Commissioners' Office
www.adcogov.org

ADAMS COUNTY
COLORADO

4430 South Adams County Parkway
5th Floor, Suite C5000A
Brighton, CO 80601-8204
PHONE 720.523.6100
FAX 720.523.6045

April 28, 2021

Colorado Air Pollution Control Commission
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246

Submitted via email to cdphe.commentsapcd@state.co.uw

Re: Supplemental Comments on Suncor Energy (U.S.A), Inc. Commerce City Refinery – Plant 2- Adams County, Title V Operating Permit Renewal (950PAD108)

Adams County provides these comments as a supplement to its March 17, 2021 comments submitted to the Air Pollution Control Division ("Division"). The County has reviewed additional emissions data provided by the Division, comments provided by other local governments, and funded an expert evaluation of the Kearney Third Party Root Cause Investigation Final Report ("Kearney Report").

Both the emissions data provided by the Division and the Kearney Report reinforce Adams County's recommendations that Suncor be compelled to provide the Division (1) timely, accurate, and transparent reports on actual and excess emissions for all regulated pollutants, including volatile organic compounds (VOCs) that are clear and comprehensible to the general public. These reports must provide the mass emission quantity of each pollutant emitted during the permit deviation and/or excess emission event. More critically, the refinery's compliance history and the Kearney report clearly demonstrate that Suncor is either unwilling or incapable of operating in compliance with its current operating permit conditions. Therefore, Adams County recommends that the Division and EPA require Suncor to fund an (2) independent third-party expert to undertake a Failure Modes and Effects Analysis or Fault Tree Analysis of Plant 2 in its entirety.

Additionally, the history of non-compliance and the inability of Suncor to provide an even facially adequate root cause investigation reinforces our recommendation that it is now appropriate to require a (3) schedule of compliance for all sources of excess emissions at the facility, and not just the FCCUs and the SRUs. Finally, (4) Adams County recommends that the Division begin the process of implementing a comprehensive evaluation of Suncor's emissions in light of impacts to the local community, ozone re-designation, Regional Haze, and Greenhouse Gas Emission Reduction requirements.

I. Monitoring and reporting at the refinery are deficient and new reporting and monitoring and conditions must be included in the Title V Operating Permit.

Adams County proposed in our original comments that the Title V permit contain clear, accurate and understandable reporting requirements. As demonstrated in the written comments submitted by Adams County, Tri-County Health Department, the City of Denver and Commerce City, the evaluation of Suncor's excess emission and deviation reports yielded different estimates of both the hours of non-compliance and number of occurrences by each respective jurisdiction, , primarily due to lack of clarity within those reports. Furthermore, these reports obfuscate the actual mass emissions associated with such events.

In our March 17, 2021 comments, Adams County included Division data documenting the increasing routine and excess emissions from the refinery between 2010 and 2019. Adams County reviewed the 2020 semi-annual deviation reports and conferred with the Division to evaluate the refinery's most recent compliance with their operating permit emission limits. As Figure 1 demonstrates, the frequency and duration of permit violations and associated excess emissions in 2020 only marginally improved from 2019's unprecedented number of excess emission events.

