University of California, Santa Cruz - CY2019 Verification Report

Section 1: Overview

Date of Verification Report: 12/15/2020 (updated 7/15/2021)

Member Name: University of California, Santa Cruz

Emissions Year Report Verified: 2019

Reporting Classification: ☐ Transitional ☒ Complete ☐ Historical

Member's Organizational Boundaries:

☒ Control Only: (☐ Financial **or** ☒ Operational)

☐ Equity Share and Control (☐ Financial **or** ☐ Operational)

Geographic Scope of Emissions Report:

☐ Transitional, specify geographic boundary:_____; specify GHGs:_____

☒ North American

☐ Worldwide (including North America) ☐ Worldwide (non-North America)

Verification Body Name: Cameron-Cole, LLC

Verification Body Contact: Chris Lawless
Title: Director, Greenhouse Gas Management Services
Telephone: (510) 777-1858
E-mail: clawless@cameron-cole.com

Subcontractors: N/A

Verification Team Members:
Lead Verifier: Chris Lawless

Independent Peer Reviewer: Dru Krupinsky

Type of Verification: ☐ Batch ☐ Streamlined ☒ Full

Level of Assurance: ☐ Limited ☒ Reasonable

GHG Reporting Protocols against which Verification was Conducted:

☒ The Climate Registry's *General Reporting Protocol Version 3.0*, dated May 2019

☐ The Climate Registry's GRP Updates and Clarifications document dated

GHG Verification Protocols used to Conduct the Verification:

☒ The Climate Registry's *General Verification Protocol Version 2.1*, dated June 2014

☒ The Climate Registry's GVP Updates and Clarifications document dated March 2016

Total Entity-Wide Emissions Verified:

Total Scope 1 Emissions: 28,801.11 mt CO_2e

27,377.94 CO_2 0.62 CH_4 0.55 N_2O HFCs 1,261.10 PFCs 0 NF_3 0 SF_6

Direct Biogenic CO_2: 633.4 mt CO_2

Total Location-based Scope 2 Emissions: 4,880.98 mt CO_2e

4,861.28 CO_2 0.33 CH_4 0.04 N_2O

Indirect Location-based Biogenic CO_2: 0 mt CO_2

Total Market-based Scope 2 Emissions: 1,408.69 mt CO_2e

1,389.28 CO_2 0.32 CH_4 0.04 N_2O

Indirect Market-based Biogenic CO_2: 0 mt CO_2

Summary of Verification Findings:

☒ Verified

☐ Unable to Verify (include reason, e.g., "due to data errors" or "due to non-compliance with TCR's reporting requirements): _____

Comment: The Scope 1 total above includes the application of 2,181 offsets used to reduce the 2019 inventory.

Section 2: Verification Plan

Describe the verification plan, including the risk assessment methodologies employed and the sampling plan (either in the space below or attached separately):

Cameron-Cole has attached a copy of the Verification Plan. Cameron-Cole's risk assessment was based on the information provided by University of California, Santa Cruz (UCSC) including the CRIS report, back-up calculation spreadsheets, and information provided during the kick-off call between UCSC and Cameron-Cole. This risk assessment informed the Verification Sampling Plan.

The Verification Sampling Plan included a ranking of emissions sources by contribution to total CO_2e emissions, and a ranking of emissions sources with the largest calculation uncertainty.

The Verification Sampling Plan included a qualitative narrative on the uncertainty risk assessment in the
following areas:

- Data acquisition equipment;
- Data sampling and frequency;
- Data processing and tracking;
- Emissions calculations;
- Data reporting; and,
- Management policies or practices in developing emissions data reports.

The Verification Sampling Plan informed the Data Request, and the Data Request was then provided to UCSC.

Section 3: Identification of Emission Sources

List all facilities/emission sources/GHGs identified through verification activities within the geographic and organizational boundaries of the emissions report.

Facility Name/Identifier	Facility Location	Emission Source	GHG	Included in Emission Report?
Main Campus	Santa Cruz, CA	Fleet Vehicles and Voyager Accounts; Main Campus Natural Gas; Refrigerants; SF6- Gas Insulated Switchgear; Off Campus Natural Gas; Lab Gases; Purchased Electricity; Biodiesel	CO_2, CH_4, N_2O, HFCs, SF_6	☒Yes ☐No
Off Campus	Santa Cruz, CA	Off Campus Natural Gas; Purchased Electricity	CO_2, CH_4, N_2O	☒Yes ☐No

Facility Name/Identifier	Facility Location	Emission Source	GHG	Included in Emission Report?
Arboretum	Santa Cruz, CA	Propane; Purchased Electricity	CO_2, CH_4, N_2O	☒Yes ☐No
Mt. Hamilton	Mt Hamilton, CA	Propane; Purchased Electricity	CO_2, CH_4, N_2O	☒Yes ☐No
Mt. Hamilton	Mt Hamilton, CA	Mobile diesel and gasoline	CO_2, CH_4, N_2O	☒Yes ☐No
Main Campus	Santa Cruz, CA	Acetylene, fertilizer application	CO_2, N_2O	☐Yes ☒No

