

# rae2008

Panel criteria and working methods

## Panel E

UOA 17 Earth Systems and Environmental Sciences

UOA 18 Chemistry

UOA 19 Physics

**January 2006**

*Ref RAE 01/2006 (E)*

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## RAE 2008 Assessment criteria and working methods: Main Panel E and UOAs 17-19

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<b>To</b>	Heads of HEFCE-funded higher education institutions Heads of HEFCW-funded higher education institutions Heads of SFC-funded higher education institutions Heads of universities in Northern Ireland
<b>Of interest to those responsible for</b>	Research assessment, Research policy, Planning
<b>Reference</b>	RAE 01/2006 (E)
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### Executive summary

#### Purpose

1. This document describes the criteria and working methods of the following main panel and unit of assessment (UOA) sub-panels in the 2008 Research Assessment Exercise (RAE2008):

- Main Panel E
- UOA 17 Earth Systems and Environmental Sciences
- UOA 18 Chemistry
- UOA 19 Physics

#### Key points

2. These statements of criteria and working methods have been revised and finalised following a public consultation on earlier draft versions which we conducted over summer 2005. They take account of views expressed through the consultation by higher education institutions and their staff, subject associations and other stakeholder bodies.

3. The main and sub-panel statements of criteria and working methods should be read alongside both the generic statement in Section 2 and the guidance on data requirements for the 2008 RAE (RAE 03/2005 'Guidance on submissions').

#### Action required

4. This document is for information and guidance. No action is required.



## Section 1: Introduction

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5. Panels met to draft criteria and working methods in spring 2005. The UK higher education (HE) funding bodies invited comments on these drafts via a web-based consultation in summer 2005. The focus of the consultation was on aspects of the panels' criteria and working methods that the panels themselves could change, rather than on matters that had been fixed and published in other documents about the 2008 RAE (for example RAE 01/2004 'Initial decisions by the UK funding bodies', and RAE 01/2005 'Guidance to panels').

6. In autumn 2005, panels met to consider responses to the consultation and to finalise their criteria. A quantitative analysis of responses to the consultation and a summary of the generic issues that respondents raised is available on the RAE web-site at [www.rae.ac.uk/pubs/](http://www.rae.ac.uk/pubs/)

7. The purpose of publishing statements of criteria and working methods is to give higher education institutions (HEIs) information about how submissions will be assessed, in good time to assist with their planning. As with previous RAEs, the assessment process is based on expert review: each panel will use its professional judgement to form a view about the overall quality of the research activity described in each submission, taking account of all the evidence presented, against its published criteria and in line with its published working methods. Results for each submission will be published in the form of a quality profile, which is described in Annex 1.

8. Section 2 of this document contains a generic statement on the criteria and working methods (hereafter referred to as 'the generic statement') that all panels will adopt. Section 3 contains the specific criteria and working methods of one main panel and the sub-panels for the units of assessment (UOAs) that it covers. Main and sub-panel criteria and working methods must be read alongside the generic statement in Section 2.

9. Panels' criteria and working methods should be read in conjunction with the guidance to HEIs on the data requirements for the 2008 RAE (see RAE 03/2005 'Guidance on submissions'). The latter explains the purpose of the RAE and the principles underpinning it, the role of main and

sub-panels, and the data they will use to make assessments, and gives other details on the context in which the panels' criteria and working methods may be understood.

10. In this document, 'panels' is used to mean both main panels and sub-panels. Where we refer exclusively to main panels or to sub-panels, we identify them as such.

### Enquiries

11. Enquiries should be addressed to the RAE team ([info@rae.ac.uk](mailto:info@rae.ac.uk) or tel 0117 931 7267) and should be routed wherever possible through each HEI's designated RAE contact.



## Section 2: Generic statement on criteria and working methods

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### Definitions

12. For the purposes of the RAE, and throughout the panels' criteria and working methods, the following definitions apply:

- a. **Assessment period** means the period from 1 January 2001 to 31 July 2007. The research described in submissions, including data about research students and research income and the textual commentary, must relate to this period.
  - b. **Census date** means the date determining the affiliation of research-active staff to a particular institution. Staff may be submitted in the RAE by the institution that employs them on this date (or, in the case of Category C staff, by the institution that is the focus of their research), regardless of previous or forthcoming changes in their employment status. The census date is 31 October 2007.
  - c. **Department** means the staff included in a submission to one of the 67 UOAs recognised by the RAE, and, by extension, their work and the structures which support it. RAE departments are often not identified with a single administrative unit within an HEI, or in the case of joint submissions, across HEIs.
  - d. **Early career researchers.** These are individuals of any age who first entered the academic profession on employment terms that qualified them for submission to RAE2008 as Category A staff on or after 1 August 2003.
  - e. **FTE** means full-time equivalent:
    - i. For staff, it refers to the extent of a member of staff's contracted duties as compared to those of a typical full-time member of staff in the same category. The length of time in the year for which the individual was employed and the relative proportion of total contracted time spent on research are irrelevant in reporting staff FTEs. The minimum contracted FTE that may be reported for Category A staff is 0.2.
    - ii. For students, it refers to the amount of study undertaken in the year of programme of study, compared to a full-time student with the same qualification aim studying for a full year.
  - f. **Publication period** means the period during which research outputs must be placed in the public domain (or in the case of confidential outputs, lodged with the sponsor) if they are to qualify for assessment in RAE2008. The publication period runs from 1 January 2001 to 31 December 2007 for all UOAs.
  - g. **Returned** refers to any data included in any of the RAE submission forms RA0 to RA5c.
  - h. **Selected staff** refers to the named staff included in RAE submissions by HEIs, in accordance with their own internal code of practice on preparing submissions and selecting staff for inclusion. Other staff may be eligible for inclusion (that is, they may satisfy the data definitions and requirements), but HEIs are not required to include all their eligible staff. Further information, and guidance from the Equality Challenge Unit on preparing a code of practice, is given in Annex G of RAE 03/2005 'Guidance on submissions'.
  - i. **Submission** means a complete set of forms RA0 to RA5c returned by an HEI in any of the 67 UOAs.
  - j. **UOA** means one of the 67 subject units of assessment defined for the 2008 RAE, which are listed in Annex 2.
13. The definition of research for the 2008 RAE is at Annex 3. Research outputs and research income may be included in submissions, provided that the work they embody or fund meets this definition. Consultancy income and research outputs arising from consultancy contracts should normally be excluded, since consultancy is usually concerned with applying existing knowledge. However, they may be included if the work undertaken or published as a result meets the

RAE definition of research, irrespective of the nature of the contract or invoicing arrangement.

## Content of submissions

14. Each submission will contain the core data detailed in sub-paragraphs 14a to 14i below. (The RA code in brackets refers to the research assessment form through which the data will be collected.) For detailed definitions of the data required in each RA form, see RAE 03/2005 'Guidance on submissions'.

- a. Overall staff summary (RA0): summary information on research-active staff selected (FTE and headcount) and related academic support staff (FTE) in the unit of assessment. The data collection software will populate some of RA0 using the data that HEIs enter in RA1.
- b. Research-active individuals (RA1): detailed information on individuals selected by the institution for inclusion as research active.
- c. Research output (RA2): up to four items (or fewer if designated for particular reasons in UOA criteria) of research output produced during the publication period (1 January 2001 to 31 December 2007) by each individual named as research active and in post on the census date (31 October 2007).
- d. Research students (RA3a): numbers of full-time and part-time postgraduate research students and degrees awarded.
- e. Research studentships (RA3b): numbers of postgraduate research studentships and the source of funding for them.
- f. External research income (RA4): amounts and sources of external funding.
- g. Textual description (RA5a): including information about the research environment and indicators of esteem.
- h. Individual staff circumstances (RA5b).
- i. Category C staff circumstances (RA5c).

15. In line with recommendations from the Roberts' Review of research assessment, some panels request that HEIs detail in RA5a further

specific, quantitative information that will contribute to the assessment of the research environment. Such additional information requirements are specified in the relevant panels' criteria statements.

16. The word limits for RA5a, RA5b and RA5c are given in Annex 6.

## Categories of research-active individual

17. The definitions of staff Categories A to D are:

- a. **Category A.** Academic staff in post and on the payroll of the submitting institution on the census date. Eligible Category A academic staff must be employed under a contract of employment with the HEI on the census date. Their contract must list research and/or teaching as their primary function.
- b. **Category B.** Academic staff who held a contract with the institution after 1 January 2001 and who left the institution (or transferred into a department returned to a different UOA) after that date and before the census date, and who otherwise would have been eligible for inclusion as Category A.
- c. **Category C.** Independent investigators active in research who do not meet the definition for Category A staff, but whose research on the census date is clearly and demonstrably focused in the department that returns them.
- d. **Category D.** Independent investigators who met the definition for Category C staff during the period 1 January 2001 to 31 October 2007 but not on the census date.

For detailed definitions, please refer to Part 3, Section 1 of RAE 03/2005 'Guidance on submissions'.

## Unit of assessment description

18. Each of the sub-panels' criteria statements contains a description of the UOA and of its boundaries with other UOAs. The description indicates the main areas covered by the UOA and is not intended to give an exhaustive account of the sub-disciplinary coverage. HEIs should refer

to the UOA descriptions when deciding in which UOAs to make submissions.

## Assessment process

19. This is an expert review exercise. Sub-panel members will exercise their knowledge, judgement and expertise to reach a collective view on the quality profile of research described in each submission, that is the proportion of work in each submission that is judged to reach each of five quality levels from 4\* to Unclassified (see Annex 1). The definition of each level relies on a conception of quality (world-leading) which is the absolute standard of quality in each UOA. Each submission will be assessed against absolute standards and will not be ranked against other submissions.

20. The five quality levels from 4\* to Unclassified apply to all UOAs. Some panel criteria statements include a descriptive account of the quality level definitions, to inform their subject communities on how they will apply each level in judging quality. These descriptive accounts should be read alongside, but do not replace, the standard definitions.

21. In reaching a view on quality profiles, sub-panels will take account of all components of a submission: research output, research students and studentships, research income, and research environment and esteem indicators. An underpinning principle is that sub-panels should assess each submission in the round: they will not make collective judgements about the contributions of individual researchers, but about a range of indicators relating to the unit, research group or department that is put forward for assessment.