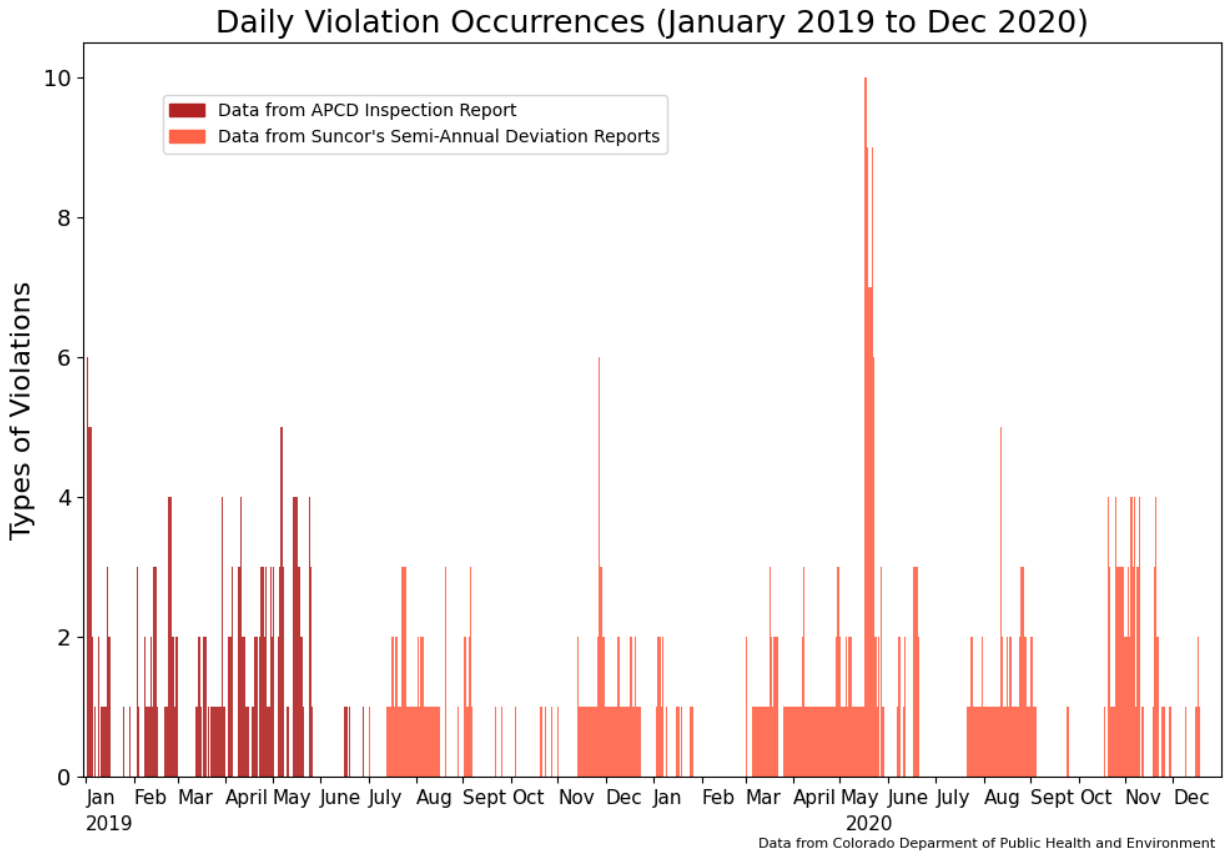

Figure 1

Recently, the Division conducted an analysis of the tons of emissions associated with Suncor's reported excess emission events in 2019, exclusive of vapor loss-related violations, which

demonstrates that emissions of sulfur dioxide exceeded permit limits by **57.8 tons** as shown in the table below. Excess nitrogen oxide emissions were not calculated by Division staff for any of the reported excess emission events.

Total Excess Emissions (Tons)

Date	Unit	SO2	NOx	CO	H2S	VOC
1/1/19	P1 Flare	18.4				
1/1/19	H-25	3.24				
2/20/19	P1 Flare				0.01	
2/22/19	P1 FCCU			0.31		
3/12/19	P1 Flare				0.14	
3/13/19	H-25	1.58				
3/13/19	H-25	0.8				
4/2/19	P2 Flare	1.02				
4/23/19	H-25	0.02				
5/5/19	P3 Flare				0.01	
5/6/19	P1 FCCU			0.18		
5/6/19	P1 Flare				0.09	
5/7/19	P3 Flare				0.01	
5/14/19	H-25	0.64				
5/14/19	P1 Flare	2.75				
5/16/19	H-25	5.35				
5/16/19	P1 Flare	23.48				
5/24/19	P2 Flare				0.08	
10/21/19	P1 Flare	0.52				
	TOTAL =	**57.8**		**0.49**	**0.34**	

The Division's excess emissions data for 2020 indicates that while the Plant 2 FCCU operated at significantly reduced capacity that year, Suncor still emitted **30.8 unpermitted tons of SO2**. What the Division could not do is provide an estimated amount of the VOCs associated with the reported 2,040 hours of violations in 2019 and the 3,048 hours of excess emissions associated with vapor loss violations in 2020. Our understanding for the lack of data on actual VOC emissions is merely that Suncor is not required to report excess VOC on a tons per year basis, per Title V, and since these are considered to be fugitive emissions, they are not reportable. However, as demonstrated in reported potential to emit calculations within the Title V permit renewal application, Suncor could be required to calculate and report mass vapor loss emissions using EPA emission factors.

Clearly, the gap in reporting of routine and excess emissions must be remedied. Adams County asserts that the Title V permit, as drafted, fails to provide the public, elected officials, and even the Division with meaningful information on how Suncor is complying with permit conditions let

alone contributing to the degradation of regional air quality. Adams County urges that recommendation V from our March 17, 2021 comment letter be included in the Title V permit.

II. The Kearney Investigation Report does not satisfy even the basic requirements for a Root Cause Investigation, and a Failure Modes and Effects Analysis or Fault Tree Analysis should be required to determine why the facility cannot comply with permit conditions for all emission sources.

