

**Suncor Settlement Supplemental Environmental Project
APPLICATION COVER SHEET**

Project Title: The Suncor Refinery: A Comprehensive, Community-directed Health and Environmental Evaluation

Organization: Cultivando

Address: 7190 Colorado Blvd. Ste. 300

City, State, Zip: Commerce City, CO 80022

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Phone Number: 303-288-4783 x 101

Fax Number: n/a

Federal Tax Identification Number: 84-1499624

Legal Tax Status (check one): **Nonprofit*** **Governmental Entity/School**

Fiscal Sponsor organization, if applicable

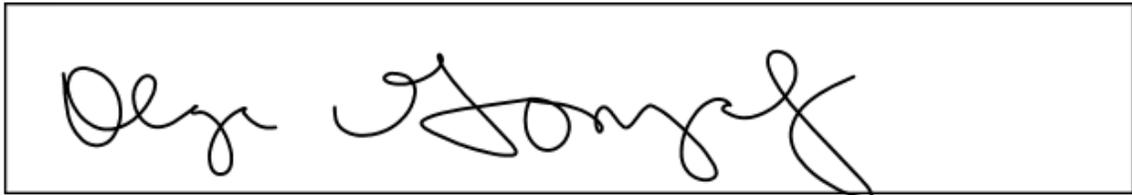
Fiscal Sponsor contact name & information, if applicable

*If nonprofit, you must attach a copy of your IRS tax exempt letter to this SEP Application: Please see Exhibit K

By signing and submitting this application, the applicant agrees to operate the program as described in the SEP Application and in accordance with the department's SEP Policy. The applicant agrees that the information provided in this application is, to the best of the applicant's knowledge and based on reasonable inquiry, true, accurate, and complete. The applicant understands that knowingly submitting any false information on this application could result in the project not being considered for funding or voiding any current or future contracts with the department of Public Health and Environment.

Print name of Authorized Official: Olga Gonzales _____

Signature of Authorized Official:



***Please insert electronic signature into the box to the right.**

Date: 1/11/21 **Title:** Executive Director

Project Manager or Main Project Contact:

Name: Olga Gonzalez

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Total Amount of SEP Funds Requested:	<u>\$880,284</u>
Total Matching/In-Kind Contributions (if any):	<u>\$10,863</u>
Total Project Cost:	<u>\$869,421</u>

**Suncor Settlement Supplemental Environmental Project
APPLICATION FORM**

Project Title	The Suncor Refinery: A Comprehensive, Community-Directed Health and Environmental Evaluation - Component B
Geographical Area to Benefit Most Directly From Project	The entire Denver Metro Area community will benefit directly. Particular emphasis will be given to understanding the health and environmental impacts on citizens living closest to the Suncor Refinery.
Community Applicant or Partnership	Cultivando, with a partial list of supporters, as detailed in Appendix A, Exhibit L
Eligible SEP Category	<input checked="" type="checkbox"/> Pollution Prevention <input checked="" type="checkbox"/> Environmental Restoration <input checked="" type="checkbox"/> Environmental Education and Training <input checked="" type="checkbox"/> Public Health and Safety
Project Summary	<p>This proposal is Component B of a two-part project. This component will consist of several interdependent studies and activities necessary to understanding the full range of health and environmental impacts the Suncor refinery has on people’s lives and their sense of wellbeing. The information developed in Component A will be essential to the successful completion of these activities and studies.</p> <p>The specific, discrete activities are as follows:</p> <ul style="list-style-type: none"> • Cultivando, a leadership, advocacy, and capacity building organization that works in collaboration with community leaders and partners will be administering the program that is described below. Their work includes culturally-relevant trainings, building collaboration and advocacy around equity, inclusion, HEAL and other self- identified community issues, with a focus on building the capacity and supporting the voice of community leaders to impact sustainable change. • Cultivando will develop a community outreach and education component that will both involve local citizens in participating directly in air quality monitoring and educating them as to its impacts, including air-quality education. • Computer generated dispersion modeling will be conducted to gauge the likely range of Suncor pollutants on surrounding populations. Mapping on a project website will show the likely reach and direction of refinery pollution. The monitoring system developed in Component A will be the source of the data for the modeling. • Radiello passive monitoring devices will be placed in homes and schools to allow the local community to participate and learn hands-on about air pollution and its importance to their home, family, and the community. Placement in local schools will provide a live educational opportunity in air pollution and its impacts on people’s health and the environment. • Summa canisters will be distributed to community members in adjacent neighborhoods for instantaneous (“grab”) air sampling when polluted air conditions are recognized. These samples will subsequently be analyzed for volatile organic compounds (VOCs) to assess the type and concentration ranges of pollutants. • PurpleAir monitors, which are small, battery-powered devices for monitoring of particulate matter (PM) will be deployed at 25 locations in adjacent neighborhoods to monitor the spatial distribution and citizen’s exposure to PM.