Section 4: Verification Activities Log and Evaluation of Compliance

Verification Activities Check List		
Preparing for Verification	**Date Achieved**	
1. Bid on a Verification Contract	2/5/20	
2. Submit Case-Specific COI Assessment Form to Registry	7/14/20	
3. Negotiate Contract with Member	5/5/20	
4. Notify The Registry of Planned Verification Activities	N/A	
5. Conduct Kick-off Meeting With Member	8/19/20	
6. Develop Verification Plan	9/16/20	
Verification Activities Assessing Conformance with the Registry's Requirements	**Yes**	**No**
7. Is the Member a legal entity under U.S., Canadian or Mexican law?	**Y**	
8. Is the Member a subsidiary of any other company, and if so is the parent company also reporting to the Registry?		**N**
9. If the Member is submitting a transitional report, is the Member eligible to do so?		**N/A**
10. Are all emissions calculated using simplified estimation methodologies (SEMs) included in the inventory and documented as such?	**Y**	
11. If the answer to Question 10 is yes, are the SEMs used appropriate, and are the results reasonable?	**Y**	
12. If the answer to Question 10 is yes, do the emissions estimated using SEMs constitute 5% or less of the sum of an entity's Scope 1, Scope 2, and biogenic emissions from stationary and mobile combustion?	**Y**	
13. Have any mergers, acquisitions, or divestitures occurred during the current emissions year?		**N**
14. Have any activities been outsourced or insourced in the current year?		**N**
15. Has the Member provided all required emissions data?	**Y**	
16. Have you performed data triangulations where reasonable?	**Y**	
17. Are any discrepancies between your emissions estimates and the Member's material? If so, has the Member addressed those discrepancies and corrected the data in CRIS?		**N**

Verification Activities Assessing Completeness of Emission Report	Date Achieved	
18. Identify and list all Facilities in the Entity	10/8/20	
19. Identify and list all Emission Sources (of Scope 1 Mobile, Scope 1 Stationary, Scope 1 Process, Scope 1 Fugitive, Scope 2, Direct Biogenic CO_2 Mobile, and Direct Biogenic CO_2 Stationary Emissions)	10/8/20	
20. Identify and list all Fuel Types	10/8/20	
21. Rank All Sources by Magnitude on a CO_2-e Basis	10/8/20	
22. Assess Any Changes in Geographic and Organizational Boundaries	10/8/20	
	Yes	**No**
23. [For Member's using the equity share approach] Does the emission report include all processes and facilities for which the Member holds an equity share? If not, why?		**N/A**
24. [For Member's using the financial control approach] Does the emission report include all processes and facilities under the financial control of the Member? If not, why?		**N/A**
25. [For Member's using the operational control approach] Does the emission report include all processes and facilities under the operational control of the Member? If not, why?	**Y**	
26. Does the report include all facilities and sources of GHG emissions within the geographic boundaries of the Member?	**Y**	
27. Does the report include all applicable types of GHGs from each facility and emission source within the geographic and organizational boundaries of the Member?	**Y**	
28. [For Members reporting transitional inventories] Has the Member publicly defined, disclosed, and justified their transitional inventory boundary in CRIS?		**N/A**
29. If the Member excluded any miniscule sources, did they properly disclose the exclusions?		**N/A**
30. Has the reporting entity included all of its scope 1, scope 2, and biogenic emissions for each facility?	**Y**	
31. Have the scope 1 emissions been broken down by source type (stationary combustion, mobile combustion, fugitive and process)?	**Y**	
32. Have biogenic CO2 emissions been reported separately from the scope 1 emissions?	**Y**	
33. What type of records were used as the basis for calculating emissions, and were these records appropriate? **– invoices**	**Y**	
Performing Risk Assessment Based on Review of Information Systems and Controls	**Date Achieved**	
34. Evaluate Procedures and Systems for Preparing Emission Report	10/8/20	
35. Evaluate Personnel and Training - Does the Member's management system define what is "qualified" and what constitutes "appropriate training"?	10/8/20	
36. Assess if the uncertainty associated with methodologies and management systems is more than appropriate	10/8/20	

