PRODUCTION FACILITY & OUTPUT AUDIT REPORT

For PURO.EARTH

Company / CO_2 Removal Supplier	**Restoration Fuels, LLC**
Production Facility Name	**Restoration Fuels Facility**
Production Facility Address	**60339 US-26, John Day, OR 97845**
Production Facility Coordinates	**44°41'61.3"N 118°95'26.8"W**
Net Volume of CO_2 Removal	**877 CORCs**
Removal Method	**Biochar**
Removal Period	**11/01/2023 – 03/31/2024**
Auditor	**Bill Chatterton 350Solutions, Inc.**

ISSUED: MAY 10, 2024

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PRODUCTION FACILITY & OUTPUT AUDIT REPORT

Company: Restoration Fuels, LLC	Company Contact: Matthew Krumenauer	Audit Team: *Bill Chatterton Kevin McCabe Tim Hansen, PE
Removal Method: Biochar		
Report Date: Original 05-10-2024		
Document No: 350VR-VG-PU2302		
Rev: 2.0		

** primary contact/lead author*

1. INTRODUCTION

350Solutions was contracted to perform an audit and validation of the production facility as well as verification of carbon dioxide removal credit (CORC) claims for Restoration Fuels biochar production and utilization. Restoration Fuels, LLC (RFL) utilizes a slow pyrolysis process at its John Day, OR facility to produce advanced carbon products including biochar from woody biomass from regional forest restoration treatments.

The area around John Day was heavily mined in the past and has many disturbed and polluted sites in need of remediation and/or soil stabilization. In partnership with the US Forest Service, RFL will supply biochar as a soil remediation application at these reclamation sites. The biochar can also be utilized as forest and agricultural soil amendment applications. To date, initial end use applications have been to provide potential biochar users the opportunity to validate the application and performance of the product.

350Solutions conducted an audit of the process, lifecycle CO_2 emissions assessment (LCA), and other administrative details to verify compliance with the requirements of the Puro.Earth Puro Standard General Rules [1] and Biochar Methodology (Edition 2022 Version 3) [2]. The audit and verification began with a document review and followed with a site visit and detailed data audit on March 13, 2024.

TABLE 1. RESTORATION FUELS ENERGY SYSTEMS VERIFICATION SUMMARY

Verification Summary	
CO_2 Removal Supplier	Restoration Fuels, LLC
Production Facility Name	Restoration Fuels 60339 US-26, John Day, OR 97845 GSRN: 643002406801001357
Removal Method	Biochar – Production from woody forest waste and use as soil amendment and abandon mine site reclamation
Verified CORC Factor	1.52 t CO_{2e} / t biochar
Verified CORCs	877 CORCs
Audit Report Date	05-10-2024
Site Visit Date	03-13-2024
Production Facility Location (Address and GPS Coordinates)	60339 US-26, John Day, OR 97845 44°41'61.3"N, 118°95'26.8"W
Verification Type	Combined Production Facility Audit and Output Audit for Puro.Earth, including on-site visit and facility audit; Puro Standard General Rules (v.3.1) and Annex A: Biochar Methodology (v3)

2. TECHNOLOGY DESCRIPTION

RFL has developed a slow pyrolysis system that utilizes woody biomass to produce torrefied wood, biochar, and other products. The process also generates heat which is captured and utilized within the process for biomass drying. The biochar produced by RFL is a charcoal-like substance with a high carbon content made from biomass. Due to the unique absorbency characteristics and high level of carbon, biochar is often beneficial in agricultural, environmental, and industrial applications.

RFL's pyrolysis system is located in John Day, OR – which is surrounded by the 1.7-million-acre Malheur National Forest. This forest has been identified as one of 23 'priority landscapes' nationwide under US Forest Service Collaborate Forest Landscape Restoration Program (Plaven, 2023). Wildfire reduction treatments take place in the forest, following Forest Service Fire Management plans for the Malheur National Forest, described above. This includes thinning the number of younger and smaller trees and promoting growth of mature fire-resilient tree species, such as ponderosa pines. The bulk of the harvested material is non-commercial grade dead or living biomass, less than 7" diameter, typically left to rot or more likely burned under controlled conditions in the National Forest. This woody biomass harvest provides the sustainable feedstock for the RFL process. Waste woody biomass from the co-located Malheur Lumber sawmill is also utilized in the process.

The biochar production process and sub-processes used by RFL for carbon removal, with respect to the Cradle-to-Grave LCA system boundaries of the Puro Standard General Rules, are shown in Figures 1 and 2 [3].

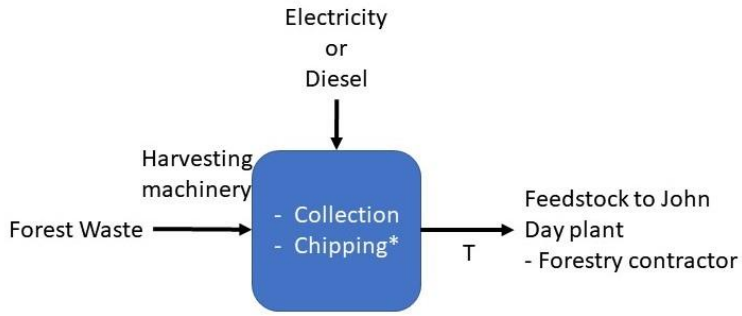

Figure 1. System Boundaries for Restoration Fuels Waste Biomass Harvest and Transport from Forest Fire Reduction Harvest or Commercial Timber Harvesting

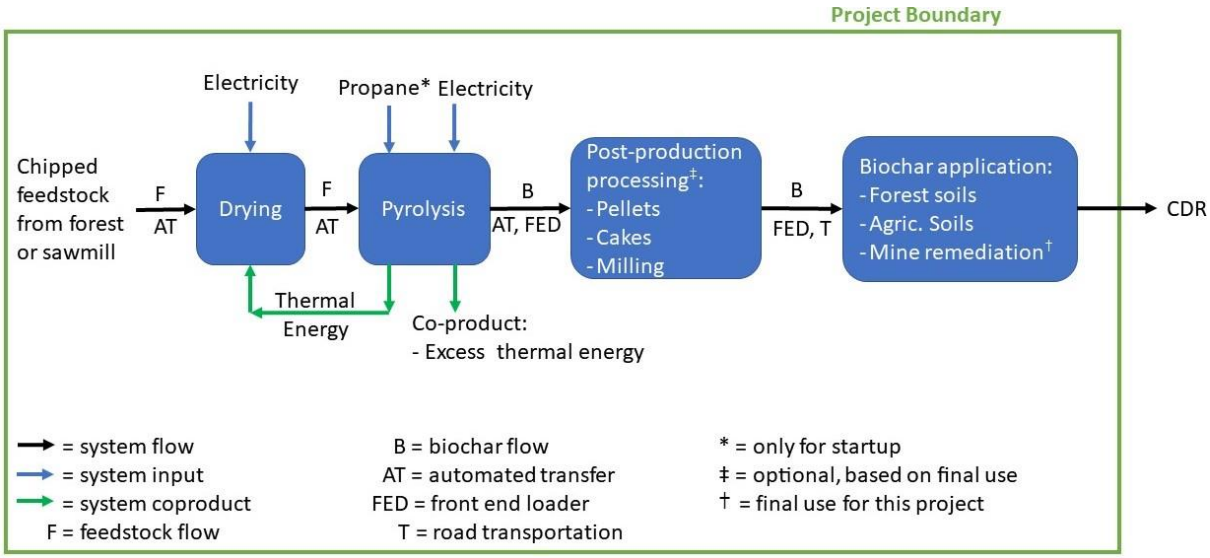

Figure 2. System Boundary and Process Flow Diagram for the Restoration Fuels Biochar Process

