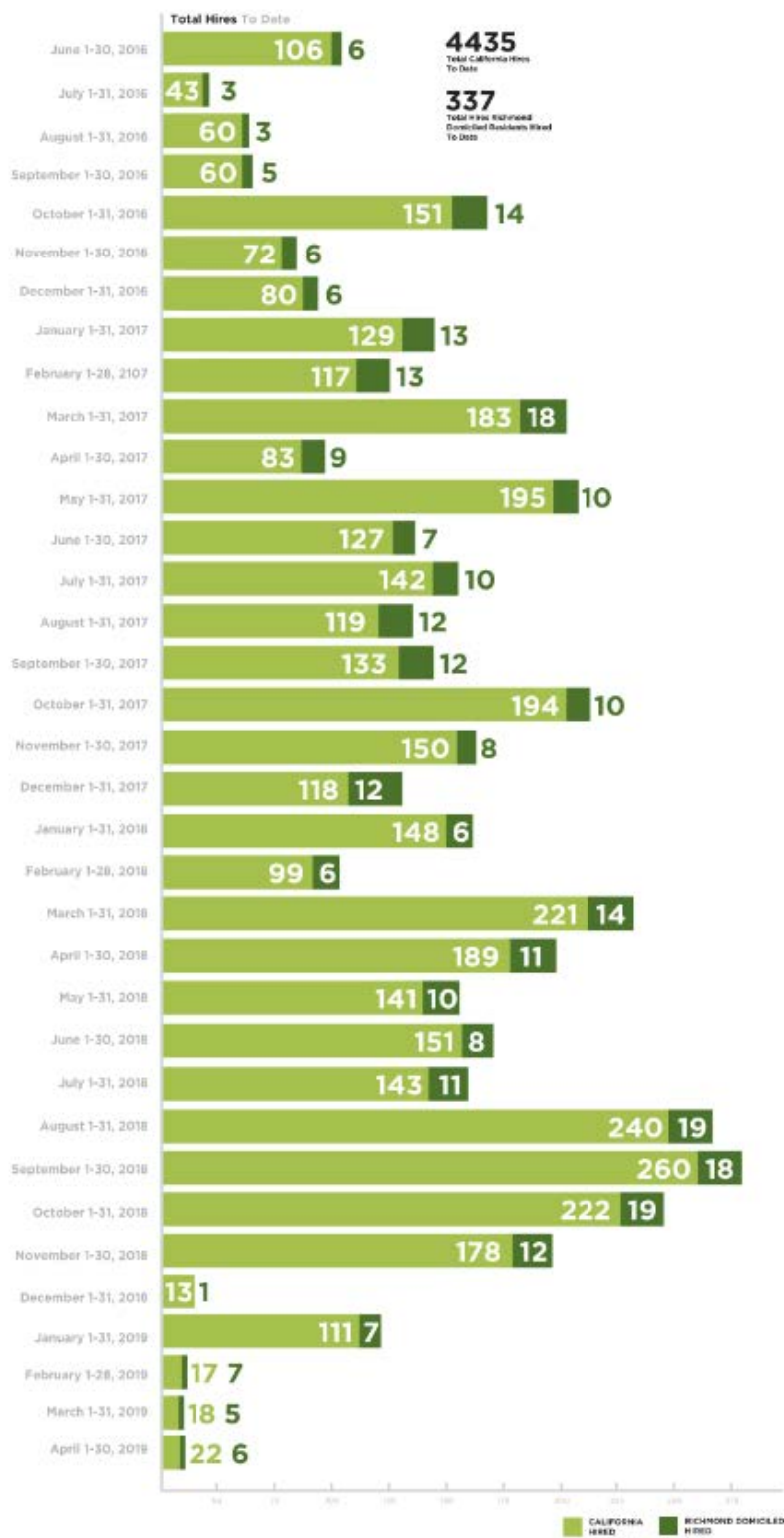
Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



Table 8: Total Modernization Hires





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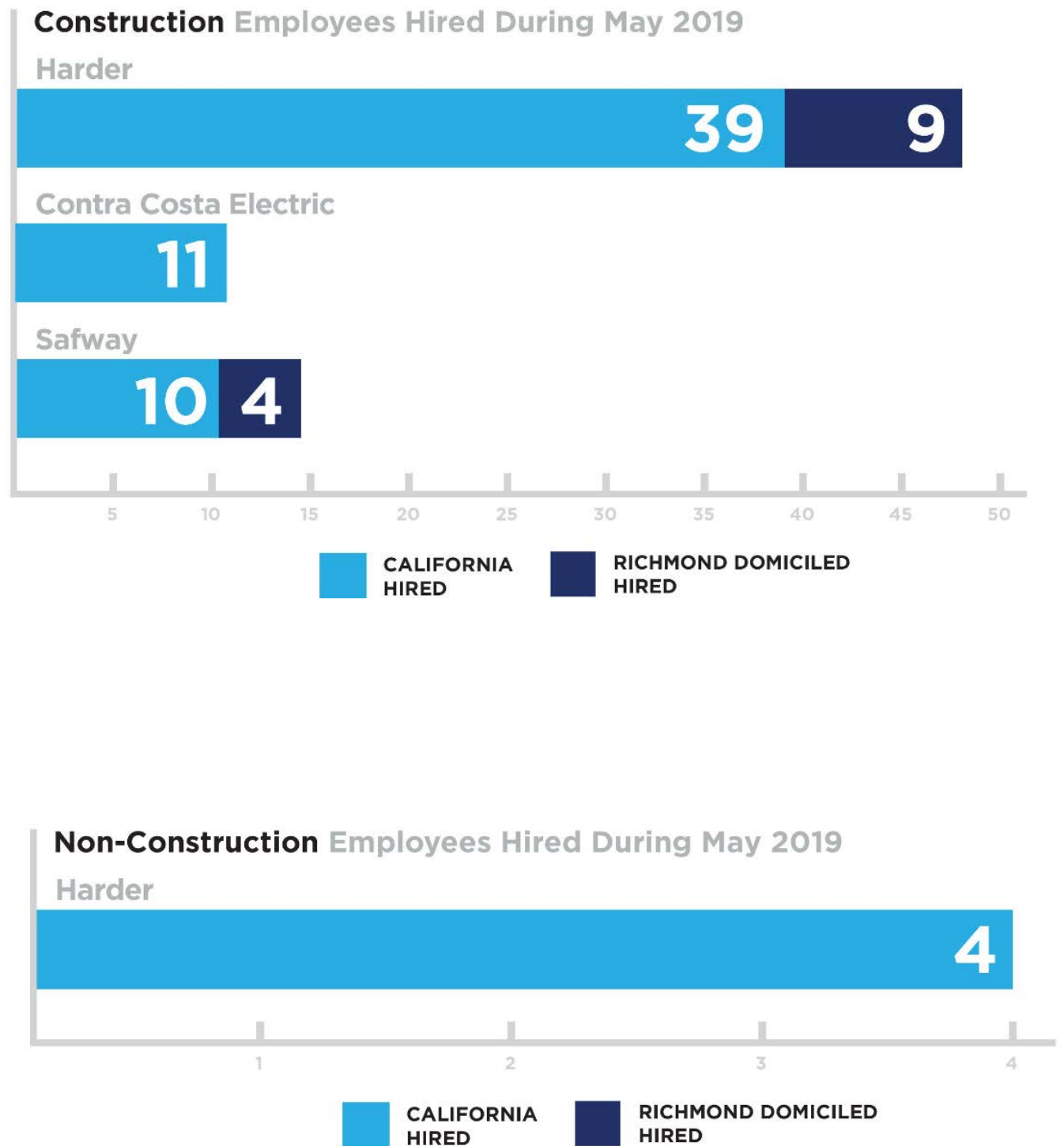


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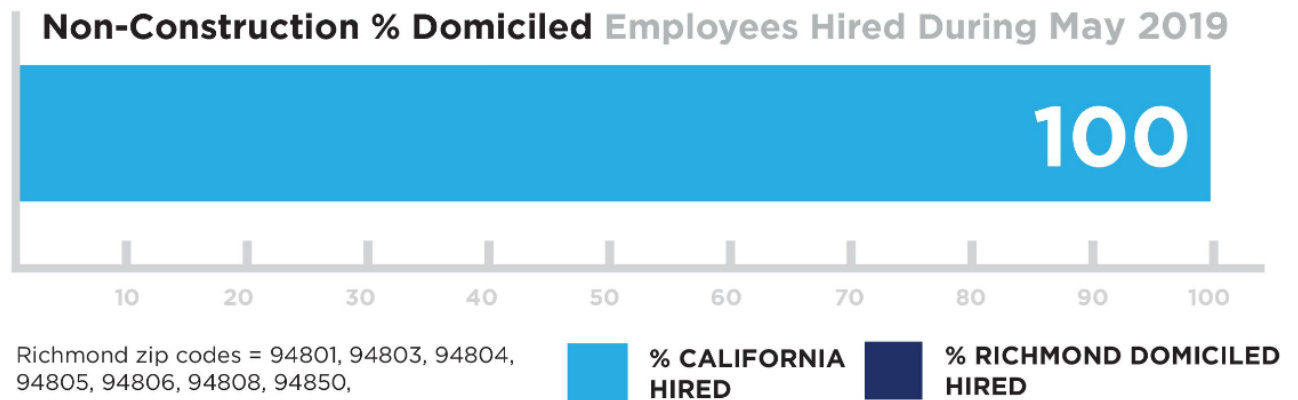
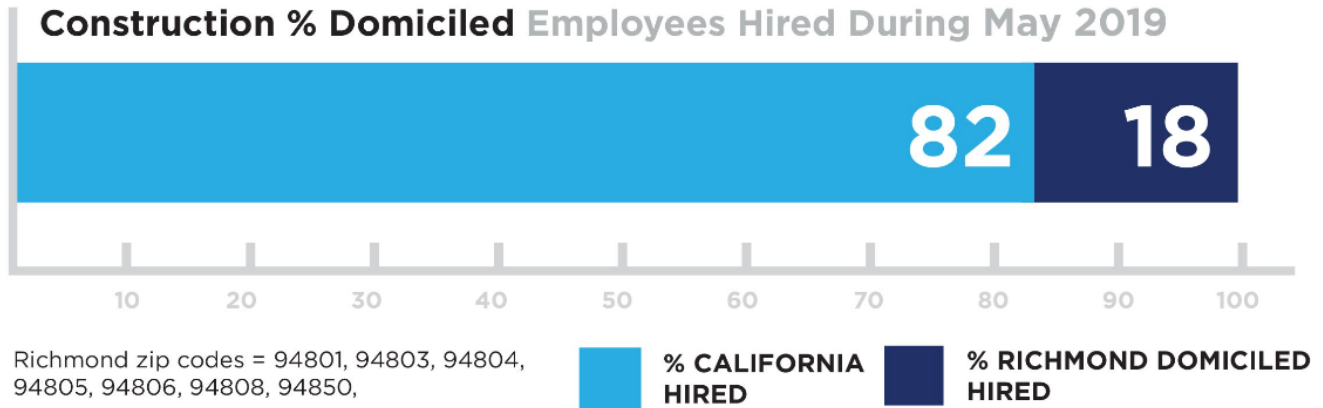


Table 3: Modernization Project Jobs

 12 boilermaker 9 journeyman 3 apprentice	 8 electrician 8 journeyman	 27 laborer 25 journeyman 2 apprentice	 14 carpenter 10 journeyman 4 apprentice	 11 fitter 3 journeyman 8 apprentice
 1 operator 1 journeyman	 2 engineer/technician	 1 quality control	 1 document control	

Table 4: Wage Bill



Table 5: Community Programs

Community Programs

\$48,000,000

Contributions to date (Of \$90 million total investment over 10 years)



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solar one



job training



**greenhouse gas
reduction**



public safety programs



**competitive grant
program**



free internet access

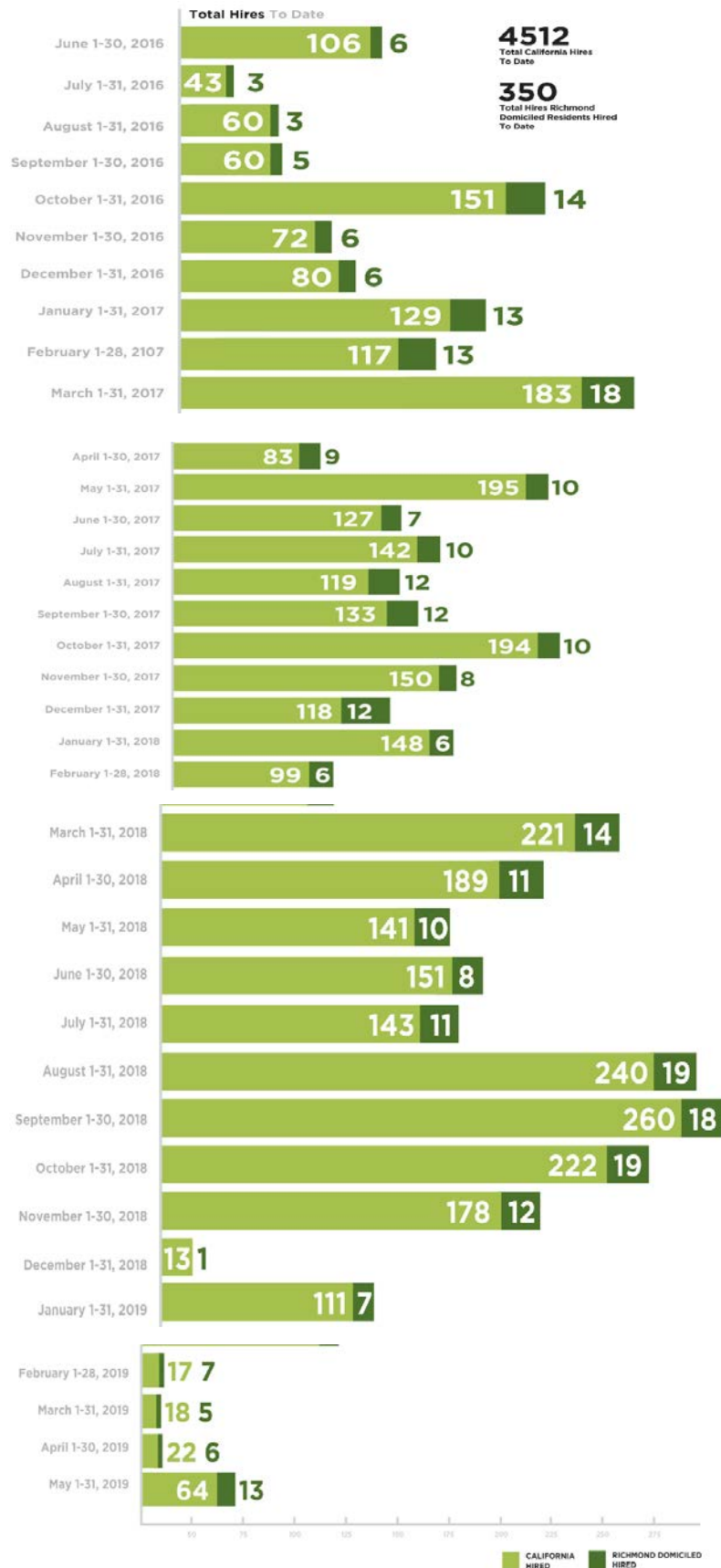
Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



Table 8: Total Modernization Hires





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June 2019

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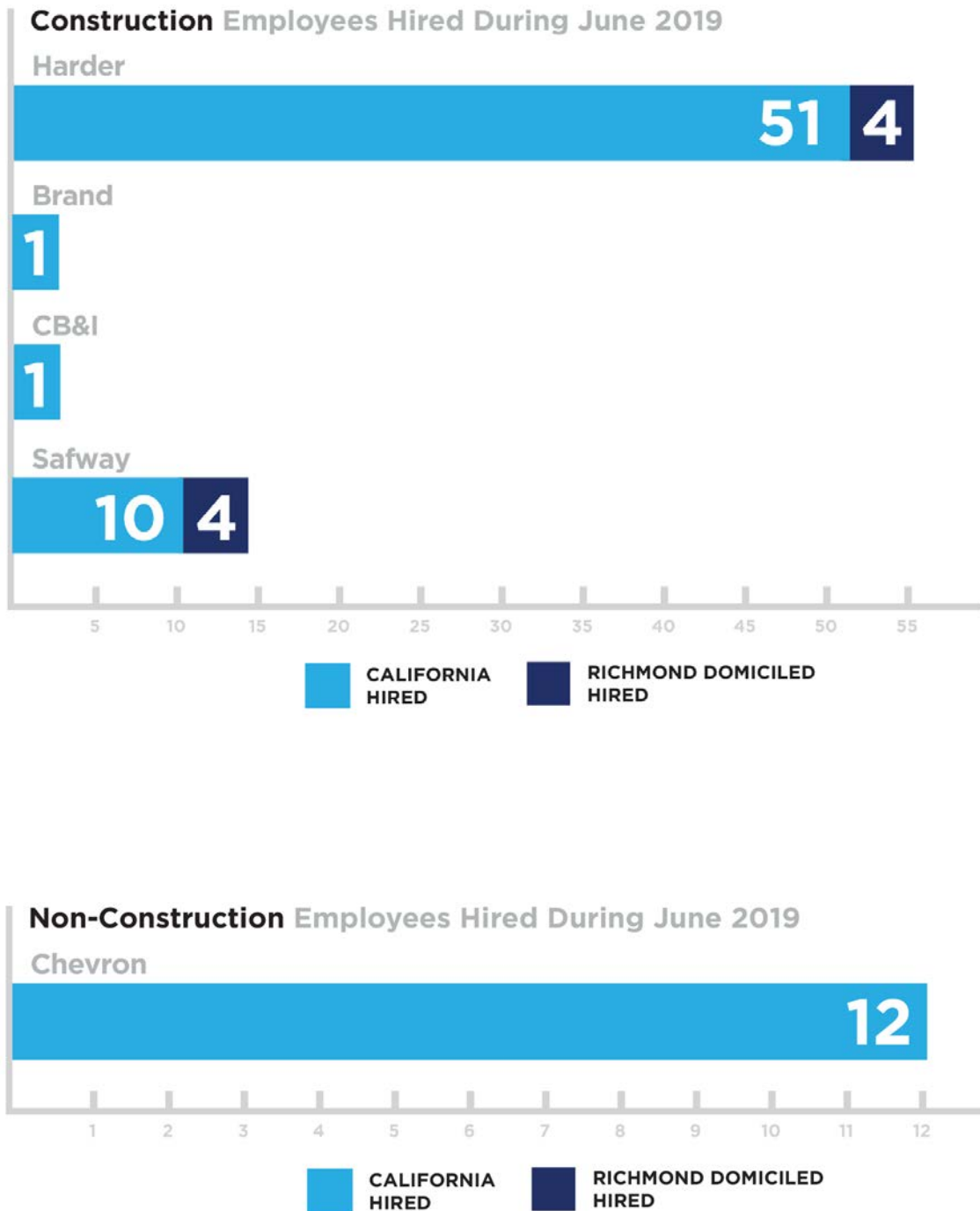