	Yes	No
37. Are the calculation methodologies/procedures used to compute GHG emissions at the source level among those described in the General Reporting Protocol? If not, why?	Y	
38. If a non-GRP methodology has been used because the General Reporting Protocol does not provide any methodology for the particular source(s) in question, is the methodology that was used an industry standard for this source type(s)?	Y	
39. If alternative emission factors were used, did the Member establish a basis for concluding that they were more accurate than the default factors?		N/A
40. If the Member used a utility-developed (non-EPS/PUP) delivery metric for purchased electricity, did the Member upload the necessary supporting documentation?		N/A
41. Are appropriate methods used to manage and implement entity-wide GHG emissions reporting programs? If the Member has more than one facility, is the emissions data correctly monitored?	Y	
42. Is a qualified individual responsible for managing and reporting GHG emissions?	Y	
43. Is appropriate training provided to personnel assigned to GHG emissions reporting duties? If the Member relies on external staff to perform required activities, are the contractors' qualified to undertake such work?	Y	
44. Are appropriate documents created to support and/or substantiate activities related to GHG emissions reporting activities, and is such documentation retained appropriately? For example, is such documentation maintained through reporting plans or procedures, utility bills, etc.?	Y	
45. Are appropriate mechanisms used to measure and review the effectiveness of GHG emissions reporting programs? For example, are policies, procedures, and practices evaluated and updated at appropriate intervals?	Y	
46. Does the system account for the diversity of the sources that comprise each emission category? For example, are there multiple types of vehicles and other transportation devices that require different emission estimation methodologies?	Y	
47. Do you know the diversity of GHGs emitted from each emission source category?	Y	
48. When available, has the Member used the emission factors, GWPs and standardized estimation methods in the Registry's General Reporting Protocol to calculate emissions in each source category?	Y	
a. Are the methodologies, data sources and emission factors documented and explained appropriately?	Y	
49. Does the Member's GHG management system appropriately track emissions in all of the emission source categories?	Y	
Developing a Sample Plan	**Date Achieved**	
50. Develop Sampling Procedures for Sources Based on Risk of Material Misstatement	9/16/20	
51. Was the overall Verification Plan and the types of facilities and their materiality considered when developing the facility visit list?	Y	
52. Were direct and indirect emissions considered separately?	Y	
	Yes	**No**
53. Based on the GVP Section 4.3.4, have you visited an appropriate number of facilities?	NA	

Verifying Emission Estimates Against Verification Criteria	Date Achieved
54. Confirm Total Fuel Consumption	10/8/20
55. Confirm Vehicle Miles Traveled	10/8/20
56. Confirm that appropriate Emission Factors are Used. If not Default Factors, ensure the Derivation and Explanation of increased Accuracy is properly Documented	10/8/20
57. Calculate Scope 1 (Mobile, Stationary, Process & Fugitive), Scope 2, and Direct Biogenic CO_2 (Mobile and Stationary) Based on Sampling Procedures	10/8/20
58. Compare Estimates from Sample Calculations to Reported Emissions	10/8/20
59. Determine if There are Any Discrepancies Between Sample Calculation and Reported Emissions	10/8/20
60. Determine if any reporting errors have caused material misstatements	10/8/20

	Yes	No
61. Are the reported electricity, steam, and district heating and cooling use consistent with utility bills?	**Y**	
62. Is the reported total stationary fuel use by fuel type consistent with the fuel use records?	**Y**	
63. Is the reported total consumption of fuels in motor vehicles consistent with available documentation and by vehicle type? If the entity calculates transportation emissions based on vehicle mileage, is the reported vehicle mileage consistent with vehicle mileage records?	**Y**	
64. Is the reported process and fugitive emissions consistent with activity data or maintenance records?	**Y**	
65. Are the emission factors used by the Member appropriate?	**Y**	
a. If Registry default factors are not used, do the alternative emission factors provide increased accuracy?		
b. Is the derivation and explanation of increased accuracy properly documented and reasonable?		
66. Does a sample of the Member's calculations agree with your re-calculated Scope 1 (mobile, stationary, process & fugitive), Scope 2, and Direct Biogenic CO_2 (Mobile and Stationary) emissions estimates? Have you documented your process for determining the appropriate sampling plan?	**Y**	
67. Are all required GHG emissions included?	**Y**	
68. Are discrepancies between your emissions estimates and the Member's immaterial?	**Y**	

Completing the Verification Process	Date Achieved
69. Prepare a Detailed Verification Report & Submit to Member	12/15/20; 7/15/21
70. Prepare a Verification Statement & Submit to Member	12/15/20; 7/15/21
71. Conduct Verification Meeting with Member to Discuss & Finalize Verification Report & Statement	By 12/18/20; 7/23/21
72. Communicate Verification findings to The Registry through CRIS	By 12/18/20; 7/23/21
73. Retain Relevant Verification Documents & Records	By 12/18/20; 7/23/21

Section 5: Findings

Non-Conformances

Issue	Resolution
The CRIS Reports list GRP Version 2.1 instead of GRP 3.0 as required by TCR	Closed – Corrected by UCSC
The Refrigerants were not categorized in CRIS as Simplified Estimation Methods	Closed – Corrected by UCSC
The Indirect Disclosure Form was not completed correctly.	Closed – Corrected by UCSC