The biomass from wildfire reduction treatment harvests is removed from the forest and trucked to the RFL plant in John Day. This work is done by an independent forestry contractor, that uses its own equipment to chip, load, and haul the biomass to a feedstock receiving area, where it is mixed with sawmill waste wood, and stockpiled using a front loader. This is therefore material of various origin and moisture content, but uniform in size, and ready to be used in the pyrolysis process (Figure 1. **System Boundaries for Restoration Fuels Waste Biomass Harvest and Transport from Forest Fire Reduction Harvest or Commercial Timber Harvesting**

). It is assumed that chipping of the forest material can happen either in the forest, or on site in John Day. Current modelling of the system assumes that electricity is used for the chipping operation. Similarly, the pyrolysis system flow chart assumes that post-processing of biochar is possible, as the equipment is available, however in the current modelling it is assumed that no post-production processing takes place. Typical biomass throughput produces in the range of 900 to 1,400 kg/hr biochar. An illustration of the system in John Day, OR is shown in Figure 3.

Further, as indicated in the process flow diagram, the generated biochar may have multiple final uses, as the environmental and ecological need and market opportunity exist in Oregon. In the current modelling scenario, incorporation into soils at a mining reclamation site is assumed to be the biochar final use application.

Figure 3. Restoration Fuels Biochar Production Facility – John Day, OR

Typical production operations at the RFL facilities includes the following:

- Receipt of biomass from wildfire reduction treatment harvests at Malheur National Forest, with documentation of feedstock delivered quantity, and acceptance of sawmill waste wood (of forest origination;
- Woody biomass from the forest is chipped and mixed with sawmill waste wood, and conveyed to the pyrolysis process;
- Operation of the RFL slow pyrolysis process, including;
    - Continuous automated feed of feedstock during operations (900 - 1,400 kg/hr);
    - Continuous production and combustion of syngas;
    - Recovery of and cycling of combustion gas heat for steam generation, biomass drying, and pyrolysis;
    - Continuous biochar output during operations (250 – 430 kg/hr);
    - Collection, cooling of biochar;
- Storage and packaging of biochar (supersacks);
- Sale and shipping of biochar to final end users;
- Documenting all process operations, including input and output rates, biochar production and product sales, and amounts of by-products.

3. AUDIT SUMMARY

3.1. AUDIT APPROACH

A planned series of audit activities were conducted by 350Solutions to independently validate and verify the production facility, its operations, production and output data, and CORC claims. The audit was conducted following the specifications of Puro General Rules (v3.1) and the Biochar Methodology (v3). Specific audit activities conducted are summarized in Table 2. Audit Activities. A completed Puro Biochar Methodology Compliance Checklist used during the verification is attached to this report as Appendix 1. Verifier qualifications are attached as Appendix 3.

TABLE 2. AUDIT ACTIVITIES

Date(s)	Verification Activity	Verification Tasks	Documents Reviewed
03/4-7/2024	Introductory Document Review	- Review of LCA - Review of Puro CORC calculations - Review of facility registries and permits	- Facility details in Puro Registry- Restoration Fuels, LLC.pdf - LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf - 02_CORC calculation Biochar template RFL.xlsx - puro_LCA Model_Restoration Fuels APR 16 2024-R1.xlsx - Biochar Production Rev 8.0.docx - 12-0032-ST-01-PmtMod-30755- 30403-FNL.docx - EIN Restoration Fuels.pdf - Stakeholder Engagement.docx
03/4/2024 – 04/19/2024	Data Review	- Review of waste biomass sources and sustainability - Review of system inputs and outputs - Review evidence of product output - Review of biochar properties - Review of biochar end use	- Wood Supply and Service Agreement Final.pdf - Proof of Raw Materials and Carbon Balance.docx - LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf - 02_CORC calculation Biochar template RFL.xlsx - puro_LCA Model_Restoration Fuels APR 16 2024-R1.xlsx - Copy October 2023 MasterOps report10.3.xlsx - Consumption Values for Audit thru 03-31-2024 - RF Production_Shipment log 4.25.24.xlxs - RF Biochar Sales Agreement template 11.13.23.docx - 23F01588 R1.pdf - Copy Sample Lab Analysis Summary.xlsx - Finished Product Quality Specifications - Biochar Rev 5 (1).docx - Restoration Fuels OMRI Certificate.pdf - Statistical Summary of Commercial Laboratory Analyses of Biochar.docx - Proof of Health and Safety Measures.docx - Restoration Fuels Biochar and Torrefied Wood Fuel SDS Rev. 1.pdf - RF PHA Report 10182023.pdf - Proof of No Double Counting.docx - Puro additionality questions to suppliers v1.8_Restoration Fuels 11.28.23.pdf - Biochar Financial Model- 05.12.23.xlsx
03/13/2024	On-site Visit	- Opening meeting and process walk through - Witness of operations, measurement points, and instrumentation - Review of equipment and calibrations - Review of intake and production data collection	- Verifier observations of operations, measurement points, and instrumentation (see compliance checklist) - Observation and documentation of feedstock receipt, production logs, equipment utilized, data collected, material handling equipment and procedures - Weigh scale calibration (file: IMG_2147.jpg). - On-site review of all documents listed above

Date(s)	Verification Activity	Verification Tasks	Documents Reviewed
		- Confirmation of company and facility administrative details - Confirmation of facility environmental and social safeguards	

3.2. PROCESS INPUTS & OUTPUTS

The RFL process uses waste biomass as its primary feedstock, with air input to support gasification (internal heating), emission control via oxidizer combustion of syngas, and production of biochar or torrified wood products. Energy related inputs include fuel (diesel) for materials handling equipment, electricity for systems operation (fully provided by the co-located sawmill and metered), and fuel (propane) for pyrolysis startup. The process uses water for biochar handling safety and moisture content management for final product. Operating time during this reporting period is 55 days for a total of 1,320 hours of production. Table 3 summarizes the observed inputs and outputs from the process and typical rates from supplied operational data.

Table 3. Verified Production Facility Inputs & Outputs

Input/Output	Verified Rate	Notes (Specifications, source, etc.)
Waste Biomass input (forest and sawmill woody waste)	Average 2.1 tonne/hr, wet basis, or 4.8 tonne wet biomass/tonne biochar dry matter basis (DMB)	Typically, nominal 65% sawmill waste (from forest) and 35% direct forest residue
Biomass supply inputs (collection, handling, transportation emissions), (Ebiomass)	19.8 kg CO2-eq. / tonne biochar DMB	Emissions are from transport of biomass feed to facility. Average roundtrip transport distance is 100 km.
Production inputs: - diesel (materials handling equipment) - propane - site electricity use	3.0 L/ tonne wet biomass input 70 L/ tonne wet biomass input 143 kWh/tonne wet biomass input	Propane used for process startup and stabilization, and reactor warming during periods of extremely cold ambient conditions
Production water input	Estimated 400 L/tonne biochar DMB (not currently recorded)	Water use for biochar quench (as needed), is estimated to be equivalent to the moisture content of the biochar. Emissions associated with estimated water use are negligible and not currently included in Eproduction.
Biochar production output	576 total tonne DMB, 10.5 tonne/day average	Biochar production during normal operations from LCA data and production logs
Production and operation emissions output (Eproduction)	639.9 kg CO_2e/ tonne biochar DMB	Emissions from all production process and supporting equipment, including process startup, burnout, process operations, syngas destruction, material handling equipment fuel usage, packaging, and equipment manufacture.
Product distribution emissions output (Euse)	21.9 kg CO_2e/ tonne biochar DMB	Verified based on average transport distance from production facility to purchasers, and end use application.