	<ul style="list-style-type: none"> • Intense interviewing in both Spanish and English by faculty and staff from DU and CSU will be conducted to evaluate the socio-psychological impact that the refinery’s presence is having on the lives of the people living closest to it. • The data generated in Component A will be evaluated by scientific and health professionals to measure the probable health and environmental impacts of pollution on the local as well as the larger Denver community. A final report will be produced outlining the major findings or conclusions of the year-long data gathering and analysis phase. • Under the administration of CIVHC, data will be obtained from the Colorado All Payer Claims Database (CO APCD) for the population surrounded Suncor. Health profiles of the populations in proximity to Suncor will be compared to the overall Colorado population. This information will also provide a health and wellbeing baseline that will be a useful tool for policy makers and public health professionals. • A review of the literature available on groundwater contamination from PFAS, the forever chemical, used by the plant in fire fighting and prevention will be catalogued and evaluated. This is becoming a major issue in many areas of the country where local governments are starting to learn the major costs groundwater cleanup of PFAS contamination represents.
<p style="text-align: center;">Project Narrative</p>	<p>SUNCOR REFINERY, CORPORATE HISTORY AND BACKGROUND</p> <ul style="list-style-type: none"> • The Suncor refinery is 90 years old, beginning operations in 1930. • The refinery has undergone several ownership changes. The most recent is Suncor’s \$150 million purchase from Conoco Phillips in 2003. The parent company is the second largest corporation in Canada. • A principal area for Suncor’s oil and gas production is the boreal forest in Alberta Canada where the company runs the largest tar sands operation in the world. Its activity has contributed to toxic waste covering 90 square miles and costing \$56 billion clean up (estimated by the Canadian government). • Suncor has spent about \$400 million retrofitting its Denver refinery to receive heavy tar sands from its mining operations in Ft McMurray, Canada. About 20 percent of the product at the refinery comes from F. McMurray. • Suncor’s Commerce City refinery has the capacity to produce about 98,000 barrels a day. It is the only refinery in Colorado. It employs about 400 people. • The refinery supplies about a third of the gasoline and most of the asphalt used in the State. <p>SUNCOR’S HISTORY OF POLLUTION AND SELF REGULATION</p> <p>The Suncor refinery has never been subject to independent air monitoring. The current methodology involves self-regulation and self-reporting. The refinery has consistently exceeded its regulatory limits of pollutants over its operating history and has an imperfect record of self-reporting its pollution. The EPA conducts analyses of Suncor operations to predict pollution emissions as an added regulatory fact basis in addition to Suncor’s spot checking.</p> <p>Overview</p> <ul style="list-style-type: none"> • The State’s Air Pollution Control Division (APCD) has given the refinery the right to emit 800,000 tons of pollutants into Denver’s air annually, most of them poisonous, health threatening, and injurious to the earth’s climate. • Suncor has exceeded these limits by its own admission. In 2019, according to articles in the Denver Post (DP), the refinery self-reported releasing “886,000 tons

of greenhouse gases annually, along with 24 tons of sulfur dioxide, 12.5 tons of hydrogen sulfide, 25 tons of ozone-forming VOCs, 4 tons of carbon monoxide, 49 tons of nitrogen oxide, and 55 tons of particulates.” [5, 6]

- Many of the refinery’s pollution permits have expired, some for over a decade. The State assigns the permit backlog to personnel shortages, ‘band-width,’ as it terms it, and regulatory loopholes. The State writes the regulations. [7]
- Garry Kaufman, director of the APCD, which has regulatory oversight of the refinery and pollution permitting, said in the DP exposé: “We will protect the health and well-being of the people we serve, and that means holding corporate polluters accountable... We don’t tolerate or accept violations of state or federal law or Suncor’s permitted emissions limits.” [5]
- A new study published in the December issue of the Journal of the National Cancer Institute states that people living within 5 to10 miles of an oil refinery in the United States have a much higher risk of multiple cancer types than those living more than 20 miles from a refinery. [8]
- Much of the Denver metro population resides within these impact markers. About 120,000 people live within a 5-mile radius. Approximately 875,000 people live within a 10-mile radius.
- A 2014 report by the Denver Department of Environmental Health found that residents of neighborhoods surrounding Suncor “experience a higher incidence of chronic health conditions such as cardiovascular disease, diabetes, obesity, and asthma than other Denver neighborhoods.” [9]
- In the last two years, Suncor has self-reported 49 malfunctions in its day-to-day operations and reported over 500 spikes in emissions above its permit limits.
- In 2019, Suncor reported 2,750 violations of their opacity limits, at one point violating them for more than seven days straight. Opacity is a measure of the thickness of air pollution from a smokestack and is monitored as an indicator of harmful emissions released therefrom. [28]

AIR POLLUTANTS OF CONCERN RELEASED BY THE REFINERY

Benzene

- The 25 tons of VOCs reported by Suncor include the cancer causing chemical benzene, as well as other dangerous compounds such as toluene. The World Health Organization says there is no safe level of benzene exposure. [19] The State of Colorado has established a liberal limit of 9 ppb. [20] Similar levels are expected to occur for people living nearby. Some states and nations have stricter limits.
- In 2012, Suncor received a fine for benzene violations of \$2.2 million.
- Benzene is not a compound that is specifically measured as a gaseous release to the metro area’s air space. Benzene is a contributing component of estimated total VOC releases reported to the state’s APCD.
- EPA and State records indicate Suncor’s releases of VOCs may be radically under reported. EPA calculations suggest that Suncor may release up to 70 times more VOCs than it reports. An EPA 2017 analysis suggests that Suncor’s operations may release over 2 tons of benzene annually. [22]

Particulates

- Suncor self-reports 55 tons of particulates as coming from the refinery. An article in the Proceedings of the National Academy of Science (PNAS) states that fine particle particulate (PM2.5) “exposure is a major health risk factor in the United States, responsible for 63% of deaths from environmental causes and 3% of

deaths from all causes.” [24]

- These health effects are not distributed equitably. Hispanic populations suffer the worst proportionately, with Black populations second. The majority population near the plant is Hispanic with Black populations in northeast Denver close by.
- A recent Harvard University study indicates that EPA’s safe particulate pollution thresholds for PM2.5 from a public health perspective are inadequate. It found that a 10 µg/m³ increase in PM2.5 resulted in a profound increase in premature death rates. [21] For people on Medicare, about 14,000 people are predicted to die prematurely as a result of the increase. [10]
- EPA calculations suggest particulate releases from the plant could be as high as 1,072 tons annually, almost 20 times greater than the refinery self-reports. [22]