Direct misstatements discovered during the verification and their magnitude at the entity level

Discrepancy	Magnitude as a Percent of Reported Direct Entity-Level Emissions	Current Disposition of the Discrepancy
Refrigerants were excluded from the report and had used incorrect GWP's.	N/A	☒Corrected ☐Not Corrected
The CH4 and N2O emission factors were outdated for mobile emissions	N/A	☒Corrected ☐Not Corrected
Fuel usage from MT. Hamilton was excluded from the report.	N/A	☒Corrected ☐Not Corrected
Rounding in recalculations	-0.002%	☐Corrected ☒Not Corrected

Net sum of all direct discrepancies at the entity level: -0.002%

Location-based indirect misstatements discovered during the verification and their magnitude at the entity level

Discrepancy	Magnitude as a Percent of Reported Location-based Indirect Entity-Level Emissions	Current Disposition of the Discrepancy

Discrepancy	Magnitude as a Percent of Reported Location-based Indirect Entity-Level Emissions	Current Disposition of the Discrepancy
Rounding in recalculations	-0.003%	☐Corrected ☒Not Corrected

Net sum of all location-based indirect discrepancies at the entity level: -0.003%

Market-based indirect misstatements discovered during the verification and their magnitude at the entity level

Discrepancy	Magnitude as a Percent of Reported Market-based Indirect Entity-Level Emissions	Current Disposition of the Discrepancy
Rounding in recalculations	-0.02%	☐Corrected ☒Not Corrected

Net sum of all market-based indirect discrepancies at the entity level: -0.02%

Attachment A –
Verification Statement

Verification Statement

The Climate Registry

This verification statement documents that Cameron-Cole, LLC has conducted verification activities in conformance with ISO 14064-3 and The Climate Registry's (TCR) General Verification Protocol for the emissions report described below.

Member Name: University of California, Santa Cruz

Reporting Year: January 1, 2019 through December 31, 2019

Reporting Boundary: ☒ Complete ☐ Self-Defined

If self-defined specify boundary: _____

Consolidation Methodology:

☐ Equity Share and Control (☐ Financial **and/or** ☐ Operational)

☒ Control Only: (☐ Financial **and/or** ☒ Operational)

☐ Equity Share Only

Verification Opinion:

☒ Conformance

☐ Unable to verify conformance; summarize reason (e.g., "due to data errors" or "due to insufficient supporting evidence"): _____

Cameron-Cole has conducted a full verification of University of California, Santa Cruz's emission report to a reasonable level of assurance. Based on Cameron-Cole's verification activities and findings, University of California, Santa Cruz's emissions report is prepared in all material respects in accordance with the reporting criteria identified below.

GHG reporting criteria against which verification was conducted:

☒ The Climate Registry's *General Reporting Protocol Version 3.0*, dated May 2019

☐ The Climate Registry's GRP Updates and Clarifications document dated [Month Day, Year]

☐ Others (specify): _____

GHG verification protocols used to conduct the verification:

☒ The Climate Registry's *General Verification Protocol Version 2.1*, dated June 2014

☒ The Climate Registry's GVP Updates and Clarifications document dated October, 2019

☐ Others (specify): _____

Total Entity-Wide Emissions Verified (Control Criteria):

- Total Scope 1 Emissions: 28,801.11 **metric tons CO_2e**, consisting of **metric tons of each GHG** as follows:

  27,377.94 CO_2 0.62 CH_4 0.55 N_2O 1,261.10 HFCs **(CO_2e)** 0 PFCs **(CO_2e)** 0 NF_3 0 SF_6

- Biogenic Direct CO_2 Emissions (stationary and mobile combustion only): 633.4 metric tons CO_2

- Total Location-Based Scope 2 Emissions: 4,880.98 **metric tons CO_2e**, consisting of **metric tons of each GHG** as follows:

  4,861.28 CO_2 0.33 CH_4 0.04 N_2O

- Biogenic Indirect Location-Based CO_2 Emissions: 0 metric tons CO_2

- Total Market-Based Scope 2 Emissions: 1,408.69 **metric tons CO_2e**, consisting of **metric tons of each GHG** as follows:

  1,389.28 CO_2 0.32 CH_4 0.04 N_2O

- Biogenic Indirect Market-Based CO_2 Emissions: 0 metric tons CO_2

Total Entity-Wide Emissions Verified (Equity-Share Criteria):

- Total Scope 1 Emissions: _____ **metric tons CO_2e**, consisting of **metric tons of each GHG** as follows:

  _____ CO_2 _____ CH_4 _____ N_2O _____ HFCs **(CO_2e)** _____ PFCs **(CO_2e)** _____ NF_3 _____ SF_6

- Biogenic Direct CO_2 Emissions (stationary and mobile combustion only): _____ metric tons CO_2

- Total Location-Based Scope 2 Emissions: _____ **metric tons CO_2e**, consisting of **metric tons of each GHG** as follows:

  _____ CO_2 _____ CH_4 _____ N_2O

- Biogenic Indirect Location-based CO_2 Emissions: _____ metric tons CO_2

- Total Market-Based Scope 2 Emissions: _____ **metric tons CO_2e**, consisting of **metric tons of each GHG** as follows:

  _____ CO_2 _____ CH_4 _____ N_2O

- Biogenic Indirect Market-Based CO_2 Emissions: _____ metric tons CO_2

Comments: The Scope 1 total above includes the application of 2,181 offsets used to reduce the 2019 inventory.