3.3. VERIFIED OUTPUT & CORCS

Table 4 includes the specific CORCs claimed by RFL Energy Systems for its Visalia and Camarillo facilities, as well as the level verified by 350Solutions during the on-site audit and data review.

TABLE 4. VERIFIED CORCS FOR RESTORATION FUELS ENERGY SYSTEMS

Performance Metric Name / Description	Claimed Value*	Verified Value[1]	Data Source	Reporting Period
CORC Factor	1.51 t CO_2/ t biochar	1.52 t CO_2/ t biochar	- LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf - puro_LCA Model_Restoration Fuels APR 16 2024-R1.xlsx - RF Production_Shipment log 4.25.24.xlxs - Finished Product Quality Specifications - Biochar Rev 5 (1).docx	11/01/2023 - 03/31/2024
Biochar Production	560 tonne (dry)	576 tonne (dry)		
Total CORCs	846 CORCs	877 CORCs[2]		

[1] Claimed values are those submitted by Restoration Fuels after completion of LCA revisions based on results of audit and extension of reporting period through 03-31-2024. Verified values are based on verification of final biochar production records for the reporting period.

[2] As determined using the Puro LCA calculations workbook "puro_LCA Model_Restoration Fuels APR 16 2024-R1.xlsx"

4. AUDIT FINDINGS

4.1. SUMMARY OF AUDIT FINDINGS

350Solutions has reviewed and audited the documentation of the technology, the instrumentation, the procedures, performance and collected data and has found that the data presented in the Puro Audit Package and during the site visit and follow up:

☐ ***Meets the requirements of the Puro General Rules V3.1 and the Annex A Biochar Methodology V3***

☒ ***Meets the requirements of the Puro General Rules V3.1 and the Annex A Biochar Methodology V3 with minor modifications***

☐ ***Does Not Meet the requirements of the Puro General Rules V3.1 and the Annex A Biochar Methodology V3***

A summary of specific findings associated with each requirement of the Puro Standard and Biochar Methodology and any identified issues with the audit are summarized below.

TABLE 5. AUDIT FINDINGS

Puro Standard Biochar Method. Section Ref.	Audit Verification Topic	Findings
1.1.1 *5.2.1*	*Sustainable Feedstock*	Acceptable. RFL obtains waste forest biomass either directly from the national forest or from the co-located sawmill for all operations. Under the baseline alternative, all woody waste would typically be open burned, used as furnace fuel, or left in the forest to decay.
1.1.2 *5.4.2*	*Biochar Use*	Acceptable. RFL has demonstrated demand for biochar product for reclamation of regional abandoned mine sites, soil amendment use from several end users. All invoices indicate use for soil amendment, mine reclamation, or other similar land application. The biochar is certified by the Organic Materials Review Institute (OMRI) for use as crop fertilizers and soil amendment and conforms to the requirements of USDA Soil Carbon Amendment Code 336. No biochar claimed for CORCs is used in energy generation.
1.1.3 *5.2.2* *5.3.3* *5.4.1*	*Net-Negative LCA*	Acceptable with modifications. RFL has demonstrated an appropriate basis for CORCs according to the Puro Biochar Methodology after required LCA modifications were completed.
1.1.4	*Prohibition of Fossil fuel use for process heat*	Acceptable. Process heat is provided by internal combustion of biomass-derived syngas. Propane is used for process startup and transition to steady operation and occasionally during periods of extreme cold ambient conditions.
1.1.5	*Negligible methane emissions*	Acceptable. Emissions from the process only occur from the oxidizer exhaust (portions of the exhaust gas are recycled back to the burner after heat recovery). The thermal oxidizer operates at conditions such that low methane emissions are anticipated. Methane emissions are measured during the annual regulatory stack test for the State of Oregon and currently quantified at 0.22 kg/hr.
1.1.6, 5.3.4	*Molar H:C Ratio < 0.7*	Acceptable. Biochar analytical results have demonstrated molar H:C ratio of 0.62 +/-0.03.
1.1.7	*Safe Environment & Biochar Handling*	Acceptable. RFL operates under an air permit issued by the Oregon Department of Environmental Quality – Permit 12-0032-ST-01 expiration 06-01-2024. Biochar is stored in open air after quench and cooling and is packaged in supersacks on-site.
1.2.2	*Environmental & Social Safeguards*	Acceptable. RFL operates under air permits discussed above and written internal safety and operational procedures. Community and stakeholder outreach activities are documented.
1.2.3	*Demonstrated Additionality*	Acceptable. RFL has submitted that: The project is not required by existing laws, regulations, or other binding obligations. Additional revenue derived from CORC sales will support RFL by providing needed revenue to improve the system and company financials.
1.2.4 *5.3.1* *5.3.2*	*Biochar Quantification*	Acceptable. The final packaged biochar dispatched from the facility to end users is measured at the facility using a calibrated weigh scale. Currently, the mass of biochar stockpiled at the facility as of the end of the reporting period (that is, produced by but not dispatched during the reporting period) is estimated using volume and density measurements. All product amounts included in inventory and dispatch sales are recorded. RFL also documents

		biochar and other product production in daily production logs. The LCA inputs are complete.
1.2.5	*Verified Production Facility standing data*	Acceptable. Conformance to the requirements of Section 1.2.5 of the Biochar methodology is documented and verified.
5.2.1	*Feedstock Sustainability Proof*	RFL has demonstrated that its feedstock is solely waste wood from the national forest and local sawmill, which are otherwise destined for open burning or furnace feed. Shipping documents from the biomass transporters and weigh scale records were provided as evidence.
5.4.3	*Justification of Soil Temperature*	Acceptable. An appropriate soil temperature of 8°C was used for LCA use in the Eastern Oregon region or as a default value.
5.5.2	*Statement re: Double Counting*	Acceptable. RFL is aware of end-user customer practices and assures no-double counting is taking place. RFL has incorporated language in its quotes and sales agreements prohibiting double-counting and claiming of CORCs for use of its product.
5.5.3	*Marketing / Branding Restrictions on end-user*	Acceptable. Documentation of product sales and shipment were reviewed and verified. Documentation of end-use is included in sales invoices log. RFL also incorporates language prohibiting use of biochar for energy purposes in sales agreements.

Additional details regarding audit activities, documents reviewed, and observations during the audit process are summarized in Appendix 1.

4.2. AUDIT ISSUES

Findings of the LCA review, production facility audit, output verification, and on-site validation of operations included identification of minor revisions to LCA input values (biochar produced, biochar yield, power and diesel consumption), LCA omissions (end use emissions and stack methane emissions), as well as items for consideration for improvement of operations, and LCA and CORC calculations in the future. Additionally, RFL modified the originally submitted reporting period for this output audit to update operations and production through the first quarter of 2024. The originally submitted reporting period of calendar year 2023 was updated to the reporting period addressed here as November 1, 2023 through March 31, 2024. The change is justified because operations and biochar production prior to November 2023 are considered a commissioning and start-up period with atypical start-up and shut down situations that were not indicative of normal operations.