Hydrogen Cyanide

- Hydrogen cyanide gas was developed as a pesticide and later used for gas warfare in World War I and by the Nazis in the extermination camps. It has been used by the United States to carry out the death penalty. Even so, hydrogen sulfide is not regulated. EPA’s 2017 toxic release inventory estimates over 9 tons of hydrogen cyanide could be released from the Suncor refinery annually.
- A hydrogen cyanide concentration of 2000 ppm (about 2380 mg/m³) will kill a human in about one minute. A hydrogen cyanide concentration in the range of 100–200 ppm will kill a human within 10 to 60 minutes. [18]
- Suncor releases large amounts of hydrogen cyanide gas. The DP related how the plant recently released a huge amount of the gas that neither the refinery nor the state revealed until months later. [11]
- State records show that tests conducted in September 2015 indicated that the refinery’s West Plant emits hydrogen cyanide at an estimated rate of 8.6 tons and the East Plant releases roughly 1.3 tons per year. These estimates derive from spot sampling, and are therefore highly suspect as accurately predictive of actual peak or annual releases.
- The CDPHE relied on emissions data Suncor reported in 2015 to calculate hydrogen cyanide air concentrations around the refinery at 5 ppb, more than seven times higher than the EPA’s 0.7 ppb risk threshold. Nonetheless, the State Health Department and the EPA assert that Suncor’s current permitted level of hydrogen-cyanide emissions is safe, though no direct, continuous measuring or exposure studies have been done. [12]
- The state has in the past granted Suncor’s request to increase its hydrogen cyanide permitted releases. In 2018, the refinery requested a new pollution limit of 12.8 tons annually. The permit was granted in January 2019 without public input. The state did not consider health criteria in its permitting. [11]
- In July 2019, Suncor asked for another increase to its hydrogen cyanide emissions to 19.9 tons, after more testing indicated annual releases could be in the 14-ton range. Because of public clamoring the permit has not been granted. [23]
- Civic leaders have condemned the secrecy surrounding state awarded pollution increases. Congresswoman Diana DeGette authored legislation in 2019 requiring EPA to set a health-based limit for hydrogen cyanide. The legislation also requires fence line monitoring of the poison and notification to the public in real time. [17] It has not been acted upon. Local citizens brought a lawsuit. It lost because the court said the agency was administering the law properly.

Sulfur Dioxide

- Three large sulfur dioxide orange cloud releases have occurred since 2016, causing highway closures, school closures, residential and stay in place lockdowns, reverse 911 calls, and damage to physical property.
- The 2016 release involved 75,000 pounds, well above the 500 pound threshold reported as a potential health risk. The refinery said there was no danger.
- A 2019 event contained clay like particles that rained down on neighborhoods. The refinery said there was no danger but warned people to wash their clothes immediately and get a car wash.
- Another major event occurred in 2020 after Suncor agreed to a \$9 million fine for its violations. With this event, a part of the refinery was shuttered for several months. The state returned \$5 million of the fine to help the refinery identify and correct its operational problems.
- In the last two years, Suncor has self-reported over 17,000 minutes when releases of sulfur dioxide and flared particulates exceeded the 20 percent opacity limit allowed under the Clean Air Act (CAA), to protect public health.

Radioactivity

- The primary gas of concern is radon (Radon-222), a highly volatile gas that gets released during ‘fracking’ of shale deposits and is subsequently transported to the surface associated with natural gas.
- Radon is the second leading cause of lung cancer in the U.S., causing about 15,000 lung cancer deaths per year.
- Radon is not destroyed during gas flaring. Being a non-combustible gas, it will get into the atmosphere un-altered. It will subsequently decay to Lead-210 and Polonium-210, which will emit harmful beta- and alpha-radiation.
- A recent peer-reviewed publication (J. of Environmental Radioactivity) reported highest levels downwind of an area with oil refineries. The activity was mostly associated to fine particulates that penetrate deep in people’s lungs. [27]
- The Suncor refinery thus far has not been assessed for its emissions of radon and associated radioactivity by an independent study.

Other pollutants

- There is not space enough to discuss these pollutants individually. EPA modeling suggests those listed below can be found in Suncor releases — this list is partial. They are listed here in descending order according to their calculated releases measured in pounds: Propylene, 76,000 lbs; Hydrogen sulfide, 6,000 lbs; Toluene, 5,700 lbs; Xylene, 2,500 lbs; Ammonia, 2,300 lbs; Ethylbenzene, 800 lbs; Lead compounds, 82 lbs; and Mercury compounds, 4 lbs.

Fires and Explosions

- At least 33 fires, explosions and chemical releases occurred at U.S. oil refineries and industrial plants in 2017.
- In a recent refinery explosion northeast of Houston people in a four-mile radius of the plant were asked to evacuate.
- A 1978 explosion of the Suncor refinery killed three people, caused \$10 million in damages, launched an orange fireball over Denver and registered 1.5 on the Richter scale in Golden.