Attestation:

7/15/2021

Chris Lawless, Lead Verifier | Date | ☒ Digital Signature Acknowledgement*

7/15/2021

Dru Krupinsky, Independent Peer Reviewer | Date | ☒ Digital Signature Acknowledgement*

Authorization:

I [Name of Member Representative] accept the findings in this Verification Statement and authorize the submission of this verification statement to The Climate Registry on behalf of University of California, Santa Cruz.

Member Representative Signature | Date | ☐ Digital Signature Acknowledgement*

*For digital signature: By checking the "Digital Signature Acknowledgement" box, I agree that this verification statement shall be deemed to be "in writing" and to have been "signed" for all purposes and that any electronic record will be deemed to be in "writing." I will not contest the legally binding nature, validity, or enforceability of this verification statement and any corresponding documents based on the fact that they were entered and executed electronically, and expressly waive any and all rights I may have to assert any such claim.

Attachment B –
Verification Plan

Verification Plan

Prepared for:

University of California, Santa Cruz

CY2017, CY2018 & CY2019

The Climate Registry

Date: 09.16.2020

(updated 12.09.2020; 07.15.2021)

Version 3

Cameron-Cole

creating sustainable success

Cameron-Cole, LLC

50 Hegenberger Loop
Oakland, CA 94621

www.cameron-cole.com

Table of Contents

1.0 Introduction

Cameron-Cole, LLC (Cameron-Cole) has been retained by the University of California, Santa Cruz (UCSC) to perform a verification of its Greenhouse Gas (GHG) Inventory for Calendar Year (CY) 2017, CY2018 and CY2019, which were prepared using The Climate Registry's (TCR) General Reporting Protocol (GRP) Version 3.0 dated May 2019 along with associated updates and clarifications (collectively referred to as the GRP). This verification will be conducted in August 2020 and July of 2021.

This Verification Plan includes information on the following:

- Level of assurance
- Verification objectives
- Verification criteria
- Verification scope
- Materiality
- Verification activities and schedule. [NOTE: THIS MAY BE INCREASED OR DECREASED THROUGHOUT THE PLANNING PROCESS AS NECESSARY.]

In 2017, UCSC reported 30,177.31 metric tons (MT) of carbon dioxide equivalents (CO_2-e) from direct emission sources, 4,876.38 MT of CO_2-e from location-based purchased electricity and 1,937.28 MT of CO_2-e from market-based purchased electricity. UCSC applied 2,160 offsets to reduce direct emissions to 28,017.31 MT of CO_2-e.

In 2018, UCSC reported 30,983.34 metric tons (MT) of carbon dioxide equivalents (CO_2-e) from direct emission sources, 5,002.68 MT of CO_2-e from location-based purchased electricity and 1,444.20 MT of CO_2-e from market-based purchased electricity. UCSC applied 2,168 offsets to reduce direct emissions to 28,815.34 MT of CO_2-e.

In 2019, UCSC reported 30,982.11 metric tons (MT) of carbon dioxide equivalents (CO_2-e) from direct emission sources, 4,880.98 MT of CO_2-e from location-based purchased electricity and 1,408.69 MT of CO_2-e from market-based purchased electricity. Additionally, UCSC reported 633.4 of direct CO_2e biogenic emissions. UCSC applied 2,181 offsets to reduce direct emissions to 28,801.11 MT of CO_2-e.

This Verification Plan was developed in accordance with the requirements of ISO14064-3:2006 and IAF MD6:2014. This document has been created using information derived via a systematic, interactive, and where necessary, iterative process. The plan will be revised and updated as necessary during the course of the verification process.

2.0 Level of Assurance

The level of assurance is used to determine the depth of detail that a verifier designs into the Verification Plan to determine if there are material omissions, errors or misstatements. Two levels of assurance are generally recognized – reasonable and limited. Reasonable assurance statements generate the highest level of confidence, and provide reasonable assurance that an emissions report is materially correct. Limited assurance statements provide less confidence, and involve less detailed examination of GHG data and supporting documentation. Limited assurance statements assert that there is no evidence that an emissions report is not materially correct.