A primary operational measurement is mass of biochar produced. Currently, produced biochar is weighed on calibrated scales after loading or packaging and prior to dispatch to end users. However, a portion of biochar production is stored on-site as inventory. Mass of biochar produced is currently not continuously monitored during production. For this reporting period, roughly half of the biochar produced was accurately weighed during dispatch, with the mass of inventoried biochar estimated using verified volume and density measurements. RFL is developing a procedure for real time and continuous measurement of mass of biochar produced to more accurately account for inventory produced during a given reporting period. It's noted here that biochar sampling is conducted during production and H:C ratio variability is low (total of 54 reported samples reported an average H:C ratio of 0.62 +/- 0.03).

With respect to LCA revisions, specific omissions identified in the original iteration of the LCA included:

- Quantification of emissions associated with $E_{production}$. CH_4 emissions from the thermal oxidizer used for syngas destruction and control were not included. To address this, emissions measured using Reference Methods for regulatory purposes in 2023 were added to the revised LCA as contributory to $E_{production}$.
- Estimation of emissions associated with end use land application of biochar. To address this, LCA analysts used a USDA fuel use estimate for biochar soil application of 0.36 L/tonne to update the total E_{use} estimate in the revised LCA. Note that at this time, emissions contributing to E_{use}, biochar transportation and land application are project-specific and estimated at this point.

As a result of these findings, RFL issued a second iteration of the LCA that addressed the LCA omissions and provided updated production records for the modified reporting period.

4.3. RECOMMENDATIONS & OPPORTUNITIES FOR IMPROVEMENT

Recommendations for improving the quality of data and accuracy of the LCA and CORC claims in the future include:

- Develop improved procedures for quantification of biochar production during operations to accurately account for dispatched and inventories biochar produced during a given reporting period.
- This procedure, and other such modifications to improve operations in the future should be noted for review in annual output audits to ensure any impacts on LCA are accounted for.
- Ensure emissions associated with any fuel and equipment use for end-use char handling, spreading, etc. is accounted for in revised LCA submissions, if applicable;
- Improved records of water use for biochar quench operations and inclusion of associated emissions in LCA;
- Ensure any significant new equipment is identified and the lifecycle emissions from manufacturing the equipment is added to the LCA;
- Conduct internal carbon and mass balances for defined periods as an internal quality check on measurements and operational procedures;
- Recommend an annual review and update of the LCA to ensure all activities, equipment, and processes are accounted for.
- There is potential for use of significant amounts of spare parts in the process. Over the predicted product life, these spare parts may add up to a significant quantity of materials, which should be accounted for in future iterations of the LCA. Monitoring spare parts usage is recommended.
- Updated thermal oxidizer stack emissions should be used in the LCA when available after future regulatory driven emissions tests; and
- Improved estimates of end use emissions should be used in the LCA, in particular emissions estimates based on actual equipment and equipment use for land applications.

5. REVISION HISTORY

Original date of issue: April 26, 2024

Version	Date Issued	Noted Changes
Draft Version (v1.0)	04-26-2024	NA
Draft Version (v1.1)	04-30-2024	350Solutions internal QA review
Version 2.0	05-10-2024	Incorporates Puro.Earth review comments

6. REFERENCES

[1] Puro.Earth, Puro Standard General Rules, Version 3.1. https://puro.earth/documents/

[2] Puro.Earth, Biochar Methodology, Edition 2022 V3, Feb 2024. https://puro.earth/methodologies/

[3] Biosystems Engineering PLLC, “Life cycle assessment report of Restoration Fuels John Day facility biochar production and use for CORC calculation (Internal)”. April 2024.

APPENDIX 1: PURO.EARTH BIOCHAR METHODOLOGY AUDIT CHECKLIST

Production Facility and Output Audit - Biochar Methodology	
Audit ID	350PU-RF-01
Audit Inception Date	26 February 2024
Production Facility ID	Restoration Fuels, LLC
Production Facility Location	60339 US-26, John Day, OR 97845
Auditing Body	350Solutions, Inc.
Auditor Initials	BC
QA	TH

Guideline Ref	Requirement	Requirement Met Y/N	Verification Remarks Insert auditors comments	Evidence Document Insert evidence used to verify requirement	Value Insert value or description (if applicable)	Units Insert unit (if applicable)
Standing Data Confirmation						
1.2.5	**The following standing data has been collected from Puro and checked for consistency against other evidence:** **- A certified trade registry extract for the CO2 Removal Supplier** **- CO2 Removal Supplier registering Production Facitiily** **- Evidence of the location of the Production Facility** **- Evidence of the Volume of Output for the full calendar year prior to registration** **- Evidence of the Removal Method(s) for which the plant is eligible to receive CORCs** **- Evidence of the date on which the Production Facility became eligible to receive CORCs** **- If the Production Facility has benefited from public support, evidence to show this** **- Documentation on Environmental and Social Safeguards imposed**	Y	1. Restoration Fuels, LLC is an Oregon registered Limited Liability Corporation and is a wholly owned subsidiary of the United States Endowment for Forestry and Communities, Inc.; a 501(c)3 public charity. Restoration Fuels also has a registered Federal tax identification number. 2. The CO2 Removal supplier is Restoration Fuels, LLC. 3. Restoration Fuels operates a biochar production facility in John Day, Oregon (60339 US-26, John Day, OR 97845), with all biochar being processed, bagged and shipped fromthis facility. 4. Restoration Fuels produced 560 dry tonne of biochar eligible for CORCs based on production records and logs for the facility in 2023 and 2024. This includes biochar stored in inventory as well as biochar sold for eligible applications. 5. Restoration Fuels produces biochar via slow pyrolysis of woody forest waste. 6. After a period of commissioning and facility upgrades, production of biochar from woody waste began at the Restoration Fuels facility in John Day OR. A total 560 tonne dry basis biochar was produced during the period of November 2023 through March 2024 Eligible biochar production for CORC claims are based on biochar deliveries (inventory on-site not included). Biochar shipments and deliveries are quantified using certified weigh scale and recorded in daily logs. 7. Restoration Fuels has secured community stakeholder support and state approval to operate, but has not received public funds to support operation of its facility 8. Restoration Fuels currently operates its facility under an air permit issued by the Oregon Dept of Environmental Quality (Permit No. 12-0032-ST-01), and a long-term lease agreement with Malhuer Lumber Company.	1. Company Documents.docx Facility details in Puro Registry- Restoration Fuels, LLC.pdf EIN Restoration Fuels.pdf Biochar Production Rev 8.0.docx puro_LCA Model_Restoration Fuels APR 16 2024.xlsx 2. Proof of Production Volumes.docx Finished Product Quality Specifications - Biochar Rev 5 (1).docx Restoration Fuels OMRI Certificate.pdf 11. Stakeholder Engagement.docx 12-0032-ST-01-PmtMod-30755- 30403-FNL.docx - Oregon DEQ Air Permit 7. On-site observations and verbal discussions with RFL. Verbal communicaiton from Restoration Fuels - Matt Krumenauer 11. Stakeholder Engagement.docx		
Evidence Confirmation						
5	**All necessary evidence has been provided to the auditor by the Production facility as per Section 5 of the Biochar Guidelines and has been used to complete the compliance checklist.** **- Proof of sustainability of raw material for forest biomass (FSC, SFI, PEFC, other certifications)** **- Proof of sustainability of raw material for waste biomass** **- LCA data for biomass and biochar production, supply and use, including climate change impact and the contribution of each life cycle stages.** **- Proof of product quality: laboratory analysis of total organic carbon content, hydrogen content and H/Corg** **- Proof of production volume: documentation for the whole period and methodology applied to calculate the dry mass of biochar produced.** **- For mobile units or carbonizer operator: proof of load cell measurement of the biochar for the whole period, and water input measurement.** **- Proof of end use of biochar: offtake agreement, shipment, and other records indicating the intended use of biochar.** **- Justification on the soil temperature selected for the calculation of the biochar sequestration.** **- Proof of sales** **- Proof of no double counting/C positive marketing**	Y	1. Raw material is waste woody biomass from forest restoration treatments in the 1.7 million acre Malheur National Forest, managed by the US Forest Service. Sustainability of these resources is managed by rigourous federal oversight (NEPA, USFS, and BLM). 2. LCA is complete and accurate. Reported CORCs within the LCA are based on projected RFL biochar production at current operating capacity. See Audit Report for details. 3. Lab tests completed by Hazen Research for biochar ult/prox analysis (and HC ratio). RFL also analyzes product for moisture content using moisture balance/meter and BET surface area for char quality indicator 4. Production logs are provided documenting all biochar dispatched, including weighed biochar mass, moisture content of biochar using appropriate methods (wet and dry weight using calibrated OHAUS MB45 digital scale moisture meter) and biochar heating value using Parr 6400 Calorimeter and Parr Heat of Combustion calibration standard (11,373 Btu/lb). Produced biochar inventory mass is estimated using volume and density measurements. 5. Biochar is measured on weigh scale certified by Oregon Dept of Ag and is current and NIST traceable. 6. Biochar use is documented in all invoices and in production log. All uses for soil amendment or mine reclamation. RFL has included statements on quotes requiring end use to be non-energy purpose. 7. Soil temp used is average soil temp and meets average for region where biochar is sold and used 8. RFL has supplied example sales agreements for all potential sales of biochar and current inventory claimed for CORCs, and that no double counting of RFL biochar is allowed under these agreements.	3. Proof of End Use.docx LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf Copy Sample Lab Analysis Summary.xlsx Copy Sample Lab Results.pdf, 23F01309 R1.pdf Finished Product Quality Specifications - Biochar Rev 5 (1).docx RF Production_Shipment log 4.25.24.xlxs puro_LCA Model_Restoration Fuels APR 16 2024.xlsx RF Biochar Sales Agreement template 11.13.23.docx On-site observations and verbal discussions with RFL.		

