



Beta Analytic
TESTING LABORATORY

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 07, 2022

Mr. Michael Polenz
Washington State Department of Natural Resources
Geology and Earth Resources Division
1111 Washington Street S.E.
P.O. Box 47007
Olympia, WA 98501
United States

RE: Radiocarbon Dating Results

Dear Mr. Polenz,

Enclosed is the radiocarbon dating result for one sample recently sent to us. As usual, specifics of the analysis are listed on the report with the result and calibration data is provided where applicable. The Conventional Radiocarbon Age has been corrected for total fractionation effects and where applicable, calibration was performed using 2020 calibration databases (cited on the graph pages).

The web directory containing the table of results and PDF download also contains pictures, a cvs spreadsheet download option and a quality assurance report containing expected vs. measured values for 3-5 working standards analyzed simultaneously with your samples.

The reported result is accredited to ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 standards and all pretreatments and chemistry were performed here in our laboratories and counted in our own accelerators here in Miami. Since Beta is not a teaching laboratory, only graduates trained to strict protocols of the ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 program participated in the analysis.

As always Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result unless otherwise requested. The reported $\delta^{13}C$ was measured separately in an IRMS (isotope ratio mass spectrometer). It is NOT the AMS $\delta^{13}C$ which would include fractionation effects from natural, chemistry and AMS induced sources.

When interpreting the result, please consider any communications you may have had with us regarding the sample. As always, your inquiries are most welcome. If you have any questions or would like further details of the analysis, please do not hesitate to contact us.

Our invoice has been sent separately. Thank you for your prior efforts in arranging payment. As always, if you have any questions or would like to discuss the results, don't hesitate to contact us.

Sincerely,

Digital signature on file

Chris Patrick
Vice President of Laboratory Operations



REPORT OF RADIOCARBON DATING ANALYSES

Michael Polenz

Report Date: January 07, 2022

Washington State Department of Natural Resources

Material Received: November 24, 2021

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
Beta - 610565	MLm197-115b	> 43500 BP	IRMS $\delta^{13}\text{C}$: -25.2 o/oo

Submitter Material: Peat
Pretreatment: (wood) acid/alkali/acid
Analyzed Material: Wood
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: < 0.44 pMC
Fraction Modern Carbon: < 0.0044
D14C: < -995.5 o/oo
 $\Delta^{14}\text{C}$: < -995.6 o/oo (1950:2022)
Measured Radiocarbon Age: (without $\delta^{13}\text{C}$ correction): NA
Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the ^{14}C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. $\delta^{13}\text{C}$ values are on the material itself (not the AMS $\delta^{13}\text{C}$). $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.



Beta Analytic
TESTING LABORATORY

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NISTSRM-1990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: January 07, 2022
Submitter: Mr. Michael Polenz

QA MEASUREMENTS

Reference 1

Expected Value: 129.41 +/- 0.06 pMC
Measured Value: 129.40 +/- 0.35 pMC
Agreement: Accepted

Reference 2

Expected Value: 96.69 +/- 0.50 pMC
Measured Value: 96.94 +/- 0.29 pMC
Agreement: Accepted

Reference 3

Expected Value: 0.42 +/- 0.04 pMC
Measured Value: 0.42 +/- 0.03 pMC
Agreement: Accepted

COMMENT: All measurements passed acceptance tests.

Validation:

Chris Patrick
Digital signature on file

Date: January 07, 2022