22. Each sub-panel will recommend provisional quality profiles for debate and endorsement by its main panel. Sub-panels must be able to demonstrate in all cases how their quality judgements relate to all the evidence before them and to their published criteria. The quality profile they recommend for any submission must reflect the sub-panel's expert and informed view of the characteristics of that submission as a whole.

23. In all cases, submissions will be assessed against the criteria for the UOA in which the submission was originally made. Responsibility for recommending a quality profile lies with the sub-panel for that UOA, regardless of whether the sub-panel sought advice on aspects of the submission from specialist advisers or other sub-panels (see paragraphs 52-55 below).

24. Although they reflect a common framework, the assessment criteria and working methods of each main panel and each sub-panel differ in varying degrees across the different UOAs. However, in general, sub-panels grouped under the same main panel have developed criteria that reflect broadly similar approaches to research. Aspects of significant variation, for example where research approaches vary substantially between subjects, are described in the relevant main panel criteria statement.

## Joint submissions

25. Joint submissions to one UOA by two or more UK HEIs, of research they have developed or undertaken collaboratively, are encouraged where this is the most appropriate way of describing the research. For further details on joint submissions, please refer to paragraphs 52-56 of RAE 03/2005 'Guidance on submissions'. Panels will receive joint submissions as a unified entity, and will assess them in the same way as submissions from single institutions.

## Research outputs

26. Submissions should list up to four items of research output by each submitted researcher, but there is no automatic disadvantage in failing to cite four items. Sub-panels will look at each case. The criteria statements offer further guidance on their respective approaches in cases where fewer than four items are listed. Staff citing no research outputs would not usually be considered as research active and should not be submitted to the exercise.

27. HEIs are allowed to list the maximum of four outputs against any researcher, irrespective of their status or the length of time they have had to conduct research. So, for example, four outputs

may be listed against part-time researchers or against individuals whose time for research has been constrained by their ill health – even if the panel's criteria indicate that the panel would not necessarily expect to see four items listed.

28. We have deliberately defined research output broadly: any form of publicly available, assessable output embodying research as defined for the RAE may be submitted, as may confidential outputs that are not publicly available. Where an output is published as a single coherent work it should be submitted as such and not subdivided for submission as two or more separate items.

29. Where a cited research output includes significant material that was previously published separately (for example, an article reissued as a chapter in a book):

- a. If both outputs were published within the publication period and both are cited, the panel may judge that these should be treated as a single output.
- b. If the earlier output was first published outside the publication period, the panel may take the view that not all of the work reported in the later output should be considered as having been issued within the publication period.
- c. In either of the above cases, the publication history should be appropriately noted in the 'Other relevant details' field in RA2, explaining where necessary how far any work published earlier may have been revised to incorporate new findings.

30. In the case of confidential outputs, HEIs must have the prior permission of the person(s) or organisation(s) to whom the work is confidential for the output to be made available for assessment (see paragraph 33).

31. Panels' criteria for judging the quality of research outputs are intended to be sufficiently broad to enable them to recognise high quality research outcomes in all forms of research – whether basic, strategic, applied, practice-based or interdisciplinary. In addition to printed academic work, research outputs may include, but are not

limited to: new materials, devices, images, products and buildings; intellectual property, whether in patents or other forms; performances, exhibits or events; work published in non-print media. Each sub-panel's criteria statement gives further guidance. In some cases, sub-panels may ask for brief supplementary material describing the research content and significance of certain works, particularly where research outputs do not exist in a conventional form.

32. Panels' criteria statements reflect an underpinning principle of the RAE that all forms of research output will be assessed on a fair and equal basis. Sub-panels will neither rank outputs, nor regard any particular form of output as of greater or lesser quality than another *per se*. Some panels may specify in their criteria that where they do not examine an output in detail, they may use, as one measure of quality, evidence that the output has already been reviewed or refereed by experts (who may include users of the research), and has been judged to embody research of high quality. No panel will use journal impact factors as a proxy measure for assessing quality.

33. So that panels can take full account of research that is of relevance to non-academic users, including industry and public bodies, the RAE team has made provision for confidential research outputs that are not publicly available to be submitted for assessment. These could include commercially sensitive research reports for companies, and reports for government departments or agencies which are not in the public domain. Where a confidential output is listed in a submission, the HEI will be responsible for securing permission from the sponsor, and making the output available on request for panels to examine. Please refer to paragraph 98 of RAE 03/2005 'Guidance on submissions' for further information.

### **Minimum proportions of work examined in detail**

34. It is not expected that sub-panels will examine in detail all the research outputs cited. Each sub-panel must, however, examine in detail

a proportion which, in its opinion, is sufficient to make an informed judgement on the quality profile of the work presented. Sub-panels indicate in their criteria statements how they will decide what work to examine in detail, and their approach to assessing work that is not examined in detail.

35. Each sub-panel indicates the minimum proportion of research outputs which it will examine in detail. This is a collective responsibility, not a requirement for each sub-panel member. The phrase 'examine in detail' indicates reading in full, reading substantially from or sufficiently to make an informed assessment, or (for outputs which by their nature cannot be read) an equivalent level of scrutiny. Sub-panel members are not required to re-examine work which they have already examined in detail outside the RAE process as part of their normal academic work. They may include such work in the minimum proportion that they report as having examined in detail. Where 'virtually all' is the phrase used to describe the proportion to be examined in detail, this means 90% or more. Where a sub-panel indicates that it intends to examine in detail all the submitted outputs, the only constraints on fulfilling this intention would be those outside the sub-panel's control, for example, if a fire were to destroy, before the sub-panel was able to assess it, an original artefact listed as an output.

36. Where a sub-panel does not examine a research output in detail, it may use information contained in RA2 in assessing it. Therefore, it is essential that HEIs adhere strictly to the specification that some sub-panels have supplied in their criteria statement for the field in RA2 entitled 'Other relevant details'.

37. For research outputs produced in languages other than English or Welsh, a 300 word abstract in English is required describing the content and nature of the work. A separate field for each output in RA2 will be available for this. Panels will use this abstract to identify appropriate specialist advisers to whom the work may be referred. The abstracts themselves will not form the basis for assessment. This requirement is

waived for outputs submitted in any of UOAs 51 to 57 if the output is produced in any of the languages in the remit of that UOA.

## Staffing issues

38. HEIs are invited to use RA5b to describe, confidentially, any circumstances of individual staff that have significantly adversely affected their contribution to the submission. Main and sub-panels' statements describe how they will apply their criteria in assessing the contribution of such staff to submissions. HEIs need not describe circumstances (for example, a disability) that have had no adverse effect on an individual's capacity to undertake research, as reflected by their contribution to the submission.

39. Panels will consider the following individual circumstances to the extent that they are stated to have had a material impact on the individual's ability to produce the expected volume of research outputs in the assessment period:

- a. Family and domestic matters, including:
  - i. Absence on maternity, paternity, parental or adoption leave and arrangements on return to work following these periods of leave.
  - ii. Part-time working or other flexible working arrangements.
  - iii. Time spent acting as a carer or other domestic commitments.
- b. Disability, ill-health and injury, including:
  - i. Any disability to which the Disability Discrimination Act 1995 applies, including both permanent disabilities and any temporary disability with a duration of 12 months or more.
  - ii. Absence from work on the advice of a registered medical practitioner.
- c. Engagement on long-term projects of significant scale and scope.
- d. Status as an early career researcher. These are individuals of any age who first entered the academic profession on employment terms that qualified them for submission to

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RAE2008 as Category A staff on or after 1 August 2003.

- e. Prolonged absences (absences for more than six months consecutively in the assessment period) which were agreed by the individual with the institution but which do not fall into one of the categories above. They include:
  - i. Secondment to non-academic positions outside the higher education sector.
  - ii. Career breaks for purposes unconnected with research, teaching or other academic duties.
- f. Other absences which the institution is legally obliged to permit, such as absences for religious observance or absence arising out of involvement as a representative of the workforce.
- g. Any other personal circumstances which are considered to have had a significant impact on an individual's ability to produce the expected volume of research outputs in the assessment period.

40. Other circumstances comparable with the examples in paragraph 39 will be considered, as long as an explanation is provided as to the way in which they are said to have impacted on the individual's ability to produce the expected volume of research outputs.

41. Panels will review the information provided regarding individual circumstances. They will determine whether those circumstances can reasonably be considered to have affected the individual's ability to produce the expected volume of research outputs and, if so, whether and to what extent they will reduce the volume requirement in respect of that individual.

42. While guidance is given below on the information to be provided by HEIs in respect of individual circumstances, it is for the panel to decide the extent of any reduction in the volume requirement.

43. Information about individual circumstances of Category A or C staff should be submitted in RA5b. HEIs must provide the panel with sufficient information regarding the individual

circumstances to enable them to assess the extent of the impact of those circumstances on the individual's research capability. This will normally include:

- a. A broad description of the nature of the circumstances (eg, ill-health, maternity leave).
- b. The timing of circumstances, ie, when they occurred.
- c. The duration of the circumstances.
- d. The extent of the impact of the circumstances on the individual's ability to carry out research activities (eg, impossible to carry out research at all, roughly 50% reduction in time available).

44. As indicated above, an outline description of the nature of the circumstances must be given. This is required so that the panel can ensure that it treats similar situations in a consistent manner. However, personal details such as the precise diagnosis of medical problems need not be given, as long as the HEI explains clearly the nature of the impact on the individual's research capability. It is for the HEI to satisfy itself that the relevant circumstances exist or have existed and that the impact is as described. The panel will seek further information about individual circumstances where it feels unable to make a decision on the basis of the information provided.

45. All information submitted in RA5b will be kept confidential by the RAE team and by the panel members, who are subject to confidentiality undertakings in respect of all information contained in submissions. It will be used only for the purposes of assessing the RAE submission in which it is contained, will not be published at any time and will be destroyed on completion of the RAE.

46. It is the responsibility of the HEI to ensure that the information in RA5b is submitted in compliance with the Data Protection Act 1998 and all other legal obligations.

47. Panels will use the information supplied confidentially in RA5b in assessing submissions against their published criteria. Panels will not take account of circumstances that may be known to them, but which are not referenced in submissions.

48. In the case of part-time working, HEIs must include an entry in RA5b if they wish a sub-panel to consider this as a mitigating factor for a researcher citing fewer than four outputs.