Eligibility Checklist						
1.1.1	**Biochar is used in applications other than energy.**	Y	All applications claimed for CORCs are indicated in sales agreements, production logs, and invoices as soil amendments for mine reclamation sites, or agricultural or forest soil amendments.	RF Biochar Sales Agreement template 11.13.23.docx		
1.1.2	**Biochar is produced from sustainable forest or waste biomass raw materials (consult list of raw materials).**	Y	Biomass used is sustainably sourced waste woody forest material	On site observation, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf		
1.1.3	**LCA shows:** **- carbon footprint of the biomass production and supply** **- emissions from the biochar production process** **- carbon footprint of the biochar end use** **- cradle to grave**	Y	See 5 (item 2) above. Final iteration LCA is complete after minor modifications recommended by 350 post-audit and conforms to Puro methodology.	LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf		
1.1.4	**Pyrolysis reactor input fuel for heating is not a fossil fuel. Unless only used for ignition/pre heating or in a mobile unit and the emissions are fully included in the LCA. The use of waste heat from other industrial processess (eg. Biodigesters, cement production) is permitted.**	Y	Pyrolysis process produces syngas which is used for self-sustaining process heating. Propane used for startup or periods of extreme cold, recorded and reported. No other fuel inputs noted.	On site observation, Biochar Production Rev 8.0.docx, site operating logs and propane utility bills		
1.1.5	**Pyrolysis gases are combusted or recovered. Bio-oil and pyrolysis gases can be stored for later use as renewable energy or materials.**	Y	Produced syngas is managed in a closed loop to provide process heat. Excess gases are combusted using thermal oxidizer and vented to atmosphere. Stack test conducted in 2023 used to quantify methane and CO2 emissions in Eproduction in LCA. Annual stack testing to be repeated Q2 2024	On site observation, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf		
1.1.6	**The molar H/Corg ratio is less than 0.7.**	Y	Confirmed. 0.62 +/-0.03 via calc based on lab result for biochar (prox / ult analysis)	Copy Sample Lab Analysis Summary.xlsx, Finished Product Quality Specifications - Biochar Rev 5 (1).docx, Statistical Summary of Commercial Laboratory Analyses of Biochar.docx		
1.1.7	**Evidence of safe handling and transport is provided and adequate for the production facility.**	Y	Detailed process hazard analysis for entire production process provided and reviewed. Biochar product SDS provided.	On-site observations, RF PHA Report 10182023.pdf, Restoration Fuels Biochar and Torrefied Wood Fuel SDS Rev. 1.pdf		
Production Facility Checklist (Desktop and Verbal Confirmation)						
1.2.1	**Evidence of Production Facility eligibility under the general rules of Puro Standard.**	Y	RFL meets all eligibility requirements	See above items		
1.2.2	**The Production Facility demonstrate Environmental and Social Safeguards.**	Y	See above re: air permits	See 1.2.5 above		
1.2.3	**CO2 Removal Supplier shall be able to demonstrate additionality, meaning that the project must convincingly demonstrate that the CO2 removals are a result of carbon finance. Even with substantial non-carbon finance support, projects can be additional if investment is required, risk is present, and/or human capital must be developed. To demonstrate additionality, CO2 removal Supplier must provide full project financials and counterfactual analysis based on Baselines that shall be project-specific, conservative and periodically updated. Suppliers must also show that the project is not required by existing laws, regulations, or other binding obligations.**	Y	CORCs are utilized to support business operations in addition to revenues from sales of biochar, and other byproducts. Addition of CORC revenues will improve company financials, and enable expansion of production. No biochar produciton or biomass use is required by any current laws or regulations.	Verbal discussoin with RFL, 03_Puro additionality questions to suppliers v1.8_Restoration Fuels 11.28.23.pdf, Biochar Financial Model- 05.12.23.xlsx		
1.2.4	**The Production Facility's documentation system is accurate and reliable**	Y	Facility utilizes daily production and operating logs, biomass weight logs, biochar analysis logs (heating value and moisture content hourly) during all operations. Production logs are based on calibrated weigh scales. All claimed CORCs based on weights of sold/shipped products.	RF Production_Shipment log 4.25.24.xlxs, Copy October 2023 MasterOps report10.3.xlsx		
	The quantity of the biochar produced and sold is quantified and documented in a reliable manner	Y	Biochar mass for all sold / inventoried final product is measured via weigh scale		576	dry tonne
	Relevant meters are in place and they are calibrated;	Y	Weigh Scale meter is certified by Oregon Dept of Ag June 2023 (expires June 2024. All biochar products are weighed on this scale	IMG_1877.jpg, IMG_2147.jpg, https://www.oregon.gov/oda/programs/MarketAccess/WeightsMeasures/Pages/LicenseScaleMeter.aspx		
	The emissions from the cultivating, harvesting and transporting of the biomass are estimated and calculated in a reliable manner	Y	Biomass transport is included in LCA. Harvesting and cultivating are not included, as this is waste biomass otherwise. No special handling for biomass required.	LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf		
	The energy use of the Production Facility can be quantified and the emissions from the process calculated	Y	Energy use on site is metered for electricity. All energy used for site operations (electrical) is recorded and reported using monthly utility bills. Propane use is also documented.	LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, utility bills and on-site observations		
	The auditor goes through the Quantification of CO2 Removal requirements with the CO2 Removal Supplier, so that the Supplier is able to calculate the CO2 Removal independently in its Output Report	Y	Confirmed discussion with RFL and review of LCA and CORC calculations.	Verbal discussoin with RFL, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, puro_LCA Model_Restoration Fuels APR 16 2024.xlsx		
3.1	**The CO2 Removal Supplier shall provide a life cycle assessment (LCA) for biochar activity including disaggregated information on the emissions arising at different stages. The system boundary is set cradle-to-grave and shall include emissions from production and supply of the biomass, from biomass conversion to biochar, and from biochar distribution and use.**	Y	Boundary is CtG. All emissions are accounted for within system boundary. Biomass handling/supply and biochar end use applications do not require additional handling beyond normal existing operations, so no Lca components associated with either are included (except transportation to sites).	On site observation, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf		
3.2	**Life cycle assessment (LCA) shall follow ISO standard, WRI GHG protocol or similar method.**	Y	Confirmed by LCA developer - Biosystems Engineering PLLLC, . ISO 14067 compliant LCA.	Verbal discussion with RFL, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf.		
3.3	**The default baseline emission scenario for the project activity feedstock is zero, which is a conservative assumption since it is not taking into account methane emissions derived from decay of manure or combustion of waste biomass.** **If a non-zero baseline presented, needs to be accepted by Puro.earth**	Y	Confirmed	Verbal discussoin with RFL, 03_Puro additionality questions to suppliers v1.8_Restoration Fuels 11.28.23.pdf, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf		

