Appendix Q
Radiocarbon Dating Reports
# REPORT OF RADIOCARBON DATING ANALYSES

Mr. Brent Hicks  
Colville Confederated Tribes

<table>
<thead>
<tr>
<th>Sample Data</th>
<th>Measured Radiocarbon Age</th>
<th>13C/12C Ratio</th>
<th>Conventional Radiocarbon Age(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta - 168491</td>
<td>9370 +/- 40 BP</td>
<td>-10.5 o/oo</td>
<td>9610 +/- 40 BP</td>
</tr>
<tr>
<td>SAMPLE : 45FR50.2642</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS : AMS-Standard delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT : (shell): acid etch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SIGMA CALIBRATION : Cal BC 9210 to 8800 (Cal BP 11160 to 10750)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta - 168493</td>
<td>1000 +/- 40 BP</td>
<td>-19.0 o/oo</td>
<td>1100 +/- 40 BP</td>
</tr>
<tr>
<td>SAMPLE : 45FR50.5202</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS : AMS-Standard delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT : (bone collagen): collagen extraction: with alkali</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SIGMA CALIBRATION : Cal AD 880 to 1010 (Cal BP 1070 to 940)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950 A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards. Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-10.5: lab. mult=1)

Laboratory number: Beta-168491

Conventional radiocarbon age: 9610±40 BP

2 Sigma calibrated result: Cal BC 9210 to 8800 (Cal BP 11160 to 10750)
(95% probability)

Intercept data

Intercepts of radiocarbon age with calibration curve:
Cal BC 9140 (Cal BP 11090) and
Cal BC 8980 (Cal BP 10930) and
Cal BC 8930 (Cal BP 10880)

1 Sigma calibrated results: Cal BC 9170 to 9110 (Cal BP 11120 to 11060) and
(68% probability)
Cal BC 9000 to 8830 (Cal BP 10950 to 10780)

References:

Database used

INTCAL98

Calibration Database

Editorial Comment


INTCAL98 Radiocarbon Age Calibration


Mathematics

A Simplified Approach to Calibrating C14 Dates

REPORT OF RADIOCARBON DATING ANALYSES

Mr. Brent Hicks                                         August 17, 1998
Colville Confederated Tribes                          September 3, 1998

<table>
<thead>
<tr>
<th>Sample Data</th>
<th>Measured C14 Age</th>
<th>C13/C12 Ratio</th>
<th>Conventional C14 Age (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-120802</td>
<td>9810 +/- 50 BP</td>
<td>-21.7 o/oo</td>
<td>9870 +/- 50 BP</td>
</tr>
<tr>
<td>SAMPLE #:</td>
<td>CCTMARMES-01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS:</td>
<td>ADVANCE-AMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT: (bone collagen): collagen extraction with alkali</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta-120803</td>
<td>9450 +/- 40 BP</td>
<td>-26.0 o/oo</td>
<td>9430 +/- 40 BP</td>
</tr>
<tr>
<td>SAMPLE #:</td>
<td>CCTMARMES-02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS:</td>
<td>ADVANCE-AMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: It is important to read the calendar calibration information and to use the calendar calibrated results (reported separately) when interpreting these results in AD/BC terms.

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables:C13/C12=-21.7:lab mult.=1)

Laboratory Number: Beta-120802

Conventional radiocarbon age: 9870 ± 50 BP

Calibrated results:
(2 sigma, 95% probability) cal BC 9120 to 9025

Intercept data:

Intercept of radiocarbon age with calibration curve: cal BC 9060

1 sigma calibrated results:
(68% probability) cal BC 9080 to 9045

References:

Pretoria Calibration Curve for Short Lived Samples

A Simplified Approach to Calibrating C14 Dates

Calibration - 1993

Beta Analytic Radiocarbon Dating Laboratory
4985 S.W. 74th Court, Miami, Florida 33155 ■ Tel: (305)667-5167 ■ Fax: (305)663-0964 ■ E-mail: beta@radiocarbon.com
## REPORT OF RADIOCARBON DATING ANALYSES

