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Vice President Commerce City Refinery
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SUNCOR ENERGY (U.S.A.) INC.
Commerce City Refinery
5801 Brighton Boulevard
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April 12, 2021

VIA FIRST CLASS MAIL AND E-MAIL

Enforcement Unit Supervisor
Colorado Department of Public Health and Environment
APCD-SS-B1-1400
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

First Assistant Attorney General
Air Quality Unit
Colorado Department of Law
1300 Broadway, 7th Floor
Denver, Colorado 80203

Re: **Final Report Pursuant to Compliance Order on Consent, Case No. 2019-097 and 2019-194**

Messrs. and Mesdames:

On behalf of Suncor Energy (U.S.A.) Inc. ("Suncor"), I am pleased to submit this Final Report pursuant to our March 6, 2020 settlement agreement with the Colorado Department of Public Health and Environment ("CDPHE"), Compliance Order on Consent, Case No. 2019-097 and 2019-194 ("COC"), to resolve air compliance issues during the 2017-2019 period.

As part of the settlement, Suncor agreed to retain a qualified third-party contractor ("Contractor") to conduct an investigation (the "Investigation") into the root causes of emissions exceedances at the Commerce City Refinery (the "Refinery") during this period and to make recommendations to minimize or prevent such emissions exceedances in the future, with a particular focus on the Refinery's fluid catalytic cracking units used to make gasoline ("FCCUs") and its sulfur recovery units ("SRUs").

Following the Investigation, paragraph 51 of the COC requires Suncor to submit to CDPHE a final report that includes a summary of the causes and recommendations identified by the Contractor in the Investigation. The COC also requires Suncor to include a proposed implementation plan (the "Implementation Plan") that identifies the recommendations to be implemented by Suncor (including the reasons for selection) and the timeline for implementation, provided that "Suncor shall not be

obligated to spend more than five million dollars ($5,000,000.00) in aggregate in the implementation of the Implementation Plan." COC, ¶ 51.

Pursuant to the COC, Suncor retained, with CDPHE's approval, the global consulting firm Kearney to complete the Investigation and make recommendations. That work has been completed. Suncor is including three attachments to this Final Report, all of which Suncor will make publicly available in furtherance of Suncor's commitment to increased transparency in connection with our operations.

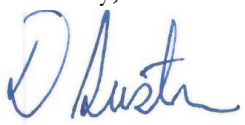
A. **Kearney Investigation Report**. Kearney's "Third-Party Root Cause Investigation" report is included as Attachment A. As detailed in Kearney's report, the Investigation found that Suncor's Refinery is designed to meet environmental permits and is adequately funded. It also found there are some areas where we can improve the safety and reliability of our systems and processes, increase training for our people, and foster a culture based on trust and confidence, making eight recommendations.

B. **Suncor's Implementation Plan.** Suncor's "Implementation Plan" as required by the COC is submitted herewith and included as Attachment B. Among its recommendations, the Kearney report prioritized first the "installation of emergency shutdown equipment" (particularly for the Plant 2 FCCU) under its recommendation No. 7, describing it as one of the initiatives that "will have the most significant long-term impact on operational integrity and minimizing or preventing future emissions violations." Accordingly, in the Implementation Plan, Suncor's focuses on the installation of upgraded automated unit shutdown capability for both the Plant 1 and Plant 2 FCCUs at the Refinery. Suncor will complete the installation upgrades through three projects, **at a total cost of approximately twelve million dollars ($12,000,000)**, far exceeding Suncor's obligations under paragraph 51 of the COC. The Plant 2 improvements alone will cost more than ten million dollars ($10,000,000).

C. **Additional Voluntary Measures**. Suncor also is voluntarily undertaking a number of additional actions in response to Kearney's other recommendations. We have included a summary of these "Voluntary Measures" as Attachment C. While not required by or subject to the COC, Suncor is taking these Voluntary Measures as part of our journey to improve our performance and continue to regain the public's trust. These Voluntary Measures will enhance our processes, strengthen the capabilities of our employees, and continue to expand and reinforce a culture focused on safety and environmental responsibility above all else.

We thank you for your time and commitment to supporting us in the execution of our Implementation Plan and Voluntary Measures. Please reach out to me directly if you have any questions.