Table 2: Percentage Richmond Domiciled Modernization Hires

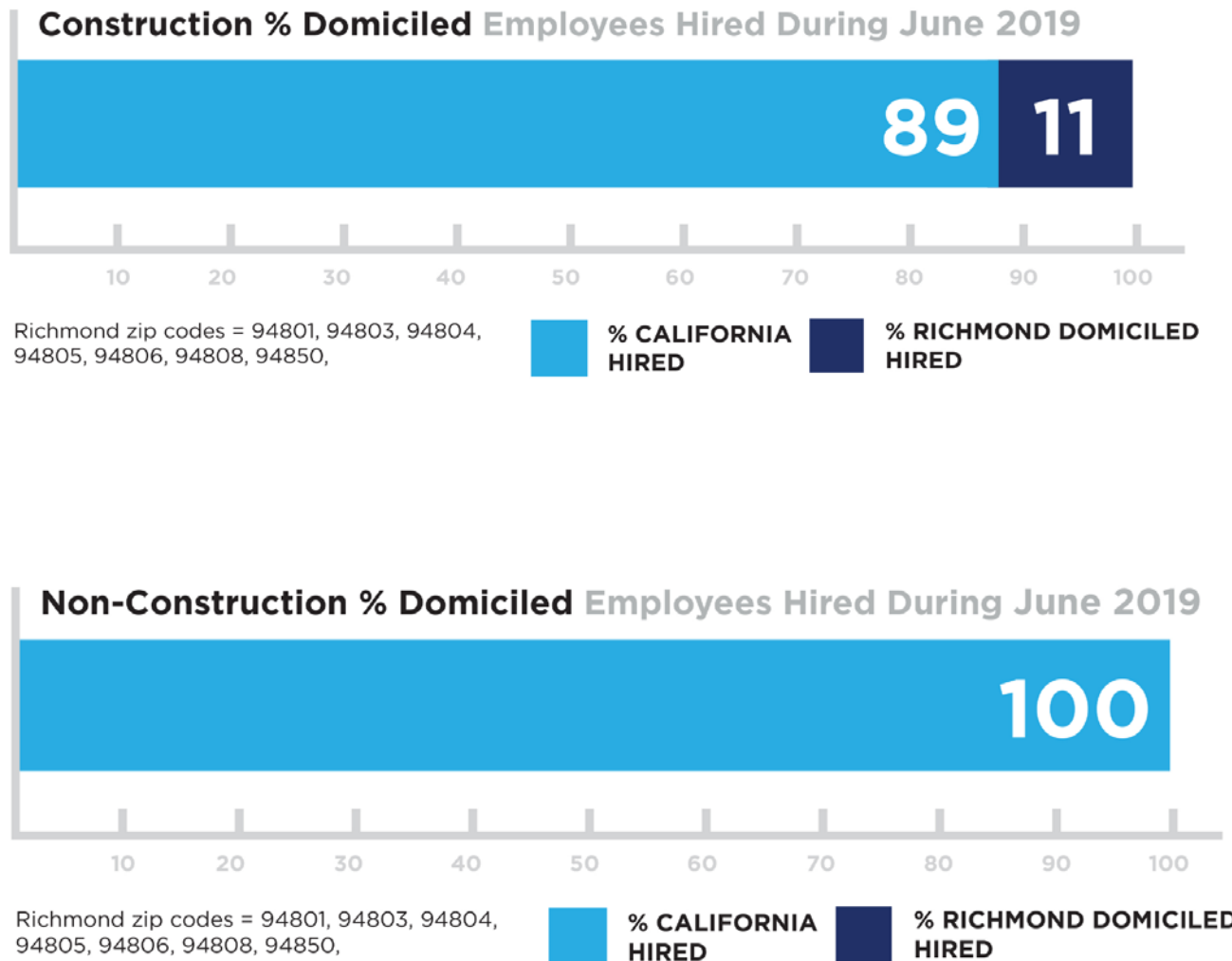


Table 3: Modernization Project Jobs

Modernization Project Job Descriptions

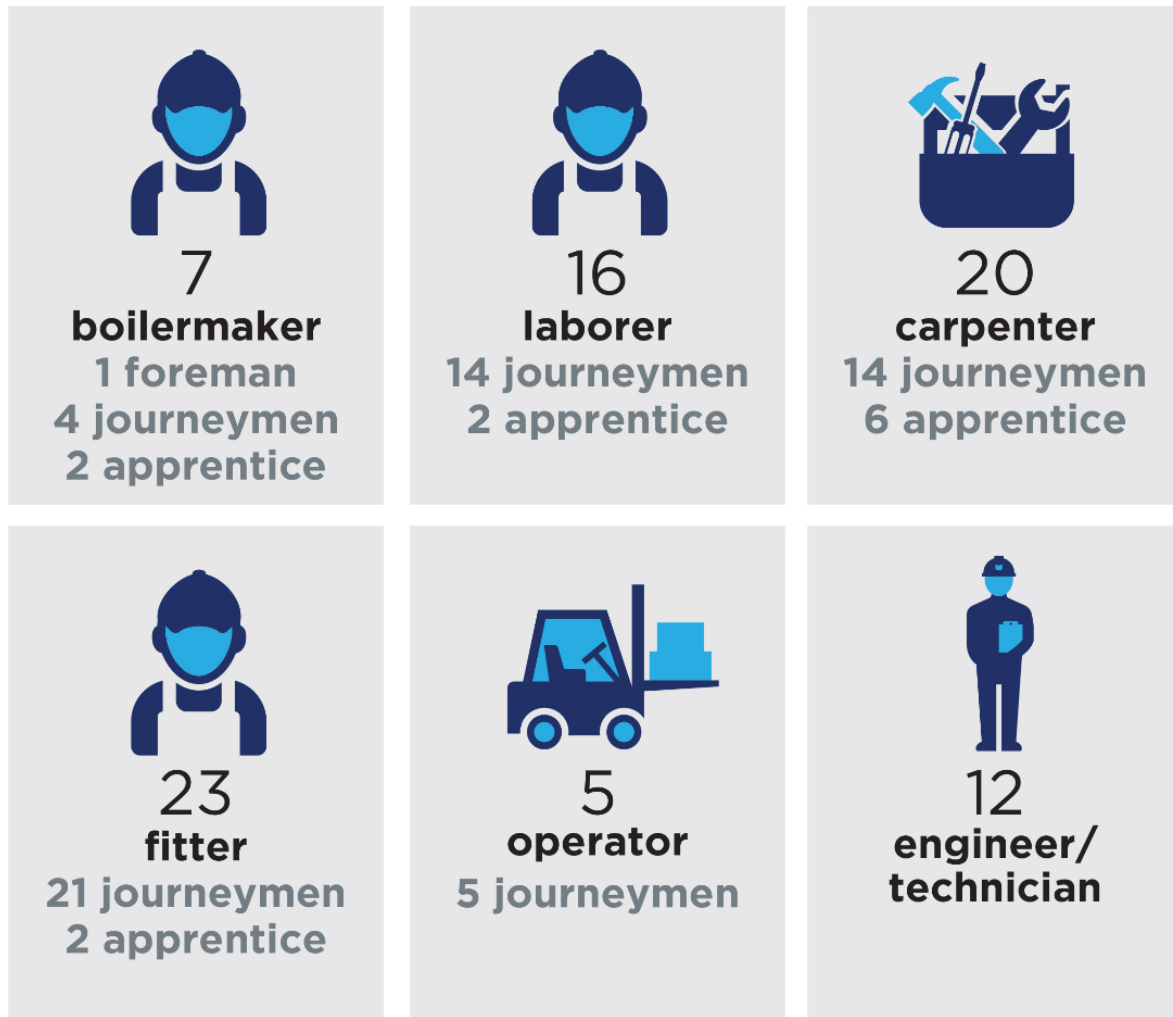
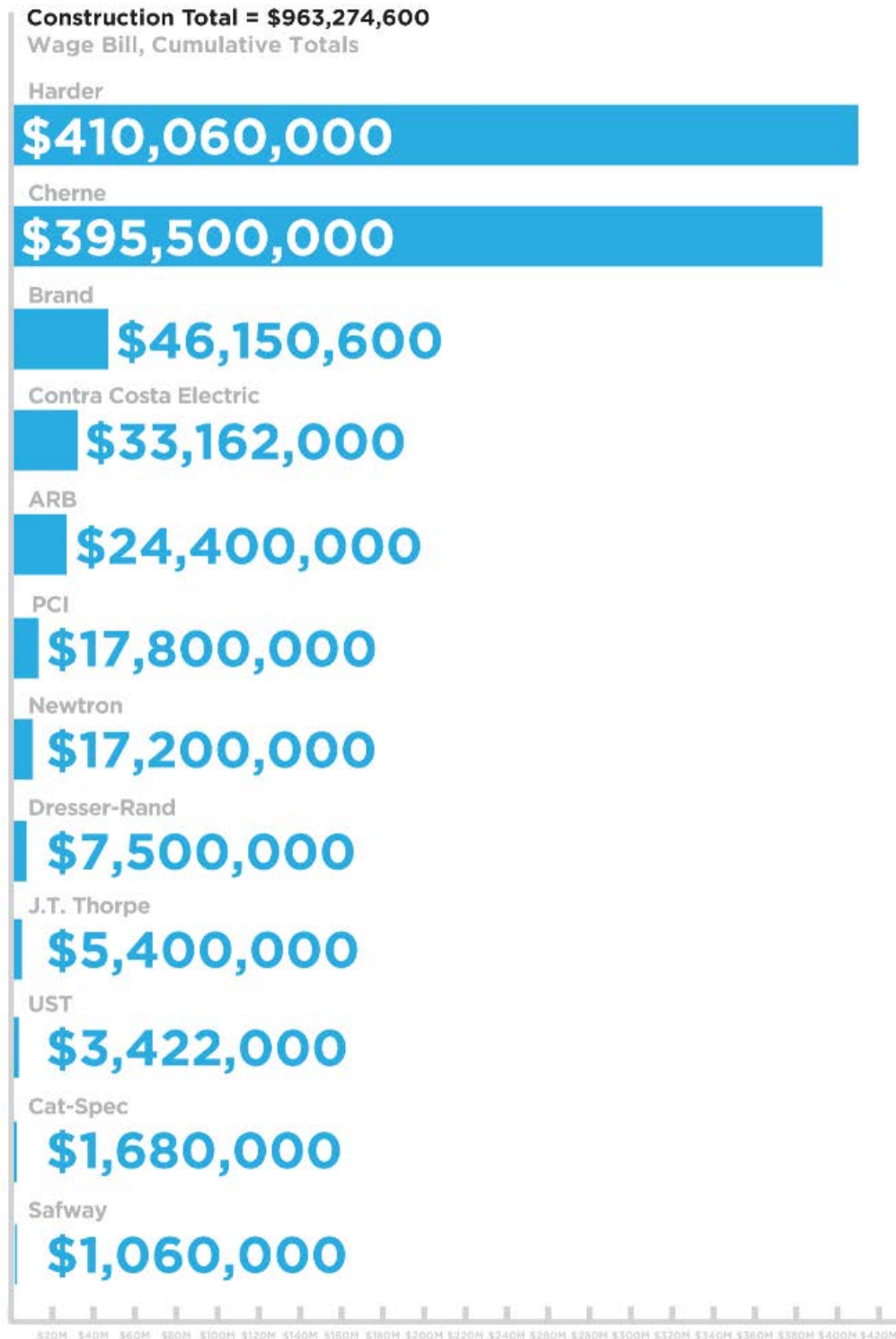


Table 4: Wage Bill



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Table 5: Community Programs

Community Programs

\$48,000,000

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richmond promise



solar one



job training



**greenhouse gas
reduction**



public safety programs



**competitive grant
program**



free internet access

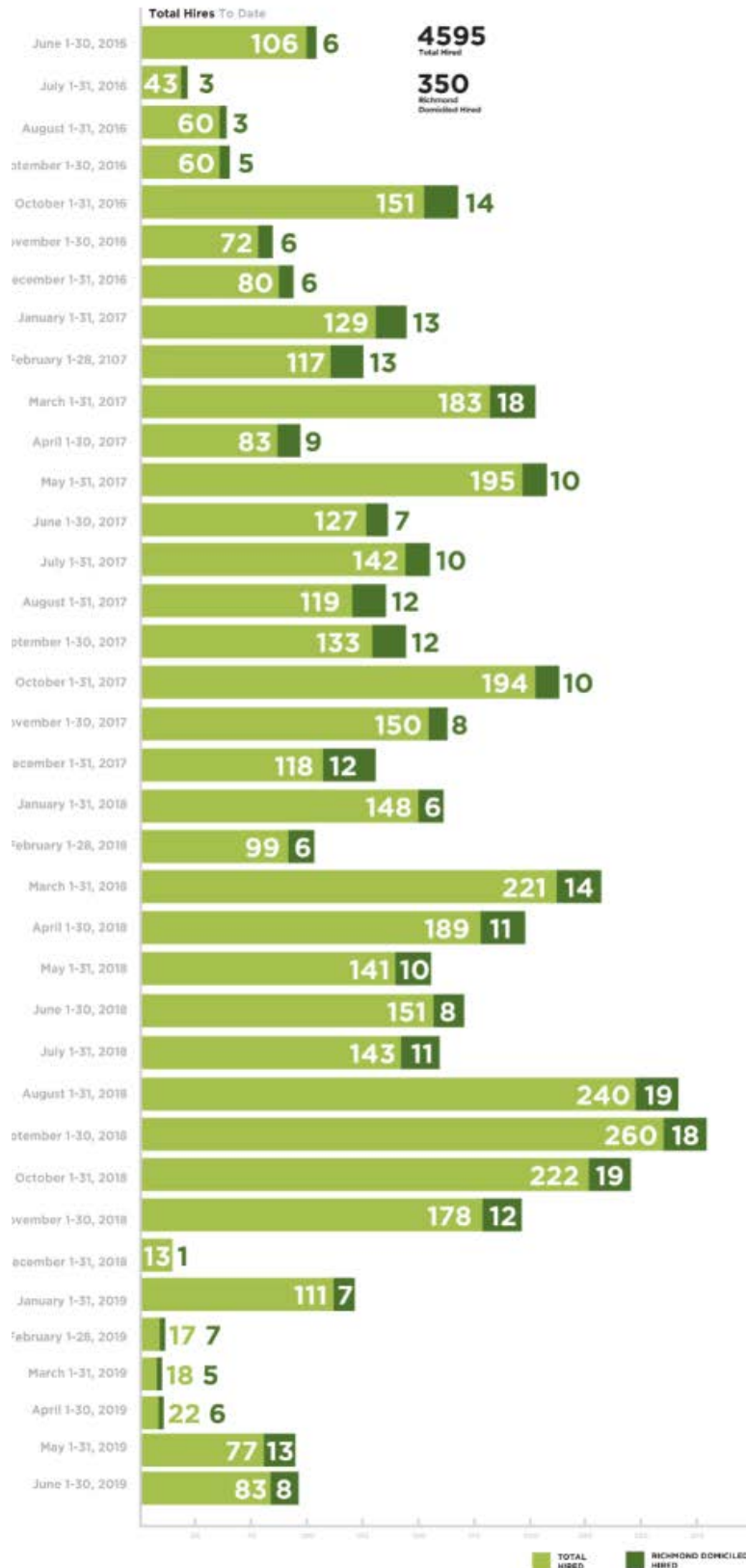
Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



Table 8: Total Modernization Hires





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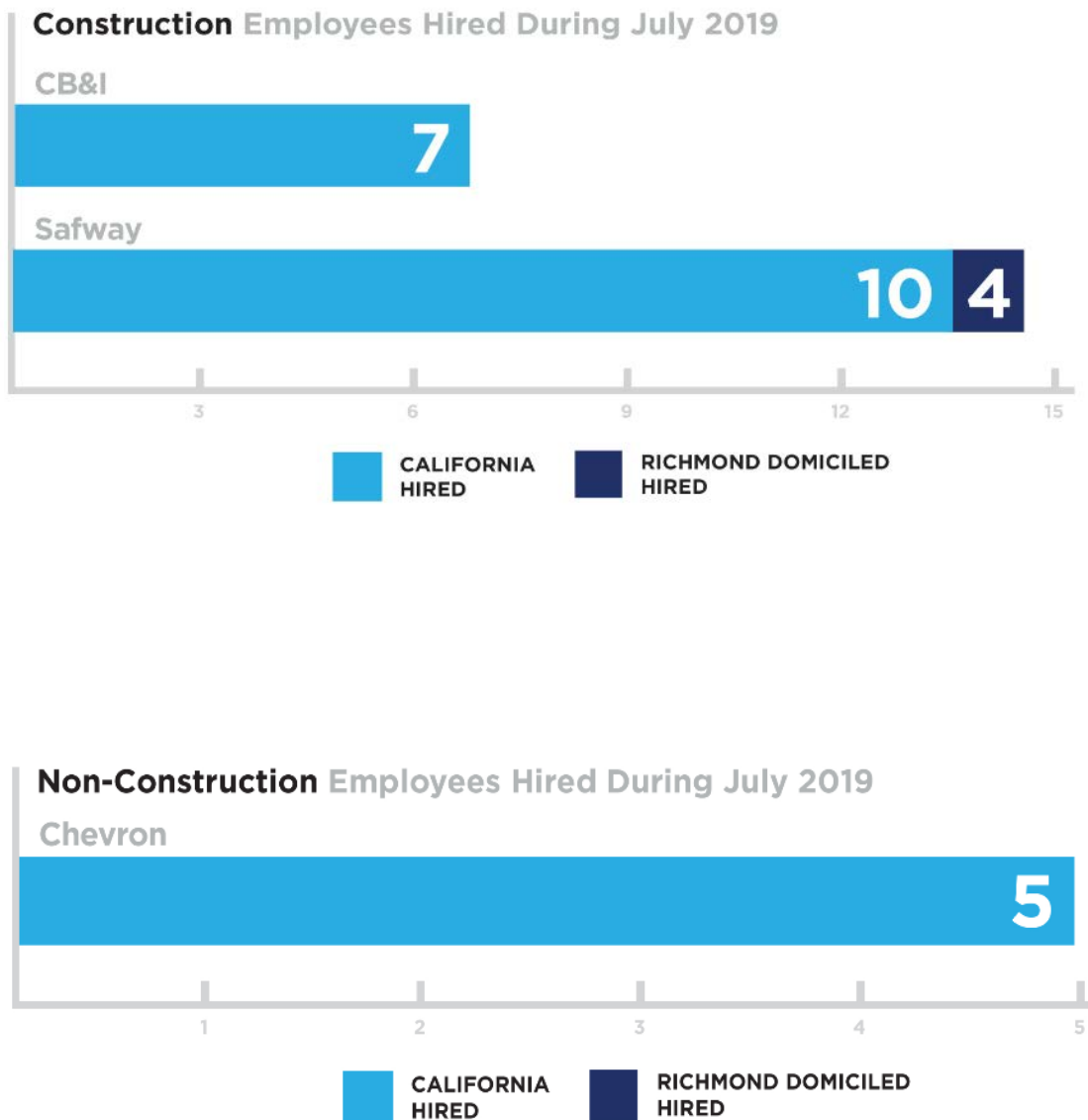