Mr. Brent Hicks  
Material Received: 6/19/01

<table>
<thead>
<tr>
<th>Sample Data</th>
<th>Measured Radiocarbon Age</th>
<th>13C/12C Ratio</th>
<th>Conventional Radiocarbon Age(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta - 156696</td>
<td>9350 +/- 60 BP</td>
<td>-24.4 o/oo</td>
<td>9360 +/- 60 BP</td>
</tr>
<tr>
<td>SAMPLE: 45FR50#1240</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS: AMS-Standard delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SIGMA CALIBRATION: Cal BC 8760 to 8460 (Cal BP 10710 to 10410)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta - 156697</td>
<td>10570 +/- 70 BP</td>
<td>-24.9 o/oo</td>
<td>10570 +/- 70 BP</td>
</tr>
<tr>
<td>SAMPLE: 45FR50#7234</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS: AMS-Standard delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SIGMA CALIBRATION: Cal BC 10970 to 10360 (Cal BP 12920 to 12310) AND Cal BC 10280 to 10220 (Cal BP 12220 to 12170)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta - 156698</td>
<td>11110 +/- 50 BP</td>
<td>-17.9 o/oo</td>
<td>11230 +/- 50 BP</td>
</tr>
<tr>
<td>SAMPLE: 45FR50#7683</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS: AMS-Standard delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT: (bone collagen): collagen extraction: with alkali</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SIGMA CALIBRATION: Cal BC 11480 to 11060 (Cal BP 13430 to 13010)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta - 156699</td>
<td>9580 +/- 40 BP</td>
<td>-16.8 o/oo</td>
<td>9710 +/- 40 BP</td>
</tr>
<tr>
<td>SAMPLE: 45FR50#10128</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALYSIS: AMS-Standard delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIAL/PRETREATMENT: (bone collagen): collagen extraction: with alkali</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SIGMA CALIBRATION: Cal BC 9240 to 9150 (Cal BP 11200 to 11100)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dates are reported as RCPBP (radiocarbon years before present, "present" = 1950AD). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards. Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCPBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

Variables: C13/C12= –26: lab mult. = 1

Laboratory Number: Beta-120803

Conventional radiocarbon age: 9430 ± 40 BP

Calibrated results: cal BC 8570 to 8395

(2 sigma, 95% probability)

Intercept data:

Intercept of radiocarbon age with calibration curve: cal BC 8450

1 sigma calibrated results: cal BC 8510 to 8420

(68% probability)

References:

Pretoria Calibration Curve for Short Lived Samples

A Simplified Approach to Calibrating C14 Dates

Calibration - 1993

Beta Analytic Radiocarbon Dating Laboratory
4985 S.W. 74th Court, Miami, Florida 33155  □ Tel: (305)667-5167 □ Fax: (305)663-0964 □ E-mail: beta@radiocarbon.com
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: \( \text{C13/C12} = -24.4; \text{lab. mult}=1 \))

Laboratory number: Beta-156696
Conventional radiocarbon age: 9360±60 BP
2 Sigma calibrated result: Cal BC 8760 to 8460 (Cal BP 10710 to 10410)
    (95% probability)
Intercept data
Intercept of radiocarbon age with calibration curve: Cal BC 8610 (Cal BP 10560)
1 Sigma calibrated result: Cal BC 8710 to 8560 (Cal BP 10660 to 10510)

References:

Database used
Calibration Database
Editorial Comment
INTCAL98 Radiocarbon Age Calibration
Mathematics
A Simplified Approach to Calibrating C14 Dates
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.9; lab. mult=1)

Laboratory number: Beta-156697
Conventional radiocarbon age: 10570±70 BP
2 Sigma calibrated results: Cal BC 10970 to 10360 (Cal BP 12920 to 12310) and Cal BC 10280 to 10220 (Cal BP 12220 to 12170)
(95% probability) Intercept data
Intercepts of radiocarbon age with calibration curve:
- Cal BC 10840 (Cal BP 12790) and
- Cal BC 10790 (Cal BP 12740) and
- Cal BC 10690 (Cal BP 12640)
1 Sigma calibrated results: Cal BC 10940 to 10650 (Cal BP 12890 to 12600) and Cal BC 10550 to 10390 (Cal BP 12500 to 12340)
(68% probability)

References:

Database used
Calibration Database
Editorial Comment
INTCAL98 Radiocarbon Age Calibration
Mathematics
A Simplified Approach to Calibrating C14 Dates

Beta Analytic Inc.
4985 SW 74 Court, Miami, Florida 33155 USA • Tel (305) 667 5167 • Fax (305) 663 0964 • E-Mail: beta@radiocarbon.com
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -17.9; lab. mult = 1)

Laboratory number: Beta-156698
Conventional radiocarbon age: 11230±50 BP
2 Sigma calibrated result: Cal BC 11480 to 11060 (Cal BP 13430 to 13010)
(95% probability)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 11210 (Cal BP 13160)
1 Sigma calibrated results: Cal BC 11430 to 11310 (Cal BP 13380 to 13260) and Cal BC 11260 to 11180 (Cal BP 13210 to 13130) and Cal BC 11150 to 11080 (Cal BP 13100 to 13030)

References:

Database used
Calibration Database
Editorial Comment
INTCAL98 Radiocarbon Age Calibration
Mathematics
A Simplified Approach to Calibrating C14 Dates
CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

Variables: C13/C12=-16.8; lab. mult=1

Laboratory number: Beta-156699

Conventional radiocarbon age: 9710±40 BP

2 Sigma calibrated result: Cal BC 9240 to 9150 (Cal BP 11200 to 11100)

(95% probability)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 9220 (Cal BP 11160)

1 Sigma calibrated result: Cal BC 9230 to 9190 (Cal BP 11180 to 11140)

(68% probability)

References:

Database used

Calibration Database
Editorial Comment
INTCAL98 Radiocarbon Age Calibration
Mathematics
A Simplified Approach to Calibrating C14 Dates