49. Academic and academic-related duties which might be expected for any staff member working in a UK HEI, including teaching and administration, are not regarded as an explanation in themselves for listing fewer than four items of research output against an individual.

50. The work of Category C staff will not be given less weight purely because the basis of their relationship with the institution is different from that of Category A staff. However, panels may reasonably form a view as to the extent and value of the contribution made by individuals listed in Category C in the light of evidence available.

51. For each individual returned as Category C, HEIs must provide information in RA5c demonstrating that their research is clearly and demonstrably focused in the department that returns them. Sub-panels' criteria statements give examples of the types of evidence to be supplied in each case. If a sub-panel is not convinced by the evidence provided for a Category C staff individual, it may take account of this in assessing that individual's contribution to the research of the department.

### **Interdisciplinary research: arrangements for cross-referral and specialist advice**

52. In view of concerns that the assessment of interdisciplinary research has presented challenges in previous RAEs (see paragraph 12 of RAE 01/2004 'Initial decisions by the UK funding bodies'), panels will continue to have access to mechanisms for cross-referring parts of submissions. There will also be enhanced arrangements for using specialist advisers to ensure that interdisciplinary research is assessed by those competent to do so.

53. An HEI may request that parts of submissions it makes to one UOA are cross-referred to other relevant sub-panels. The RAE team will consider all such requests but will not be bound by them. 'Parts of submissions' may range from all the research output listed against a submitted researcher, to all the research output and textual commentary relating to one or more research groups. HEIs may not request cross-referral of either entire submissions, or single outputs, although sub-panels may refer single outputs to specialist advisers (see paragraph 55).

54. Sub-panels may also request cross-referral of parts of submissions on the same grounds, even where submitting HEIs have not done so. In all cases, whether requested by a sub-panel or an HEI, the RAE manager will consider the request, and take advice from the relevant main and sub-panel chairs. Where it is thought that cross-referral will enhance the assessment process, the relevant parts will be cross-referred to all the sub-panels concerned. Although advice will be sought only on the quality of the cross-referred parts, the entire submission will be made available to the receiving panel so that it can judge the cross-referred part in context. Advice from other sub-panels on cross-referred parts will be sought and given on the basis of the assessment criteria for the UOA to which the work was originally submitted. The sub-panel for the UOA to which the work was originally submitted will retain responsibility for recommending the quality profile awarded.

55. Sub-panels may request that parts of submissions, including but not limited to interdisciplinary research, are referred to specialist advisers where they believe this will enhance the assessment process. This includes where HEIs identify single or multiple research outputs as being outcomes of interdisciplinary research. The RAE team has a database of individuals who were nominated as specialist advisers through the process described in RAE 03/2004 'Units of assessment and recruitment of panel members'.

## Assessment of applied research and practice-based research

56. As we indicated in RAE 01/2004 'Initial decisions by the UK funding bodies', we have striven to ensure that the panel membership comprises individuals who have experience in conducting, managing and assessing high quality research; as well as experts who are well equipped to participate in the assessment of applied research and practice-based research from a practitioner, business or other user perspective.

57. Panels will treat on an equal footing excellence in research across the spectrum of applied research, practice-based and basic/strategic research, wherever that research is conducted. Panel criteria encompass a range of indicators of excellence that are sufficiently broad to enable them to recognise the distinctive characteristics of applied research and practice-based research, and to ensure that they apply their quality benchmarks equitably. The panel criteria statements detail how they will assess a broad range of research, including applied research relevant to users in industry, commerce and the public sector. Certain main panels could reasonably expect submissions to cite evidence of applied research or practice-based research, and these panels have defined in their criteria statements a brief typology and appropriate criteria by which the sub-panels will assess such research.

## Assessment of pedagogic research

58. Submission of pedagogic research is encouraged where it meets the definition of research for the RAE at Annex 3. Pedagogic research pertaining to sectors other than higher education (for example, pre-school, compulsory education, or lifelong learning) falls squarely within the remit of UOA 45 (Education). We anticipate that submissions substantially comprising research on pedagogy in these sectors would normally be submitted to UOA 45, but see also paragraph 61 below. Higher education pedagogic research is also within the remit of UOA 45. However, in view of the arrangements described in paragraph 61, HEIs need not artificially disaggregate relatively small bodies of

subject-specific higher education pedagogic research from their submissions to other UOAs.

59. The RAE team has consulted the Higher Education Academy to provide a more descriptive account of higher education pedagogic research that HEIs may find helpful in preparing submissions (see paragraph 60).

60. Pedagogic research in HE will be assessed where it meets the definition of research for the RAE. It is research which enhances theoretical and/or conceptual understanding of:

- teaching and learning processes in HE
- teacher and learner experiences in HE
- the environment or contexts in which teaching and learning in HE take place
- teaching and learning outcomes in HE
- the relationships between these processes, outcomes and contexts.

Reports of studies providing descriptive and anecdotal accounts of teaching developments and evaluations do not constitute pedagogic research. Pedagogic research is firmly situated in its relevant literature, and high quality pedagogic research makes a substantial contribution to that literature.

61. In all cases pedagogic research will be assessed by experienced and expert reviewers. Some panels have appointed as panel members one or more experts in higher education pedagogy; others consider research in higher education pedagogy to be within the collective expertise of their membership. In some main panel areas, for example engineering (Main Panel G) and in the medical and related panels (Main Panels A and B), pedagogic research will be cross-referred to a specific member or members of one of the sub-panels. However, as with any other body of research where it considers that seeking external advice will enhance the assessment process, a sub-panel may also refer some pedagogic material to specialist advisers or to the Education sub-panel for advice. We expect that panel members and specialist advisers involved in the assessment of pedagogic research will co-ordinate their activity to ensure consistency of approach in its treatment.

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## **Dealing with declarations of interest and confidentiality**

62. All main and sub-panel members, panel secretaries, and specialist advisers have declared any major interests they have in HEIs eligible to participate in the RAE. A 'major interest' is one that could be deemed material to their participation in assessing the submission from that HEI. They will not participate in assessing a submission from any HEI in which they have declared such an interest, and will be required to withdraw from any panel meeting during discussion of that submission. Major interests will be continually updated and a register of interests will be maintained by the RAE manager.

63. The guidance to panels on declaring and dealing with major interests is at Annex 4. How each panel will implement this guidance is described in its criteria statement. Minor interests (for example supervision of doctoral students registered at, or co-holding of grants held at, submitting institutions) will not be kept on the register, but panels will declare, minute and handle them on a case-by-case basis.

64. All main and sub-panel members, panel secretaries, and specialist advisers are bound by a duty of confidentiality governing information contained in RAE submissions and panel discussions. Details are at Annex 5.



## Section 3: Criteria and working methods

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### Main Panel E

Covers the following UOAs:

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• 17 Earth Systems and Environmental Sciences	23
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### Absences of chair and declaration of interests

1. A deputy chair has been elected from the outset, to cover any planned or unforeseen absences of the chair of Main Panel E. The boundaries of the deputy chair's role are to replace the main panel chair in the event of their absence from the main panel, and to assume the chair during a meeting where the main panel chair is asked to withdraw due to a conflict of interest.
2. Where the chair and any members of the main panel declare a current or recent major interest in an institution, they will withdraw from discussions. The formal note of discussion provided by the secretary shall be the only part of those discussions to which they are party.
3. The main panel will declare minor interests, to the secretariat, in line with guidance provided in Annex 4, and the chair will determine appropriate methods for handling any conflicts of interest arising.

### How the main panel will work with its sub-panels

4. The main panel expects a collaborative working relationship with and between its sub-panels to facilitate an iterative process. The main panel will:
  - a. Provide leadership and guidance to its sub-panels on their approaches to the assessment process and establishment of their criteria and working methods.
  - b. Ensure that assessment is completed within given timescales and in accordance with the funding bodies' policy and operational framework.
  - c. Work with sub-panels during the criteria-setting and assessment phases to ensure consistency, and adherence to, equal opportunities guidance.
  - d. Endorse the criteria for assessment and working methods of sub-panels, and ensure that sub-panels complete their assessments in accordance with their published criteria and working methods.
  - e. Based on the work of the sub-panels, endorse quality profiles for all submissions.

5. Where sub-panels raise questions or issues of general interest to the subjects within Main Panel E or more widely, these will be communicated to the chairs of the other sub-panels (and to other main panels where appropriate). The main panel will oversee the handling of any such common issues.

6. The main panel will receive the minutes of all sub-panel meetings. Sub-panels will receive reports on the meetings of the main panel.

7. The chair of the main panel may attend some meetings of Sub-panels 17, 18 and 19 during the assessment phase.

### **Consistency of quality levels**

8. Consistency between the sub-panels in applying quality levels will be assured by dialogue at main panel level at appropriate times throughout the RAE2008 process.

9. The following differential weightings of the components of the assessment will be applied by the sub-panels under Main Panel E:

#### **Sub-panel 17:**

- research outputs 65%
- research environment 20%
- esteem indicators 15%.

#### **Sub-panels 18 and 19:**

- research outputs 60%
- research environment 20%
- esteem indicators 20%.

10. Taking prescribed minimum weightings into account and given the primacy of expert review in the process, a significant weighting for research outputs is deemed appropriate by the main panel, while giving reasonable weighting to environment and esteem so as not to be overly retrospective. UOA 17 has significant common ground with UOA 32 (Geography and Environmental Studies) and Main Panel E has agreed that the weightings for the three components of the assessment should also reflect the interactions between these two UOAs.

### **Research environment**

11. Data on research students, studentships and research income will be assessed under the component of research environment, and this will be applied consistently across the disciplines of Earth Systems and Environmental Sciences, Chemistry and Physics. Research income (as per the definition of research income in RAE 03/2005 'Guidance on submissions') will be regarded as a measure of peer judgement in relation to previous achievements and promise. The use of funds to improve physical infrastructure and facilities (eg, the Joint Infrastructure Fund, Science Research Investment Fund) will also be considered by sub-panels.

12. Sub-panels specify the measures of quality of the environment in their criteria and working methods. Sub-panels expect submissions to include information on structures which are coherent for their discipline.