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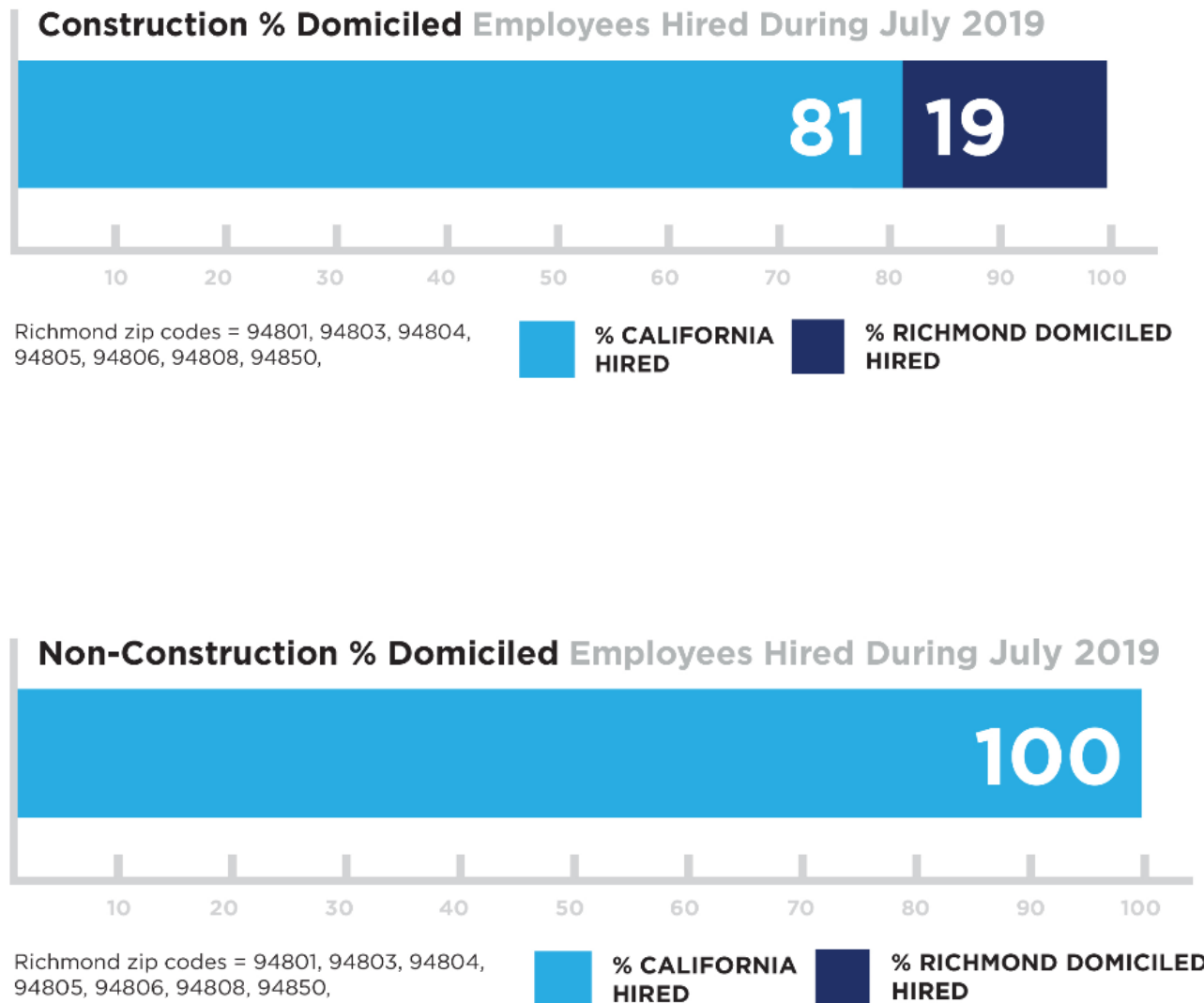


Table 3: Modernization Project Jobs

Modernization Project Job Descriptions



6

boilermaker
2 journeymen
4 apprentice



14

carpenter
10 journeymen
4 apprentice



1

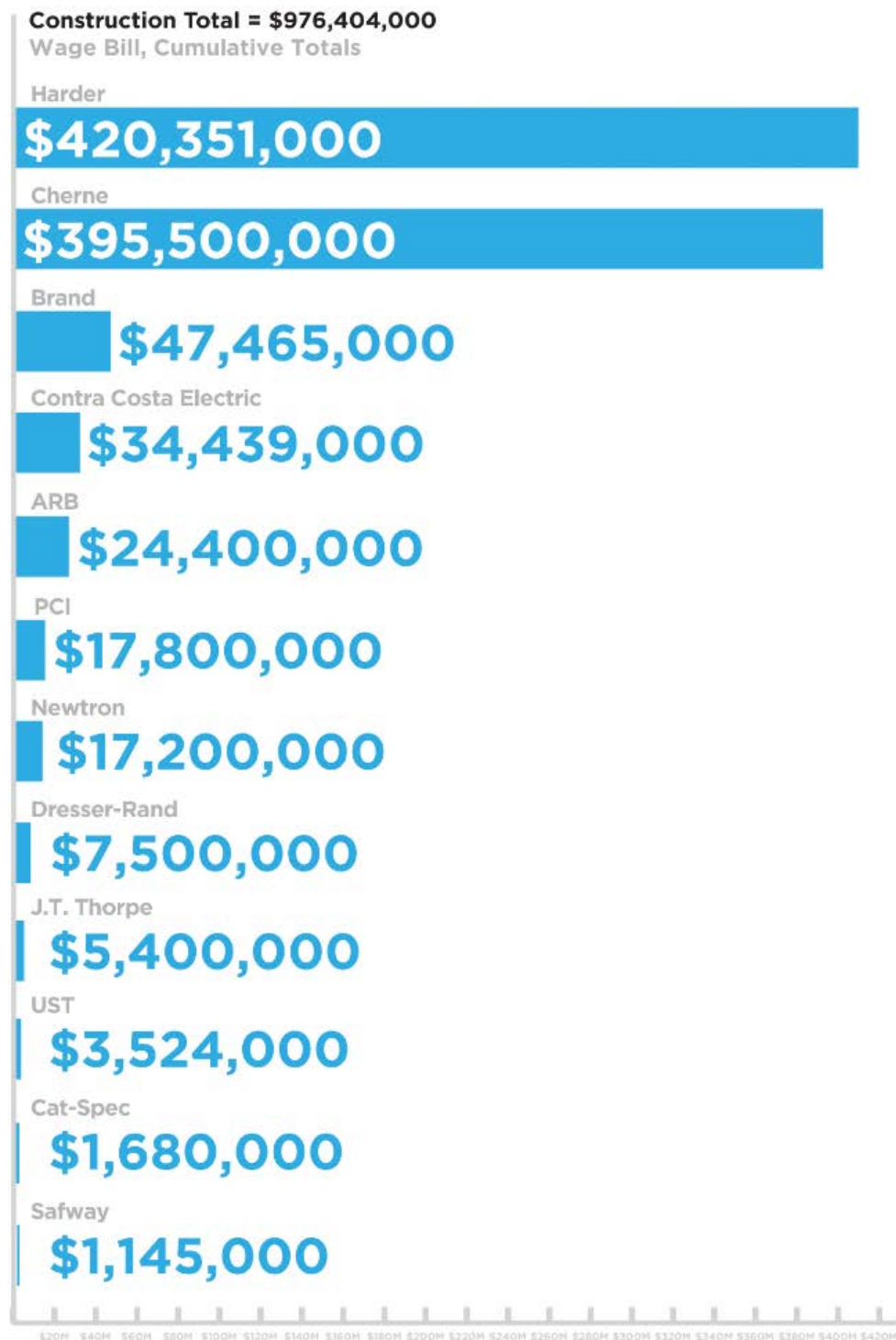
operator
1 journeymen



5

**engineer/
technician**

Table 4: Wage Bill



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solar one



job training



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public safety programs



**competitive grant
program**



free internet access

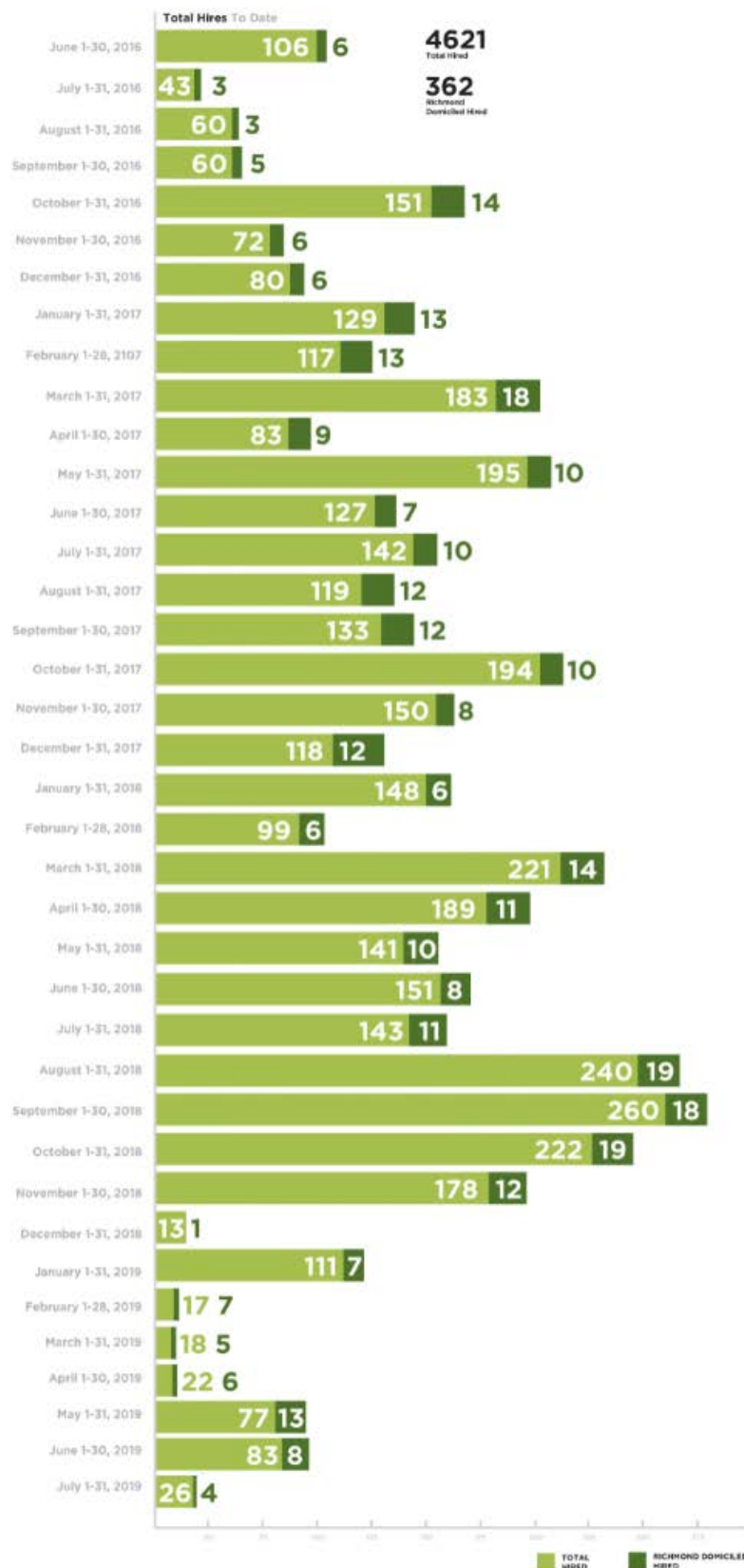
Table 6: Cumulative Modernization Hires



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Table 8: Total Modernization Hires





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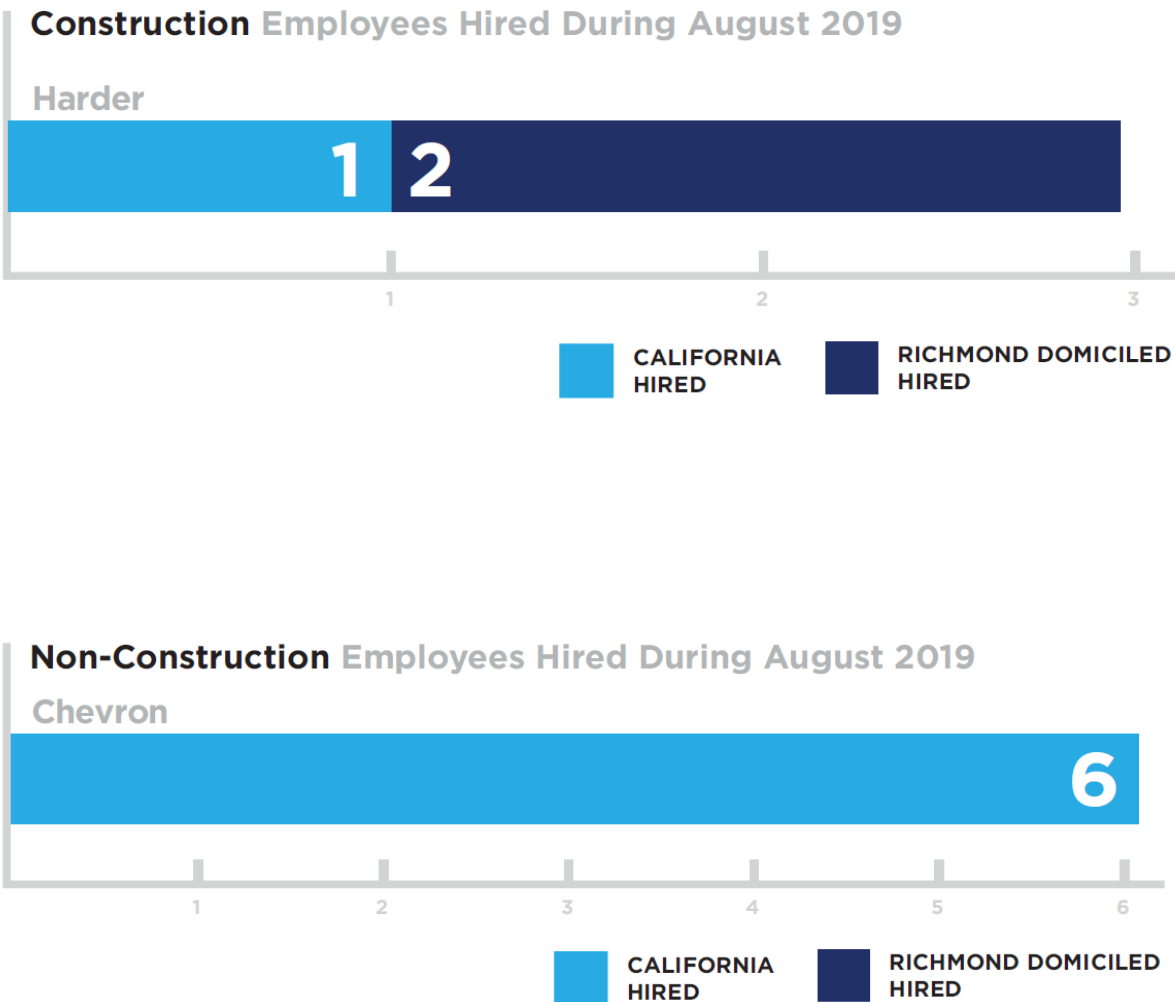