The Root Cause Investigation (RCI) conducted by independent consultant, A.T. Kearney Limited (Kearney), primarily concludes that the majority of incidents leading to excess emissions at the refinery were caused by human factors, which are nearly impossible to translate into enforceable conditions and requirements within the Title V permit. Given the weight the RCI was given in the March 2020 compliance order for determining mechanisms through which the refinery could be brought into compliance with its existing operations permit, Adams County engaged a nationally recognized expert to evaluate the adequacy of the Kearney Investigation Report findings, herein referred to as the Kearney Report. We are providing the evaluation below:

In the public distribution email, Suncor noted that the "Kearney's investigation concluded that our Commerce City Refinery is designed to meet environmental permits during steady-state operations, and it is adequately funded". The term 'steady-state' operations implies that the facility was evaluated using process simulation software (e.g., Promax or HYSYS or other), which is inherently not time dependent. The term implies that the technical evaluation was restricted to totalized or daily throughput for the facility, and that the results of that simulation aligned with the simulation provided on the air permit application for the facility. However, no single facility is truly steady state in nature – variances, fluctuations, and acceptable operating ranges for process variables are common and should be anticipated and designed for. The fact that this public notice specifically indicates that the facility is designed to meet steady state operations indicates that either (1) Suncor does not understand how slugging and surges can affect deviation from permitted limits, (2) Suncor does not believe their facility is dynamic in nature which indicates their lack of understanding in facility design and operations, (3) Suncor acknowledges that they do not know how to dynamically simulate their facility or (4) Suncor is admitting that the facility does not or would not meet permitted limits if the facility were to be properly evaluated with a dynamic simulation. Adams County requests clarification on whether or not dynamic simulation software was used, and if not, provide justification through pressure, temperature, flow trends that the facility under normal operations is truly steady state in nature.

The Kearney Report indicates that over 30 interviews were conducted "across all levels of the refinery and supporting organization in management, operations, maintenance, and technical areas, as well as Suncor corporate." At no point were *incident investigation* interviews conducted, wherein personnel involved with or witness to releases or upset events were

questioned about the events themselves. Instead, it appears that Kearney jumped directly to evaluating "root causes" in management structure, communications within the organization, and operations following underlying assumptions formed from leading similar investigations across 50 refineries. However, Kearney did not properly evaluate the incidents/events themselves.

In many Root Cause and Incident Investigations, a proper drilldown means that all potential causes are weighed. No potential causes are dismissed initially unless it can be shown that proper controls are in place to resoundingly discount them as root causes. Individuals who conduct root cause investigations regularly know that in most instances the root cause is attributed to human error when all is said and done. For example, root causes are often attributed to human error in procedure, human error in quality control of calculations or designs, human error in providing training, etc. Almost any incident, if drilled down deep enough can be attributed to some form of human error, either by the operator or by the vendor that supplied a piece of hardware.

As such, there is a tendency to skip steps in the RCA process and move straight to addressing the human error component. This appears to be what Kearney did in this case. It is true that human errors can be alleviated with procedural and process improvement, but there are still no guarantees to eliminate reoccurrence. The only way to eliminate human error is to design out the ***opportunity*** for human error and that is always the best option. It appears that Kearney did not properly address why process and procedure was determined to be the best option for remediation, and why designing out the human element was not.

Kearney also explicitly indicates that in their experience focusing on "individual incidents can lead to false conclusions about root causes" but instead to "focus on the initiating event and underlying risk factors as keys for determining prevention and mitigation". The third-party evaluation provided a breakdown of the 140 incidents. Only in one category (which constituted 24 incidents) was there a potential for human error being the true root cause, as it was attributed to a transition from maintenance activities to operations. However, the remaining incidents were explained as follows:

> *"Fifty incidents (36 percent) were procedural in nature, meaning they occurred because either a procedure for proper response to events was not followed correctly, or a procedure for events leading up to incident did not exist, leaving operators without a defined response".*
>
> *"Thirty-six incidents (26 percent) involved a situation where the event had started to occur or had already occurred, and an individual did not properly…"*

In every single category, **the event had already occurred**. Kearny did not properly investigate the root cause of the event. The purpose of a root cause and incident investigation is to determine the cause of the underlying event, ***not to evaluate the effectiveness of the***

countermeasures. To use a similar example as shown in the report, if a certain make and model of automobile continually has its brakes fail during rainy conditions, you would not focus on improving the response of the air bag system or make the rear emergency brake lever more accessible to the driver. Nor would you put a warning on the dashboard to tell the driver not to drive in the rain.

The Leading Practices to Reduce the Risk of Major Incidents section provides little value to the site-specific occurrences at the Suncor refinery and seems to be a catch all recommendation that passes the obligation to Suncor to continue with the investigation. Adams County requests that the root cause and incident investigation be completed in detail, describing the event, delineating all potential causes for the events and how they were evaluated individually, and finally why improvement to countermeasures (e.g., procedures, training, and safing systems) is the only option for remediation.