STUDY DETAILS

The technical components of the community air-monitoring study are presented in

	detail in Exhibit C.
<p>Expected Environmental or Public Health Benefits</p>	<ul style="list-style-type: none"> • Cultivando’s outreach program will address the despair and sense of hopelessness expressed by citizens as recorded in “Voices of the People.” These voices are representative of the many people in the Tier 1 working class neighborhoods, many of whom are Hispanic and can often be ignored or discounted because of their lack of facility with English. This is particularly true of older members of the community for whom English could very well be a second language- • Cultivando will educate the Tier 1 communities, with an emphasis on the often ignored Spanish speaking population, on the meaning and dangers of the information generated from the several monitoring programs developed primarily in Component A, but expanded on in component B to engage the people of these communities and their schools. This information will be immediately available to these citizens on a user-friendly platform. • The project will produce information that has never been provided before to the people about Suncor’s impact on their air quality and the probable range of that impact on the people living in the Denver Metro area. • The state-of-the-art, high-resolution monitoring platforms as discussed in Component A together with the community monitoring supported by Component B will allow citizens of the neighborhoods immediately surrounding Suncor and citizens of the entire Denver Metro area to observe the actual level of individual chemicals and overall pollution being released from the refinery precisely as those releases occur. • The project website will also provide local and state governments with new, precise scientific data, data or information neither the state nor the communities have ever had before in such detail and reliability. This is information CDPHE Deputy Director Putnam is on record saying the State needs to determine the health and environmental impacts of the refinery (see voices of civil leaders above).
<p>Inclusion of Priority Communities</p>	<ul style="list-style-type: none"> • The Cultivando project will engage community members in Tier I communities (south Commerce City, Globeville, Elyria-Swansea, Cole, Clayton and unincorporated western Adams County) by educating the citizens of these communities about the chemicals releases from Suncor. Schools, with the assistance of teachers, who have helped promote this study, will be able to guide students through the websites to enhance their understanding of climate and the impacts of air pollution on their lives. Outreach from Cultivando to residents will increase the understanding of the citizens. • Tier II cities and communities include the Denver Metro area as well as the entire northern Front Range which has been out of compliance with federal air standards for ozone pollution for over a decade. Suncor as a major emitter of VOCs, which are essential to the formation of ozone. This project will help define just how great the refinery’s emissions are in the creation of ozone in the Northern Front Range. Moreover, project dispersion mapping will inform citizens of the Denver Metro area how far the reach of pollution from the Suncor refinery actually is on any given day dependent on wind speed and direction.

<p>Community Impact</p>	<ul style="list-style-type: none"> • Cultivando’s outreach and education program will inform the Tier 1 community about the unique information being generated by the project, its importance, with special emphasis on reaching citizens who can be and often are easily overlooked because of financial or cultural limitations, such as older citizens who are primarily Spanish speakers. • For the first time ever, the citizens in the Tier 1 communities will know the pollution released from the refinery as it occurs with generalized information on the health and safety implications of those releases. • The information will be equally valuable to the wider Denver community, Tier 2, but outreach and education will be focused on the Tier 1 communities. • Attention will be given to making regular, if not always daily, assessments of the generally understood health consequences these pollutants pose to the communities.
<p>Project Evaluation and Communication</p>	<ul style="list-style-type: none"> • Updates will be provided to Cultivando from the scientists and medical experts for the project health assessment on a regular basis. Cultivando will hire and use its staff to educate the neighborhoods surrounding the refinery as to the possible health implications and to gain insight into public perceptions concerning the health data. • As stated earlier, Cultivando’s outreach program will address the despair and concerns expressed by citizens as recorded in “Voices of the People.” These voices are representative of the many people in the Tier 1 working class neighborhoods, many of whom are Hispanic and can often be ignored or discounted because of their lack of facility with English. This is particularly true of older members of the community for whom English could very well be a second language. • Again, as stated earlier, Cultivando staff will engage daily with citizens in Tier I communities to inform them about the objectives, approach, and progress of the study, and the implications of the data being generated from the various air monitoring platforms. • Project progress and outcomes will be 100% transparent to the public, CDPHE, and Suncor. A dedicated website will be built. The website will explain all study components, the study progress, and will have tabs to the real-time data pages, dispersion modeling outputs, and posted data records (results from the Summa canisters, Radiello passive sampling, and PurpleAir monitors). Those data will be uploaded at regular time intervals as the analytical data become available. • Cultivando will set up an inquiry e-mail portal where citizens can submit questions pertaining to the project and monitoring results. • The Subra company will provide day-to-day assistance to Cultivando on the meaning of chemical and particulate Suncor releases in language that can be easily understood by the general public. • Questionnaires will be distributed to citizens soliciting their feedback on how the study met or did not meet their expectation. The survey results will be posted to the study website. Feedback received throughout the study will be used to fine tune and correct, as needed, the study to maximize its value to the concerned communities and CDPHE. • Biannual progress reports will be publicly posted to the project website. The report will include updates on all study components. • A final report will be submitted after the conclusion of the study. Lead scientists of the project components will give project summary presentation at 6 months into, and at the conclusion of the monitoring phase. Additional presentations will be considered as desired by citizens and the agency. Dr. Brown will provide a fi-

	nal report on the likely health consequences of the Suncor pollution both on the short-term and long-term basis.				
Project Budget	Budget Category	Description	SEP Cost	Matching or In-kind Funds	Total Cost
	Personnel (Salaries, Benefits, Wages)		\$292,100		\$292,100
	Materials and Supplies		\$39,500		\$39,500
	Major Equipment				
	Contractors/ Subcontractors		\$529,270		\$529,270
Other Direct Costs					
Indirect Costs (limited to no more than 10%)		\$8,551		\$8,551	
Total:			\$869,421		\$869,421
Budget Narrative	<p>Cultivando will manage the project. Their budget request includes salary and benefits for a full-time project manager, a project coordinator, six part-time promotoras. Other personnel expenses are for a videographer, a translator, and a part-time accountant. Materials include six Chromebook computers and two laptops.</p> <p>Other project participants and groups are supported through subcontracts to Cultivando. Individually, these include:</p> <p>The Subra Company is requesting \$20,000 for personnel costs. \$20,000 are budgeted for a school liaison.</p> <p>The PFAS study (M. Wireman) will be supported at \$17,500.</p> <p>The CSU and DU budget (S. Molin and R. Beltran) for the environmental justice study comes to a total of \$94,065.</p> <p>\$20,000 is budgeted to CIVHC for the health database research.</p> <p>Dr. David Brown request is for \$20,000 for personnel costs.</p> <p>The Southwest Pennsylvania Environmental Health Project will be funded at \$35,000.</p> <p>Boulder A.I.R. is requesting \$326,256. These funds include a subcontract to Texas A&M for the Radiello sample analysis at \$51,500, \$150,000 for the dispersion modeling, \$32,500 for the Summa canister analyses, and \$31,225 for the PurpleAir monitors and their installation and maintenance.</p>				
Project Schedule/Work Plan	Activities	Staff Responsible		Completion Date	
	Project management, outreach, education, community air sampling	Cultivando		1-24 months after project start	