Sincerely,



Donald Austin
VP Commerce City Refinery

Attachments A, B, and C

Implementation Plan

I. Introduction.

On March 6, 2020, Suncor Energy (U.S.A.) Inc. ("Suncor") and the Colorado Department of Public Health and Environment ("CDPHE") entered into a settlement regarding air compliance issues duringthe 2017-2019 period. As part of the settlement, memorialized in Compliance Order on Consent, Case No. 2019-097 and 2019-194 (the "COC"), Suncor agreed to retain a qualified third-party contractor ("Contractor") to:

- Perform an investigation (the "Investigation") to determine the causes of certain emissions exceedances during the period of July 1, 2017 through June 30, 2019; and
- Make recommendations to minimize or prevent further reoccurrences of the emissions exceedances at the Commerce City Refinery Plant 1 and 2 Fluid Catalytic Cracking Units ("FCCUs") and Plant 1 and Plant 2 Sulfur Recovery Units ("SRU's).

Suncor retained, and CDPHE approved, the global consulting firm Kearney to complete the Investigation and make recommendations. As required by paragraph 51 of the COC, Suncor has submitted the Final Report, as well as the Implementation Plan.

Section III of this document (the "Implementation Plan") identifies the recommendations to be implemented by Suncor (including the reasons for selection) and the timeline for implementation pursuant to the COC, which providesthat "Suncor shall not be obligated to spend more than five million dollars ($5,000,000.00) in aggregatein the implementation of the Implementation Plan."

The Implementation Plan in Section III proposes to address Kearney's recommendation number 7 with respect to the installation of upgraded automated unit shutdown capability in both the Plant 1 and Plant 2 FCCU at the Refinery. Suncor will complete the installation through two projects, **at a total cost of approximately twelve million dollars ($12,000,000)**[1], far exceeding Suncor's obligations under paragraph 51 of the COC. The Plant 2 improvements alone are estimated to cost more than ten million dollars ($10,000,000).

These upgrades are designed to further increase the reliability and speed of the automated shutdown processes in the Plant 1 and Plant 2 FCCUs, and reduce the potential and severity of future catalyst releases.

II. Background Information.

As background, a fluid catalytic cracking unit ("FCCU" or "cat cracker") is a large piece of refinery equipment used to make gasoline. In this unit, hydrocarbons are "cracked" (breaking down complex molecules or long chain hydrocarbons into simpler molecules or light end hydrocarbons) in the presence of catalyst particles (predominantly clay and sand) to make gasoline. The pressure balance inside an FCCU is very important. When that pressure is out of balance, catalyst can escape from theFCCU, resulting in white or colored "smoke" or "dust."

[1] All cost estimates are +/- 25%.

The Commerce City Refinery experienced significant catalyst releases from the Plant 2 FCCU (also called the #2 FCCU) in December 2019 and March 2020.

Following the March 2020 catalyst release from the Plant 2 FCCU, Suncor completed the installation and commissioning of an automated shutdown system within the Distributed Control System ("DCS") in the Plant 2 FCCU. The DCS is a computerized process control system within the Refinery.

Automating the Plant 2 FCCU shutdown eliminates the need for operator intervention to initiate a shutdown of the unit in the event of a pressure imbalance in the Plant 2 FCCU. Accordingly, it increases the speed of a unit shutdown and significantly reduces the potential and severity of future catalyst releases from the Plant 2 FCCU.

The installation of the DCS in the Plant 2 FCCU and the costs associated with this work are not included in the Implementation Plan, and are discussed here for background information only.

III. Implementation Plan.

Under this Implementation Plan, Suncor commits to spending five million dollars ($5,000,000.00) in aggregate in qualified costs under the COC to install upgraded automated unit shutdown capability in both the Plant 1 FCCU and Plant 2 FCCU at the Refinery as provided in Section (1)(a) and Section (2)(b) below. Suncor also commits to providing CDPHE sufficient documentation to demonstrate satisfaction of Suncor's obligations under paragraph 51 of the COC pursuant to Section (1)(c) and Section (2)(c) below.

These upgrades were selected because the "installation of emergency shutdown equipment" was prioritized by Kearney in its report under its recommendation number 7, describing it as an initiative that "will have the most significant long- term impact on operational integrity."

(1) Installation of PLC in Plant 2 FCCU and Upgrade Valves.

(a) Plant 2 PLC and Valve Upgrades. By December 31, 2022, Suncor will upgrade the Plant 2 FCCU to include a Programmable Logic Controller (PLC) as well as upgraded instrumentation, automated shutdown valves, and new hydraulic pressure units.