In the Kearney Report section "Incident Investigation and Followup", Kearney attested that "…while PHAs were done in compliance with applicable regulations, in some cases PHAs were not fully comprehensive relative to leading practice expectations, and there was at least one example where an oversight or omission in a PHA contributed directly to an environmental incident." Typically, PHAs are a step through of the design to systematically evaluate "what-if" scenarios, usually around component failures, process failures, or equipment failures. The fact that Kearney determined that an omitted PHA attributed to an environment incident proves that design flaws should be investigated more thoroughly as being the cause of environmental incidents. The deficiently of the PHA or quality control process is not the root cause – the design is the root cause - the PHA is the safeguard. Adam's County disagrees with stopping at the process and procedure level in this report and labeling deficiencies in safeguards as the root cause. Clearly, each of the 140 events started with an event that was attributed to something hardware or software related, and Adam's County requests a more detailed explanation of what caused those events.

Under Technological and Safeguards, Kearney suggests design changes to (again) bolster counter measures where in all cases a human interface is needed to properly engage the safing system to avoid an incident. Adam's County requests additional clarification as to why data trending, control logic, and automatic switchover to the safing system was not part of the recommendations and why Suncor is not investigating designing out the opportunity for human error.

III. The 2020 excess emissions data demonstrates that the refinery cannot manage routine ("stable") operations in compliance with its operating permit, therefore, a schedule of compliance for all sources of excess emissions at the facility, and not just the FCCUs and the SRUs must be incorporated into the Title V permit renewal.

The Kearney Report confirms Adams County's concerns that the Suncor refinery is incapable of operating in compliance with the permit conditions. While professing that the "facility's design is sufficient to meet environmental permits during steady state operations", the report examines 140 incidences of non-compliance during a 730-day period, a non-compliance rate of 19%, *for the FCCU and SRU alone*. Combined with the vapor loss violations, the facility appears to be challenged to operate in compliance with environmental permits.

Most concerning is that the Kearney Report glosses over the failure to operate consistent with permit conditions. The Kearney Report states, at page 24:

> "All refineries experience occasional excursions of process variables outside equipment safe operating limits…In 2019, the site experienced an average of 2.2 excursions per day, which was an increase from 0.7 Excursions per day in 2018."

The County is concerned that the Kearney Report has conflated a 75 percent increase in unpermitted events with "all refineries experience an occasional excursion." Kearney's belief in the adequacy of a steady state model under normal operating conditions is a likely cause of underestimating actual emissions and a foundational reason for such a high volume of emissions exceedances. A steady state model is probably insufficient for accurate emissions evaluation of actual operations given the complexity of operations at the facility. It is more than likely the proposed Plant 2 operating permit renewal has emission limits that are inaccurately developed.

Further, as explained in our expert evaluation, the Kearney Report almost exclusively focused on human error and failed to determine the true root cause of incidents leading to excess emission events and upset conditions. The Division does not have the ability or authority to regulate human error and should require the submittal of a compliance plan and schedule that remedies all sources of excess emissions not limited to the FCCUs and SRUs. The complete compliance plan and schedule must be based on findings of an independent Failure Modes and Effects Analysis or Fault Tree Analysis and subsequent recommendations for appropriate engineering design, process, and equipment controls to eliminate excess emissions from upsets and malfunctions.

IV. Adams County recommends that the Division begin the process of implementing a comprehensive evaluation of Suncor's emissions in light of impacts to the local community, ozone re-designation, Regional Haze, and greenhouse gas emissions reduction requirements

As stated in our introduction, Adams County urges the Division to establish reporting requirements that enable all parties to understand the operations within the entire refinery, compel Suncor to complete a comprehensive FMEA or FTA of Plant 2, and include a compliance plan based on such findings to ameliorate the unacceptable number and severity of all excess emissions. We also believe now is the time for the Commission to direct Division staff to

establish an appropriate singular regulatory process for Suncor that will achieve compliance with existing Title V requirements, address inequitable public health and climate impacts to the local community, and implement emission reduction strategies to comply with ozone non-attainment designation, Regional Haze Rule, and Greenhouse Gas Emissions Reduction requirements.

In summary, Adams County appreciates the complexity facing the Division in crafting an effective permit for the Suncor facility. However, the failure of Suncor to operate its refinery safely and in compliance with existing regulations and permit conditions compels the Division to take a new approach. Adams County has employed experts to provide a strategy to effectively evaluate existing operations and to plan for future operations such that adverse impacts to public health, air quality and climate are mitigated to the maximum extent feasible and that will achieve the needs of the local community, the State, and the region.

Sincerely,

Eva J. Henry, Chair
Board of County Commissioners