RADIOCARBON DATING: A GUIDE FOR APPLICANTS

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

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1. INTRODUCTION

Historic Environment Scotland (HES) operates a national radiocarbon call-off contract, managed by the HES Archaeological Science Manager. This contract provides access to radiocarbon dates and Bayesian analysis. Under the terms of the contract, the following stable isotope measurements are also produced: δ13C, δ15N, δ34S C/N, C/S & N/S.

Direct contact between the applicant and the laboratory holding the contract is encouraged, especially during sample selection, but the detailed interpretation and/or analysis of the results is the responsibility of the applicant. The exception is the undertaking of the Bayesian analysis and reporting; the laboratory archaeologist's time for this is included in the terms of the contract.

The contract requires the laboratory to maintain a quality assurance scheme comparable to that operated by the National Physical Laboratory, and it is also a requirement of the contract that the laboratory participates in inter-laboratory comparison exercises and international calibration schemes. This is to ensure that the highest quality and most robust dates are produced.

Unreliable radiocarbon dates can be worse than having no dates at all. Therefore, HES expect radiocarbon dating to be an integral part of any project methodology from its inception, and we expect fieldwork to be planned and conducted so that good quality, uncontaminated, samples are collected. Storage of samples in appropriate conditions must also be considered, which is usually a dark and dry space. If you need advice on any of this, please contact the HES Archaeological Science Manager.

The applicant is entirely responsible for the selection of samples, but to ensure best possible results, the applicant should discuss their selection with the archaeologist at the laboratory. You, or your specialists, should be aware of current academic standards, and you must be able to defend your selection, especially if the results do not support your interpretations.

Please note, if you intend to apply for radiocarbon dates for a Property in the Care of Scottish Ministers (PiCs), you must first have approval, in principle, from the Head of Cultural Resources. The contact for this is CRTEnquiries@hes.scot.

2. ELIGIBILITY

Historic Environment Scotland may provide:

i. Radiocarbon dates (14C) and Bayesian analysis to archaeological projects undertaken with grant support from HES. This includes supported PhDs and Post-doctoral research.

ii. Radiocarbon dates for research projects, which we are not grant-aided by HES, but where the dates will enhance currently supported projects. These will be assessed on a case by case basis, and support will be dependent on available budget – HES funded archaeology projects will have priority. In order to apply for dates in this way, you will need to provide a project design for the radiocarbon dating, including the research questions that the dates will help you to answer. A Data Structure Report will be required, including section drawings, for the excavation (if it has taken place), or a detailed sampling strategy if it has not.

iii. Radiocarbon dates for external projects which will assist HES with management research, where this is requested by strategic managers within HES, and where the work is directly linked with our annual operating plan.

iv. Radiocarbon dates for research projects in which HES is a nominated partner, subject to discussion and approval by the HES Archaeological Science Manger.

Historic Environment Scotland will not:

i. Provide radiocarbon dates for samples from developer-funded projects.

3. SAMPLE SELECTION

It is important that applicants discuss their sample selection with the archaeologist at the laboratory which holds the contract, this is especially important for projects which will also be seeking Bayesian analysis. The HES Archaeological Science Manager will provide the contact details, when approval in principle is given to an applicant.

There are two key concepts to consider when selecting samples, which you will be asked about in the application form: context and taphonomy.

Context – this is a description of where the sample was found. In your description you should describe how this context relates to the activity you want to date, what it was cut into or overlay, and how well it was sealed by the overlying material.

Taphonomy – this is about the source of the material which forms the sample you propose to date. It focuses on the sample and how it has ended up in the context in which it is found. The taphonomy of the sample must be considered separately from the context, because its date is not the same as the date of the context, and sampling methodology should be designed to guarantee taphonomic security, as far as possible.