### **Research esteem**

13. The research esteem component of the quality profile will be used by sub-panels to assess the esteem of individuals submitted, particularly taking account of the relative career stage of staff submitted. The esteem of a department will be assessed under the environment component of the profile. Sub-panels specify in their criteria and working methods the measures of esteem appropriate to their discipline.

### **Elements of variation in the criteria statements**

14. The development of the criteria and working methods of the sub-panels has been undertaken in consultation with the main panel. The main panel expects that the criteria adopted by its sub-panels will reflect broadly the degree of similarity in their approaches to research. Any variations in the criteria statements and working methods of sub-panels have been considered by the main panel to ensure that they are in keeping with the extent to which research approaches and methods vary between the

disciplines covered. The key elements of variation in the criteria statements are:

- a. The extent to which external advice will be used, according to the breadth of the discipline and the ability of the sub-panel to assess appropriately all outputs submitted to it.
- b. The weighting given to research outputs and esteem indicators, as specified at paragraph 9.
- c. The assessment of outputs and esteem by research group (Physics) or by individual (Earth Systems and Environmental Sciences, Chemistry), as the most appropriate methodology in line with institutional structures of research.
- d. The working methods for agreeing a quality profile for outputs, and the use to be made of the 'Other relevant details' field in RA2.
- e. The acceptability of co-authored or multi-authored outputs from the same department, in line with the extent to which such outputs are common within the discipline.
- f. The structure by which departments should submit their measures of esteem.
- g. The indicators for esteem and environment which will be taken into account, in line with the specifics of the different disciplines.

### **Methods for ensuring consistency**

15. The main panel expects sub-panels to set criteria and working methods with the principles of equity and consistency uppermost in mind. Sub-panels will have a common conception of the standard defined by each quality level (as set out below at paragraphs 20-24), and their methods will take account of all the components of a submission and a range of indicators.

16. Where sub-panels have generic issues, these will be communicated to the chairs of the other sub-panels under Main Panel E (and those under other main panels if appropriate). The main panel will oversee the handling of any such common issues.

17. The main panel will convene prior to the consideration of submissions in 2008 to ensure correct interpretation of criteria that are common across sub-disciplines, thereby avoiding undue variation. The chair of the main panel may

request that the sub-panels under Main Panel E discuss, at the start of the assessment phase, the methodology for consideration of outputs which are to be cross-referred, with appropriate members of sub-panels handling cognate disciplines. This is to ensure common practices are adopted.

18. The main panel will receive the minutes of all meetings of its sub-panels.

### **Range of indicators of excellence**

19. The assessment of the quality of research will be based upon the main panel and its sub-panels' professionally formed judgement, expertise and knowledge of the associated subject areas, and informed by all the information presented in each submission. In determining the range of indicators of excellence to be used by sub-panels in making assessments, the quality of research is to be used as the primary criterion. Sub-panels will consider:

- a. The quality of research as judged by research outputs, with no discrimination between forms of output.
- b. The extent of research and its quality, as indicated by the activity of research students, research assistants, post-doctoral workers, visiting academic and industrial researchers, and others who are deemed to add value to the research output.
- c. Evidence of support from external funders, as indicated by research income from Research Councils, industry, charities, international agencies and other funding sources.
- d. Evidence of the vitality of a school or department, as demonstrated by its research strategy, supporting environment, and achievements over the assessment period.
- e. Evidence of national and international peer recognition.

### **Research outputs**

20. In assessing work as being 4\*, ie, 'world-leading in terms of originality, significance and rigour', the sub-panels will expect to see evidence of some of the following characteristics:

- agenda setting
- research that is leading or at the forefront of the research area

- great novelty in developing new thinking, new techniques or novel results
- major influence on a research theme or field
- developing new paradigms or new concepts for research
- major changes in policy or practice with respect to applied research.

21. In assessing research as being **3\*** the sub-panels will expect to see evidence of some of the following characteristics:

- makes important contributions to the field at an international level
- contributes important knowledge, ideas and techniques which are likely to have a lasting impact, but are not developing new paradigms or leading to fundamental new concepts
- for applied work, a contribution is judged to have led to significant change to policies or practices.

22. In assessing research as being **2\*** the sub-panels will expect to see evidence of some of the following characteristics:

- provides useful knowledge to the field, but lacks the potential for lasting impact
- involves incremental advances which might include new knowledge or model calculations, using established techniques or approaches, which conform with existing ideas and paradigms
- has influence outside the UK
- for applied work, has influenced policy or practice.

23. In assessing research as being **1\*** the sub-panels will expect to see evidence of some of the following characteristics:

- useful but unlikely to have more than a minor impact in the field
- influential at a national level
- minor influence on policy or practice.

24. Research will be assessed as **Unclassified** if it is considered to fall below the quality levels described above or does not meet the definition of research used for the RAE.

25. Sub-panels will state which types of research outputs they anticipate receiving (this should not be regarded as an exhaustive list), and will make it clear that all forms are assessed on an equal basis. All sub-panels will expect to receive a maximum of four outputs per individual. However as the RAE concerns quality not volume, and takes into account equal opportunities legislation, it is accepted that the maximum and normal expectation of four outputs may not be possible in all circumstances. Sub-panels will state how they will assess research outputs and what proportion will be considered in detail. It is anticipated that this will vary across disciplines.

26. Sub-panels will provide guidance to departments on how they might use the 'Other relevant details' field in RA2 to provide useful, additional information on outputs. The criteria of sub-panels will not ask for citation data or journal impact factors to be provided for all submitted outputs.

27. Sub-panels will specify whether they generally expect to receive different items of research output for each researcher submitted.

28. Sub-panels will specify how they will judge the contribution of new entrants to higher education research and early career researchers. Submissions containing new entrants and early career researchers will not be disadvantaged, and their presence should be highlighted by departments.

29. All sub-panels wish to be informed by departments of other UOAs to which they have submitted.

### **Research environment**

30. Sub-panels will request forward-looking strategies for a six-year period from 2008.

### **Research esteem**

31. Measures of esteem will be considered as appropriate to an individual's career stage.

## Multidisciplinary and interdisciplinary research

32. The main panel recognises the diverse nature of the disciplines it covers, and regards many aspects of research in those areas as naturally interdisciplinary or multidisciplinary. The main panel and sub-panels welcome interdisciplinary and multidisciplinary submissions.

33. Sub-panels may seek specialist advice or cross-refer research to other UOAs as appropriate to assess interdisciplinary or multidisciplinary research at the boundaries of their UOA, or where they need to supplement their expertise. Departments may also request cross-referral within the terms laid down in RAE 03/2005 'Guidance on submissions'.

34. The general standards of excellence defined for the RAE by the quality levels will be expected to be applied equally to research in new interdisciplinary areas and established disciplines.

## Applied research and practice-based research

35. In the assessment of applied research, the main panel expects sub-panels to request departments to provide an explanation in the 'Other relevant details' field in RA2 of significant use or application of the research submitted for assessment.

36. In the assessment of esteem and environment, sub-panels will consider the extent to which staff interact with bodies external to the HE sector.

37. Research on the teaching of any of the disciplines covered by Main Panel E will be considered initially by the relevant sub-panel then cross-referred to UOA 45 (Education) where necessary, with a request for a judgement to be returned to the relevant sub-panel. The final assessment will lie with the sub-panel which originally received the submission.

38. All sub-panels will augment their expertise by consulting with external specialist advisers where appropriate. In UOA 17, Earth Systems and Environmental Sciences, this will be in the majority of areas. In all cases, the advisers'

judgements will inform the sub-panel's overall assessment of research outputs.

## Individual staff circumstances

39. In assessing submissions, the main and sub-panels will normally expect the number of outputs listed for staff to be proportionate to the time they have had available for research. While the panels will consider each case on its own terms, they will normally accept a reduction in the number of submitted outputs to take account of the circumstances described in paragraph 39 of the generic statement.

40. In addition to the circumstances described in the generic statement, the main and sub-panels would also wish to take account of the following circumstances:

- a. Difficulties in undertaking field work due to particular circumstances (UOA 17).
- b. Limitations on travel or other such factors, due to personal circumstances (UOAs 18 and 19).
- c. As described above, all specific circumstances will be considered on a case by case basis, but the panels note that given publication patterns in these disciplines it is anticipated that the vast majority of early career staff will be able to submit four outputs for assessment.

41. Sub-panels' criteria and working methods provide information on how submitted staff who have faced or are facing such circumstances during the assessment period will be handled. In all cases, sub-panel processes take appropriate account of the work of researchers whose volume of research output may have been limited for reasons covered by equal opportunities legislation and other personal circumstances. Sub-panels will take account of requirements for laboratory-based research where health and safety restrictions are imposed on pregnant and nursing women which may have prevented them from undertaking some types of research during the assessment period.

42. Departments are encouraged to use section RA5b (which will be treated confidentially) to provide supporting information on the impact of

specific circumstances on an individual's research. Detailed personal histories will not be required by sub-panels, but commentary on the recovery of scientific momentum, and information on the approach taken by the department in such circumstances, will be considered by sub-panels in the assessment of research environment.

43. In making assessments, sub-panels will consider only the information provided to them in the submissions they receive.

### **Panel observers**

44. Research Councils UK (RCUK) observers will attend main panel meetings, and may be invited to attend meetings of sub-panels on the agreement of the main panel chair and the appropriate sub-panel chair. RCUK will be represented by named individuals from the Engineering & Physical Sciences Research Council and the Natural Environment Research Council; requests for input from other Research Councils will be sent, via the main panel chair, to the RAE team. The main panel may ask observers to provide advice on matters such as the dual-support system of funding. The role of an observer will be passive and distinct from that of a panel member.

This statement should be read alongside the statement for Main Panel E and the generic statement.

### **Absences of chair and declaration of interests**

1. A deputy chair has been elected to cover any planned or unforeseen absences of the sub-panel chair. The responsibilities of the deputy chair are to replace the sub-panel chair in the event of their absence from both the main panel and sub-panel, to take over the sub-panel chair's duties in the event of illness, and to replace them on the sub-panel where they have a conflict of interest. Where the sub-panel chair or members declare a current or recent major interest in an institution, they will be asked to withdraw. The formal note of discussion provided by the secretary shall be the only part of that discussion to which members who have been asked to withdraw are party. The sub-panel will declare minor interests to the sub-panel secretariat, in line with guidance provided in Annex 4, and the chair will determine appropriate methods for handling any conflicts of interest arising. Members will not necessarily withdraw from the meetings in such cases, but will not be asked to lead the discussion.