(b) Estimated Costs. The estimated cost of these upgrades is more than ten million dollars (U.S.$10,000,000), which includes estimated costs for (i) procurement of equipment and construction material, (ii) third party engineering costs, (iii) third party construction costs, and (iv) a contingency allocation. These estimates are +/- 25%.

(c) Documentation. Suncor will provide CDPHE sufficient documentation to demonstrate that the costs of the upgrades are qualified and meet its obligations under paragraph 51 of the COC.

(d) Reasons for Deadline. The deadline in Section (1)(a) above was determined based on several factors, including: (i) in 2021, Suncor is completing its turnaround of

Plants 1 and 3, (ii) the Plant 2 FCCU will need to be brought down to complete the work and the best window to do that will be in 2022, (iii) the procurement of certain required equipment has been delayed due to COVID 19 related impacts, and (iv) this deadline provides for some flexibility in the event of further delays or unforeseen events that may require the work to be pushed to later in 2022.

(2) Upgrading the Automated Shutdown System in the Plant 1 FCCU.

(a) Plant 1 FCCU Automated Shutdown Upgrades. By June 30, 2021, Suncor will upgrade the automated shutdown system in its Plant 1 FCCU (which already has a PLC) by installing upgraded instrumentation, automated shutdown valves, and new hydraulic pressure units.

(b) Estimated Costs. The estimated cost of these upgrades is more than two million dollars (U.S.$2,000,000), which includes estimated costs for (i) procurement of equipment and construction material, (ii) third party engineering costs, (iii) third party construction costs, and (iv) a contingency allocation. These estimates are +/- 25%.

(c) Documentation. Suncor will provide CDPHE sufficient documentation to demonstrate that the costs of the upgrades are qualified and meet its obligations under paragraph 51 of the COC.

(d) Reasons for Deadline. The deadline in Section (2)(a) above was determined based on the scheduled end of Suncor's turnaround for Plants 1 and 3, during which these upgrades will be performed.

Voluntary Measures

I. Background

On March 6, 2020, Suncor Energy (U.S.A.) Inc. ("Suncor") and the Colorado Department of Public Health and Environment ("CDPHE") entered into a settlement regarding air compliance issues during the 2017-2019 period. As part of the settlement, memorialized in Compliance Order on Consent, Case No. 2019-097 and 2019-194 (the "COC"), Suncor agreed to retain a qualified third-party contractor to:

- Perform an investigation (the "Investigation") to determine the causes of certain emissions exceedances during the period of July 1, 2017 through June 30, 2019; and
- Make recommendations to minimize or prevent further reoccurrences of the emissions exceedances at the Commerce City Refinery Plant 1 and 2 Fluid Catalytic Cracking Units ("FCCUs") and Plant 1 and Plant 2 Sulfur Recovery Units ("SRUs).

Suncor retained, and CDPHE approved, the global consulting firm Kearney to complete the Investigation and make recommendations.

The Investigation found that the Commerce City Refinery is designed to meet environmental permits, and is adequately funded. It also found there are some areas where we can improve the safety and reliability of our systems and processes, increase training for our people, and foster a culture based on trust and confidence.

Accordingly, Kearney made eight (8) recommendations. Suncor addresses Kearney's Recommendation Number 7, the installation of upgraded automated shutdown capability, in its Implementation Plan submitted pursuant to the COC.

Separately, Suncor is voluntarily taking a number of actions in response to Kearney's remaining recommendations. Below, Suncor provides a summary of Kearney's remaining recommendations, and Suncor's voluntary actions to address them. Suncor has listed the recommendations as they appear in Kearney's report, which follow the order of its methodology, not in order of importance. In addition, Suncor has grouped some of the inter-related recommendations and our actions together.

II. Voluntary Measures

Kearney Recommendations 1 and 5: These Recommendations state that Suncor should continue to expand and reinforce a culture focused on safety and environmental responsibility, operational discipline, and compliance with procedures. They recommend collaboration with Suncor technical experts, and reinforcing operations department accountability for operating procedure development, management of associated changes, communication, and training.