For example, if you find charred hazel twigs on a hearth, under a thick charcoal-free layer, it is fair to suppose that these twigs relate to the last use of the hearth; that the tree-rings in the twigs are close to the date the twigs were collected, charred soon after. However, material from oak timbers associated with structures, may not necessarily date the house and its occupation, as they could have been reused from earlier buildings.

To reduce the chance for modern contaminants, HES will normally only approve a single entity submission where the material has been identified, ideally to species, by an appropriate specialist. For bone and residue on pottery, HES prefer that these samples are extracted by the laboratory. If this is not possible, please contact the HES Archaeological Science Manager in advance, to discuss.

4. APPLICATION AND SENDING SAMPLES TO THE LABORATORY

Historic Environment Scotland uses an online system to record the application for, approval of, and results from, radiocarbon dates which it funds. Please note that you should discuss your application with the HES Archaeological Science Manager in advance of applying. You must receive approval, in principle, from HES before completing the form. At this point, you will also be asked to contact the archaeologist at the laboratory to discuss sample selection.

If you encounter any problems with the application process, please contact the HES Archaeological Science Manager on: c14@hes.scot, or 0131 668 8752.

1. Your project must be registered with OASIS, before you can apply for radiocarbon dates. To register your project, please visit: https://oasis.ac.uk/form/

2. You should try and add as much information into the OASIS record as possible, as this is the information that will be pulled through into the online system and will be used to assess your application.

3. Once your project is registered with OASIS, you will have a login username and password to the OASIS website, and your project will also have been assigned a unique OASIS reference code.

4. The online radiocarbon system can be found here: http://www.archaeologydataservice.ac.uk/c14/

5. Go to the website and login using your OASIS username and password. Sometimes you will receive an error message to say your session had expired; login a second time and it will work. If you know that your password and username are correct, but it isn't being accepted, please stop trying to login and email c14@hes.scot

6. If your dates are for a HES funded archaeology project, for a PhD, or for the Human Remains and Emergency call-off contract, select 'Apply for HES Archaeology Programme Funding'. If your dates are for a Property in Care, or are funded by another part of HES, please select 'Create a record of other HES funded Radiocarbon dates'.

7. Enter the OASIS ID for your project. This can be found on your OASIS record and usually comprises your username, followed by a dash, and then five numbers. E.g. histenv1-23456. Select ‘Create new record’.

8. This should take you to a new screen, which will have pulled the project information through from your OASIS entry. Double check the information and fill out any parts which are missing. It is important that you ensure that if your site has a Canmore number, you have included this in the record. This will help link the record to the results when they are published online.

9. If you select the ‘?’, this will provide you with further information to ensure that you have entered the correct data.

10. Select ‘STORE RECORD’ and you be taken to the sample information page.

11. Select ‘NEW SAMPLE’.

12. Enter the ‘Unit Sample ID’, which is the sample number.

13. For ‘Sample material description’, provide a brief description of the sample which you are submitting.

14. Enter the ‘Unit context’; this is the context number from which your sample was taken.

15. For ‘Context description’; provide a brief description of the context and its possible interpretation. For example, the context could be a charcoal-rich fill of a hearth.

16. Select the ‘Sample type’ from the drop down list. It is rare, but if your sample type is not in the list, select ‘other’, and enter the material type under the ‘other’ box.

17. If you select wood, charcoal, plant remains, or bone, a second dropdown will appear for you to select the specific sample type in Latin. There is an option for ‘other’, if your sample type is not in the list and an additional free-text box will appear for you to enter further details.

18. For the ‘condition’ of the sample, please select the most accurate description from the drop-down list. Your specialist will usually have provided you with this data.

19. Enter the weight of the sample being submitted in grams.

20. Based on the archaeology, provide an ‘Estimated Age’ for the remains. This can be a time period, e.g. Iron Age, or can be a number value.

21. Under ‘taphonomy’; enter your best interpretation as to how the sample came to be contained within this context. For example, including that it is a dump of hearth material, or that a bone is part of a burial.