	Sociological study of Suncor impacts on Tier I citizens	CSU and DU faculty representatives and staff	ditto
	CIVHC (CO APCD) statistical health analysis		ditto
	questionnaires and information pamphlets production	EHP	ditto
	Summary Report of likely health consequences of Suncor pollution data	Dr David Brown	ditto
	Passive Air monitoring installation, Summa canister analyses, Radiello sampling, dispersion modelling	Boulder A.I.R.	ditto
Reporting	X The applicant has reviewed the reporting requirements below and if selected for SEP funding, agrees to adhere to these requirements.		
	<p><u>Applicant's Biannual Status Reports</u></p> <p>The applicant will submit a biannual project status report to the department's SEP Coordinator. Status reports will be submitted using the department's template and include the following information:</p> <ul style="list-style-type: none"> • A description of activities completed to date; • A budget summary table listing funds expended to date by budget category; and • A discussion of any anticipated changes to the project scope or timeline. <p><u>Applicant's Final SEP Completion Report</u></p> <p>The applicant will submit the SEP Completion Report to the department's SEP Coordinator within 30 days of project completion. The applicant's Final SEP Completion Report will be submitted using the department's template, and will contain at a minimum:</p> <ul style="list-style-type: none"> • A detailed description of the project as implemented; • A summary table identifying project deliverables and tasks along with the associated completion date; • A description of any operating problems encountered and the solutions thereto; • A full expense accounting including itemized costs, documented by copies of purchase orders, contracts, receipts or canceled checks; • Demonstration that the SEP has been fully implemented in accordance with the SEP application; • A description of the environmental or public health protection and improvement resulting from implementation of the SEP along with quantification of the outcomes and benefits; • Examples of brochures, educational or outreach materials developed or produced as part of the SEP; and • Photographs documenting both project implementation and results. 		
Other Relevant Information	<p>This project was developed in response to the widely expressed desire within the Tier 1 communities to know what chemicals were being released by the Suncor refinery and what effect those chemicals were having on community wellbeing. This proposal evolved over ten months of communication and collaboration with local citizens and neighborhood groups. The sophisticated monitoring work proposed in Component A will be essential to much of the work to be accomplished here, under Component B. As stated previously, Component B will constitute the locally directed outreach and education portion of the project. Organizations and civic leaders who have gained</p>		

early knowledge of this proposal and endorsed the project are shown in Exhibit I. Endorsements will grow exponentially as people and civic organizations learn of this proposal, for it represents good government at its best in our opinion. But remember no listing can properly represent un-named thousands of children and adults, many of them from minority and under-represented groups, who will ultimately benefit from the reforms this study will engender.

This project will give the people the information they want and have a right to know about Suncor air pollution. It will undoubtedly lead to less pollution from reformed operations, and thus better health outcomes. Nevertheless, It will almost certainly take further action on the part of government to implement wider solutions.