### **UOA descriptor**

2. The UOA encompasses earth, environmental and planetary sciences, including: geophysics; geochemistry; palaeontology; geology; mineral physics; planetology; cosmochemistry; earth surface processes; the physics, chemistry and biology of the environment including ecology; atmospheric, oceanic and freshwater sciences; global change; natural resources; and scientific aspects of environmental management, including pollution and conservation.

### **UOA boundaries**

3. The sub-panel is structured to judge coherently the quality of submissions under the umbrella of earth systems and environmental sciences. The sub-panel will augment its own expertise by consulting with external specialist advisers, who will be appointed on the basis of appropriate expertise. The advisers' judgements will form part of the sub-panel's overall assessment of research outputs. In addition, the sub-panel may consult, via the RAE team, a further number of external specialist

advisers if the subject profile of an institutional submission requires such consultation, or the sub-panel may choose to refer elements of the submission to appropriate UOAs. The sub-panel expects that where a submission's main research emphasis lies elsewhere, it will be submitted to an alternative, more appropriate UOA. The sub-panel expects to refer work at its boundaries to those sub-panels covering Epidemiology and Public Health (UOA 6), Biological Sciences (UOA 14), Agriculture, Veterinary and Food Science (UOA 16), Chemistry (UOA 18), Physics (UOA 19), Mathematics (UOAs 20-23), Engineering (UOAs 24-29), Town and Country Planning (UOA 31), Geography and Environmental Studies (UOA 32), Archaeology (UOA 33), Law (UOA 38), Sociology (UOA 41) and others as appropriate. The sub-panel asks departments to inform it of other UOAs to which they have submitted. Paragraph 62 sets out how the sub-panel will deal with cross-referrals.

4. The sub-panel will request that other sub-panels assess referred work using the criteria and methodology of Sub-panel 17. The weightings of Sub-panel 17 will be applied to cross-referred assessments provided by other sub-panels.

5. Institutions should read carefully the sub-panel's description of the subjects within its remit. Institutions should not feel that they have to split a cohesive unit across UOAs, but are encouraged to indicate elements of a submission that should be referred to other UOAs.

6. External assessments of esteem and environment may also be obtained when it is judged that appropriate expertise is not on the sub-panel. External specialist advisers will be given explicit guidance on the assessment criteria and working methods of the sub-panel. Experts from the user community may be consulted on applied work. Final responsibility for the assessment of all components of a submission will lie with the sub-panel that originally received the submission.

### **Research staff**

7. The contribution of Category A staff will be assessed with regard to their research outputs, their esteem and their contribution to the research environment.

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8. The contribution of staff in Categories B and D to the research environment at the census date will be considered. However, such staff will not count towards the quality profiles for outputs and esteem. The date of leaving will be a consideration for assessing the influence of such staff. Institutions may wish to make a case for the ongoing impact of such staff on the research environment. Departments are asked to describe how such staff have been replaced.

9. The contribution of Category C staff will be assessed with respect to their esteem and contribution to the research environment and research outputs. Submissions should demonstrate that Category C staff are closely embedded in departments and have a close and long-standing connection to the Category A staff included in the submission. Evidence of such a long-standing connection should be provided in RA5c and might include, eg, joint research grants with established Category A staff, co-authorship of publications and co-supervision of research students. If the sub-panel is not convinced by the evidence provided about a Category C staff individual, it may take account of this in assessing that individual's contribution to the research of the department. Information in RA5c will not be confidential.

10. The sub-panel requests departments to bring to its attention, in RA5b, specific staff circumstances (eg, sick leave, maternity leave, career breaks/delays) which have had a significant impact on the research programme. These are to be treated confidentially. Where staff have been involved on long-term projects with limited publication opportunities, textual information should be provided in RA5b.

11. Early career researchers are individuals who entered the academic profession on employment terms that qualified them for submission to the RAE2008 as Category A staff on or after 1 August 2003. Departments submitting early career researchers as Category A staff will not be disadvantaged, and their presence should be highlighted. The sub-panel wishes institutions to indicate how they have encouraged the development of the potential of early career researchers and other new entrants; and to give any evidence of national and, if applicable,

international esteem, so that full account can be taken of their contribution to the research programme and long-term development of the department. The sub-panel will recognise the presence of early career researchers as an indication of vitality when considering the research environment, together with the support provided to staff that have experienced breaks in their careers during the assessment period.

12. The career stage of the individual and expected performance in relation to the appropriate peer group will be considered when evaluating research esteem.

### Research outputs

13. Research outputs will be weighted at 65% of the overall quality profile. The sub-panel will consider any form of output. Irrespective of the form and type of output, the sub-panel will seek, above all, to consider the intrinsic research quality of items submitted. The sub-panel will neither rank nor regard any particular form of output as inherently of greater or lesser quality than another. Outputs related to basic research and those relating to practical applications, including intellectual property such as patents, and work published in non-print media, will be equally acceptable. Although refereeing and editorial standards may be used to indicate high quality, the sub-panel will not use a ranked list of journals in its assessment process. The context of the output and its contribution to the research field, particularly the impact on the wider field of science, will be considered in relation to the significance of a particular output.

14. The judgement of research outputs will be against the absolute grading criteria. In the case of applied work, impacts on products, processes, management, user uptake and policy development will form part of the assessment.

15. In assessing work as being 4\* (ie, 'world-leading in terms of originality, significance and rigour'), the sub-panel will expect to see evidence of some of the following characteristics:

- agenda setting
- research that is leading or at the forefront of the research area

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- great novelty in developing new thinking, new techniques or novel results
  - major influence on a research theme or field
  - developing new paradigms or new concepts for research
  - major changes in policy or practice with respect to applied research.
16. In assessing research as being **3\*** the sub-panel will expect to see evidence of some of the following characteristics:
- makes important contributions to the field at an international level
  - contributes important knowledge, ideas and techniques which are likely to have a lasting impact, but are not developing new paradigms or leading to fundamental new concepts
  - for applied work, a contribution is judged to have led to significant change to policies or practices.
17. In assessing research as being **2\*** the sub-panel will expect to see evidence of some of the following characteristics:
- provides useful knowledge to the field, but lacks the potential for lasting impact
  - involves incremental advances which might include new knowledge or model calculations, using established techniques or approaches, which conform with existing ideas and paradigms
  - has influence outside the UK
  - applied work, which has influenced policy or practice.
18. In assessing research as being **1\*** the sub-panel will expect to see evidence of some of the following characteristics:
- useful but unlikely to have more than a minor impact in the field
  - influential at a national level
  - minor influence on policy or practice.
19. Research will be assessed as **Unclassified** if it is considered to fall below the quality levels described above or does not meet the definition of research used for the RAE.
20. Individuals are normally expected to submit the maximum of four research outputs. The sub-panel recognises that there may be valid reasons for individuals submitting fewer than the maximum number of outputs, and submissions must include explanations for this in RA5b. Paragraphs 55-57 below describe how the sub-panel will handle such cases.
21. The sub-panel recognises that much of the research within its remit is collaborative and naturally leads to multi-authored research publications. The list of authors may include co-authors from different UOAs within the same institution, or from different institutions, or from other UK or overseas institutions. In the assessment of outputs, author order will not be a consideration.
22. The sub-panel recognises the importance of multidisciplinary research. Comments are invited on the value added by the multidisciplinary aspects of such research outputs in the 'Other relevant details' field of RA2 (maximum length 50 words).
23. The sub-panel expects that each output will normally only be submitted in respect of one individual within a submission, unless two or more individuals have made clear and distinctive contributions to the output and justified this in the 'Other relevant details' field in RA2. Each output submitted will generally be counted only once in the calculation of the quality profile. Where a significant piece of work is classed as of exceptional scale and scope, the contribution to the quality profile will be scaled as appropriate.
24. The same output(s) may be cited in submissions to the UOA from different institutions, but joint submissions from two or more institutions will be treated in the same way as submissions from single institutions. Departments are encouraged to provide information in RA2 on the role of individuals and the department in multi-authored and multi-institutional outputs and joint submissions, where the authors are not wholly contained within the same submission. In such cases the contribution

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of the individual or the department should be significant. Institutions should describe briefly in RA5a the nature and extent of the collaborations leading to the joint submission.

25. The sub-panel will collectively review all research outputs cited in submissions. The sub-panel aims to assess in detail all outputs. Each output will be assessed in detail by at least one person, either a member of the sub-panel or a specialist external adviser. The sub-panel will allocate outputs for assessment using its professional judgement and knowledge. The sub-panel will expect to see evidence in the textual part of RA2 where practical applications are considered to be important.

26. The textual part of RA2 should not be used to offer opinions on the quality of outputs, and any such information will not be used by the sub-panel.

27. While the sub-panel does not expect to receive citation data, departments might wish to indicate details of the exceptional citation performance of an output in RA5a as evidence of esteem.

28. Outputs resulting from pedagogic research will be considered initially by the sub-panel and, if appropriate, referred to UOA 45 (Education) for advice. Final responsibility for the assessment of such research will lie with Sub-panel 17.

### Research environment

29. Research environment will be weighted at 20% of the overall quality profile.

### Research students and research studentships

30. The sub-panel will use data on research students and research studentships in judging the quality of the research environment component of the overall quality profile. The sub-panel will base its judgements on the following standard analyses:

- the number of research degrees completed and the number of research studentships registered by each year of the assessment period

- the average number of research students per staff FTE
- the average number of research masters awarded per staff FTE
- the number of postgraduate research assistants, as defined in RA1, per staff FTE.

The sub-panel wishes to receive non-standard analyses of doctoral degrees awarded per staff headcount. This will form part of the consideration of the research environment.

31. Sources of funding for research studentships will be regarded equally. Departments are asked to describe how research masters students contribute to the research environment.

### Research income

32. The sub-panel will use data on research income (as per the definition of research income in RAE 03/2005 'Guidance on submissions') as one criterion to judge the quality of the research environment.

33. The sub-panel will base its judgements on the following measures:

- the volume of research income, with due regard to the relative cost of undertaking research in a particular subject area
- the average level of research income per staff FTE
- sources of research income, including income in kind.