UCSC and Cameron-Cole have agreed that the verification of the CY2017, CY2018 and CY2019 GHG Inventory will result in a reasonable level of assurance.

3.0 Verification Objectives

The primary objectives of the verification are to:

- Verify whether UCSC's CY2017, CY2018 and CY2019 GHG Inventory meets the generally accepted GHG accounting principles of accuracy, completeness, transparency, relevance and consistency.
- Determine if UCSC has reported all emissions in conformance with the guidelines provided in TCR's GRP.
- Determine whether or not UCSC's CY2017, CY2018 and CY2019 Inventory meets/exceeds the 95% threshold for accuracy required by TCR.

4.0 Verification Criteria

The verification process will maintain the principles of completeness, consistency, accuracy, comparability and transparency. Cameron-Cole will conduct verification activities to assess accuracy and conformance with the stated objectives and GRP. Where the GRP does not provide guidance on methodologies, or where UCSC has a justification for using alternatives, UCSC will reference these sources. In these cases, Cameron-Cole will use professional judgment to assess the accuracy and completeness of the GHG assertion.

Cameron-Cole will verify UCSC's GHG emission report using the (most current versions of the) following standards:

- TCR GRP and its associated updates and clarifications
- TCR GVP and its associated updates and clarifications
- ISO 14064-3:2006(E) (Specifications with Guidance for the Validation and Verification of Greenhouse Gas Assertions)

Per IAF MD 6:2014 (IAF Mandatory Document for the Application of ISO 14065:2013, Issue 2) A.8.4.8, Cameron-Cole shall identify applicable definitions in the agreed validation or verification criteria and consider them when determining whether a GHG assertion conforms to the validation or verification criteria.

5.0 Verification Scope

A description of UCSC's GHG Emissions Inventories that is included in the scope of verification activities is as follows:

- **Geographical:** North America
- **Chemical:** all Kyoto gases for their operations include sources which emit carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs)
- **Organizational Boundary:** campus facilities, cogeneration plant; UCSC off-campus facilities and vehicle fleet
- **Operational Boundary:** The following sources/emissions were identified in UCSC's organizational boundary:
    - Indirect Emissions from Electricity Purchases: main campus imported electricity; off-campus Imported Electricity
    - Direct Emissions from Mobile Combustion Sources: vehicle and voyager accounts
    - Direct Emissions from Stationary Combustion Sources: cogeneration plant; emergency generators; Lick Observatory diesel fuel; main campus natural gas; propane - Arboretum & Mt. Hamilton; off-campus natural gas; acetylene
    - Direct Fugitive Emissions: chillers, domestic refrigeration; industrial refrigeration; mobile AC; residential and commercial AC system; fertilizer application

6.0 Materiality

The concept of materiality is used to determine if erroneous, omitted or misstated GHG emissions information will lead to significant misrepresentations of emissions. A material misstatement is the

aggregate of errors and omissions with program requirements, and/or misrepresentations that could influence the decisions of intended users.

The Climate Registry sets the materiality threshold at 5% (for both understatements and overstatements) of a Member's direct and indirect emissions. UCSC and Cameron-Cole have agreed on a materiality threshold of 5% assessed separately for direct and indirect emissions.

7.0 Discrepancies

Cameron-Cole's verification activities include understanding any issues with UCSC's GHG Inventory processes, calculations, data and documentation -- particularly those that result in a material discrepancy. Cameron-Cole will provide UCSC with information on discrepancies found during the course of the verification. Cameron-Cole will make every effort to provide this information in a timely manner (mostly likely in batches as the review progresses), so that UCSC has sufficient time to rectify the discrepancies, if appropriate. UCSC will then resubmit information to Cameron-Cole, preferably in batches, to allow Cameron-Cole ample time to re-verify the information.

If UCSC and Cameron-Cole cannot agree on a discrepancy, a determination will be made as to its material impact on UCSC's GHG Inventory. If the discrepancy is not considered material, Cameron-Cole will notify UCSC, and allow UCSC to rectify the discrepancy. If UCSC does not rectify the non-material discrepancy, the Verification Statement will be qualified per IAF MD 6:2014 8.4.6. Cameron-Cole will also note this in the Verification Report. If the discrepancy is material, a compromise will be reached between UCSC and Cameron-Cole with regard to how the discrepancy is presented in Cameron-Cole's Verification Report, and Cameron-Cole will notify UCSC whether the discrepancy will impact Cameron-Cole's ability to provide reasonable assurance.

8.0 Preliminary Findings

There are no preliminary findings at this time.

9.0 Verification Activities

Per IAF MD 6:2014 A.8.4.10, in evaluating the risk of material discrepancies related to the GHG assertion, Cameron-Cole shall consider:

- Views of the intended user(s);
- Relevance and relative contribution of the various GHG emissions from all GHG sources, sinks and reservoirs;
- Adequacy of the GHG information system and controls;

- Complexity of organization;
- Monitoring process applicable to the organization; and
- Relevant evidence from previous verifications, as applicable.