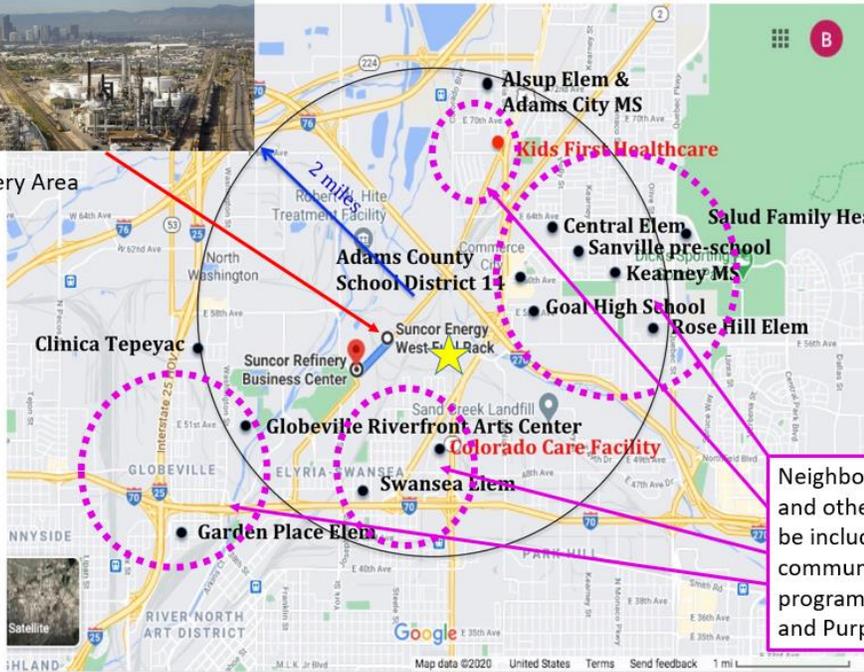
Appendix

Exhibit A – List of Citations

1. <https://www.sigmaaldrich.com/technical-documents/articles/analytical/radiello-air-sampler.html>
2. <https://www.325monitoring.com/what-is-method-325-.html>
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6. Finley, B., Climate change clobbers Colorado and the West, unfurling fire, drought, insects and heat. Denver Post, 2018. <https://www.denverpost.com/2018/12/01/climate-change-impact-colorado/>.
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19. World Health Organization, Exposure to Benzene, A Major Public Health Concern, page 2, <https://apps.who.int/iris/bitstream/handle/10665/329481/WHO-CED-PHE-EPE-19.4.2-eng.pdf?ua=1>.
20. Tami McMullen, Times-Call, August 18, 2020, It’s Important to Know What Benzene Measurements Mean, <https://www.timescall.com/2020/08/18/tami-mcmullen-its-important-to-know-what-benzene-measurements-mean/>.
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Suncor Refinery Area



Neighborhoods and schools and other public facilities to be included in the community sampling program (Radiello, Summa, and Purple Monitors)

EXHIBIT C - DESCRIPTION OF THE STUDY COMPONENTS

Cultivando will be leading this project. Cultivando, a leadership, advocacy, and capacity building organization that works in collaboration with community leaders and partners will be administering the program that is described below. Their work includes culturally-relevant trainings, building collaboration and advocacy around equity, inclusion, HEAL and other self-identified community issues, with a focus on building the capacity and supporting the voice of community leaders to impact sustainable change.

Cultivando's work will be foundational to the neighborhood education and outreach aspects of the proposal. The following provides a brief summary of the particular studies to be conducted under the umbrella of Component B.

- Cultivando and Boulder A.I.R. staff will work together on training of six promotoras to deploy the samples and data from the Radiello, Summa canisters, and PurpleAir in the neighborhoods surrounding the refinery.
- Cultivando will develop a community outreach and education component that will both involve local citizens in participating directly in air quality monitoring and educating them as to its impacts, including air-quality education.

Radiello Passive VOCs Sampling

- The Radiello air-quality monitoring devices [1] selectively collect VOCs from ambient air, following an EPA Method 325 [2] (Exhibit D). Target compounds are aromatic VOCs including benzene, ethylbenzene, toluene, and xylenes (BTEX).
- This sampling delivers average air contaminant concentrations over a one-week deployment window. The method also captures alkane and alkene hydrocarbons. The deployment of the samplers will be organized by Cultivando, after training by Boulder A.I.R.
- Collected samples will be shipped to an analytical laboratory at Texas A&M University under the auspices of Prof. G. Schade [3], a world class expert in ambient VOCs analysis. Samplers will be distributed and placed strategically in the community. Deployments will be at six locations in parallel at any given time throughout a full year, which will result in an anticipated 300 collected samples in total.
- Deployments are particularly intended in Tier I community schools. Besides the value of the VOCs data, this will then also provide real hands-on student scientific participation and education.

Summa Canisters

- Much in contrast to the Radiello samplers, Summa canister sample collection targets capturing and characterizing short pollution spikes. Cultivando staff will be trained by Boulder A.I.R. staff in the deployment, and Cultivando will then organize the distribution and collection of the canisters to community members (Exhibit E).
- Summa samples can be collected by citizens when bad pollution conditions are encountered, such as identified by smell, visibility, or health symptoms. The sample collection is as simple as opening the canister valve for a few seconds.
- After sample collection the canisters will be returned to Boulder A.I.R. for analysis by gas chromatography, which identifies and quantifies a wide range of VOCs present in the sample. A total of 100 canister samples will be provided and deployed over the course of the study.

Particulates Monitoring with Purple Monitors

- PurpleAir monitors [4](Exhibit F) will be deployed strategically at 25 locations within the Tier I areas to assess residents' exposure to particulate matter. The distribution and deployment of the samplers will be organized by Cultivando staff.
- The monitors capture particulates in three size ranges, including small particulates that can penetrate deep into people's lungs and that are the most harmful to human health.

- These samplers will run continuously over the full year of the study.
- The parallel deployment will generate a sampling network that allows assessing the geographical distribution and possible local hotspots of particulates pollution.

Chemical Exposure Assessment

This activity will be conducted by W. Subra, who is an expert on the environmental impacts of oil, gas and shale drilling and production activities, waste treatment and disposal practices and associated human health impacts.

- Emission events reported by Suncor as a result of incidents, upsets, accidental releases, etc. will be investigated to assess negative impacts to community members as a result of released chemicals.
- Subra will analyze project-generated environmental air monitoring data and provide assessments of a health impacts to Cultivando in language that can easily be understood by the general public.

Environmental Justice/Community Health Qualitative Assessment

This study component will be overseen by Colorado University Scientists Drs. Stefanie Malin and Romona Beltran. Utilizing community based participatory research (CBPR) methods, their team will conduct a comprehensive social science assessment of Suncor’s presence in the community.

- At least 40 in-depth interviews focusing on individual, household, and community-level environmental justice and health impacts of Suncor’s operations will be conducted.
- The project will start by engaging the community through attending and holding virtual meetings and gatherings to assess the community’s research needs, how community organizations (especially Cultivando) wish to participate, and specific methods needed to capture relevant data. The scientists will work with either Cultivando’s staff to determine the most appropriate interview protocol and questions. One Program Manager and 4 bilingual/bicultural research assistants will be hired and trained in culturally responsive CBPR methods. The research assistants will conduct in-depth interviews either virtually or in-person (depending on COVID-19 infection rates). These will be digitally audio recorded, professionally transcribed, and translated.