34. The sub-panel will take account of the origin, nature and balance of funding but will not apply a rigid scale of merit. Research income gained competitively or after a rigorous peer review process will carry greatest weight. In the case of applied work, research income may also be used as evidence of the potential practical importance of such work.

35. Departments may wish to use RA5a to provide additional information about the nature of the submitted research income.

### Research structure

36. Institutions should note that the sub-panel will be assessing the contribution of individual

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researchers under esteem, and departmental research attributes under environment. RA5a should be arranged to give the details of the following research environment issues:

- a. Mechanisms and practices for promoting research and sustaining and developing an active and vital research culture.
  - b. The nature and quality of the research infrastructure, including significant space, quality of buildings, equipment and facilities; library facilities, IT/computing support, including those for research students; and promotion of, attendance at, and participation in conferences.
  - c. Research groups or themes: membership and criteria for membership, rationale, aims, prime activities, how they operate (including in relation to the non-research activities of the unit), and their main achievements. Emphasis should be placed on specific achievements, which can be verified, including, eg, creation of new research themes, funding streams, research centres, policy initiatives and technology developments which have demonstrably enhanced research quality and/or have advanced economic and social development or new environmental regulation.
  - d. Where applicable, arrangements for supporting interdisciplinary or collaborative research at national and international level.
  - e. Where applicable, relationships with research users (including industry and commerce), and to the legislative requirements, policy initiatives and objectives of government.
  - f. Arrangements for developing and supporting staff in their research, including those new to research.
  - g. The organisation and training of research students.
  - h. The organisation and training of postdoctoral fellows and research assistants.
  - i. Interactions and collaborations between academic and postdoctoral staff and research students.
  - j. The nature of technical support for research.
  - k. The provision and policy for sabbatical leave.
  - l. Support for visitors and seminar programmes.
  - m. Institutional support, at central or faculty level, including financial support, facilities, studentships, academic posts.
  - n. Additional information on particular circumstances that are unique to the department.
37. The sub-panel will look for evidence of research vitality and a vibrant research culture when considering RA5a. Institutions are encouraged to draw the sub-panel's attention to the full range of research activities covered by research themes, as evidence of a well planned and cohesive research programme. However, there is no penalty for identifying researchers who work alone or in effective collaboration with colleagues in other institutions in the UK or overseas. There will be no advantage in artificially grouping staff in delineated research areas if there is little or no evidence of a common intellectual basis in that group. Size of submission is not an issue of relevance to the sub-panel.
38. Departments should inform the sub-panel of any other UOAs to which they have submitted.
39. The sub-panel wishes institutions to indicate how they have encouraged the development of the potential of early career researchers and other new entrants, so that full account can be taken of their contribution to the research programme and long-term development of the department. The sub-panel will use the presence of early career researchers as an indication of vitality.
40. Investment in the infrastructure of a department (including from initiatives such as the Science Research Investment Fund, SRIF), and its use to support a department's research strategy, will be assessed in the sub-panel's judgement of research environment.
41. As a UOA which covers a broad range of subjects both within and between earth systems and environmental sciences, the sub-panel is structured to optimise the assessment of multidisciplinary and

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interdisciplinary research. The sub-panel affirms that multidisciplinary and interdisciplinary submissions will be given the same weight as single-discipline submissions, and that subjects which, by nature, are not interdisciplinary or multidisciplinary will not be classed as intrinsically inferior. The sub-panel expects to use the expertise of other sub-panels and external specialist assessors to judge multidisciplinary and interdisciplinary research as appropriate.

42. The sub-panel will give full recognition to applied research which is of direct relevance to the needs of commerce, industry and public bodies (eg, government departments). While much of this work will eventually be published in academic journals, the sub-panel accepts that there may be a time delay, and a significant proportion of such work may initially be disseminated through other media (eg, patents and government reports). Research which is neither innovative nor original will not receive special consideration simply because it is relevant to some practical problem. The sub-panel will also recognise that there can be outstanding innovation and originality in solving practical problems. Departments are encouraged to provide information on the purpose and application of research in the 'Other relevant details' field in RA2.

### Staffing policy

43. The sub-panel will consider information on a department's arrangements for developing and supporting staff in their research, including how this fits with their non-research duties. It wishes to receive information on how staff new to research or at the early stages of a research career are supported and developed, and integrated into a wider research culture.

44. Information on how staff in Categories B and D have affected the strength, coherence and research culture of the department at the census date is also welcomed. The role of Category C staff should also be described (see paragraph 9 above). The sub-panel will be looking for clear evidence that Category C staff are an integral part of a department; this should be provided in RA5c. Such evidence could include affiliations given in publications, co-authorship of

publications, jointly held research grants and joint supervision of research students.

### Research strategy

45. The sub-panel will judge research strategy within the research environment component of the overall quality profile. The sub-panel encourages departments to provide a statement on its main research objectives and activities over the six years from the submission date, including any ongoing work that is not producing immediately visible outcomes. This strategy statement should include:

- a. Analysis of future drivers for research within the department (scientific, technological, policy, legislative, environmental, social).
- b. Analysis of departmental strengths and weaknesses.
- c. Identification of priority developmental areas for the department.
- d. A plan of action for developing research themes, including research topics, funding streams, facilities, staffing, administration and management.
- e. A plan for optimisation of the benefits of research findings, through dissemination and knowledge transfer.
- f. Contingency plans to address possible obstacles.
- g. Identified measures of success.

46. Departments are asked to provide information on the level of continuity in the research plans from those submitted in RAE2001, and how the aspirations of RAE2001 have been achieved, if appropriate. The sub-panel recognises that some units may have changed substantially since RAE2001 and therefore reference to RAE2001 may not always be appropriate. Departments should also provide a brief statement of self-assessment. Information provided should be robust and measurable, and may include:

- a. An estimate of the number of actions in RAE2001 plans which departments believe have been delivered.

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- b. A summary of the internal mechanisms by which departments review and update their research strategy.
- c. Factors which impacted on the plan.
- d. Any contingency actions taken where the RAE2001 plan could not be implemented.
- e. Reasons for significant divergence from the RAE2001 plan.

### Esteem indicators

47. Esteem will be weighted at 15% of the overall quality profile. Departments should list in RA5a indicators of peer esteem and national and international recognition. Esteem indicators should relate to the staff submitted and have been awarded or held within the assessment period. These indicators are required for all staff submitted, including Category C staff. The sub-panel will consider indicators of esteem appropriate to the career stage of the staff concerned. Departments should therefore include those esteem indicators most appropriate to the career stage of each member of staff.

48. Information on esteem measures is required for each member of staff, to allow judgements to be made based on the career stage of the individual. Information on esteem measures is restricted to a maximum of 100 words for each individual.

49. Measures of esteem may include both national and international activities, but the importance of international quality indicators is emphasised. Examples of evidence of esteem may include items from the list below. Items marked with an asterisk are especially relevant to early career researchers.

- a. Conference organisation and significant presentations:
  - organisation of major conferences
  - key-note speakers and plenary lectures at conferences
  - organisation of special symposia at conferences (especially where these are competitive)\*.
- b. Editorial activities:
  - journal and guest editorships
  - editorial board membership\*
  - significant editorial work, eg, major books or review volumes.
- c. Peer review and contributions to the scientific community:
  - contributions to the work of national and international committees and working groups
  - membership of national or international research committees such as the sub-panels or boards of Research Councils
  - service on peer review committees
  - leading role in scientific societies
  - hosting distinguished scientists or rotating offices for international programmes
  - journal peer review\*
  - peer review of research grant applications.
- d. Awards, prizes and honours:
  - fellowships awarded competitively (eg, Royal Society University Research Fellowship, Research Council, Marie Curie\*, or Leverhulme Trust fellowships)
  - election to fellowship or membership of prestigious learned societies and academies
  - conferment of medals and other honours
  - honorary professorships, honorary degrees, visiting professorships
  - best paper awards
  - awards specifically aimed at early career scientists\*.
- e. Service to government, industry and non-governmental bodies:
  - work on scientific advisory panels to industry or government or government agencies (including non-departmental public bodies)
  - contribution to boards for industry
  - joint or sponsored appointments or secondments with industry or commerce

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- exceptional knowledge transfer or spin-out company activities
- collaborative research with industry – please provide details of funding and the nature and timescale of the relationship
- work on advisory or trustee boards for relevant non-governmental organisations.

f. Others:

- exceptional citation rates
- exceptional or significant communication of science to the public
- any other measures of individual esteem not included in this list and deemed relevant.

50. Esteem measures that may apply to the department as a whole will be considered in the assessment of the research environment.

### Applied research and practice-based research

51. In the assessment of applied research, the sub-panel will request departments to provide an explanation in the 'Other relevant details' field in RA2 of significant use or application of the research submitted for assessment.

52. In the assessment of esteem and environment, sub-panels will consider the extent to which staff interact with bodies external to the higher education sector.

53. Research on the teaching of any of the disciplines covered by Main Panel E will be considered initially by the relevant sub-panel and then cross-referred to UOA 45 (Education) where necessary, with a request for a judgement to be returned to the relevant sub-panel. The final assessment will be made by the sub-panel which originally received the submission.

54. The sub-panel will augment its expertise by consulting with external specialist advisers where appropriate. For this UOA, this will be in the majority of areas. In all cases, the advisers' judgements will inform the sub-panel's overall assessment of research outputs.

### Individual staff circumstances

55. In assessing submissions, the sub-panel will take account of individual staff circumstances which have significantly affected their contribution to the submission. The sub-panel will normally expect the number of outputs listed for staff to be proportionate to the time they have had available for research. While the sub-panel will consider each case on its own terms, it will normally accept a reduction in the number of submitted outputs to take account of the circumstances described in paragraph 39 of the generic statement, and of the following discipline-specific circumstances:

- a. Difficulties in undertaking field work due to particular circumstances.
- b. Catastrophic loss of critical facilities or failure of scientific missions (eg, satellite launch failure).
- c. As described above, all specific circumstances will be considered on a case-by-case basis, but the sub-panel notes that given publication patterns in this discipline it is anticipated that the vast majority of early career staff will be able to submit four outputs for assessment.

56. The sub-panel will also be mindful of health and safety restrictions imposed on pregnant and breastfeeding women which may have prevented them from undertaking some types of research during the assessment period, and have therefore had a negative impact on their research activity.