Calculation Checklist						
4.2	Qbiochar = Quantity of biochar produced and sold to end user. (dry char)	Y	Confirmed, does not include on-site biochar inventory	puro_LCA Model_Restoration Fuels APR 16 2024.xlsx , RF Production_Shipment log 4.25.24.xlxs	576.00	tonne
	FpTHTs = c + m x H/Corg	Y	Confirmed		77.0%	%
	C Biochar = carbon content of biochar	Y	Confirmed		78.5%	%
	Estored = biochar carbon storage = Qbiochar x Cbiocharorg x FpTHTs x 44/12	Y	Confirmed		2.21	tonne CO2e/tonne biochar (dry)
4.3	Ebiomass = LCA emissions of production and supply of biomass	Y	Confirmed		0.02	tonne CO2e/tonne biochar (dry)
4.4	Eproduction = LCA emissions from biochar manufacturing	Y	Confirmed	LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, puro_LCA Model_Restoration Fuels APR 16 2024.xlsx	0.65	tonne CO2e/tonne biochar (dry)
4.5	Euse = LCA emissions of the use of biochar, including distribution up to the point of final use	Y	Confirmed		0.02	tonne CO2e/tonne biochar (dry)
4.1	CORCs = Estored - Ebiomass - Eproduction - Euse	Y	Confirmed		1.52	tonne CO2e/tonne biochar (dry)
	Quantity of CORCs (in evidence).	Y	Confirmed		877	CORC

Guideline Ref	Requirement	Requirement Met Y/N	Verification Remarks Insert auditors comments	Evidence Document/Source Insert evidence/observation used to verify requirement
Site Visit Findings				
1.1	**The raw material is of eligible type and sustainably sourced**	Y	Raw material is young and small trees that have been thinned from nearby Malheur Forest for wildfire prevention. Trees would otherwise be completely burned or left to decay in place.	on-site observations, file: Biochar Production Rev 8.0.docx
	The LCA specifics and emissions boundary are consistent with observations on site	Y	LCA is complete and accurate after RFL completed required modifications identified in audit (See Verification Report for details).	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf
	There are no fossil fuels used to heat the pyrolysis reactor	Y	Startup and burnout are completed using propane. Normal operation continues via utilization of syngas produced to provide and maintain gasifier temperature. No fossil fuels are used for gasification process except during periods of extreme cold	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, Copy October 2023 MasterOps report10.3.xlsx
	Pyrolysis gases are recovered or combusted in the biochar production process	Y	System is a gasifier with energy production via combustion of syngas.	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, Copy October 2023 MasterOps report10.3.xlsx
	Evidence of safe handling and transport of the biochar	Y	Biochar moisture content as shipped is recoreded in sales log	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, Copy October 2023 MasterOps report10.3.xlsx, RF Production_Shipment log 4.25.24.xlxs
	Biochar is used in applications other than energy	Y	All invoices indicate sales as a soil amendment	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, RF Biochar Sales Agreement template 11.13.23.docx
	The molar H/Corg ratio is less than 0.7	Y	reported average 0.63 +/- 0.03	Hazen Research lab test results - from LCA Report / files: Copy Sample Lab Analysis Summary.xlsx, Finished Product Quality Specifications - Biochar Rev 5 (1).docx, Statistical Summary of Commercial Laboratory Analyses of Biochar.docx
1.2	**Confirm how the Production Facility documents the quantity of biochar produced and sold**	Y	Biochar logs and sales logs along with invoices. Dry weight of biochar calculated properly based on moisture content	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, Copy October 2023 MasterOps report10.3.xlsx, RF Production_Shipment log 4.25.24.xlxs
	Confirm that the Production Facility's documentation system is accurate and reliable	Y	Production logs are provided documenting all biochar production, including weighed biochar amount and moisture content of biochar using appropriate methods.	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf, Copy October 2023 MasterOps report10.3.xlsx, RF Production_Shipment log 4.25.24.xlxs
	Confirm that appropriate metering infrastructure is present and calibrated correctly to determine production output	Y	Biochar is measured on calibrated weigh scale at RFL facility. Scale calibrated anually by Oregon Dept of Ag for commerce - use conforms to ORS 646 and OAR 603-027 in order to be licensed by ODA. With a current licensing certificate, meets specifications and tolerances found in NIST Handbook 44 .	IMG_1877.jpg, IMG_2147.jpg, https://www.oregon.gov/oda/programs/MarketAccess/WeightsMeasures/Pages/LicenseScaleMeter.aspx
	Confirm that appropriate metering infrastructure is present to quantify the energy use of the Production Facility	Y	Electricity is metered at 4 biochar process specific busses. Electricity meters are revenue grade utility meters.	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf
	Confirm the calculations that are used to quantify emissions from the process. These account for: **- the energy (e.g. waste heat) created by the biochar** **- the energy source used in the production process**	Y	LCA calculations include all energy sources utilized in the process via metering of electricity use, propane used for process startup, and quench water use. Diesel use for material handling is recorded using sales receipts, diesel use for material transportation is estimated using equipment specifications and estimated distances for biomass delivery and biochar sales.	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf
	Confirm the process that is in place to quantify emissions from the cultivation, harvesting, and transport of raw materials. These account for: **- forest biomass vs biomass from other waste**	Y	Emissions of transport of forest biomass are included and were corrected to include proper transit distances. Waste biomass from lumber mill is used that is otherwise diverted to landfill and no special handling is performed, so no additional harvesting or handling emissions are present.	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf

1.2	**Confirm the process that is in place to quantify emissions from the transport of raw materials to the Production Facility**	Y	See above	Onsite observations, LCA-Restoration Fuels Biochar CORC Report APR-16-2024 REVISED FINAL.pdf
	The Production Facility demonstrate Environmental and Social Safeguards	Y	RFL currently operates its facility under air permit issued by the Oregon Dept of Environmental Quality . (Permit Number: 12-0032-ST-01). Operations operations conform to Malhuer Lumber safety procedures and internal process hazard analysis.	Air Permits - 12-0032-ST-01-PmtMod-30755- 30403-FNL.docx - Oregon DEQ Air Permit. Process Hazard Analysis: RF PHA Report 10182023.pdf
	Confirm the CO2 removals are a result of carbon finance	Y	CORCs are utilized to suport business operations in addition to revenues from sales of biochar, and byproducts. Addition of CORC revenues will improve company financials (currently operating at a loss), and enable expansion of production. No biochar produciton or biomass use is required by any current laws or regulations.	Verbal discussoin with Matt Krumenauer - Restoration Fuels
	The requirements for Quantification of CO2 Removal have been explained to the Supplier by the Auditor for the purpose of compiling the Output Report	Y	Verbal discussion with RFL - Matt Krumenauer and Wayne Lei	
5	**Confirm the process that is in place to collect and maintain proofs as per Section 5 of the Biochar Guidelines.** **- Proof of sustainability of raw material for forest biomass (FSC, SFI, PEFC, other certifications)** **- Proof of sustainability of raw material for waste biomass** **- LCA data for biomass and biochar production, supply and use, including climate change impact and the contribution of each life cycle stages.** **- Proof of product quality: laboratory analysis of total organic carbon content, hydrogen content and H/Corg** **- Proof of production volume: documentation for the whole period and methodology applied to calculate the dry mass of biochar produced.** **- For mobile units or carbonizer operator: proof of load cell measurement of the biochar for the whole period, and water input measurement.** **- Proof of end use of biochar: offtake agreement, shipment, and other records indicating the intended use of biochar.** **- Justification on the soil temperature selected for the calculation of the biochar sequestration.** **- Proof of sales** **- Proof of no double counting/C positive marketing**	Y	Confirmed. See Compliance Checklist.	See compliance Checklist

APPENDIX 2: SITE VISIT PHOTOS

Figure A2-1. Restoration Fuels Processed Feedstock Supply

Figure A2-2. Restoration Fuels Biochar Production Control Screens

Figure A2-3. On-site Calibrated Moisture and Heating Value Analyzers

Figure A2-4. Restoration Fuels Biochar Product

Figure A2-5. Restoration Fuels Biochar Inventory

APPENDIX 3: VERIFIER QUALIFICATIONS

Supporting documentation, including verifier resumes, and verifier or corporate accreditations are also included in this appendix.

Verifier Qualifications

Company Name:	**Restoration Fuels**
Date:	**1/16/2024**

Verifier Name:	**Bill Chatterton**
Company Name (where applicable):	**350Solutions**
Verifier Contact Information:	**bill@350solutions.com, 984-215-0585**
Verifier Address:	**1053 E. Whitaker Mill Rd. Suite 115, Raleigh, NC 27604**
Verifier Scope of Activities:	**Production facility and output audit through review of facility standing data, on-site observations and meeting, review of key technology components, operational data, and documentation.**

Verifier Qualifications	**Criteria Met?**	**Evidence / Notes** *(note how the criteria was met, specific documents - resume/CV, publications, certifications, etc.).*
Verifier has relevant technical knowledge of the type of technology being evaluated and carbon removal processes in general		
A) Does Verifier have:		
1. An in-depth technical knowledge of the technology type under verification;	☑	350Solutions is accredited to ISO/IEC 17020:2012 and ISO 14034 Environmental Technology Verification (ETV) as a Type A (third party) Inspection Body (ANAB Certificate Number: AI-2618). The technical scope of 350's accreditation includes verification of performance and environmental impact as it relates to design, materials, equipment, installation and operations of technologies in the categories of Energy, Clean Production and Process, and Air Pollution Monitoring and Abatement. As documented in 350Solutions' ETV Standard Operating Procedure (ETV QPM 350-223-03), and Quality Systems Procedures for verifier qualifications (QSP-350-005-02), 350Solutions conforms to the requirements of ISO 17020 Annex A with respect to verifier qualifications and procedures. These procedures and quality management programs are generally relevant to verification under the Puro.Earth General Standard. Note that verifications completed for Puro.Earth are not equivalent to ISO 14034 verifications. 350 staff have participated in the evaluation and verification of novel technologies that sequester carbon via various methods, including biomass conversion to liquids, solids, and other products which are then permanantly stored in ways such as land application or geologic storage, conversion of captured CO2 into building materials and co-products, and the production of chemicals, fuels, and products via biomass pyrolysis and gasification. 350 also served as lead verifier for the Carbon XPrize competition and contributed to the development of procedures and processes for verification of relevant calculations, modeling, and statistical methods in order to assess team results and calculations of performance metrics and uncertainty. 350 has demonstrated knowledge of data quality and data validation approaches and execution in supporting verification of performance claims and results.
2. Knowledge of specific risk areas associated with performance of such technologies (i.e. common failure points, performance issues, barriers to scaleup);	☑	
3. Knowledge of the environmental implications related to the use of the technology from a life cycle perspective, such as impact of the technology on lifecycle CO2 emissions and carbon removal;	☑	
4. Knowledge of relevant applicable test methods and standards for evaluating performance or impact of the technology;	☑	
5. Knowledge of relevant calculation, modeling, and statistical methods in order to assess test results and calculations of performance metrics and uncertainty, as applicable;	☑	
6. Knowledge of data quality and data validation approaches, including QA/QC procedures, for example.	☑	
Verifier is a credible independent 3rd party		
B) Is Verifier:		
1. third-party body independent of the team registered for the Puro Earth CORCs;	☑	350Solutions is accredited to ISO/IEC 17020:2012 and ISO 14034 ETV as a Type A (third party) Inspection Body. As documented in 350Solutions ETV Policy Manual (ETV QPM 350-200-03), 350Solutions conforms to the requirements of ISO 17020 Annex A with respect to impartiality for Type A inspections, pursuant to ISO 14034 activities.
2. Not directly involved in the design, manufacture or construction, marketing, installation, use or maintenance of the specific technologies submitted to Puro.Eargh for verification, or represent the parties engaged in those activities.	☑	
3. Not part of a legal entity that is engaged in design, manufacture, supply, installation, purchase, ownership, use or maintenance of the items inspected.	☑	

William Chatterton
350Solutions, Verification Program Manager

EDUCATION
B.S. Environmental Science, SUNY at Plattsburgh, 1982
Certified Measurement and Verification Professional (CMVP), 2019

Professional Experience
William Chatterton is an Environmental Scientist with 28 years' experience in technology evaluation and demonstration, project management, air pollution monitoring, testing, and regulation. He serves as Program Manager at 350Solutions and manages projects and programs for commercial and government clients. Previously the past 20 years at Southern Research, Mr. Chatterton has managed, and supported programs designed to integrate, demonstrate, and evaluate technology performance in the advanced energy field. Technology demonstrations and evaluations that he has been involved with include technologies designed to promote sustainable energy sources, increase energy use and efficiency, mitigate GHG and other emissions, and in most cases provide other social and economic benefits to potential users. Mr. Chatterton has been heavily involved in the evaluation of numerous emerging energy technologies, distributed generation technologies, and technologies relevant to transportation and oil and gas markets. Mr. Chatterton's roles in support of these projects has included program and project management from administrative and technical perspectives, lead or technical support on test plan development, method development and validation, design and implementation of field-testing activities, data evaluation and presentation, and reporting of results. He has managed numerous projects for both commercial and government clients.