Dispersion Modeling

The continuous air-monitoring data developed and described in Component A will provide the basis for both the dispersion modeling and the health assessment in Component B. This modeling will be conducted by Cultivando subcontractor Boulder A.I.R. Two approaches will be used. The modeling will build on both Gaussian plume dispersion description and on the application of the EPA AERMOD Modeling System [16], which is about the widest used and accepted dispersion model in the community. Assumed pollutant emission rates, as reported by Suncor and as available in emissions inventories, will be used as inputs for dispersion modeling to assess resulting exposure levels downwind of the facility (Exhibit G). The modeling domain will primarily describe the 2-5 miles radius around the refinery.

- Assumed pollutant emission rates, as reported by Suncor and as available in emissions inventories, will be used as inputs for dispersion modeling to assess resulting exposure levels downwind of the facility (Exhibit G). The modeling will consider and test the sensitivity under the full range of meteorological conditions that are encountered in central Denver throughout a year. Mean annual emissions as well as best estimates for peak emission rates will be applied to capture the full range of possible emissions and meteorological conditions. Products of this work will be pollution ‘heat maps’ that provide projections of pollution exposure as a function of distance and direction from the refinery (Exhibit x).
- Secondly, a modeling tool utilizing the real-time monitoring data will be developed. The chemical observations and current meteorology will feed into the model in real time. Calculations will be repeated every 15 minutes. The dispersion modeling output maps will be made available on the project air monitoring website to the public in real time.

Health Effects Survey

- Dr. David Brown, is the Public Health Toxicologist and Director of Public Health Toxicology for Environment and Human Health. He will provide a toxicological summary analysis of the continuous monitoring data as well as the outside air monitoring device data. He will also produce a publicly available final

report that will summarize the likely health consequences of the Suncor pollution data, both on a short-term and long-term basis.

PFAS Study

- The Commerce City PFAS study will consist of a literature review and compilation existing data on the current occurrence and distribution of PFAS compounds in groundwater and surface water in the vicinity of the SUNCOR facility. If available, data and information on PFAS occurrence will be obtained from documents at Suncor, South Adams County Water and Sanitation District (SACWSD), CDPHE and other potential sources.
- A written report will document the findings, summarize all current monitoring data in the vicinity of Suncor including Sand Creek and SACWSD wells and make recommendations concerning the need for future monitoring necessary to adequately characterize the extent of PFAS contamination of water resources that may impact people living in the neighborhoods surrounding Suncor.

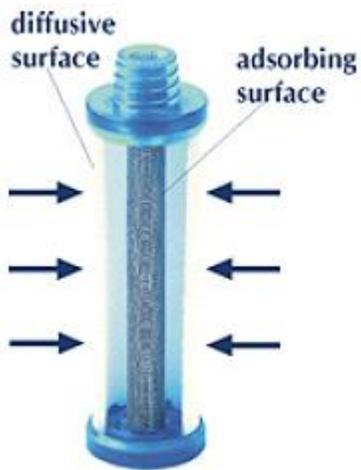


Exhibit D – Community Air Sampling – Radiello Passive Samplers

Radiello passive air samplers to be used for assessing exposure to Volatile Organic Compounds at residences. These samplers are small analytical devices that collect VOC vapors from the air over time. Samplers are typically exposed for one week to the ambient air at weather protected location. After that they are collected, placed in an air-tight container, and shipped to a central laboratory for chemical analysis. We propose deployment of the samplers at six locations at any given time. This accounts to approximately 300 individual sampling locations to be considered. With one-week deployments, and including duplicates and blanks, a total of 900 samples will be analyzed for the study.

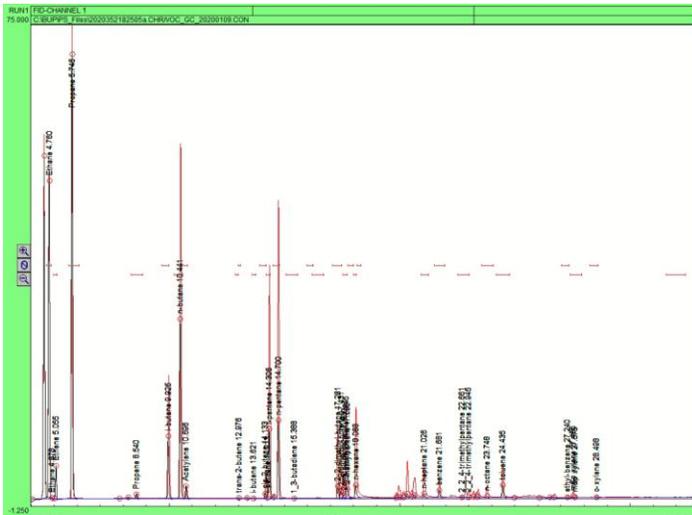


Exhibit E – Community Air Sampling – Summa Canisters

Summa canisters are air sampling containers made of stainless steel. The canisters are evacuated in the lab and then transported to a field site for air sampling. By opening a valve (blue in the upper left picture) air is quickly sucked into the canister. Canisters can also be filled gradually at a slow rate over time, as shown in the upper right picture. At the conclusion of the sampling the valve is closed again and canisters are transported to the laboratory for gas chromatography analysis. The left graph shows an example of an air sample. VOCs are separated into individual signals reach representing a specific individual compound, such as propane or benzene. The height of the signal is indicative of the concentration of the compound in the sample.



Exhibit F – Community Air Sampling – PurpleAir Monitoring

PurpleAir monitors are small devices that monitor particulates in air in three different size ranges. These images show the sensor unit as well as to examples of its deployment. 25 sensors are budgeted for deployment at community members' residences. Data are transmitted to a central hub and can be viewed in real time. One sensor each will be operated at the stationary monitoring site near the refinery and one with the mobile lab for comparison and evaluation of the data with research-grade monitors.