57. The sub-panel will look for information on an individual's return to scientific momentum, and the support provided to them by their department to do so will be illustrative of the research environment.

### Working methods

58. The assessment will be one of peer review based on professional judgement.

59. At its first meeting in 2008, the sub-panel will divide submissions between its members and external specialist advisers, following consideration by the chair in consultation with

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sub-panel members of declared conflicts of interest and members'/advisers' fields of specific expertise.

60. Every output will be assessed by three sub-panel members and or external specialist advisers. External assessors will be used when there is no expertise or insufficient expertise on the sub-panel, or conflicts of interest exclude a sub-panel member who is an expert from making the assessment. One of the sub-panel experts or an external expert will be designated as the person most familiar with the subject matter and will assess the output in detail. The other experts will normally assess the output in less detail, with a minimum requirement of reading the abstract, introduction and conclusions, and examining enough of the illustrations and tables to make an assessment. In assigning an agreed score the sub-panel will give due consideration to the level of expertise of the assessors. If the expert assigned to read the output in detail is external, a sub-panel member will be assigned to summarise the findings of the assessments and propose a score. Where there are significant differences between the assessments of the sub-panel members or external experts, a fourth sub-panel member or external expert will be asked to make a further detailed assessment.

61. Applied research will be judged using the same criteria as basic or strategic research.

62. Requests for information from other sub-panels will be made at the first meeting in 2008. Other sub-panels asked to provide levels for outputs and/or esteem indicators must provide these in good time so that their levels can be included in the scoring process with enough time for Sub-panel 17 to seek clarification of detail from the other sub-panel(s). Other sub-panels will be asked to assess outputs using the same methodology, and in return Sub-panel 17 will assess their outputs in whatever way helps them to integrate the results into their quality profile.

63. Where four outputs have not been returned in respect of a submitted individual, the reasons, as given in RA5b for confidential matters or in the 'Other relevant details' field of RA2 in the cases of major pieces of work, will be discussed by

the sub-panel. Where the reasons are deemed satisfactory, the missing outputs will be disregarded. Where a significant piece of work is classed as being of exceptional scale and scope, it will be scaled as appropriate. If the reasons are not deemed to be satisfactory, or if no reason is provided, an Unclassified grade will be awarded for each missing output.

64. Research environment measures for a department will be initially considered by three members of the sub-panel and the chair (or deputy chair if appropriate). They will assess the overall research environment and then moderate it to take into account particular areas of strength or weakness identified, in line with the measures of environment stated in the sub-panel's criteria, in order to arrive at a quality profile. Joint submissions will be considered in their entirety, and institutions will need to state the basis for the joint submissions and the benefits that accrue.

65. The assessment of the research environment will be weighted at 20% of the overall quality profile. The panel will take into account the statistical information returned in RA3 and RA4 as well as information contained in RA5 relating to indicators of research environment. The general factors assessed will include:

- a. Research strategy.
- b. Research expenditure.
- c. Research students and studentships.
- d. The presence and contribution in the department of senior visitors, honorary staff, research fellows, facility users, and links with users of applied research.
- e. Physical infrastructure and investment (eg, from SRIF).
- f. Staffing policy, and support for early career staff, new entrants and staff with other mitigating factors, including the role of support staff.

66. The sub-panel will be neither mechanistic nor formulaic in regard to the way the environment is judged. Each of the six areas in paragraph 65 will be used to judge the vitality and health of the department.

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67. The assessment of esteem will be made in respect of the esteem indicators provided for each member of staff submitted for assessment, taking into account their career stage and specific individual circumstances. The esteem indicators listed for each individual will normally be assigned a quality level by those members of the sub-panel who have assessed their outputs. If the number of qualifying sub-panel members falls below three because external assessors have been used, additional sub-panel members will be assigned to the task.

68. The chair of the sub-panel will read all sections RA3, RA4 and RA5 of submissions (with the exception of those in which he has a conflict of interest, which will be read by the deputy chair). A member of the sub-panel will be nominated to act as chair in the event that both the chair and deputy chair have a conflict of interest. A minor interest by the chair will be treated in the same way as for any other sub-panel member (ie, they may be present but not contributing to the discussion or acting as chair).

69. The sub-panel will reach final quality levels and profiles through consensus or, where this is not possible, by majority vote. The sub-panel will recommend to the main panel a quality profile for each submission returned within the UOA which is consistent with its published criteria.

This statement should be read alongside the statement for Main Panel E and the generic statement.

### Absences of chair and declaration of interests

1. A deputy chair has been elected from the outset, to cover any planned or unforeseen absences of the chair. The boundaries of the deputy chair's role are to replace the sub-panel chair in the event of their absence from both the main panel and sub-panel, to take over the sub-panel chair's duties in the event of illness, and to replace them on the sub-panel where they have a conflict of interest. Where members, including the chair, declare a current or recent major interest in an institution, they will withdraw. The formal note of discussion provided by the secretary shall be the only part of that discussion to which members who have been asked to withdraw are party.

2. The sub-panel will declare minor interests to the sub-panel secretariat, in line with guidance provided in Annex 4, and the chair will determine appropriate methods for handling any conflicts of interest arising. Members will not necessarily withdraw but may not be asked to lead the discussion.

### UOA descriptor

3. The UOA includes all aspects of experimental and theoretical chemistry.

### UOA boundaries

4. The sub-panel expects to receive submissions from all areas of chemistry. In areas where the sub-panel thinks that it lacks relevant experience, eg, electro-chemistry, it will augment its own expertise by referring outputs to either specialist advisers or another appropriate sub-panel. The sub-panel will utilise external advisers of appropriate expertise who will provide advisory judgements on outputs, to form part of the sub-panel's overall assessment of research outputs. Where a submission is deemed to cross the boundaries between the UOA and others, selected outputs will be referred to specialist advisers or sent to an appropriate sub-panel. The sub-panel expects to refer work at its boundaries to those sub-panels covering Pharmacy (UOA 13), Biological Sciences (UOA 14), Agriculture,

Veterinary and Food Science (UOA 16), Earth Systems and Environmental Sciences (UOA 17), Physics (UOA 19), Applied Mathematics (UOA 21), Chemical Engineering (UOA 26), Metallurgy and Materials (UOA 29), Education (UOA 45) and others as appropriate. The sub-panel asks departments to inform them of other UOAs to which they have submitted.

5. Institutions should not feel that they have to split a cohesive unit across UOAs, but are encouraged to indicate elements of a submission that should be referred to other UOAs.

6. Final responsibility for the assessment of all components of a submission will lie with the sub-panel which originally received the submission.

### Research staff

7. Category C staff will be treated in the same way as Category A staff for the assessment of research outputs. Departments should provide clear evidence, in RA5c, of the status of and contribution to the research programme made by Category C staff. The evidence of such links includes:

- supervision of research students or contract research workers
- use of departmental facilities
- membership of or leadership of an active research group
- address of submitting department on published outputs.

8. Examples of Category C staff might include independently funded research fellows and staff within embedded research units.

9. The contribution of staff in Categories B and D to the research environment at the census date will be considered. However such staff will not count towards the quality profiles for outputs and esteem. When considering such staff, consideration will be taken of the date of leaving. Institutions may also wish to make a case for the ongoing impact of such staff on the environment of the department. The assessment of environment will also consider the way such staff are replaced.

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10. In RA5b the sub-panel requests departments to bring to its attention specific staff circumstances (eg, sick leave, maternity leave, career breaks/delays) which have had a significant impact on the research programme. These are to be treated confidentially.

11. The sub-panel wishes to encourage the submission of early career researchers. Early career researchers are individuals who entered the academic profession on employment terms that qualified them for submission to the RAE 2008 as Category A staff on or after 1 August 2003. Departments are encouraged to explain the context of such individuals in RA5, particularly the impact of their subject specialism on the period of time that it takes to establish a research profile.

12. When assessing the research environment the sub-panel will look for evidence of the appointment of early career staff and new entrants within a department's recruitment strategy in RA5. The sub-panel will recognise early career researchers as an indication of vitality when considering the research environment, together with the support provided to staff that have experienced breaks in their careers during the assessment period.

13. In assessing the esteem of early career researchers and new entrants, the sub-panel will take account of the career stage of the individual when agreeing the appropriate levels of esteem measures for each quality level. The context for the outputs of early career researchers, such as those completed while a postgraduate or a postdoctoral researcher, will be considered.

14. The career stage of all individuals in RA5 and expected performance in relation to the appropriate peer group will be judged as a measure of research esteem.

**Research outputs**

15. Research outputs will be weighted at 60% of the overall quality profile.

16. The sub-panel will neither rank nor regard any particular form of output as inherently of

greater or lesser quality than another. In addition to printed academic outputs, it will consider (but not be limited to) outputs in the following form:

- new materials, devices, images and products
- intellectual property, whether in patents or other forms
- work published in non-print media.

17. The context of the output and the contribution to the research field, particularly the impact on the wider field of science, will be considered in relation to the significance of a particular output. In assessing work as being 4\* (ie, 'world-leading in terms of originality, significance and rigour') the sub-panel will expect to see evidence of some of the following characteristics:

- agenda setting
- research that is leading or at the forefront of the research area
- great novelty in developing new thinking, new techniques or novel results
- major influence on a research theme or field
- developing new paradigms or new concepts for research
- major changes in policy or practice with respect to applied research
- impact on processes, production and management and user uptake.

18. In assessing research as being 3\* the sub-panel will expect to see evidence of some of the following characteristics:

- makes important contributions to the field at an international level
- contributes important knowledge, ideas and techniques which are likely to have a lasting impact, but are not developing new paradigms or leading to fundamental new concepts
- for applied work, a contribution is judged to have led to significant change to policies or practices.

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19. In assessing research as being **2\*** the sub-panel will expect to see evidence of some of the following characteristics:

- provides useful knowledge to the field, but lacks the potential for lasting impact
- involves incremental advances which might include new knowledge or model calculations, using established techniques or approaches, which conform with existing ideas and paradigms
- has influence and importance outside the UK
- for applied work, has influenced policy or practice.

20. In assessing research as being **1\*** the sub-panel will expect to see evidence of some of the following characteristics:

- useful but unlikely to have more than a minor impact in the field
- influential at a national level
- minor influence on policy or practice.