Table 2: Percentage Richmond Domiciled Modernization Hires

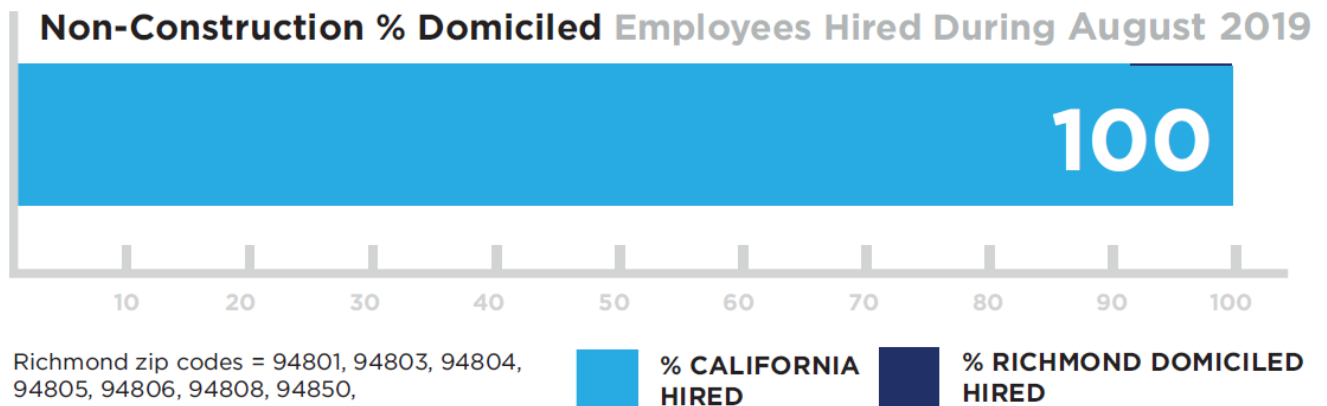


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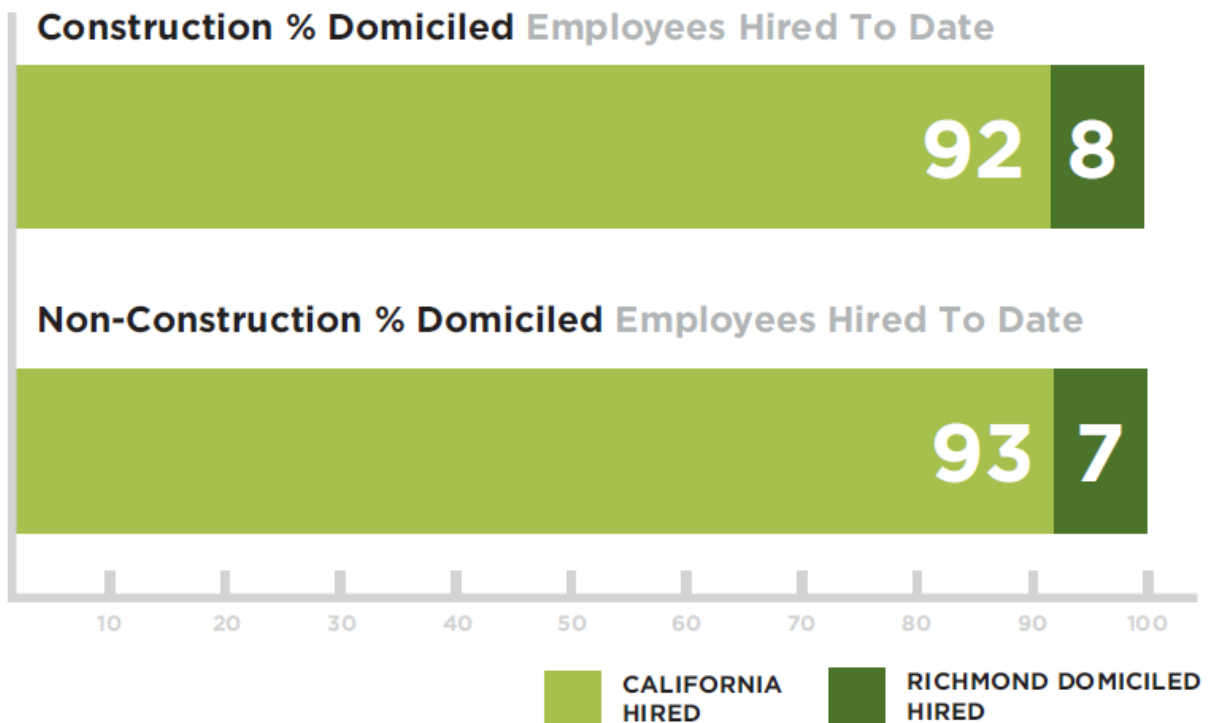
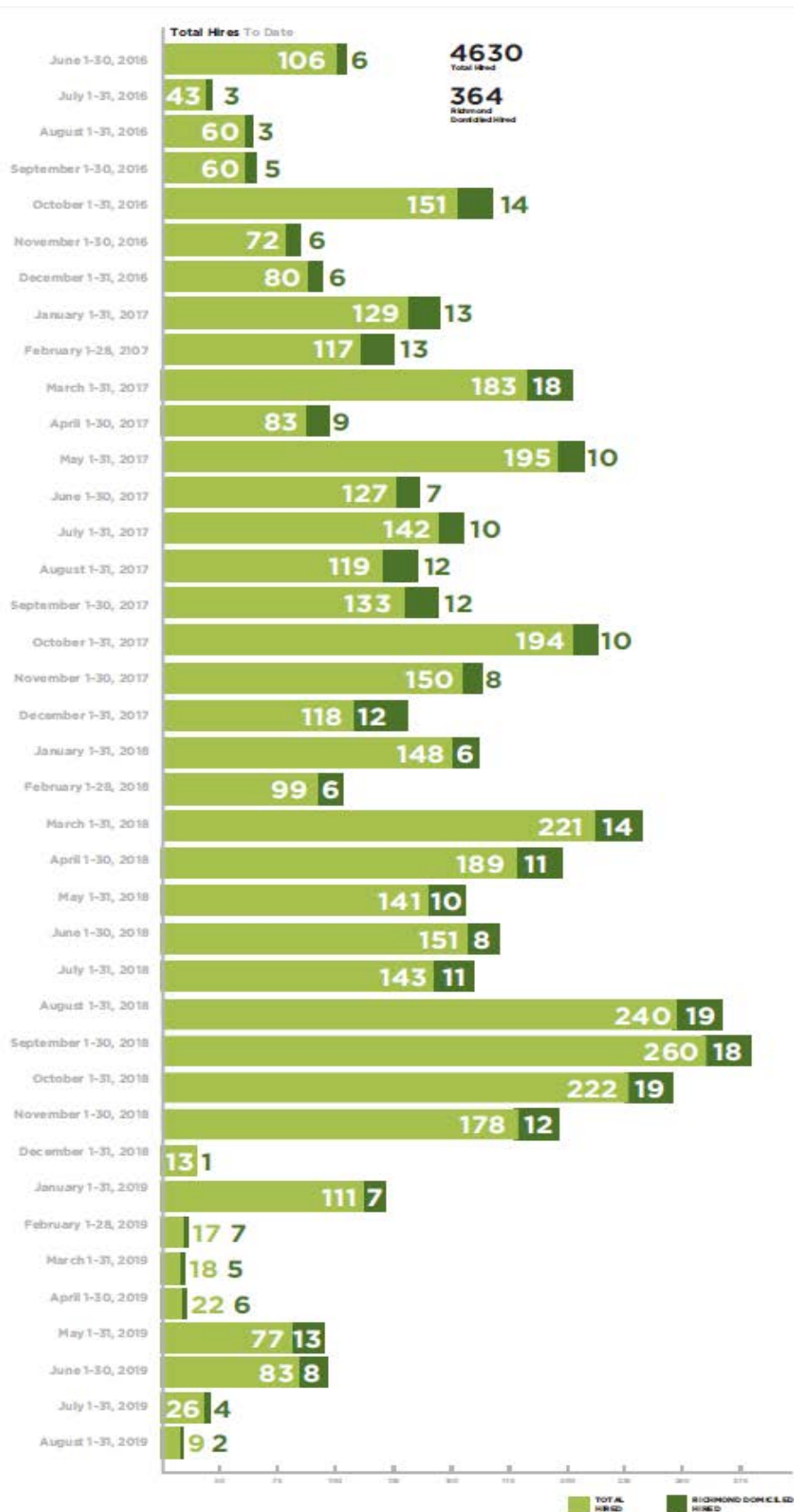


Table 8: Total Modernization Hires





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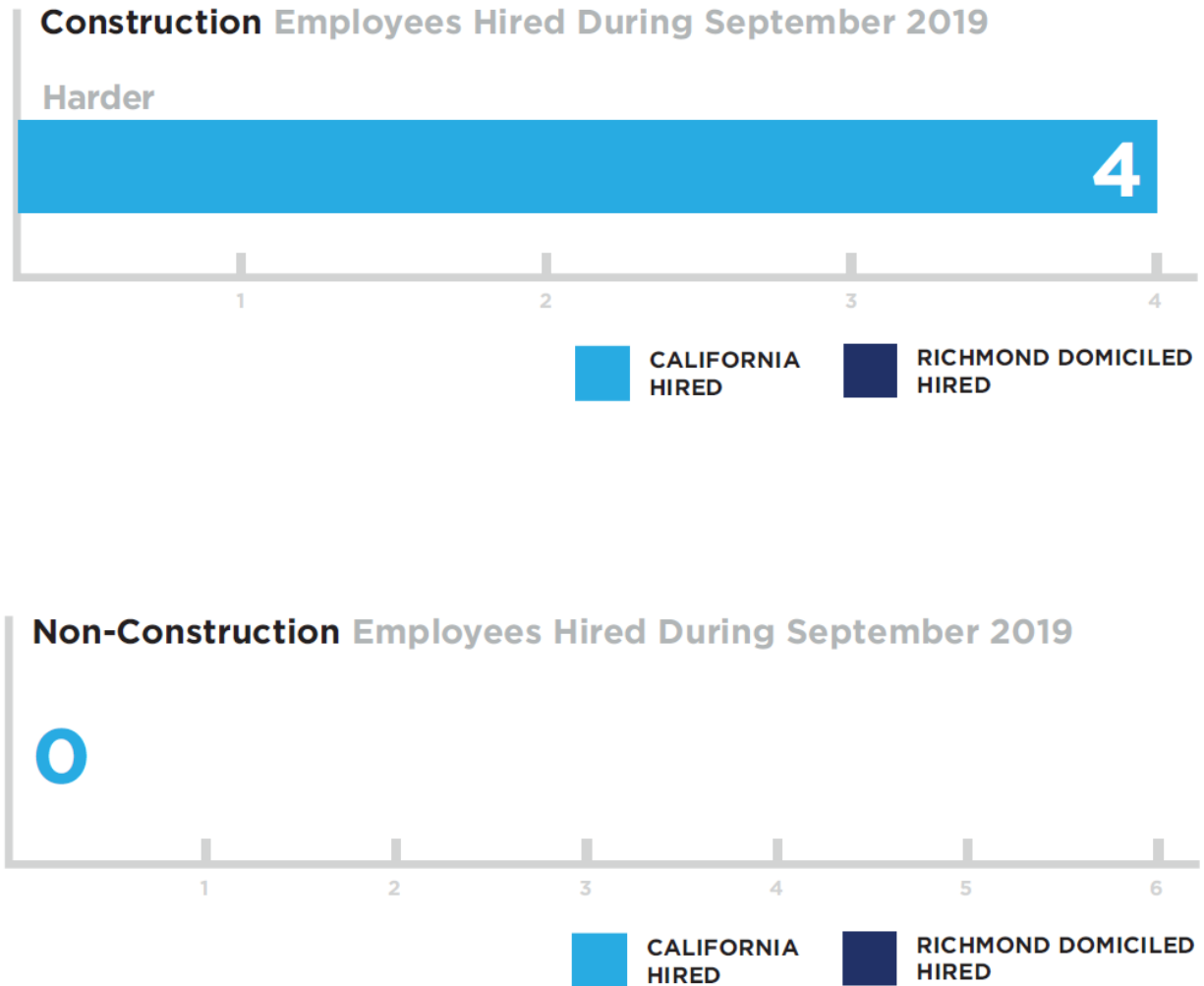


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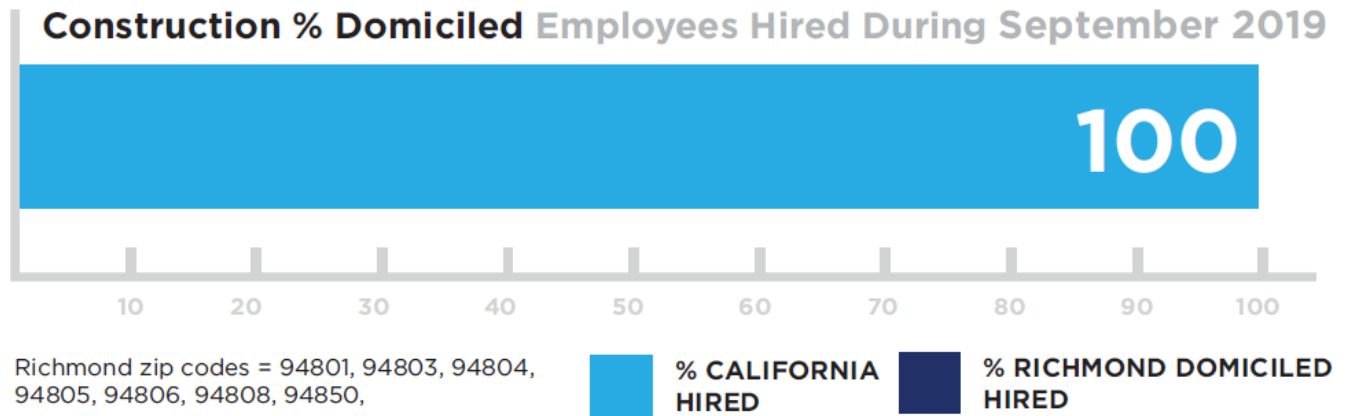
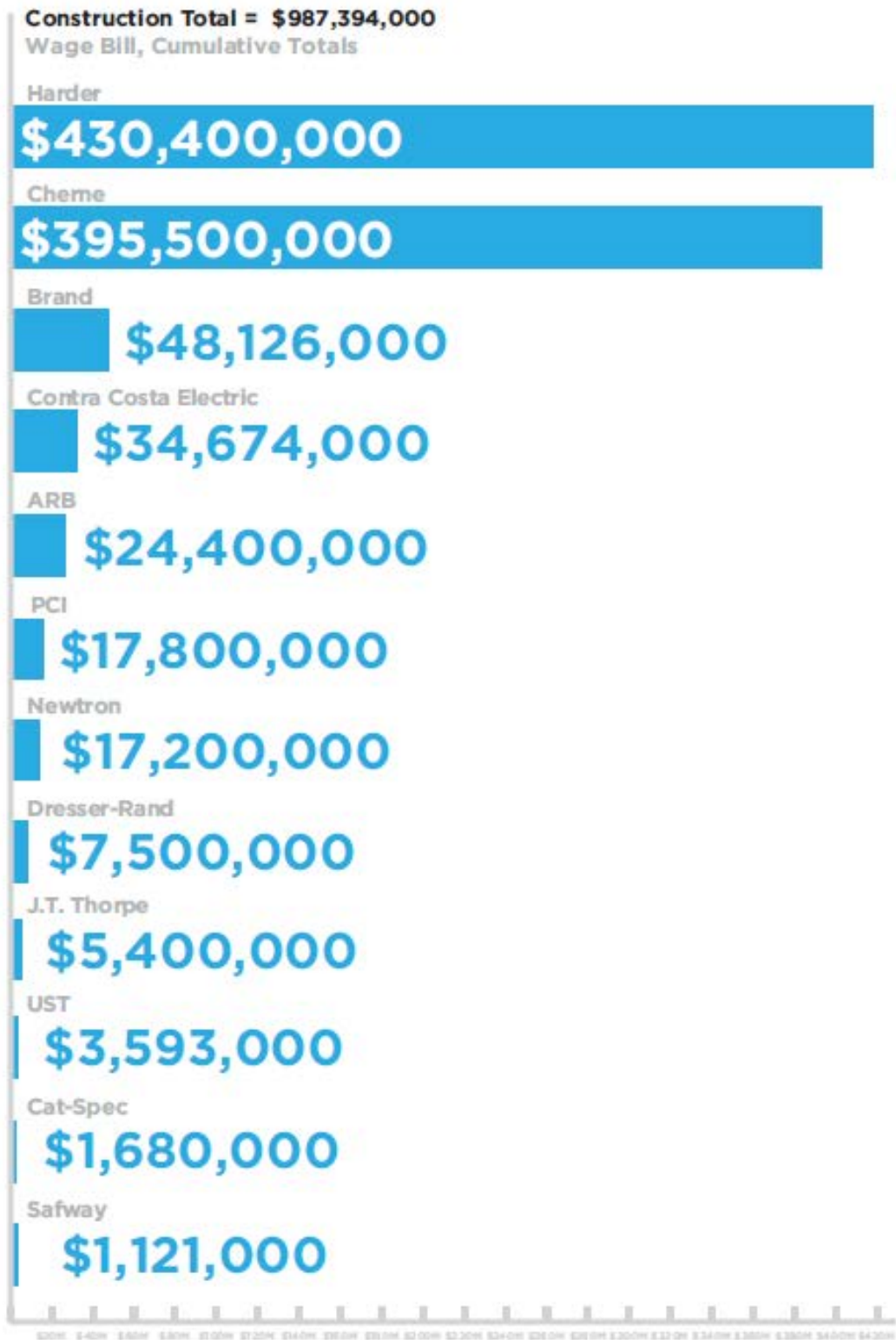


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job training



**greenhouse gas
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**competitive grant
program**



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Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires

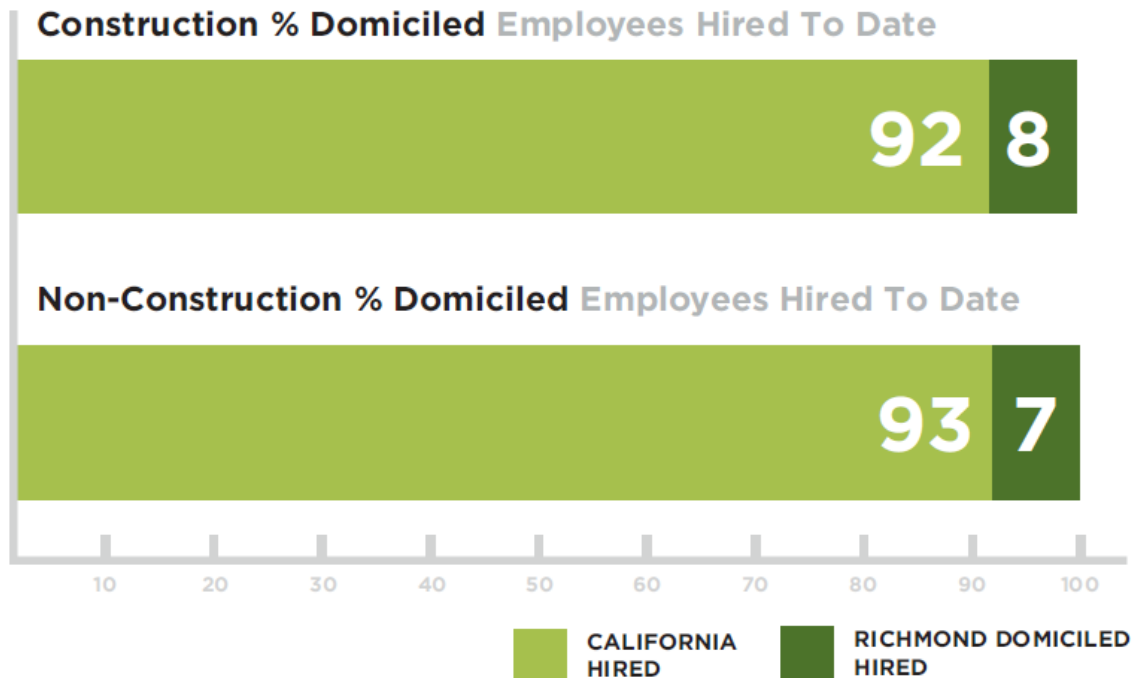
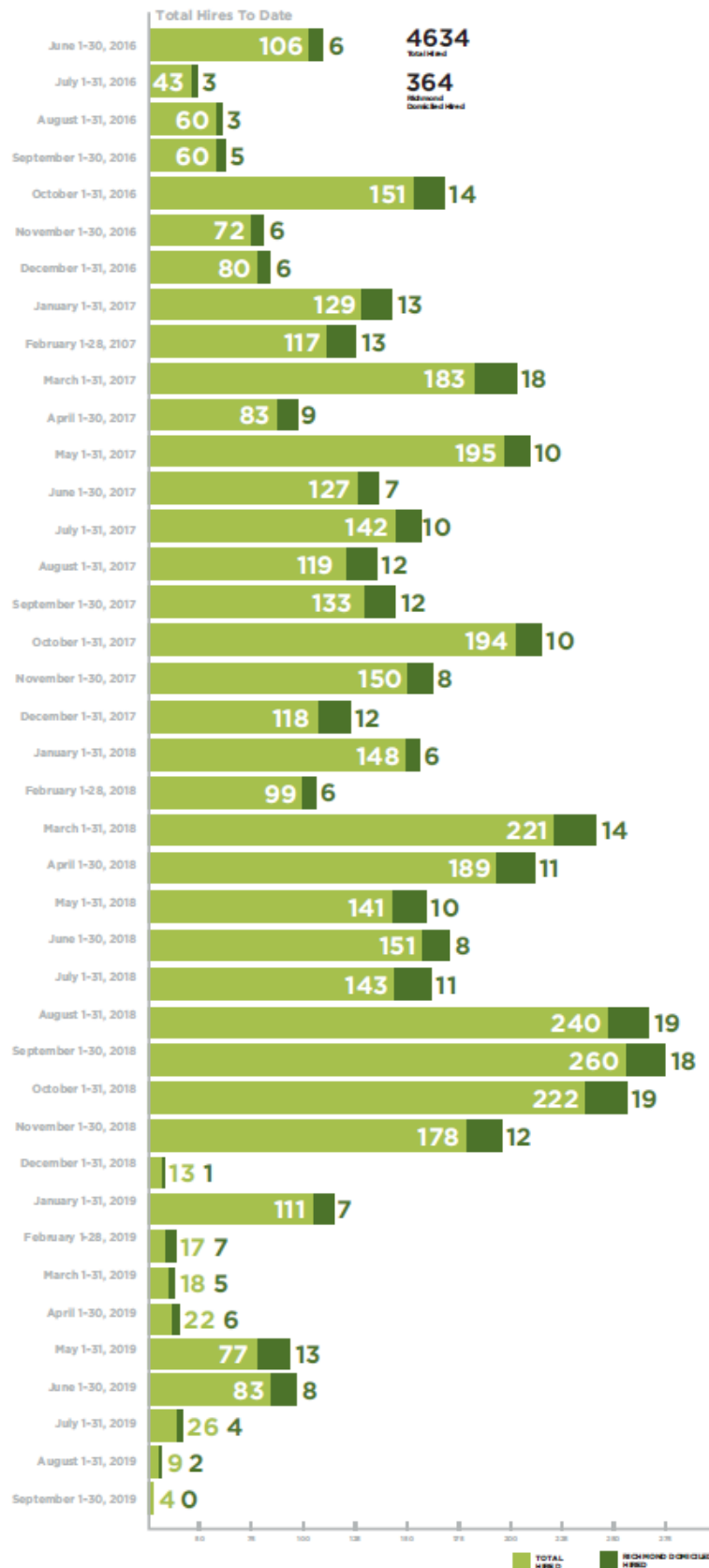