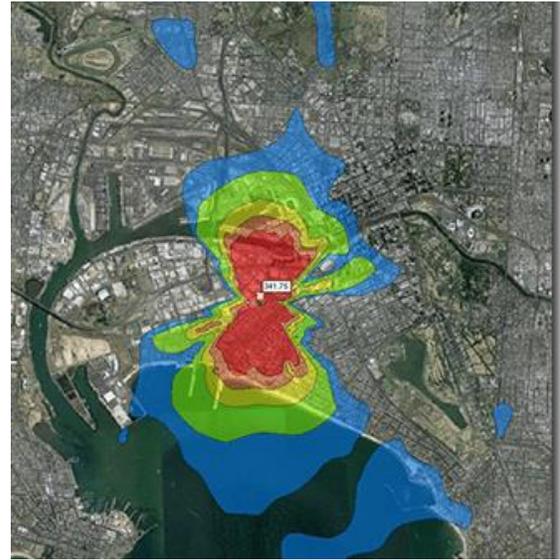
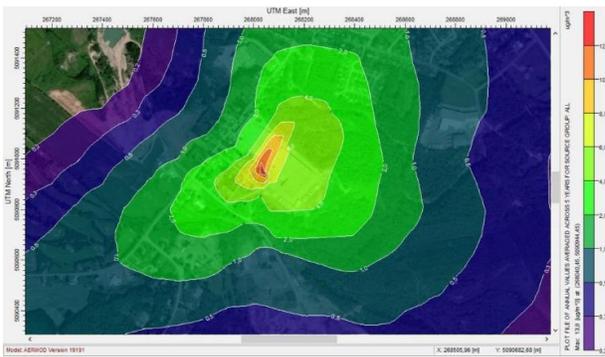
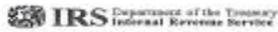


Exhibit G – Community Dispersion Modeling

Emission outputs and ambient air monitoring (Component A) data from the stationary platform, together with meteorological observations, will be used to model resulting concentrations from refinery emissions in adjacent communities. This modeling will be conducted using the real-time data, and in real time, to provide citizens with information on current exposure levels at their particular location based on reported emissions and observed concentrations at the refineries.

Exhibit H – Cultivando Tax Exempt Letter



ATLANTA GA 39901-0001

In reply refer to: 0752861009
Mar. 06, 2019 LTR 4168C 0
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00029981
B0DC: TE

CULTIVANDO
% CRISTIE JOPLIN MARTIN
PO BOX 29247
THORNTON CO 80229-0247

032658

Employer ID number: 84-1499624
Form 990 required: YES

Dear Taxpayer:

We're responding to your request dated Feb. 25, 2019, about your tax-exempt status.

We issued you a determination letter in AUGUST 1999, recognizing you as tax-exempt under Internal Revenue Code (IRC) Section 501(c)(3).

We also show you're not a private foundation as defined under IRC Section 509(a) because you're described in IRC Sections 509(a)(1) and 170(b)(1)(A)(vi).

Donors can deduct contributions they make to you as provided in IRC Section 170. You're also qualified to receive tax deductible bequests, legacies, devises, transfers, or gifts under IRC Sections 2055, 2106, and 2522.

In the heading of this letter, we indicated whether you must file an annual information return. If you're required to file a return, you must file one of the following by the 15th day of the 5th month after the end of your annual accounting period:

- Form 990, Return of Organization Exempt From Income Tax
- Form 990EZ, Short Form Return of Organization Exempt From Income Tax
- Form 990-N, Electronic Notice (e-Postcard) for Tax-Exempt Organizations Not Required to File Form 990 or Form 990-EZ
- Form 990-PF, Return of Private Foundation or Section 4947(a)(1) Trust Treated as Private Foundation

According to IRC Section 6033(j), if you don't file a required annual information return or notice for 3 consecutive years, we'll revoke your tax-exempt status on the due date of the 3rd required return or notice.

You can get IRS forms or publications you need from our website at www.irs.gov/forms-pubs or by calling 800-TAX-FORM (800-829-3676).

If you have questions, call 877-829-5500 between 8 a.m. and 5 p.m.,

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Mar. 06, 2019 LTR 4168C 0
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00029982

CULTIVANDO
% CRISTIE JOPLIN MARTIN
PO BOX 29247
THORNTON CO 80229-0247

local time, Monday through Friday (Alaska and Hawaii follow Pacific time).

Thank you for your cooperation.

Sincerely yours,

Teri M. Johnson
Operations Manager, AM Ops. 3

Exhibit I – Letter of Support

Parties and Individuals who have contributed to the conception of this project, and have agreed to have their names listed as an expression of their endorsement of the study:

- Richard Lamm, former Governor, Colorado
- Father Jorge de Los Santos
Nuestra Señora Madre de la Iglesia/Our Lady Mother of the Church
- Eva Henry, Adams County Commissioner
- Colorado Businesses for a Livable Climate
- Call to Action Colorado
- Catholic Network
- Venner Consulting
- Energy and Environmental Initiative of the Colorado Democratic Party
- I-70/Vasquez Blvd Superfund, Environmental Protection Agency Community Advisory Group
- Transformative Leadership for Change
- Colorado Jewish Climate Action
- Public Employees for Environmental Responsibility
- GES Coalition Organizing for Health and Housing Justice
- Clean Energy Action
- 350Colorado
- The Climate Mobilization – Colorado
- Colorado Latino Forum
- Fort Collins Sustainability Group
- Colorado Citizens for a Livable Climate
- What the Frack?! Arapahoe
- Be the Change, Colorado