Actions:

- The Commerce City Refinery is taking a number of actions to reinforce a culture of safety and environmental compliance and re-focus on Suncor's five operational discipline behaviors in how we lead and work every day, which are to (i) seek knowledge & understanding, (ii) surface problems, (iii) adhere to procedures, (iv) collaborate, and (v) expect accountability. For example:

- **Seek knowledge and understanding.** The Refinery is beginning an environmental controls review, which includes a review of alarms and pre-alarms and associated operating procedures.
- **Using a questioning attitude to surface problems.** The Refinery has begun to use a software program in support of its Process Hazard Analyses ("PHAs"). PHAs identify risks and evaluate the effectiveness of controls and responses. The program enables the Refinery to use expertise and experience from other Suncor facilities to surface issues and better sequence and prioritize recommended actions.
- **Improve adherence to procedures.** The Refinery has implemented changes to reinforce accountability for current operating procedures and introduce knowledge checks to confirm understanding of procedures.
- **Collaboration.** The Refinery conducted a review of our key procedures (for example, the Plant 2 FCCU Start-Up Procedure) with Suncor technical experts and revised them so they more closely reflect industry best practice.
- **Expect accountability.** The Refinery is clarifying roles and responsibilities around its major processes, for example, work notification, action close out, and incident investigation.

- In addition, to facilitate the above, the Refinery recently created an Operations Support structure led by a senior Refinery manager to reinforce operations accountability including through training and drills, referenced in response to Kearney Recommendations 4 and 8.

Kearney Recommendations 2 and 6: Recommendation 2 states that Suncor should focus on excellence across a critical few, high-priority initiatives. With respect to maintenance work specifically, Recommendation 6 recommends refining the equipment maintenance strategy so that it better focuses on the highest priority equipment.

Actions:

- Beginning in 2019, the Refinery reviewed its list of initiatives, ultimately cancelling or postponing many, and prioritizing others that focused on reliability, environmental, and safety improvements. Current Refinery goals reflect these priorities, and they have been communicated to managers and front-line employees.
- To improve equipment maintenance prioritization, the Refinery also reorganized operations and maintenance roles and responsibilities and assigned technical subject matter experts to improve effectiveness of work prioritization, focusing on the highest priority equipment using risk assessments and inspection data.

Kearney Recommendation 3: Recommendation 3 states that Suncor should address immediate staffing needs and put strategies in place to maintain staffing and capability at current levels.

Actions: The Refinery has taken the following actions to increase staffing levels and prepare for natural attrition, while improving hiring, sustainment, and retention:

- Hired approximately forty (40) additional operators to supplement the operations workforce;
- Hired nineteen (19) professional staff, including engineers;

- Hired five (5) craft laborers in the maintenance workforce in preparation for upcoming retirements;
- Brought in additional maintenance trades on a temporary contract basis; and
- Is implementing job rotations, which enable operations personnel to develop competency and experience within Refinery divisions.

Kearney Recommendations 4 and 8: These recommendations state that Suncor should improve technical and operations staff training, including through greater incorporation of technical experts and a more structured training strategy. The structured training strategy should include stronger competency assessments and practice such as increased operational drills, knowledge checks, and a training simulator. They also state that Suncor should use digital technology to support knowledge and training.

Actions: To improve operations training and competency, the Refinery is doing the following:

- Increased the use of training exercises to prepare for all types of events. Specifically, operations developed an inventory of formal scenarios (based on probable risks and operating conditions) and executed 43 mock drills in 2020. After the Refinery develops the scenarios, it then conducts drills on those scenarios. The scenarios and drills help all involved understand how to troubleshoot, respond, and collaborate with others in connection with the event. They also help operations understand processes, roles, and responsibilities. Where necessary, the Refinery updates procedures to reflect the learnings from the simulated exercise.
- As discussed above, implemented "knowledge checks" following critical procedure reviews. Operations personnel must complete periodic reviews of all critical operations procedures. Following their review, they must complete a "knowledge check," which tests their understanding of the procedures.
- As also discussed above, the Refinery implemented a newly-created Operations Support structure led by a senior Refinery manager. This group's responsibilities also include operations recruitment, training, and retention. It contains both full and part-time operations training staff and uses internal technical experts as appropriate to support them in their roles.
- The Refinery intends to initiate a project to design, build, and operate a training simulator. A training simulator will enable control room operators to work through simulated plant conditions and upsets within the Distributed Control System ("DCS") which will help operators apply critical knowledge and procedures to improve response skills prior encountering conditions in real life.
- The Refinery already utilizes an electronic database to store and manage all procedures, and will continue to consider digital solutions to enhance operator knowledge and training as they arise.