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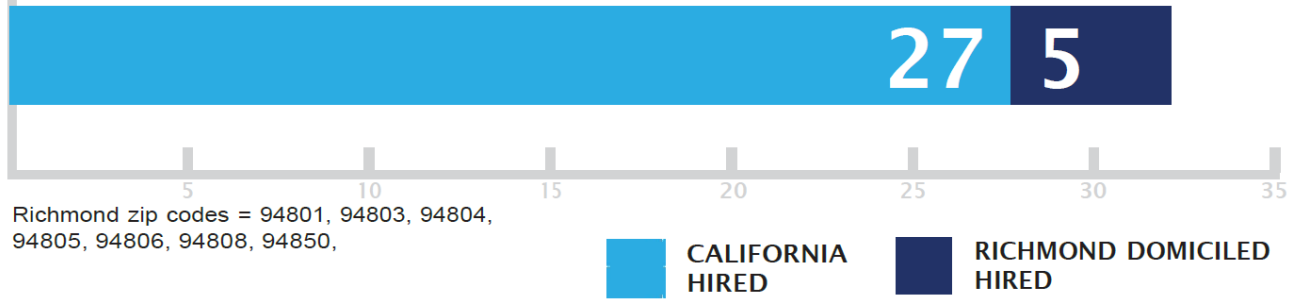
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Construction Employees Hired During October 2019



Non-Construction Employees Hired During October 2019

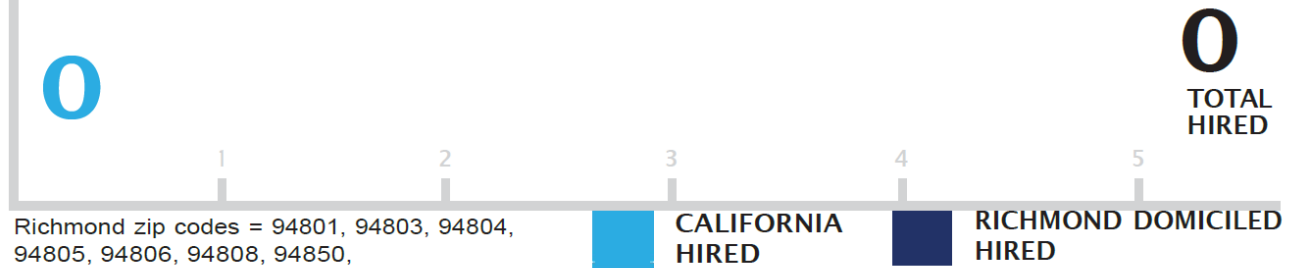


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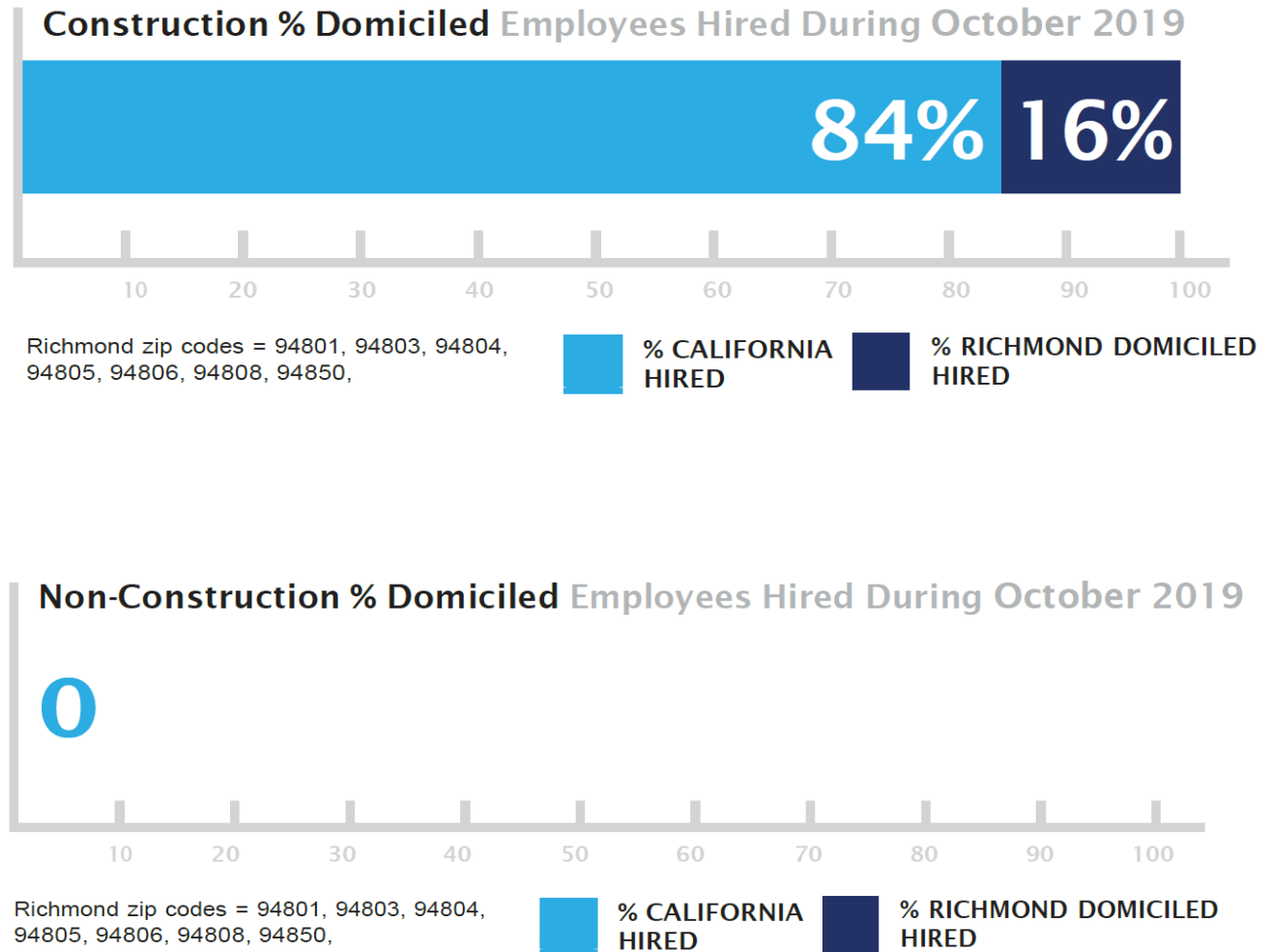
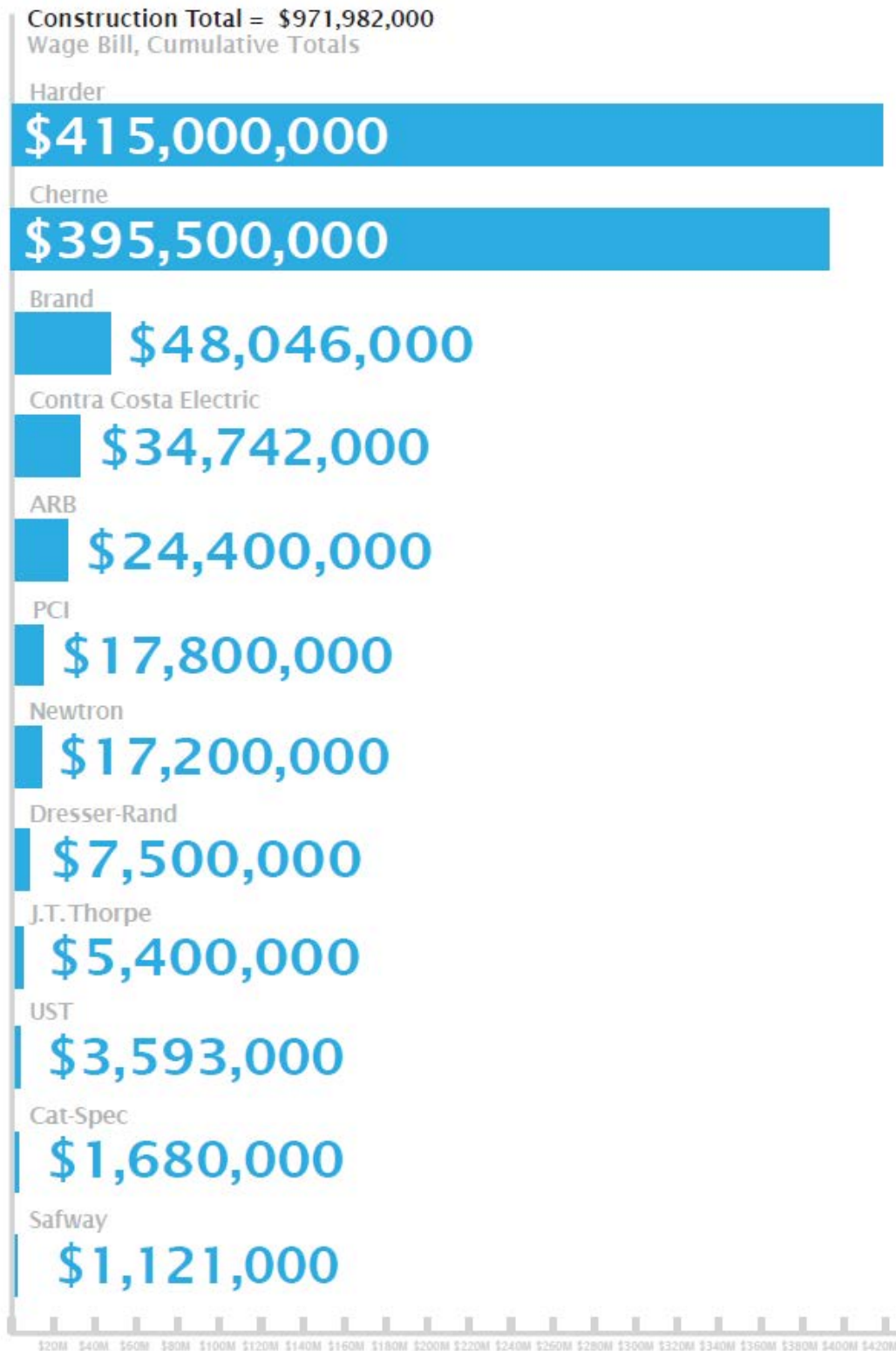


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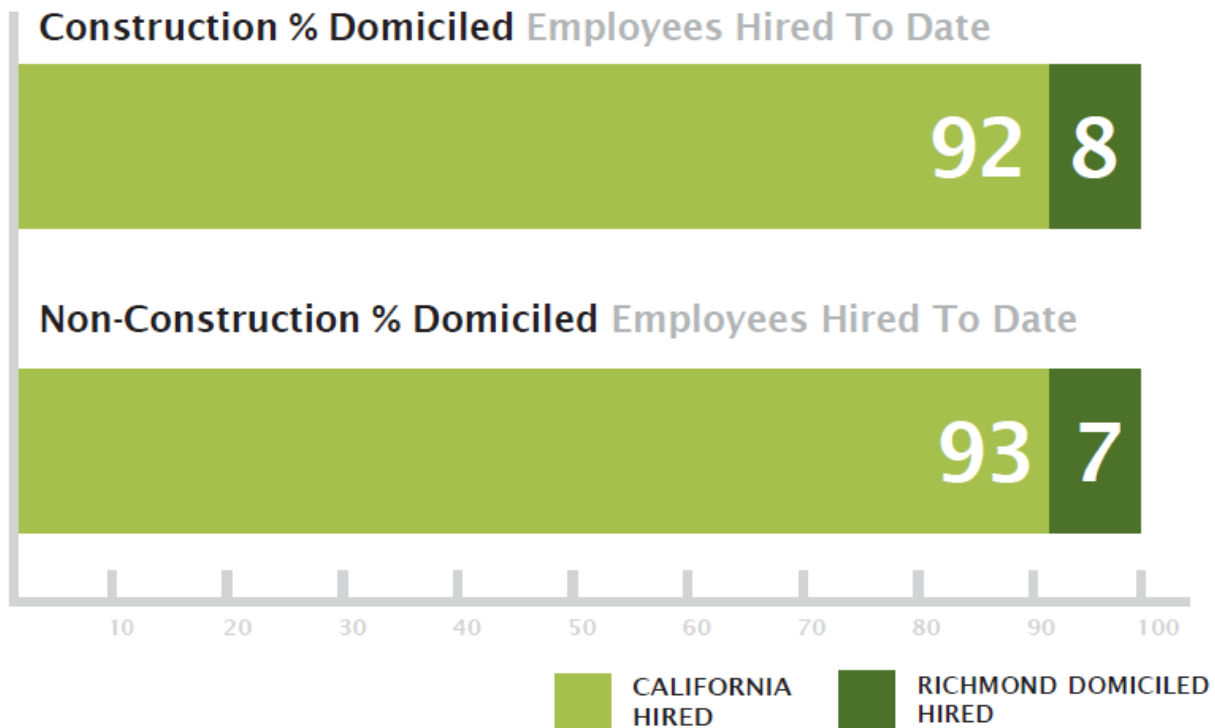
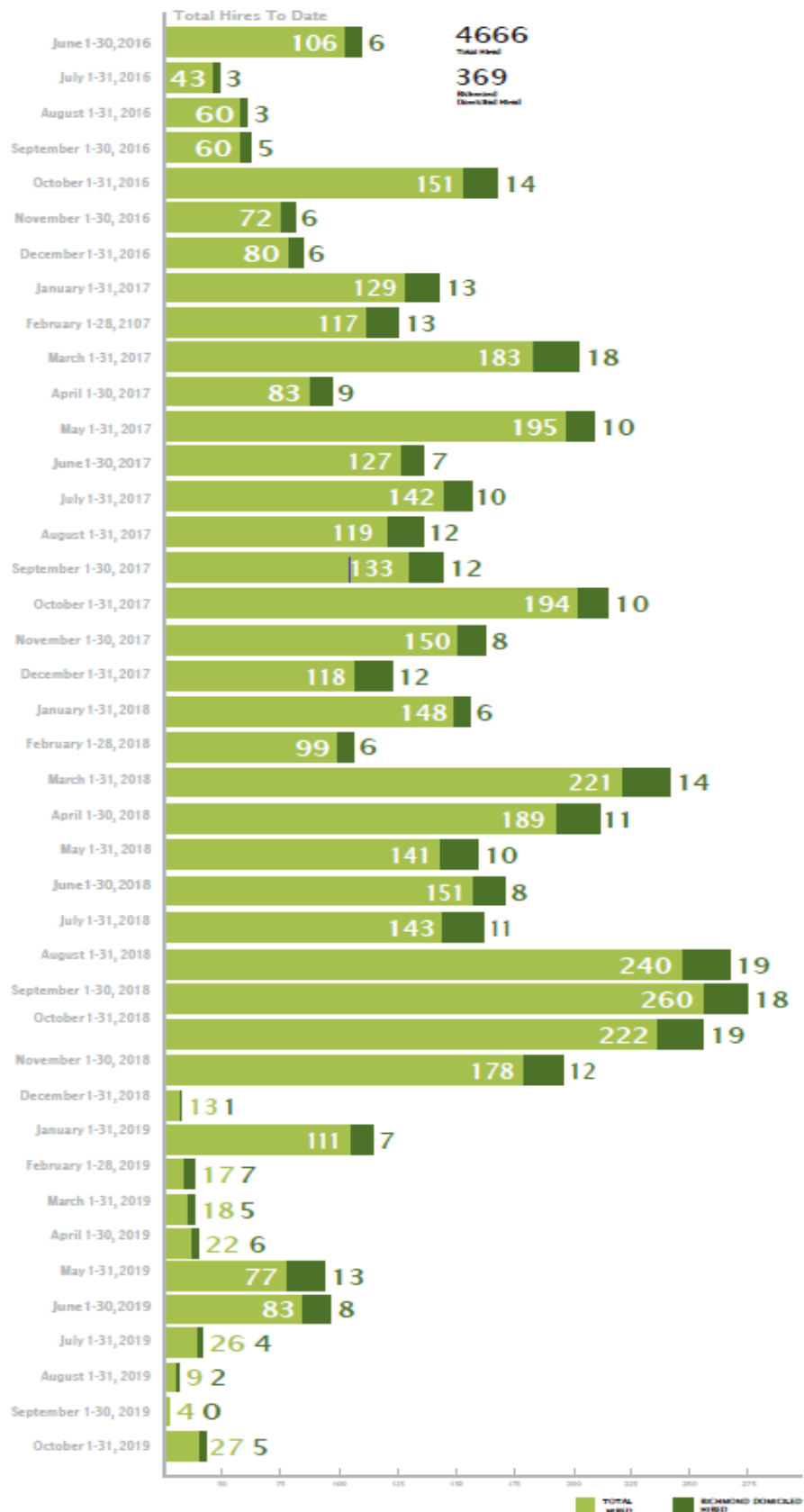