350Solutions: 08-2019 – Present
Verification Program Manager: As Verification Program Manager, Mr. Chatterton manages and executes technology performance demonstrations and verifications of emerging energy (efficiency and green building) and transportation technologies, primarily for U.S. governmental agencies, energy research associations, and state energy agencies. These performance evaluations generally involve evaluation of commercial feasibility, economic impacts (installation, operating, and capital costs, simple payback, and return on investment), environmental impacts (primarily greenhouse gas and criteria pollutant emission reductions), and technology performance. He also manages and monitors 350Solutions' quality management programs and ISO accreditations.

Southern Research Institute: 1999 - 2019
Program Manager, Energy & Environment Technologies: As Program Manager, Mr. Chatterton has managed and executed several technology performance demonstrations and verifications of emerging energy (efficiency and green building) and transportation technologies, primarily for U.S. governmental agencies, energy research associations, and state energy agencies. Mr. Chatterton also has direct experience with management and execution of projects under DOE and DoD grants and contracts. He has recently managed activities on three large DoD projects including Demonstration of a Solar Thermal Combined Heating, Cooling and Hot Water System Utilizing an Adsorption Chiller for DoD Installations, Demonstration and Verification of the Performance of Microturbine Power Generation Systems Utilizing Renewable Fuels, and the Electric Power with Small Scale Organic Rankine Cycle (ORC) Engine/Generator Technology demonstration.

Tim Hansen, P.E.
Founder and CEO, 350Solutions

EDUCATION:
B.S., Chemical Engineering, University of Virginia, 1993
M.S., Engineering Science, Thayer School of Engineering, Dartmouth College, 1995

EXPERIENCE SUMMARY:
Mr. Hansen has 26 years of experience in management of energy and environmental technology development and demonstration projects and programs, as well as multimedia environmental engineering efforts. These majority of his recent work has focused on the evaluation of innovative carbon capture, utilization, and removal technologies. Mr. Hansen has led the development and management of large technology evaluation programs in the advanced energy, transportation, and climate change areas.

RESEARCH AND PROFESSIONAL EXPERIENCE:
2019-Present Founder – CEO, 350Solutions, Inc.
Owns and operates a small cleantech engineering consulting business focused on the independent evaluation of new cleantech innovations and their impact on the environment and carbon emissions. Provides engineering consulting, testing and evaluation, techno-economic assessment, and other support to companies developing, using, or investing in new clean technology innovations. Manages administrative, business development, and project activities for 350Solutions.

2012-2019: Director - Energy and Environment, Southern Research
Manages scientific and technical staff performing research, development, and evaluation of innovative clean energy technologies. Projects range from $25,000 to $6million in size, and are funded by the US Department of Energy, Department of Defense, and commercial partners. Technical focus areas are conversion of biomass to fuels and chemicals, carbon capture and utilization, energy efficient building technologies and renewable energy generation.

2009-2012: Program Manager – Transportation & Climate Change Technology, Southern Research
2003-2009 Sr. Project Leader, Environmental Engineer, Southern Research
1996-2003 Environmental Engineer, Bensinger & Garrison Environmental

PROJECT EXPERIENCE:
Mr. Hansen has executed several independent technology performance verifications of emerging carbon, energy and transportation technologies, as CEO of 350Solutions, Director of Energy & Environment at Southern Research, and Director of the U.S. EPA's Greenhouse Gas Technology Center. Mr. Hansen has completed clean technology evaluations for the Department of Defense, state energy agencies, commercial clients, investors, and technology developers, involving evaluation of commercial feasibility, economic and environmental impacts, and technology performance. Mr. Hansen served as the Measurement and Verification Program Lead for the NRG COSIA Carbon XPrize – a $20M prize competition for technologies that capture and beneficially utilize CO_2. Mr. Hansen also served as U.S. Technical Expert for the development and implementation of ISO 14034 – Environmental Technology Verification, an international standard, issued in 2016

350Solutions, Inc. Corporate Experience

350Solutions serves as an independent expert in cleantech, low carbon, and environmental technologies. We provide an unbiased assessment of innovative technologies. 350Solutions is accredited through ANAB under ISO 17020 as an independent inspection body to provide independent technology evaluation services using the ISO 14034 ETV process. In addition, 350Solutions staff include a Certified Measurement and Verification Professional (CMVP for IPMVP) and a North Carolina Registered Professional Engineer (P.E.). 350Solutions ANAB Accreditation certificate is provided below.

CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

350Solutions, Inc.
1053 E. Whitaker Mill Rd., Suite 115
Raleigh, NC 27604

Fulfills the requirements of

ISO/IEC 17020:2012

and

ISO 14034:2016, Environmental Management - Environmental Technology Verification (ETV)

In the field of

INSPECTION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 25 September 2024
Certificate Number: AI-2618

An inspection body's fulfilment of the requirements of ISO/IEC 17020:2012 means the inspection body meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid inspection results (refer to joint ISO-ILAC-IAF Communiqué dated Sept 2013).

ANAB
ANSI National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17020:2012

and

ISO 14034:2016, Environmental Management - Environmental Technology Verification (ETV)

350Solutions, Inc.
1053 E. Whitaker Mill Rd., Suite 115
Raleigh, NC 27604
Tim Hansen tim@350Solutions.com
(919) 675-6432

INSPECTION
TYPE A (THIRD-PARTY) BODY

Valid to: **September 25, 2024** Certificate Number: **AI-2618**

General

Products Categories	Range	Stage	Methods and Procedures
Energy Technologies (ET):	Performance and Environmental impact as it relates to design, materials, equipment, installation and operations.	Operating	QSP-350-223-02 - *SOP ISO 14034 ETV*
Cleaner Production and Processes (CPP):	Performance and Environmental impact as it relates to design, materials, equipment, installation and operations.	Operating	QSP 350-223-02 - *SOP ISO 14034 ETV*
Air pollution monitoring and abatement (APP):	Performance and Environmental impact as it relates to design, materials, equipment, installation and operations.	Operating	QSP 350-223-02 - *SOP ISO 14034 ETV*
Water monitoring and treatment (WMT)	Performance and Environmental impact as it relates to design, materials, equipment, installation and operations.	Operating	QSP 350-223-02 - *SOP ISO 14034 ETV*

Note:
1. This scope is formatted as part of a single document including Certificate of Accreditation No. AI-2618.

R. Douglas Leonard Jr., VP, PILR SBU