Beta Analytic Inc.
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Consistent Accuracy . . .
. . . Delivered On-time

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

September 30, 2013

Dr. Richard Smith
New House
Spring Lane
Cold Ash
Thatcham, Berkshire RG18 9PL
United Kingdom

RE: Radiocarbon Dating Results For Samples HLF-13, RC-1, HLF-13, RC-2, HLF-13, RC-3

Dear Richard:

Enclosed are the radiocarbon dating results for three samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

The web directory containing the table of results and PDF download also contains pictures including, most importantly the portion actually analyzed. These can be saved by opening them and right clicking. Also a cvs spreadsheet download option is available and a quality assurance report is posted for each set of results. This report contains expected versus measured values for 3-5 working standards analyzed simultaneously with your samples.

All results reported are accredited to ISO-17025 standards and all analyses were performed entirely here in our laboratories. Since Beta is not a teaching laboratory, only graduates trained in accordance with the strict protocols of the ISO-17025 program participated in the analyses. When interpreting the results, please consider any communications you may have had with us regarding the samples.

If you have specific questions about the analyses, please contact us. Your inquiries are always welcome.

The cost of the analysis was charged to the MASTERCARD card provided. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Richard Smith

Report Date: 9/30/2013

New House

Material Received: 9/13/2013

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 359181	540 +/- 30 BP	-25.0 o/oo	540 +/- 30 BP
SAMPLE : HLF-13, RC-1			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1320 to 1350 (Cal BP 630 to 600) AND Cal AD 1390 to 1430 (Cal BP 560 to 520)			
Beta - 359182	480 +/- 30 BP	-25.1 o/oo	480 +/- 30 BP
SAMPLE : HLF-13, RC-2			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1410 to 1450 (Cal BP 540 to 500)			
Beta - 359183	610 +/- 30 BP	-26.6 o/oo	580 +/- 30 BP
SAMPLE : HLF-13, RC-3			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 1300 to 1370 (Cal BP 650 to 580) AND Cal AD 1380 to 1420 (Cal BP 570 to 530)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-359181**

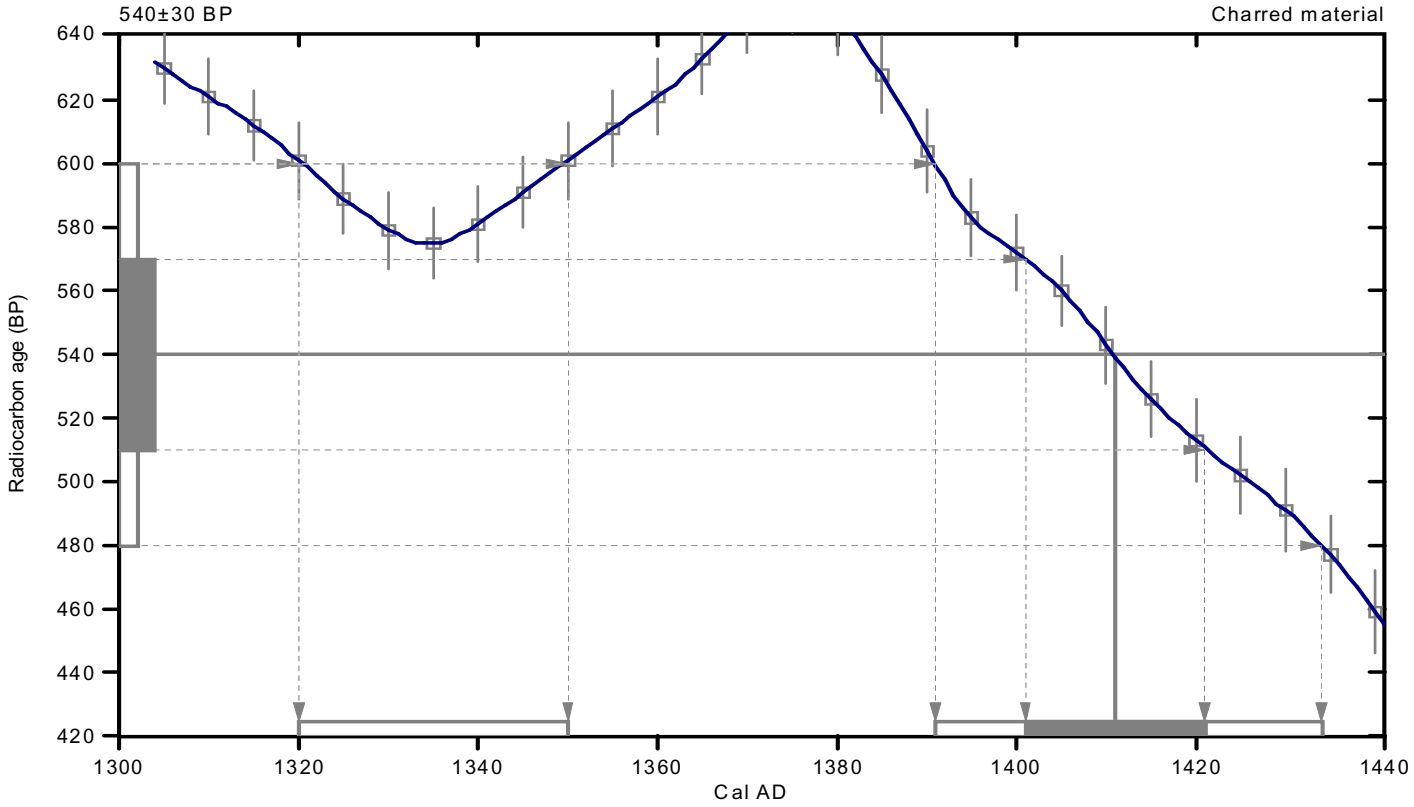
Conventional radiocarbon age: **540±30 BP**