Review results of previous verifications

Per IAF MD 6:2014 A.8.4.2, if previous verifications have been conducted, Cameron-Cole will conduct a review of the results of those activities and identify any changes to the GHG inventory since the last verification, and the reason(s) for such changes.

Verify emissions sources

Cameron-Cole will conduct a detailed desktop review of UCSC's source list to verify that all facilities, emissions sources, and fuels for the entity have been identified. All sources will be ranked by magnitude.

Determine areas of high risk and uncertainty

Based on initial discussions, and on information gathered and evaluated in previous tasks, Cameron-Cole will then determine which areas (facilities, sources and resultant emissions estimates) have the highest risk of material error or misstatement. We will focus our efforts in these areas. The following are types of potential errors, omissions and misrepresentations that will be included in our assessment:

- The inherent risk of a material discrepancy occurring;
- The risk that the controls of the organization will prevent/ not prevent or detect a material discrepancy; and
- The risk that the verifier will not detect any material discrepancy that has not been corrected by the controls of the organization.

Per IAF MD 6:2014 A.8.4.4, Cameron-Cole will take into account the level of risk mitigation provided by the GHG information systems and controls when considering the detail and level of verification sampling.

Verification Sampling Plan and Data Request

Since it is generally inefficient to assess all GHG information collected by an organization, a risk-based approach will be employed in developing a Verification Sampling Plan. The Verification Sampling Plan will identify the sources that will be subject to evaluation.

Cameron-Cole will submit a Data Request to UCSC. The Data Request will request information including, but not limited to, the following:

- A description of inventory management systems, including methods used to gather, transcribe (if applicable), QA/QC and aggregate activity data;
- Fuel and utility bills; and
- Copies of leases or rental agreements.

Per ISO 14064-3:2006(E), the Verification Sampling Plan will "be amended, when necessary, based on any new risks or material concerns that could potentially lead to errors, omissions and misrepresentations that are identified throughout the validation or verification process."

Per IAF MD 6:2014 A.8.4.6, In cases where errors, omissions or misstatements are identified in the GHG data and information, the validation and verification team shall require that these are corrected by the client, and increase the sampling. Where non-material errors, omissions or misstatements cannot be corrected, the V/VB shall qualify the validation or verification statement. Where statements cannot be qualified, e.g. materiality or other program requirements are not met, the V/VB shall issue an adverse verification statement.

Evaluate methodologies and management systems

Cameron-Cole will review the methodologies and management systems used by UCSC to determine whether they are in conformance with the GRP. We will review the data collection, transcription, conversions (if applicable), assumptions (if applicable), QA/QC and recordkeeping processes to ensure they are robust. Cameron-Cole's management system review will give consideration to the following:

- Selection and management of the GHG data and information;
- Processes for collecting, processing, consolidating and reporting GHG data and information;
- Systems and processes that ensure the accuracy of the GHG data and information;
- Confirmation of the operability of the software and hardware used to process or generate GHG data and information (IAF MD 6:2014 A.8.4.7);
- Design and maintenance of the GHG information system;
- Systems and processes that support the GHG information system; and
- Results of previous assessments, if available and appropriate.

Desktop Review

First, Cameron-Cole will conduct activities as described in the GVP to verify the accuracy and completeness of activity data (i.e., verifying fuel and electricity usage). Then, using the results of previous tasks, Cameron-Cole will select calculations to verify.

Site Visits

A site visit was conducted in 2016 as part of the emissions year 2015 verification. Since there were no significant operational changes since last year, no site visit will be conducted in 2020.

Recalculation

Cameron-Cole will recalculate emissions estimates for selected sources using underlying activity data (provided by UCSC). Material and immaterial errors and misstatements will be identified, and UCSC's overall emissions estimates will be compared to our overall emissions estimates to determine if the materiality threshold (of 95% accuracy) has been achieved.

Verification Report, Verification Statement & Exit Meeting

Per IAF MD 6:2014 A.8.4.9., input in to the assessment of the GHG assertion shall include: contract requirements related to scope, criteria, objectives, level of assurance and materiality as well as any validation or verification criteria-specific requirements; GHG assertion; output from the strategic analysis and assessment of risks; output from the assessment of GHG information system and controls; output from the assessment of GHG data and information; and output from the assessment against the verification criteria.