22. Under ‘identified by’; please enter the name of the specialist who identified the material.

23. For ‘packaging’; provide a description of how the sample has been stored, from its collection on site to being sent to the radiocarbon laboratory.

24. The results from HES approved dates are published on Canmore. However, you can request an embargo on this for up to 3 years.

25. If you would like to delay the online publication of the dates, please select ‘NO’ and provide a reason for this, and the delay time period (up to 3 years).

26. Under ‘Dating lab’, select SUERC.

27. Select ‘ADD SAMPLE’, and you will be prompted to confirm that you want to save/update the record, select ‘OK’, which will store the sample details which you have added, and you will now see the sample listed on the left of the page under ‘Sample List’.

28. Repeat steps 11-27 for each of the samples you will be submitting.

29. When all of the sample information has been entered, select ‘NEXT’.

30. This will take you to another page, where you should select ‘Submit’.

31. This will take you to a list of applications, and your sample will now be under the ‘submitted’ list.

32. Once the samples have been submitted, it isn’t possible to make changes to the information. If you need to do this, please contact the Archaeological Science Manager at HES, who will need to unlock the application.

Once your application has been assessed, you will receive an email to confirm which samples have been approved and which have been rejected. Please package up securely the approved samples and send to the laboratory. You will have received an application and a sample reference number in your approval email. It is best to include these with your samples, to allow the samples to be matched to the application when they are logged in the laboratory.

5. RECEIVING THE RESULTS

The expected turn around for radiocarbon dates is 8-10 weeks. In exceptional circumstances, it may be possible to receive results sooner, but this is dependent on their being capacity within the laboratory to do this. If your application is urgent, please discuss this with the HES Archaeological Science Manager.

Since we encourage direct contact between the applicant and the laboratory, it is appropriate for the applicant to contact the laboratory directly, if results seem to be delayed, but please copy the correspondence to c14@hes.scot so that this can be noted by HES. For an update on samples submitted, or if there are any other questions about receiving results, please contact the HES Archaeological Science Manager.

6. QUOTING DATES

Primary and most secondary archaeological and palaeo-environmental reports should contain, somewhere in the publication, the details of the date as quoted in ^{14}C years BP by the laboratory, including the laboratory code. It is good practice to quote uncalibrated dates (BP) exactly as you get them from the laboratory, but if quoting calibrated dates, it is best practice to give a range, rounded outwards, also quoting the associated probability.

Calibrated dates should be quoted as: cal BC, cal AD or cal BP, and not BC or AD; the latter should be restricted to describing historical dates.

7. DISSEMINATION OF RESULTS

Applicants for radiocarbon dates can request that HES embargo the dissemination of the results for up to 3 years. After this time, the results will be added to the National Record for the Historic Environment (NRHE), and made Open Access. Please note, in line with GDPR, no personal data will be associated with these dates. If you would like to embargo your results, please select 'No' under 'Publication' in the application, and ensure that you add a reason why. If no reason is provided, the results will not be embargoed.

8. ADDITIONAL INFORMATION

Projects which have been supported by radiocarbon dates only, are not eligible to apply to the HES Archaeology Programme for a publication grant. The exception to this is if HES issue an open invitation to apply for the Open Access of significant publications.

If you are issuing a press release based on radiocarbon dates supported by HES, please inform HES in advance (at least one week), so that it can be noted by our Communications Team; the press release should be emailed to c14@hes.scot The name of the laboratory which undertook the dating and Bayesian analysis should also be included in any press release as a professional courtesy.

Historic Environment Scotland is the lead public body established to investigate, care for and promote Scotland's historic environment.

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SCOTLAND'S ARCHAEOLOGY STRATEGY

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

Historic Environment Scotland
Longmore House, Salisbury Place
Edinburgh EH9 1SH

0131 668 8600
historicenvironment.scot

Historic Environment Scotland – Scottish Charity No. SC045925
Registered Address: Longmore House, Salisbury Place, Edinburgh EH9 1SH