2 Sigma calibrated results: (95% probability) **Cal AD 1320 to 1350 (Cal BP 630 to 600) and Cal AD 1390 to 1430 (Cal BP 560 to 520)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1410 (Cal BP 540)

1 Sigma calibrated result: (68% probability) Cal AD 1400 to 1420 (Cal BP 550 to 530)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.1:lab. mult=1)

Laboratory number: **Beta-359182**

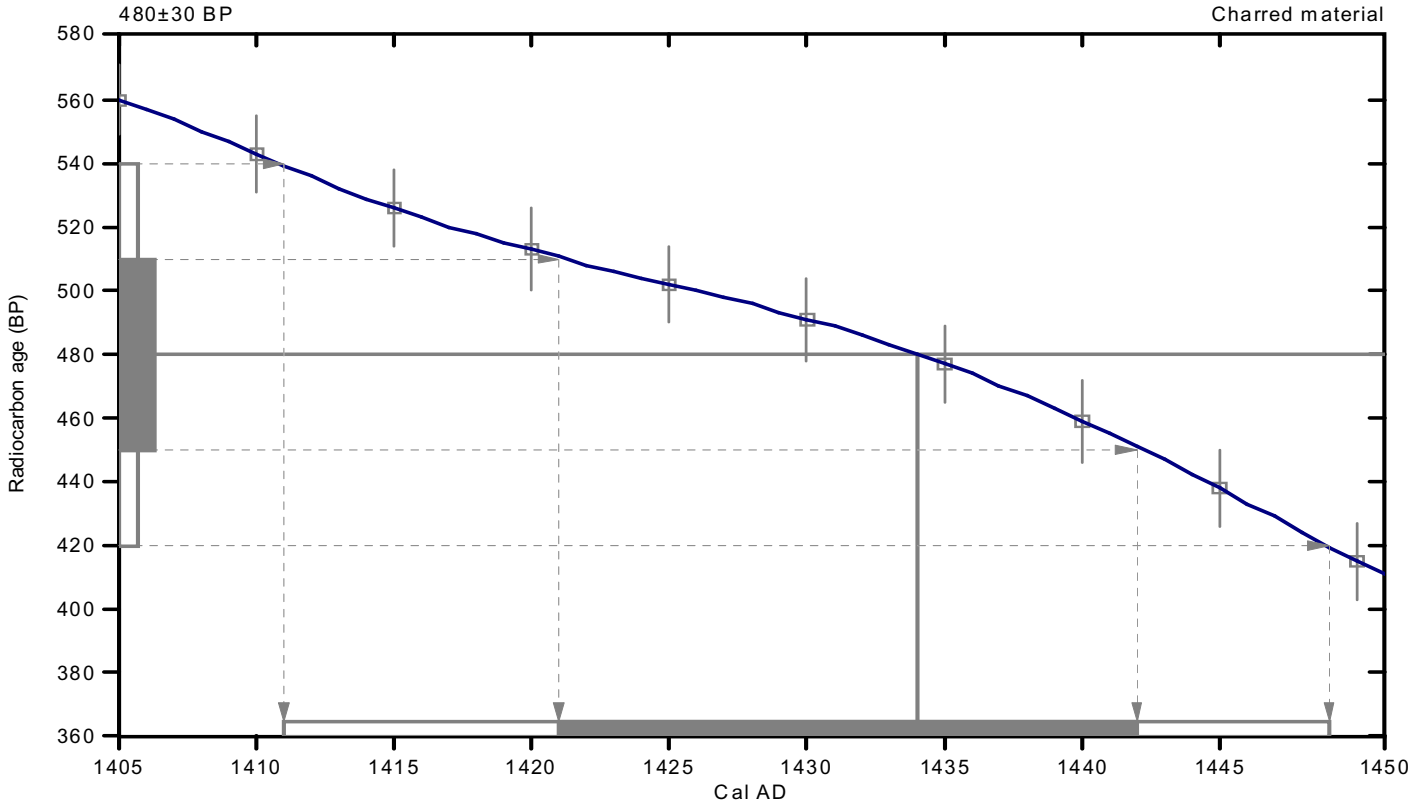
Conventional radiocarbon age: **480±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1410 to 1450 (Cal BP 540 to 500)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1430 (Cal BP 520)