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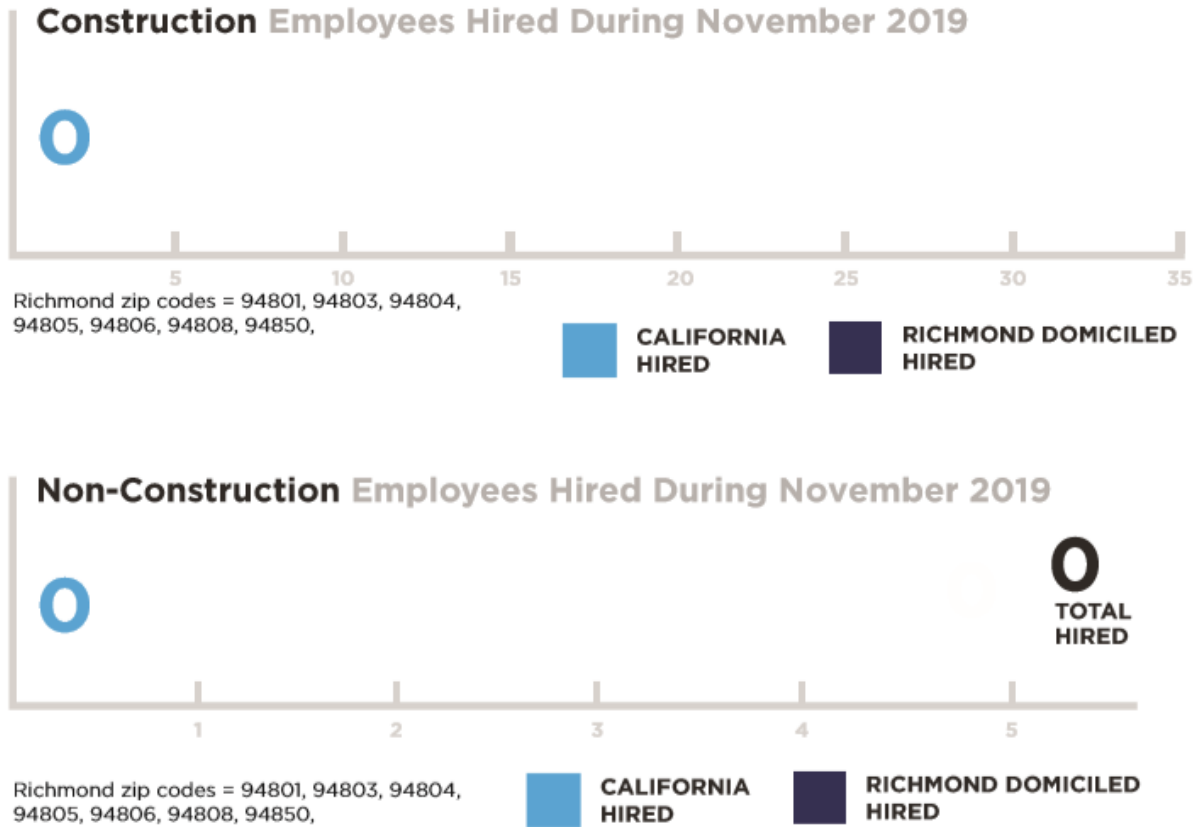


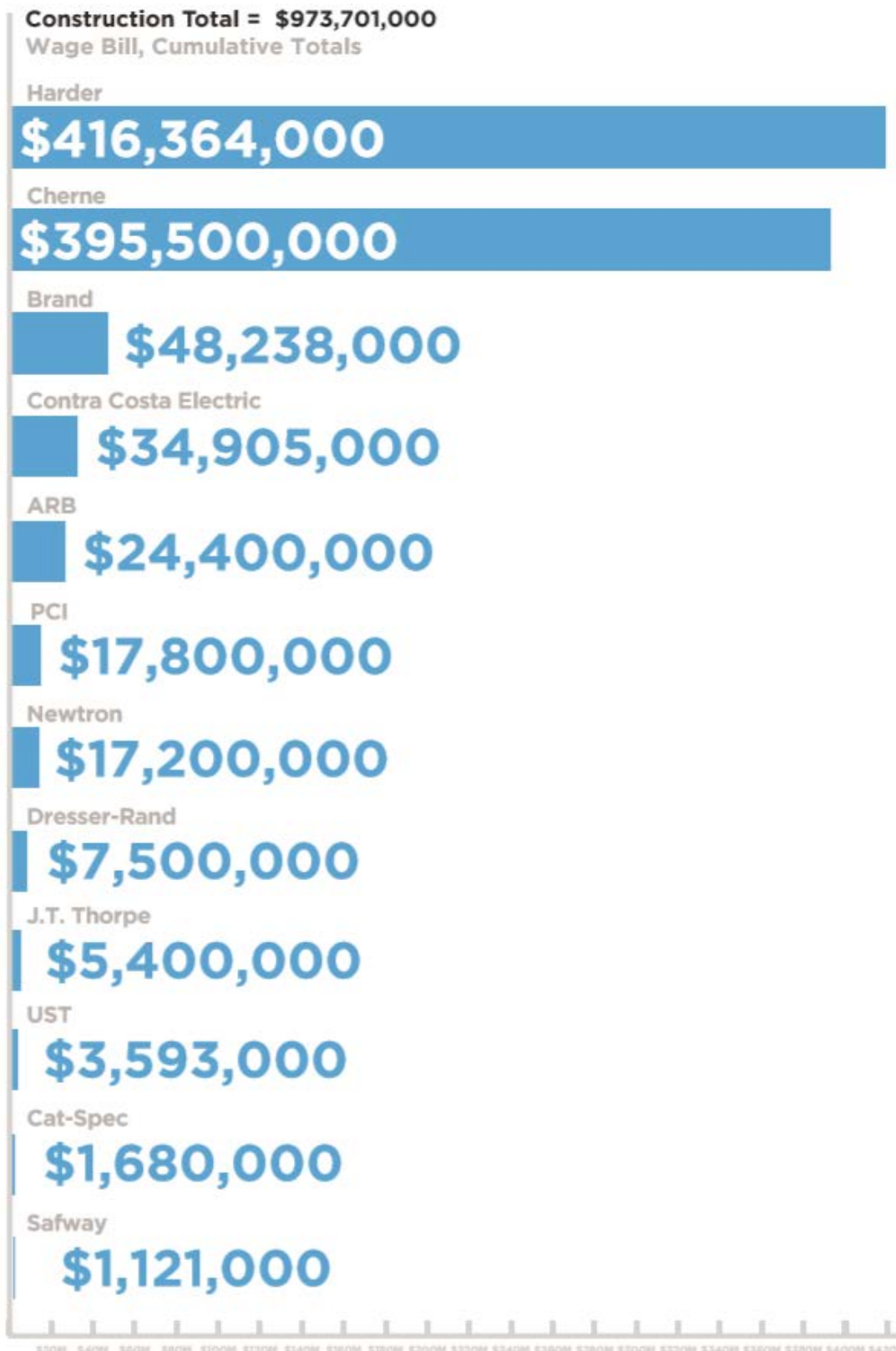
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N/A – November 2019

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program**



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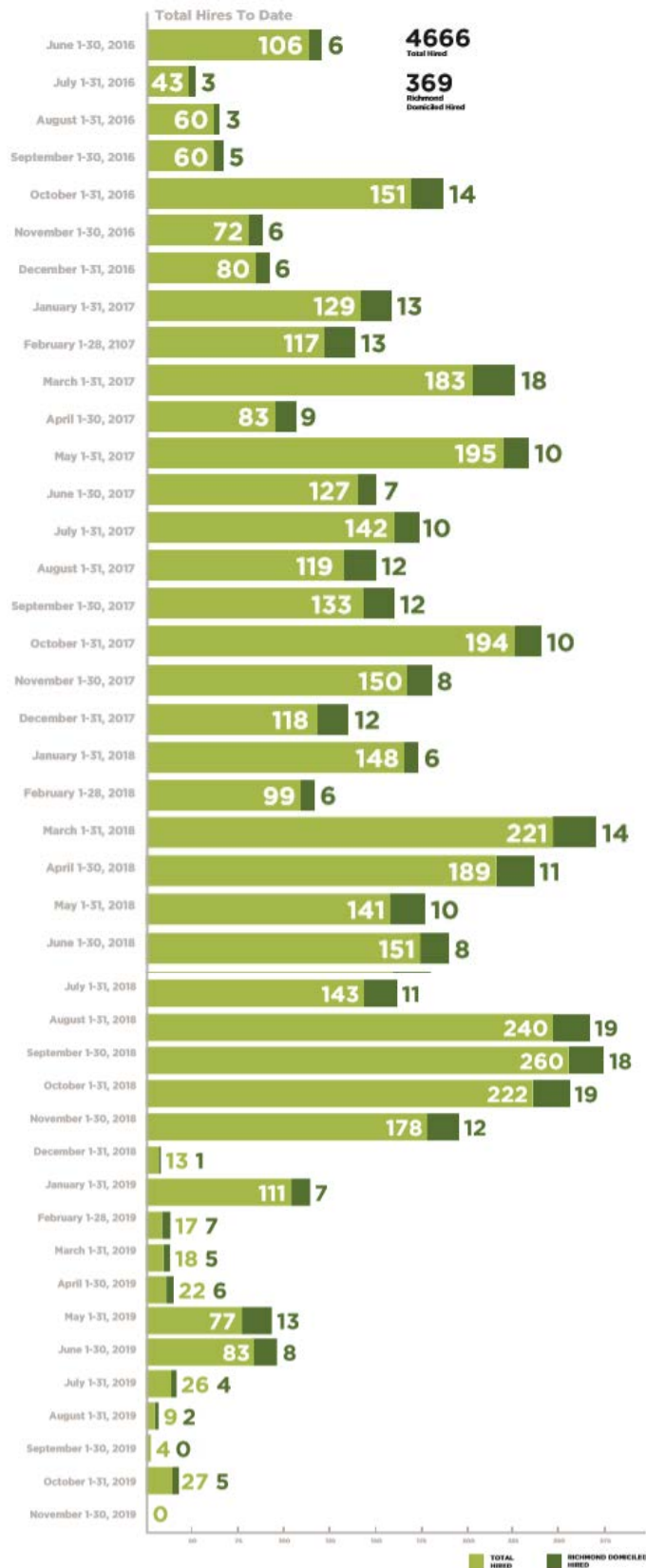
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Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires



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Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires.....	7
Table 8: Total Engineers/Project Team Modernization Hires.....	8

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1 purpose

In accordance with the Local Content Agreement and Environmental and Community Investment Agreement dated August 4, 2014, for the Richmond Refinery Modernization Project, Chevron U.S.A. Inc. ("CUSA") is providing this monthly update on local hiring.

2 training and workforce readiness programs

Chevron continues to support programs to train residents of Richmond and unincorporated North Richmond for work at the Richmond Refinery and on the Modernization Project.

3 local hiring

Chevron continues to work with construction contractors and non-construction suppliers in attempt to employ Richmond residents on the Modernization Project. Section 4. A. (3) (c) of the ECIA states, "The requirements of sections (a) and (b) shall not apply to hours of work performed by residents of states other than the State of California, and such hours shall not be considered determining satisfaction of percentage requirements described herein.". Therefore, the following metrics are for the State of California.

3.1 Metrics

Below are the ECIA, Section 4. A. (3) (b) metrics for the State of California.

Table 1: Modernization Hires

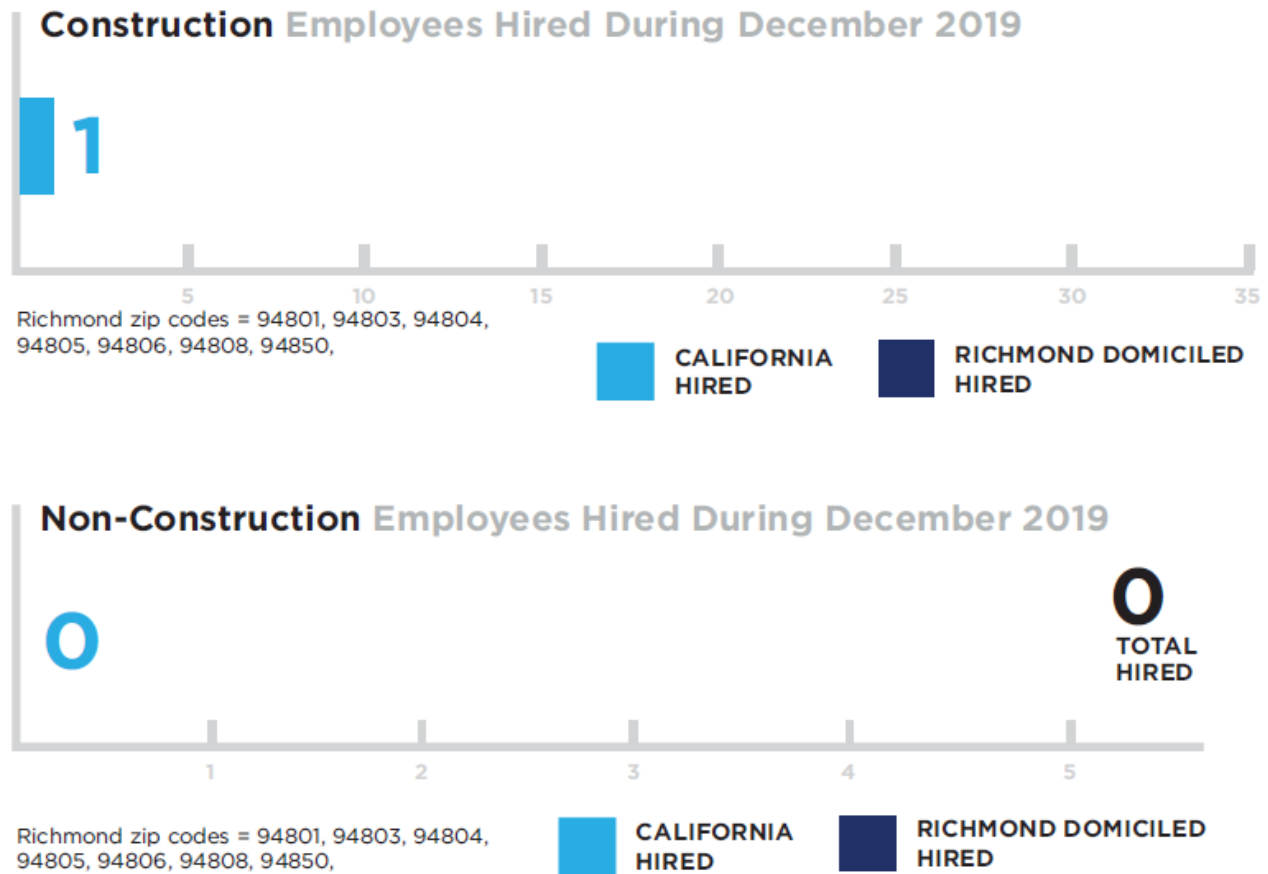


Table 2: Percentage Richmond Domiciled Modernization Hires

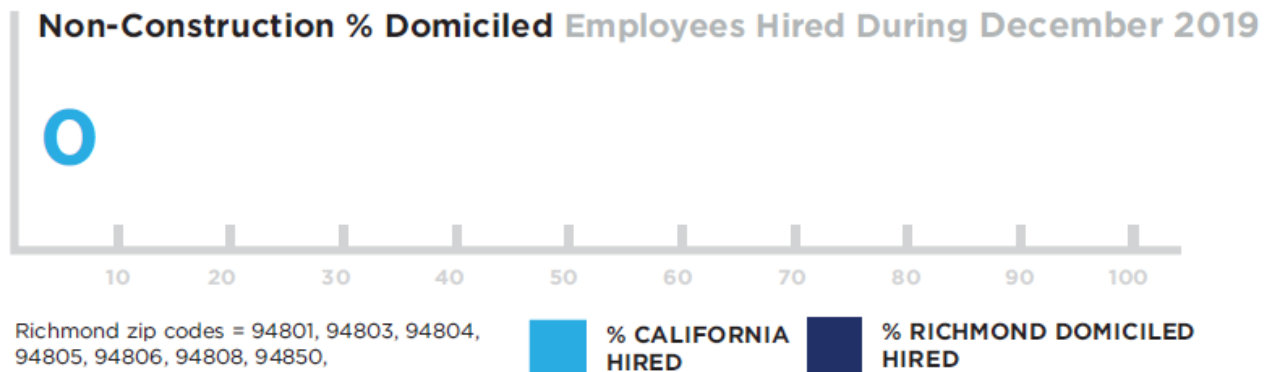
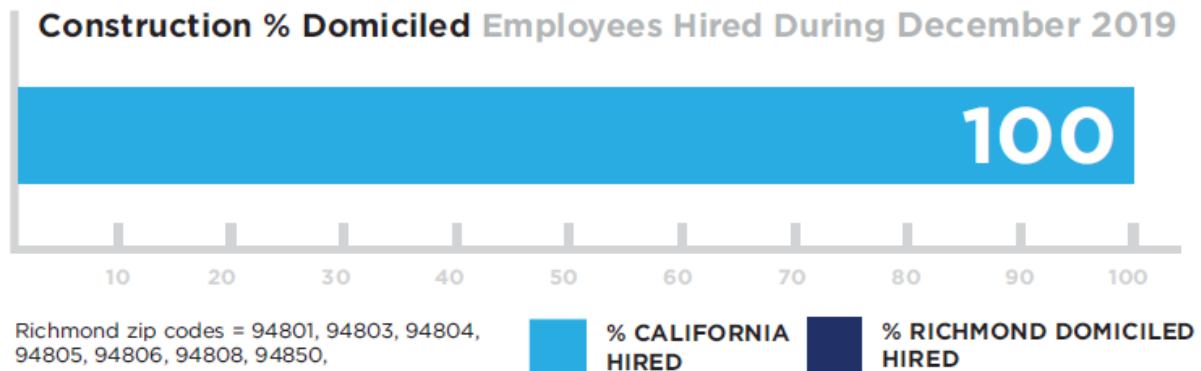


Table 3: Modernization Project Jobs

Modernization Project Job Descriptions

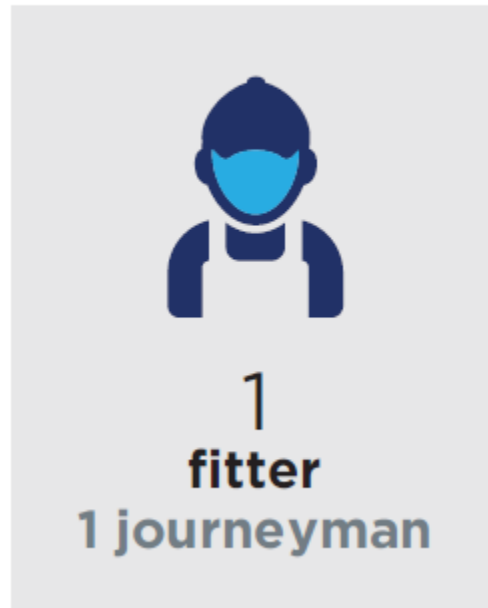
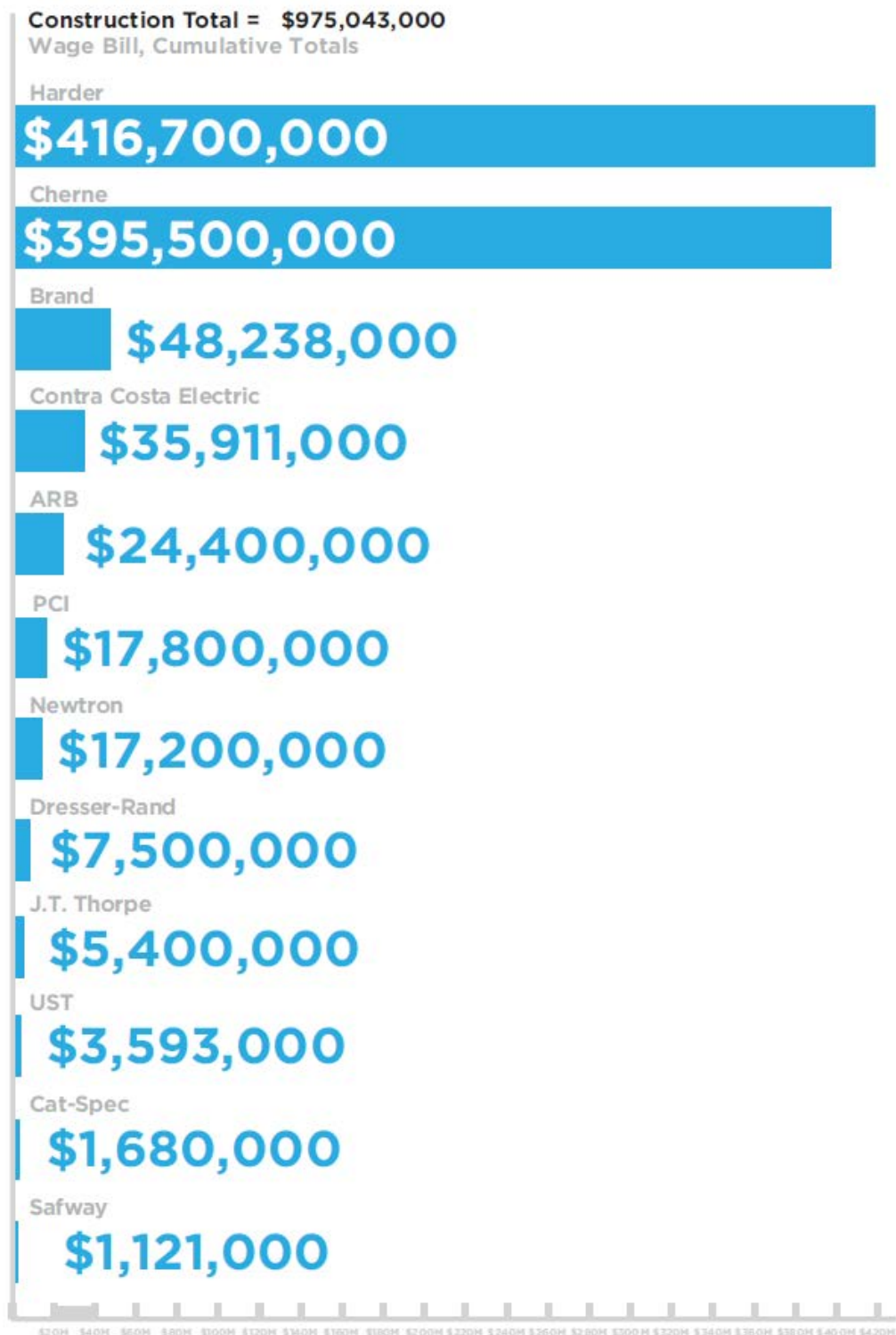


Table 4: Wage Bill



These amounts are for all our core construction contractors, primary subcontractors and non-construction contractors which includes Richmond Domiciled and California hires from June 2016 to the current reporting month.