Per IAF MD 6:2014 A.8.4.11, the output from the assessment of the GHG assertion shall confirm that: evidence gathered is sufficient to validate or verify the GHG assertion in line with the scope, criteria, objectives, materiality and level of assurance as agreed in the contract; the verification process, as carried out, has delivered the level of assurance as agreed; sampling and its results support or not a conclusion that there are no material discrepancies in the GHG assertion; and, the GHG assertion is free from material discrepancy based on the evidence and findings from the verification process and the agreed scope, objective, criteria, materiality and level of assurance. If the evidence and findings are not sufficient to reach this conclusion then; either: the level of assurance and / or materiality of the engagement shall be amended, or one of the following types of opinion may be formed - "adverse", "qualified", or a disclaimer of opinion.

Cameron-Cole will prepare a Verification Report and Verification Statement for UCSC for each calendar year. The Verification Report will document the verification process, inventory recalculations and summarize the verification findings. Per IAF MD 6:2014 A.8.4.6, in cases where errors, omissions or misstatements cannot be corrected, Cameron-Cole will qualify the Verification Statement (see previous statement under Verification Sampling Plan and Data Request).

Per IAF MD 6:2014 A.8.4.12, the verification team shall submit to the V/VB[1], evidence and findings to substantiate and supports its recommendations related to the GHG assertion (the proposed V/V statement). The evidence and findings shall link to the agreed Verification Plan and Verification Sampling Plan and be sufficient for the Reviewer to carry out an effective review (refer also to ISO 14065:2013 Clause 8.5). All documents will be subjected to an evaluation and quality assurance check by the Reviewer. Per IAF MD 6:2014 A.8.5.1, in concluding (refer also to ISO 14065:2013 Clause 8.5) the Reviewer shall take into account the evidence resulting from the following:

- Whether the Verification Plan, Verification Sampling Plan and verification process and its stated conclusions and opinions are consistent with the agreement related to level of assurance, materiality, criteria, objectives and scope;
- Findings from the strategic analysis and the assessment of risks;
- Whether the design of the verification process and its stated conclusions and opinions are consistent with the requirements in the contract;
- Changes to the Verification Plan or the Verification Sampling Plan;
- The conclusion reached on GHG data and information; and

[1] In Cameron-Cole's case, the Independent Peer Reviewer ("the Reviewer") will receive the information from the verification team.

- The recommendation related to the GHG assertion.

Per IAF MD 6:2014 A.8.5.2, the Independent Reviewer shall determine whether the Verification Statement is consistent with findings from the verification activities, and that its stated conclusions and opinions are consistent with finding from the verification and that nothing material has been omitted.

Per IAF MD 6:2014 A.8.5.3, the Independent Reviewer shall determine whether the Verification Statement meets the requirements set out in the verification criteria. Where there is no Verification Statement requirement(s) set out in the verification criteria, the Verification Statement shall meet ISO 14064-3 Clause 4.9.

The general conclusion from the Verification Report will be used to create the Verification Statement, which will then be reviewed and signed by Cameron-Cole's Independent Reviewer and the Team Leader/Lead Verifier. Per IAF MD6:2014 A.8.5.5, the Verification Statement shall conform with ISO 14064-3, Clause 4.9, except in cases where regulated requirements overrule this; be consistent with the outcome of the V/VB review[2]; contain a verification opinion and conclusion that reflects material discrepancies that remain after the conclusion of the verification; contain a validation/verification opinion and conclusion that reflects material discrepancies that remain after the conclusion of the validation or verification and be issued to the responsible party.

Originals of these documents will be provided to UCSC, and an exit meeting will be held with UCSC to discuss the Verification Report and Verification Statement. Per IAF MD 6:2014 A.8.4.14, Cameron-Cole shall ensure that all material discrepancies are reported to the client including explaining their potential impact on the Verification Statement. If no material errors or misstatements are found, UCSC will then sign the Verification Statement. If material misstatements are found, it is understood that UCSC can revise its information and resubmit it for review by Cameron-Cole (on an additional time-and-materials basis) until the minimum quality standard is met. UCSC can provide a copy of Cameron-Cole's Verification Statement to all interested parties and directly quote the Verification Conclusion from the Verification Statement.

10.0 Schedule

The verification schedule is as follows:

- Kick-off meeting – August 19, 2020
- Submit Verification Plan to UCSC – September 16, 2020
- Complete Verification Sampling Plan – September 16, 2020
- Submit Verification Findings to UCSC – by October 16, 2020
- UCSC responds to Verification Findings – by December 8, 2020

[2] In the case of Cameron-Cole, this will be consistent with the Independent Peer Review.

- Submit Verification Report to UCSC – by December 18, 2020
- Exit meeting – by December 18, 2020
- Submit Verification Statement – by December 18, 2020
- Offsets applied to the inventories – June 29, 2021
- Submit updated Verification Report & Statement to UCSC – July 15, 2021
- Submit updated Verification Statement – by July 23, 2021

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Chris Lawless 9/16/2020 (updated 12/9/2020; 7/15/2021)
Lead Verifier
Cameron-Cole, LLC

DCN 536
Version 13.0
Date: 02.25.16
Approved by: GHG Director