1 Sigma calibrated result: (68% probability) Cal AD 1420 to 1440 (Cal BP 530 to 510)



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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.6:lab. mult=1)

Laboratory number: **Beta-359183**

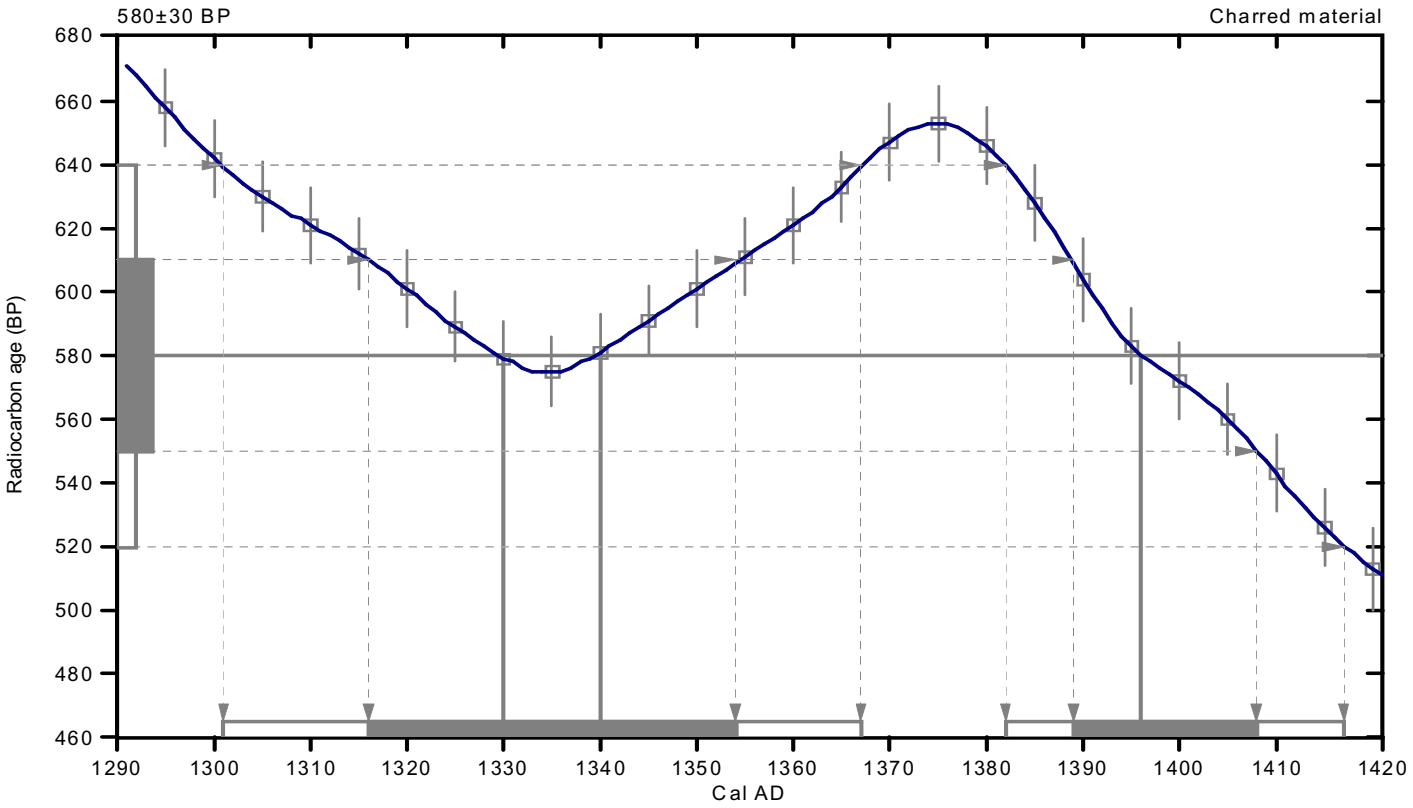
Conventional radiocarbon age: **580±30 BP**

2 Sigma calibrated results: **Cal AD 1300 to 1370 (Cal BP 650 to 580) and**
(95% probability) **Cal AD 1380 to 1420 (Cal BP 570 to 530)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1330 (Cal BP 620) and
Cal AD 1340 (Cal BP 610) and
Cal AD 1400 (Cal BP 550)

1 Sigma calibrated results: Cal AD 1320 to 1350 (Cal BP 630 to 600) and
(68% probability) Cal AD 1390 to 1410 (Cal BP 560 to 540)



References:

Database used

INTCAL09

References to INTCAL09 database

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