Table 5: Community Programs

Community Programs

\$48,000,000

Contributions to date (Of \$90 million total investment over 10 years)



richmond promise



solar one



job training



**greenhouse gas
reduction**



public safety programs



**competitive grant
program**



free internet access

Table 6: Cumulative Modernization Hires



Table 7: Cumulative Percentage Richmond Domiciled Modernization Hires

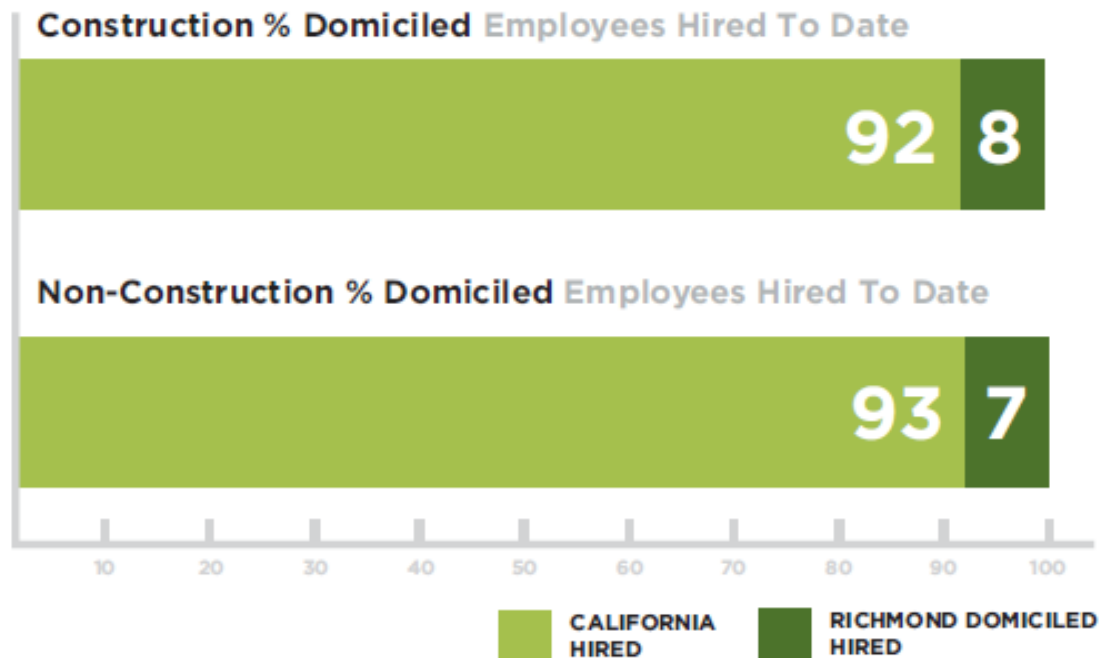
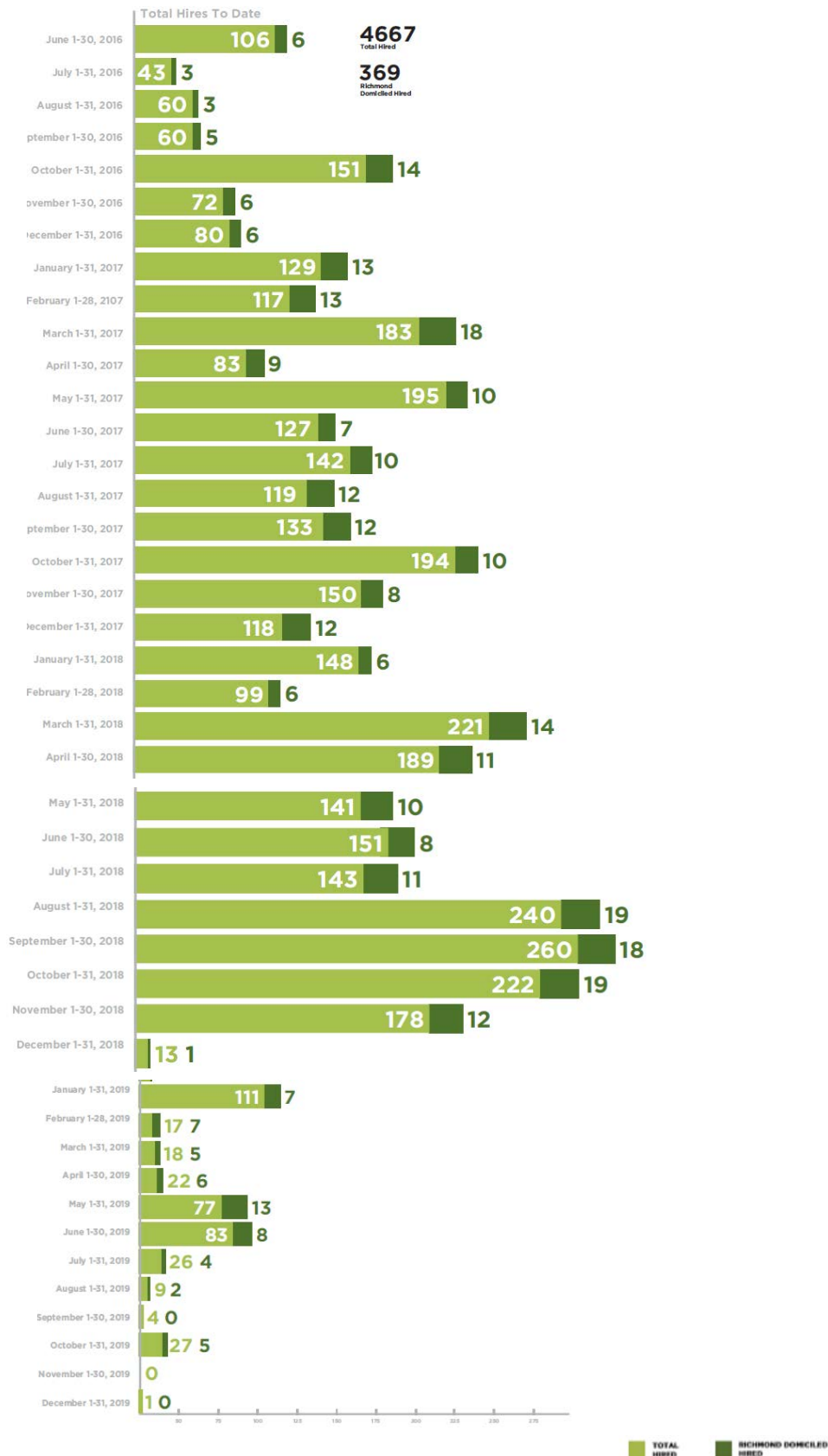


Table 8: Total Modernization Hires



ATTACHMENT 9

Project Operations Compliance Plan

**CHEVRON RICHMOND REFINERY MODERNIZATION PROJECT
CONDITIONAL USE PERMIT OPERATIONS COMPLIANCE PLAN**

August 30, 2018 (rev. 2 4/18/19)

LEAD AGENCY
CITY OF RICHMOND
450 CIVIC CENTER PLAZA
RICHMOND, CA 94804

INTRODUCTION

On July 29, 2014, the City of Richmond approved Conditional Use Permit and Design Review Permit No. PLN11-089 (“CUP”) for the Chevron Refinery Modernization Project (“Project”). Pursuant to CUP condition A9:

“Within six (6) months after approval of this Conditional Use Permit or prior to issuance of the first grading, fire construction, or building permit for the Modernization Project, whichever is earlier, Chevron shall submit a written plan describing how it will meet the requirements of each Condition of Approval. An independent auditor or other third-party expert selected by the City shall review the plan and shall advise the Planning and Building Services Department on whether or not Chevron's plan is reasonably likely to achieve compliance with each Condition of Approval. If the City is not satisfied with the compliance plan submitted by Chevron, Chevron shall cooperate in good faith with the City and its experts to modify the plan to satisfy the City. Chevron shall reimburse the City for any and all costs and expenses associated with the review of the plan and the auditor or third party's review and advice to the City regarding Chevron's written plan.”

The Conditions, Mitigation Measures, and Reliability Program components (collectively “CUP/MMRP”) can generally be divided into three categories: pre-construction, construction, and operations. Chevron submitted its pre-construction Compliance Plan on June 16, 2016 and provided an update to that plan on October 7, 2016. For status with the construction related components, please refer to the Annual Compliance Report submitted to the City of Richmond on March 31, 2018. This submittal serves as the Project’s Operations Compliance Plan and documents Chevron’s systems for compliance with each operations-related Condition of Approval, Mitigation Measure, and Reliability Program Component. Each condition of approval, mitigation measure, or Reliability Program requirement is identified next to the component of the compliance system pursuant to which implementation will be facilitated and tracked.

COMPLIANCE VERIFICATION - OPERATIONS¹

Compliance verification for the operations requirements will be managed by the **Refinery** and are described in this section, including structure and governance. The Refinery is divided into the following organizational divisions:

- Operations
- Maintenance and Reliability
- **Health, Environmental, and Safety (HES)**
- **Process Safety Management (PSM)**

¹ Terms which initially appear in bold are defined in the attached Glossary.

- Technical
- Strategic and Facilities Planning

In addition, the Refinery is supported by onsite corporate services including Human Resources, Procurement, Finance, Control and Information Systems, and Capital Projects.

The overall framework for compliance with the CUP/MMRP is the **Modernization CUP Compliance System**, which is intended to establish the compliance structure utilized to meet the requirements of the CUP/MMRP, and specifically the new operational limits associated with the no net increase (NNI) in **CAP** emissions, NNI in health risks from **TACs**, and no physical increase (NPI) in **GHG** emissions. All ongoing and future Project commitments associated with Refinery operations have been incorporated into the Refinery's compliance structure. This structure consists of the following elements:

- Programs of Compliance
- Tools and Applications
- Guidance Documents
- Written Plans

The Refinery utilizes these elements to maintain compliance where multiple organizations within the Refinery have roles and responsibilities. This system will reside on the Refinery's intranet webpage and is accessible to all Refinery personnel.

As Project components become operational, responsibility for compliance with CUP/MMRP requirements is turned over from the **Modernization Compliance Team** to the Refinery. The Refinery's **HES** and **PSM** organizations are staffed to provide monitoring, tracking and reporting of compliance with regulatory requirements and commitments using sustainable programs and systems. These organizations are supported by additional Refinery personnel, including Operations, Maintenance and Reliability, Planning, and Technical, as applicable.

A. PROGRAMS OF COMPLIANCE

The following new and existing programs will be utilized to implement the CUP/MMRP requirements:

1. **Crude Monitoring Program** [MM 4.3-6c, 6d, 4.13-7i, 4.13-7j; Reliability Program III.C1, C6, D1, E2, E3, H1, I2; IV.A]

Chevron has developed and implemented a Crude Monitoring Program that captures post-Project requirements for monitoring crude, including sulfur, TAN, mercaptans, metals, nitrogen, etc. This program establishes the processes needed to implement Reliability Program requirements, including additional reliability analysis and reporting. Specifically, the program outlines the roles and responsibilities for action owners responsible for monitoring the sulfur triggers in crude blends, which when reached, will require additional inspection and analysis needed to fulfill the requirements of the Reliability Program. In addition, the program specifies how monitoring of other components of crude, like TAN and mercaptans, will be achieved to meet reliability

reviews, reporting, and recordkeeping requirements. The following requirements are specifically incorporated in the program.

- a. Metals in feedstock and RFG [MM 4.3-6c]
 - b. Annual sulfur and nitrogen concentrations in feedstocks and RFG [MM 4.3-6d]
 - c. TAN [MM 4.13-7i]
 - d. Post-operations Sulfur triggers [III.C1, C6, D1, E2, E3, H1, I2; IV.A]
2. **Title V Permit Compliance System** [PC 24136; CUP B3, B4, B5, B6, D1, D2; MM 4.3-6a2]

Modernization **Authority to Construct (ATC)** Permit Condition 24136 and other associated compliance requirements that specify operational limits are incorporated into the Refinery's Title V Air Permit and its compliance system. The refinery also monitors uses these Title V compliance systems to monitor Project utilization rates. This system includes the following elements, which are each managed by Refinery HES staff, and supported by Refinery personnel, including Operations and Maintenance, as applicable.

- **Critical Environmental Variables (CEVs)**
 - **Continuous Emissions Monitoring System (CEMS) and Parametric Monitoring System (PMS)**
 - Source Testing
 - **Leak Detection and Repair Program (LDAR)**
 - Commissioning Plan
 - Routine Duties
 - **Flare Minimization Plan**
 - Title V Compliance reporting database
3. **Fixed Equipment Asset Strategies** [CUP G1, G5; Reliability Program II.2, II.3, III.C7, D3, E1, E4, E7, H, I3, I4, IV.B.; MM 4.13-13h]

Chevron's Fixed Equipment Asset Strategy (FEAS) program is designed to prevent and mitigate losses of containment in **fixed equipment** by developing inspection strategies specific to the equipment and the service. Manufacturing Standard 525, or MFG 525, Fixed Equipment Asset Strategies Standard describes the process the Refinery utilizes to create and maintain these strategies. Elements of the program include:

- **Damage Mechanism Reviews (DMR)**
 - A Chevron work process that requires a multidiscipline team to:
 - Identify damage mechanisms for piping and equipment.
 - Evaluate existing safeguards and mitigations for the applicable damage mechanisms.
 - Develop recommendations for improving safeguards and mitigations.
- **Integrity Operating Windows (IOWs)**

Established limits for process variables (parameters) that can affect the integrity of the equipment if the process operation deviates from the established limits for a predetermined length of time (per API RP 584) and provides notifications when such deviations occur. Includes Critical, Standard, and Informational IOWs.

- **Circuit Analysis**

A Chevron work process that requires a multidiscipline team to determine:

- o Total potential condition monitoring locations (CMLs) for each applicable damage mechanism and the percentage of total potential CMLs to select for inspection,
- o Initial (if required) and subsequent inspection intervals of selected CMLs,
- o Additional CMLs that require monitoring due to high corrosion rates or low remaining life or to comply with jurisdictional requirements, Chevron best practices, or other documentation on inspection requirements.

- **Condition Monitoring Locations (CMLs)**

Designated areas on assets where periodic examinations are conducted; also known as thickness monitoring locations (TMLs).

- **Inspection, Testing, and Preventative Maintenance (ITPM)**

A documented component of an asset strategy that consists of the complete list of surveillance, predictive maintenance and non-intrusive tasks that help ensure risk mitigation to the approved level for the asset. Tasks are listed with description, interval, responsible personnel, and references to acceptance criteria.

4. **Richmond Industrial Safety Ordinance (RISO) Compliance Systems** [MM 4.13-7a, 13c; II, IV.F.2,]

Chevron leverages compliance systems for RISO where overlap exists between the mitigation measures and the RISO. RISO compliance mechanisms ensure sustainability and consistency with the mitigation measures.

B. TOOLS AND APPLICATIONS

New and existing tools and database applications have been created or modified to meet compliance with the CUP/MMRP. These tools are being utilized to calculate emissions, schedule and verify task completion, and manage existing Refinery databases to perform work. These tools include:

1. **Operations Emission Tracking Tool (OETT)** [MM 4.3-5, 6a, 6b; MM 4.8; CUP B12]

Chevron worked with Ramboll, the City's environmental consultant, to develop an operations emissions tracking tool (OETT), which when finalized will provide the method pursuant to which Chevron will report on its compliance with its commitment to no net increase in CAP emissions, no net increase in health risks from TACs, and no physical increase in GHG emissions. An OETT guidance document has been created to ensure consistency in the use of the tool and identifies the responsible parties and action items needed to perform periodic emissions calculations throughout the calendar year. An Environmental Specialist within the HES organization will monitor emissions data

and inform Planning of the results to facilitate operational compliance. The OETT will enable Chevron to report project emissions to the City on an annual basis.

2. **Essential Suite Compliance Module** [All future and ongoing requirements, including CUP B1, B11; MM 4.8-2; ECIA 2.B, IV.D]

Compliance tasks have been created and uploaded into the Refinery's Essential Suite Compliance Module which assigns tasks to appropriate Refinery personnel to manage compliance with ongoing and future requirements, including periodic reports, monitoring, and inspections. This program tracks completion of assigned periodic tasks (eg. monthly, quarterly, yearly) and provides accountability through a management reporting structure. The Essential Suite Compliance Module is managed by HES staff, and supported by Refinery personnel, including Operations and Maintenance, as applicable. All assigned tasks in Essential Suite are monitored using OERI (see number 7 below) which is a dashboard tool viewable to Refinery personnel. On an approximately monthly basis, refinery management reviews tasks for completion.

3. **Scheduling Databases** [CUP G1, III.C7, E1, E4, I3, I4]

The Refinery utilizes a turnaround database to manage work needed to be completed during scheduled turnaround events. A routine work order database is used to manage routine maintenance work performed when the process facility is online. Another database is used to schedule and document ultrasound and X-ray inspections. Follow-up inspections required by the Reliability Program have been incorporated into these databases, as appropriate, to manage and schedule the completion of these inspections.

4. **Process Monitoring and Optimization Tool (PMO)** [CUP G1, III.C.8, III.D3, E7, F]

Chevron uses Process Monitoring and Optimization Tool (PMO) for each process unit to monitor process conditions to provide data concerning optimization, as well as reliability and environmental conditions. This data is also considered as part of the Unit Reliability Brief (URB) meetings which are attended by **Area Business Unit** management and subject matter experts in the areas of reliability and operations to review reliability topics relative to current operation.

5. **Permasense® Monitors** [III.B, C2, E5]

Chevron has installed and upgraded 118 Permasense® monitors in the Crude Unit and is planning for the installation of 25 monitors in the Solvent Deasphalting (SDA) Unit, scheduled for 2Q2019. Permasense® is continuous monitoring ultrasonic thickness gauge monitors that are utilized by the Refinery to monitor pipe thickness. Chevron has also developed an asset strategy to ensure the long-term maintenance of this equipment.

6. **Crude Acceptance Tool** [MM 4.13-7i; III.C10]

The Refinery utilizes a Crude Acceptance Tool in evaluating new crudes and crude blends. This tool assists Planning in determining if crude blends and resulting products are within specifications for the downstream processing units. Chevron has incorporated its TAN limits and mercaptan flags into this tool in order to fulfill its obligations for reliability review and reporting.

7. **OERI** [Future and ongoing requirements]

OERI is a reporting tool that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery's information management systems. The Refinery uses OERI to track completion of its compliance obligations.

C. GUIDANCE DOCUMENTS

Guidance documents have been created to document the technical basis of how the Refinery will comply with specific requirements. These documents are utilized by subject matter experts (SME) to meet compliance requirements and ensure long-term sustainability of the compliance programs built to meet the CUP/MMRP obligations. They reference the roles and responsibilities for key personnel to maintain compliance. Guidance documents developed for the Project include:

1. **Annual Compliance Report Guidance Document** [CUP G2, H5]

A guidance document for the preparation of the Annual Compliance Report was developed to summarize all elements of the report and associated requirements. The document covers the items to include in the report necessary for the City of Richmond to prepare for the annual presentation to the Planning Commission.

2. **Annual Reliability Program Report Guidance Document** [MM 4.13-7a, 7c, 7i, 7j, 13f, 13h; IV.H]

A guidance document for preparation of the Annual Reliability Program Report was developed to summarize all elements of the report and associated requirements that its intended to cover. The document references roles and responsibilities for each of the reporting requirements so that the report facilitator within the Refinery's HES or PSM organization can organize submittal of this report.

3. **OETT Guidance Document** [MM 4.3-5, 6a, 6b; MM 4.8; CUP B12]

A guidance document for maintaining the OETT is being developed and will ultimately encompass the final OETT functionality to assure consistent and timely updates in order to track Facility emissions and compliance with the NNI and NPI commitments. This document lays out each step necessary to update the tool on a routine basis and the origin of each data set. The document also summarizes quality checks and reporting obligations.

4. **IOW Reporting Guidance Document** [4.13-13h]

A guidance document was developed for reporting IOW level one alerts within one week of the alert and IOW2 alerts if process temperature exceeds the established temperature for a cumulative 365 days. The document provides a template for reporting within one week, methods for obtaining the data to include in the report, and for quality assuring the data.

5. **RI-434 Agency & Internal Communications, Notifications, and Reporting** [CUP E1; MM 4.13-5c, 4.3-8a, 8b, 8c, 8d, 8e]

Refinery Instruction 434, RI-434, Agency & Internal Communications, Notifications, and Reporting has been updated to include reporting of spills and releases, flaring events, and odor complaints.

a. Spill and release [MM 4.13-5c]

Chevron reports all spills and releases of hazardous materials or hazardous waste to the environment, including those from the transportation of those materials, within 48 hours to the City, and to the other appropriate regulatory agencies in accordance with the timing and other notification and reporting requirements prescribed by the applicable laws and regulations. Chevron updated its existing RI-434 to include reporting of this existing notification requirement to the City of Richmond.

b. Flaring [CUP B1]

Notifications required under BAAQMD Regulation 12 Rule 12-405 are also made to the Richmond Police and Fire dispatch and a phone call with this information is also placed to the Richmond Planning Division Senior Planner. Chevron updated its existing RI-434 to include reporting of this existing notification requirement to the City of Richmond.

c. Odor complaints [MM 4.3-8a, 8b, 8c, 8d, 8e]

The Refinery's Odor Management Team manages tracking and resolution of all odor complaints. Chevron has implemented RI-434 which details the communication process for investigating and reporting outside odor complaints. This process has been modified to track, when confirmed, complaints related to hydrogen sulfide, ammonia, or an unspecified compound or source. RI-434 details the roles and responsibilities for response and reporting of odor complaints.

6. RI-506 Refinery Hazardous Waste Management [MM 4.13-4e]

The Refinery utilizes Refinery Instruction 506, RI-506, Refinery Hazardous Waste Management for management and disposition of spent catalyst which includes compliance with re-use and recycle requirements. Chevron will comply with recordkeeping and reporting requirements as specified.

7. List of Referenced Reliability Program Documents [IV.E]

The Refinery has developed a list of all referenced programs, procedures, and refinery documents used and maintained for compliance with requirements of the Reliability Program. This list is maintained by the Refinery's HES organization, and will transition to the PSM organization over longer term operation of Modernization.

8. California State Lands Commission (CSLC) Reports [MM 4.13-5a]

Mitigations from the Long Wharf EIR are provided in reports to the CSLC pursuant to Chevron's 2009 lease with CSLC. Copies of the reports are available from CSLC or Chevron.

D. WRITTEN PLANS [MM 4.9-7, 4.13-4c, 4d]

1. Flood Contingency Plan

Within five years of construction completion, Chevron will retain qualified professionals to develop a Facility flood contingency plan that addresses all types of coastal flooding (i.e., storm-related flooding, extreme high tides, and tsunamis) and how these coastal flooding hazards will increase over time due to sea level rise. The contingency plan will be submitted to the City of Richmond for review and approval.

2. Hazardous Materials Business Plan

Chevron submitted written confirmation of CCHS's acceptance of Chevron's hazardous materials business plan that incorporates the new hydrogen plant to the City of Richmond Building Department on April 3, 2019.

3. Spill Prevention, Control, and Countermeasures Plan (SPCC)

Chevron has completed a revision to its SPCC Plan prior to the regulatory deadline and will continue to revise the Plan in the future as required by 40 CFR Part 112.

4. Emergency Response Plan (ERP)

The Facility Emergency Response Plans have been updated and will continue to be updated as required. In addition, a pre-incident scenario addressing the new Hydrogen Plant emergency response needs has been prepared and reviewed in detail within the Refinery. CCHS verified implementation of the ERP in August 2018.

E. TRAINING

Training on the above elements of the Program has been developed and conducted for key personnel including HES, PSM, Refinery Leadership Team, Operations, Maintenance and Reliability, Technical, and general Refinery personnel. The training elements include:

1. Computer Based Training (CBT) [all future and ongoing requirements]

Computer Based Training of the Program has been developed for initial and periodic refresher training of the key elements of ongoing requirements associated with the CUP and MMRP.

2. Face-to-face Training [all future and ongoing requirements]

Onboarding face-to-face training is in development for key personnel responsible for oversight and implementation of compliance requirements.

3. Other Training

- a. Fitness for Service Training [applicable Reliability Program components]
- b. Emergency Response Training for emergency responders has been developed and implemented on an annual basis. [MM 4.13-7f, 11b, 11c; 4.14-2]
- c. Training of operators in Emergency Operating Procedures has been completed prior to the commencement of Modernization Project operations and will continue on a routine basis through the **Operator Training Program**. [MM 4.13-11b]

GLOSSARY

A glossary of acronyms and other terms used throughout the Appendices has been provided.

GLOSSARY

ABUM or Area Business Unit Manager is a job title within Richmond Refinery line operations. Area Business Unit Manager duties can include ownership and management of business initiatives within a Business Unit or Division.

API or American Petroleum Institute is a trade association for the oil and gas industry. API develops a number of technical standards for the oil and gas industry to enhance safety and assure quality.

API 570 is the API Recommended Practice for piping inspection code.

API 571 is the API Recommended Practice for damage mechanisms affecting fixed equipment in the refining industry.

API 578 is the API Recommended Practice providing guidance and standards to the oil industry for positive materials identification.

API 584 is the API Recommended Practice providing guidance and standards to the oil industry for Integrity Operating Windows.

ATC or Authority to Construct is an air permit issued by the **BAAQMD** authorizing the Facility to construct and operate a permitted project. The ATC outlines emission limits and standards, monitoring, reporting, and recordkeeping compliance requirements for the permitted equipment and emission sources.

BAAQMD is the Bay Area Air Quality Management District and is the agency which oversees the Title V Permit program.

CalARP is the California Accidental Release Prevention Program.

CalOSHA is the California Occupational Safety and Health Administration.

CAP is Criteria Air Pollutants which include nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxides (SO₂), particulate matter (PM).

CARB is California Air Resources Board.

CCHS is Contra Costa County Health Services

CEMS or Continuous Emission Monitoring System is the total equipment necessary for the determination of a gas or particulate matter concentration or emission rate using pollutant analyzer measurements and a conversion equation, graph, or computer program to produce results in units of the applicable emission limitation or standard. [Source: <https://www.epa.gov/emc/performance-specifications-and-other-monitoring-information>]

CEVs or Critical Environmental Variables are environmental-related process monitoring conditions, including emissions as monitored through a CEMS, that inform Operations to maintain compliance with Title V requirements.

CFR is the Code of Federal Regulations.

Circuit is a section of piping that is exposed to a process environment of similar corrosivity or expected damage mechanisms and is of similar design conditions and construction material (per API 570). Other pressure equipment types can be broken into multiple circuits depending on potential corrosion mechanisms.

CSLC is the California State Lands Commission.

Compliance Assurance is a Chevron OE process by which compliance with all internal and external regulatory practices can be measured and assured.

CBT is Computer Based Training.

CMLs or Condition Monitoring Locations are designated areas on assets where periodic examinations are conducted.

Crude Acceptance Tool is a tool utilized to ensure all process, reliability, and compliance constraints are considered when evaluating a new crude.

Damage Mechanism is any type of deterioration encountered that can result in flaws or defects that can affect the integrity of an asset, i.e. corrosion, cracking, erosion, dents, and other mechanical, physical, or chemical impacts. See **API 571** for a comprehensive list and description of damage mechanisms.

DMR or Damage Mechanism Reviews is a Chevron work process performed by a multidiscipline team to identify damage mechanisms for piping and equipment, evaluate existing safeguards and mitigations for the applicable damage mechanisms, and develop recommendations for improving them.

DTSC is the California Department of Toxic Substances Control which governs hazardous waste laws.

EPA or US EPA is the United States Environmental Protection Agency.

ERP is Emergency Response Plan

Essential Suite® Compliance Module is the Chevron enterprise standard tool selected for Compliance Assurance. Essential Suite® is provided by IHS, Inc., based in Englewood, Colorado. IHS provides business software for management of Health, Environment, and Safety requirements [subsidiaries include Carfax and Jane's Information Group].

Chevron also uses Essential Suite® Waste and Air modules at an enterprise level for waste management and air emissions reporting, respectively.

Essential Suite® Compliance Module features-

- Manages regulatory register of requirements, controls, and tasks.
- Tracks assigned owners of requirements
- Provide e-mail notifications of tasks due and status
- Enables report generation and verification
- Enables auditing of compliance assurance performance
- Integration with CyberRegs® web-based regulatory database maintains updated regulatory references

Facility as used in the Modernization Project Final Environmental Impact Report refers to the Refinery and associated transportation sources (e.g., Long Wharf).

Fixed equipment includes pressure vessels, boilers, on-plot and off-plot piping (including valves), atmospheric storage tanks, and furnaces within Chevron-operated refineries.

Fixed Equipment Asset Strategy or FEAS is Chevron's plan for the inspection, testing, preventative maintenance, routine duties, and other tasks that are required to maintain the function of fixed equipment. This strategy is defined in Manufacturing Standard, MFG 525.

Flare Minimization Plan is a BAAQMD-regulated plan which details how the Facility will plan and execute, including minimizing, its flaring activities, planned and unplanned.

GHG is Greenhouse Gases which refer to gases that trap heat in the atmosphere including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases.

Guidance document is a written document used to explain internal practices.

HES organization refers to the Refinery personnel responsible for the development and implementation of compliance programs to meet HES requirements including EPA, CARB, CLSC, BAAQMD, DTSC, and **RWQCB** regulations.

ITPM or Inspection, Testing, and Preventative Maintenance is a documented component of an asset strategy that consists of the complete list of surveillance, predictive maintenance, and non-intrusive tasks that help ensure risk mitigation to the approved level of the asset. Tasks are listed with description, interval, responsible personnel, and references to the acceptance criteria.

IOWs or Integrity Operating Windows establishes limits for process variables (parameters) that can affect the integrity of the equipment if the process operation deviates from the established limits for a predetermined length of time (per **API 584**). Includes critical, standard, and informational IOWs.

ISS or Inherently Safer Systems refers to systems used in process industries which seek to reduce or eliminate hazards over controlling them.

LDAR or Leak Detection and Repair is a program regulated by EPA for monitoring and repairing equipment components that may emit air contaminants. Components may include pumps, pipe connectors, flanges, valves, drains, and pressure-relief devices (PRD).

LOPA or Layer of Protection Analysis is a methodology for hazard evaluation and risk assessment.

Maximo is a tool utilized by the Refinery to schedule and track completion of routine maintenance activities and tasks.

MFG or Manufacturing Standard refers to internal Chevron instructions for compliance with rules, regulations, practices, or instructions affecting more than one facility or refinery. Manufacturing Standards are issued and maintained by Chevron Global Manufacturing.

MOC or Management of Change is a PSM process which details how the Facility will manage changes to its processes or organization. The Refinery utilizes Refinery Instruction (RI) 370 to manage its MOC program.

Modernization Compliance Team is a team of subject matter experts in HES, PSM, and Compliance Assurance put in place during the Richmond Modernization Project construction and commissioning to provide support for Chevron's compliance with the Modernization Conditional Use Permit.

Modernization CUP Compliance System establishes the compliance structure that will be utilized to meet the requirements of the CUP/MMRP, and specifically the new operational limits associated with the no net increase in CAP emissions, no net increase in health risks from TACs, and no physical increase in GHG emissions. The system also references other materials that have been developed to assist the refinery in maintaining compliance with these requirements. This system will reside on the Refinery's intranet webpage and is accessible to all Refinery personnel.

NPDES or National Pollutant Discharge Elimination System, refers to the Refinery's water effluent permit, which is managed within the Refinery environmental staff.

OA or Operating Assistant is a job title within Richmond Refinery line operations. Operating Assistant duties can include ownership and management of business initiatives within a Business Unit or Division.

OERI or Operational Excellence Reliability Intelligence is a reporting tool that tracks various metrics, including safety, operations, and reliability metrics, by automatically pulling data from the Refinery's information management systems. These systems contain information pertaining to (1) reliability, including design safety and inspection schedules and history, and (2) maintenance management data, including the status of preventative maintenance and safety activities. OERI also tracks the Management of Change process, PHA process recommendations, and regulatory compliance action items.

Operations Emission Tracking Tool or OETT is the Excel-based tool developed in conjunction with the City's third-party environmental consultant to be utilized by the Refinery to track emissions for compliance with CUP/MMRP requirements, including the no net increase in CAP emissions and no physical increase in GHG emissions.

Operator Training Program is the Refinery's program for training new and experienced operators and maintaining qualified operators in the Refinery. The Program includes periodic CBT, face-to-face training, and simulator training methods.

Permasense® is a corrosion monitoring system technology used in the Refinery which provides corrosion detection and monitoring data on piping circuits. These systems include permanently installed ultrasonic corrosion monitoring devices which use waveguide technology to allow them to operate in high temperature environments while being intrinsically safe. The sensors communicate using wireless technology, which includes creating a self-forming and self-managing wireless mesh, to provide continuous wall thickness measurements.

PHA or Process Hazards Analysis is a hazard assessment associated with an industrial process. The Refinery utilizes Refinery Instruction (RI) 363 to manage its PHA process.

PMO or Process Monitoring and Optimization is an Excel-based tool owned and maintained by Process Engineers assigned to ABU to monitor and track process variable concerning optimization, reliability, and environmental conditions of the process unit.

PMS or Parametric Monitoring System measures a parameter that is a key indicator of system performance. The parameter is generally an operational parameter of the process or the air pollution control device that is known to affect the emissions levels from the process or control efficiency of the APCD. Examples of parametric monitoring include temperature, pressure, or flow rate monitoring. [Source: <https://www.epa.gov/air-emissions-monitoring-knowledge-base/basic-information-about-air-emissions-monitoring>]

PSM or Process Safety Management refers to a set of OSHA regulations focused on managing hazards associated with process industries.

PSM Organization refers to the Refinery personnel responsible for the development and implementation of compliance programs to meet PSM including CalARP, CalOSHA, and RISO regulations.

Refinery is the Chevron Richmond Refinery.

RI or Refinery Instruction refers to internal Chevron instructions for compliance with rules, regulations, practices, or instructions affecting more than one Business Unit or Division within a specific refinery. Richmond Refinery Instructions are issued and maintained by the Richmond Refinery.

RISO is the Richmond Industrial Safety Ordinance (R.M.C. Article VI Chapter 6.43).

RWQCB or Regional Water Quality Control Board refers to the California San Francisco Bay Regional Water Quality Control Board.

SIS or Safety Instrumented Systems refers to process systems with hardware and software controls designed to avoid adverse operation which could result in health, safety, or environmental consequences.

SPCC represents Spill Prevention, Control, and Countermeasure.

Title V Permit Compliance System refers to the Refinery's system for ensuring compliance with the facility's Title V air permit. This system includes monitoring, recordkeeping, and reporting elements.

- Monitoring elements include, but are not limited to: automatic alarms and alerts for Title V permit limits; operational verifications for continuous emission monitors and parametric analyzers; source testing; Operator routine duties; and leak detection and repair program
- Reporting elements include but are not limited to: semi-annual and annual certifications; monthly reports on flare monitoring, continuous emission monitors, ground level monitors, and permit deviations; and notifications for compliance activities, including inoperative monitors, emissions excesses, permit deviations, and start-ups and shutdowns of specified units.

Turnaround refers to refinery maintenance turnarounds which are planned and scheduled events where a process unit or multiple units are taken off-line so that equipment can be inspected, and maintenance performed. Construction projects, or portions of projects, may be executed during a turnaround when equipment or tie-in points become available.

Turnaround Database is a tool utilized by the Refinery to schedule and track completion of turnaround-related activities or tasks.