21. Research will be assessed as **Unclassified** if it is considered to fall below the quality levels described above or does not meet the definition of research used for the RAE.

22. Given that chemistry is a discipline characterised by a high publication rate, staff in Categories A and C are expected to submit the maximum of four research outputs. However, the sub-panel recognises that there may be valid reasons for individuals submitting fewer than the maximum number of outputs, and departments are required to provide explanation for this in RA5b.

23. The sub-panel aims to assess in detail all submitted outputs. Where those assigned to assess an output are unable to reach a consensus, the chair will assign a further panel member to read the output. The sub-panel will assign each output a quality level which will be carried forward to the departmental quality profile for outputs.

24. The sub-panel expects departments to make use of the 'Other relevant details' field in RA2 only in the exceptional circumstances indicated

below. Departments must not use the 'Other relevant details' field in RA2 to offer opinions on the quality of an output.

25. The sub-panel expects to receive different items of research output for each researcher submitted by a department, and will therefore not normally expect to see the same output appear more than once in a submission to this UOA from a department. However, there could be circumstances where two or more individuals have made clear and distinctive contributions to the output, eg, where a theorist and experimentalist combine to perform a coherent data collection, analysis and interpretation, or where synthesis, biology, spectroscopy or imaging are combined in a single output. In these circumstances – ie, where the same output appears more than once in the submission – the sub-panel will expect to see an explanation in the 'Other relevant details' field in RA2, including identification of distinctive contributions.

26. Citation rates and journal impact factors will not be used as measures of quality. However departments might wish to highlight in up to 50 words, in the 'Other relevant details' field in RA2, outputs with particularly high citation rates, as well as outputs describing highly novel research. The sub-panel would welcome comments describing the impact of the research on other fields, products, processes, production, management and user take-up in industry. For multi-authored papers, departments should use the 'Other relevant details' field in RA2 to identify the contribution of individuals or the contribution to multidisciplinary research. In the case of un-refereed outputs (which may include the outputs from applied research) it is essential that departments provide information in the RA2 'Other relevant details' field on the impact of the research, including generation of income if appropriate.

### Research environment

27. Research environment will be weighted at 20% of the overall quality profile.

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28. Departments should include in RA5 indicators of their research environment. This will include:

- research strategy
- research income
- research students and studentships
- staffing policy, and support for early career staff, new entrants and staff with other mitigating factors, including the role of support staff
- departmental esteem measures, eg, prizes awarded to the department as a whole, rather than to an individual, or the presence in the department of senior visitors, especially from overseas
- physical infrastructure.

29. The sub-panel will be neither mechanistic nor formulaic in regard to the way the environment is judged. Each of the six areas in paragraph 28 will be used to judge the vitality and health of the department, and an approximately equal weight will be given to each.

**Research students and research studentships**

30. The number of research studentships and the number of research students will be regarded as evidence when assessing the research environment. This will include consideration of:

- research masters degrees awarded per staff FTE
- doctoral degrees awarded per staff FTE
- studentships per staff FTE.

31. The sub-panel will not differentiate between sources of funding for research studentships. This information will be used to assess the health and vitality of the research environment.

**Research income**

32. Research income (as per the definition of research income in RAE 03/2005 'Guidance on submissions'), will be regarded as evidence of the research environment. The sub-panel will base its judgements on the following measures:

- income by source per staff FTE
- research assistants per staff FTE.

33. In its assessment of research environment and the sustainability of research activity, the sub-panel will consider the financial health of a department's total level of research income, taking into account all sources of income and the appropriate level of funding for subject disciplines offered by the department. Departments should comment on income in relation to research activity and subject coverage. The sub-panel will attach greater weight to external income awarded via a process of evaluation.

34. Allocation of central facilities and resources, both national and international, will be seen as important and will carry similar weight to grant income.

35. The sub-panel will assess how capital expenditure by a department supports its physical infrastructure. The sub-panel would therefore like to receive a separate statement of income from:

- the Joint Infrastructure Fund
- institutional infrastructure support, including the Science Research Investment Fund and similar sources.

**Research structure**

36. The sub-panel is aware that the concept of research groups varies between sub-disciplines and institutions. Departments are therefore asked to describe the organisational networks that support the research of the department, and how the department (or departments in the case of joint submissions) chooses to structure itself.

37. This should include:

- a. How the different streams of activity are organised, how they operate and their main achievements.
- b. Other UOAs to which related work has been submitted, and any difficulties of fit between departmental structure and the UOA framework.
- c. Mechanisms and practices for promoting research, and sustaining and developing an active and vital research culture.
- d. The nature and quality of the research infrastructure, including: significant

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- equipment; research facilities; space; quality of buildings; library facilities; IT/computing support (including those for research students); promotion of, attendance at, and participation in, conferences; and facilities for research studentships.
- e. Arrangements for supporting multidisciplinary, interdisciplinary or collaborative research.
  - f. Information on the relationship with research users, particularly industry, commerce or government; together with the contribution to industry and society of research undertaken, particularly any results or processes which have demonstrably advanced economic and social development.
  - g. Mechanisms and practices for promoting research and sustaining and developing an active and vital research culture.
  - h. Any other issues on which the department believes the sub-panel would find comment helpful.

38. There will be no advantage in artificially grouping staff in delineated research areas if there is little or no evidence of a common intellectual basis in that group.

39. The sub-panel affirms that multidisciplinary and interdisciplinary submissions will be given the same weight as single discipline submissions; subjects which, by nature, are multidisciplinary or interdisciplinary will not be classed as intrinsically inferior. The sub-panel expects to use the expertise of other sub-panels and external specialist assessors to judge multidisciplinary and interdisciplinary research as appropriate.

**Staffing policy**

40. The sub-panel will be looking at the overall staffing policy of the department, in particular the ongoing sustainability of research which will include a reference to the demographics of the department. Other factors will include:

- a. Arrangements for developing and supporting staff in their research, including how this support relates to their non-research duties.

- b. Arrangements for developing the research of colleagues new to research and for integrating them into a wider, supportive research culture.
- c. Details on how the departure of staff in Categories B and D has affected the strength, coherence and research culture of the department at the census date.

**Research strategy**

41. The sub-panel wishes to receive a brief description of the research strategy for the six years following the submission date. In considering the strategy, the breadth of the subjects offered by a department will not be taken into consideration. However, the department needs to indicate its overall philosophy and how this relates to its chosen subject mix and delivery of the research strategy. Other issues that could be covered include:

- a. A statement about the main objectives and activities in research over the six years from the submission date, including any ongoing research work that is not producing immediate visible outcomes.
- b. A self-assessment of how research plans described in RAE2001 have developed, and how they link with the strategy for the next six years.

**Esteem indicators**

42. Esteem indicators will be weighted at 20% of the overall quality profile.

43. Departments should list indicators of peer esteem and national and international recognition which relate to the staff submitted (Categories A and C) and which have been achieved during the assessment period. The sub-panel will take into consideration the career stage of the individual when agreeing the appropriate levels of esteem measures for each quality level, and information should be presented in such a way as to allow the sub-panel to undertake this assessment.

44. Esteem measures will include (but are not limited to and in no particular order):

- plenary lectures
- invited lectures

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- conference organisation
- college membership of the Engineering and Physical Sciences Research Council and other similar services for research funding providers
- named international lectures
- visiting appointments such as professorships
- election to fellowship of learned societies such as the Royal Society
- editorship of journals and membership of editorial boards
- recent large grants if not shown in RA4
- co-ordination of large EU grants
- prizes for research
- senior research fellowships
- industrial consultancy/spin-out activity
- joint appointments or secondments with industry; company directorships and appointments to science advisory boards
- positions of elected office in national and international associations and organisations
- expert witness in legal disputes.

45. The sub-panel will consider up to a maximum of four categories of esteem measures per member of staff. The panel is limiting the esteem measures on the grounds that it wishes to assess the breadth of esteem in the department as a whole and to ensure that appropriate measures of esteem indicators for early career staff are given adequate prominence. Measures of the same type may be aggregated, eg: Measure 1 – delivery of 10 plenary lectures; Measure 2 – membership of five editorial boards; Measure 3 – organisation of three national conferences; Measure 4 – named prize.

### Applied research and practice-based research

46. In the assessment of applied research, the main panel expects sub-panels to request departments to provide an explanation in the 'Other relevant details' field in RA2 of significant use or application of the research submitted for assessment.

47. In the assessment of esteem and environment, sub-panels will consider the extent to which staff interact with bodies external to the higher education sector.

48. Outputs that relate to research on the teaching of any of the disciplines covered by Main Panel E will be considered initially by the relevant sub-panel and then cross-referred to UOA 45 (Education) where necessary, with a request for advice to be returned to the relevant sub-panel. The final assessment will lie with the sub-panel which originally received the submission.

49. The sub-panel will augment its expertise by consulting with external specialist advisers where appropriate. This can include the referral of single research outputs, particularly in the case of interdisciplinary research work. In all cases where this is required, the advisers' judgements will inform the sub-panel's overall assessment of research outputs. External specialist advisers will be given explicit guidance on the assessment criteria and working methods of the sub-panel. Experts from the user community may be consulted in relation to applied work.

### Individual staff circumstances

50. In assessing submissions, the sub-panel will normally expect the number of outputs listed for staff to be proportionate to the time they have had available for research. While the sub-panel will consider each case on its own terms, it will normally accept a reduction in the number of submitted outputs to take account of the circumstances described in paragraph 39 of the generic statement. In the case of early career researchers, although the sub-panel will consider specific circumstances on a case-by-case basis, it notes that, given publication patterns in this discipline, it is anticipated that the vast majority of early career staff will be able to submit four outputs for assessment.

51. The sub-panel will also be mindful of health and safety restrictions imposed on pregnant and breastfeeding women which may have prevented them from undertaking some types of research during the assessment period, and have therefore had a negative impact on their research activity.

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52. The sub-panel will look for information on an individual's return to scientific momentum, and the support provided to them by their department will be illustrative of the research environment. Institutions may also include information on personal circumstances that may have affected the research esteem of individuals, such as circumstances limiting the ability to attend international conferences.

**Working methods**

53. Each output will be assigned to two members of the sub-panel, who will review the output and suggest a grading. Where there are significant differences of opinion on quality level, the output will be referred to a third member.

54. A sub-group of the sub-panel – to include the chair and two other members – will assign outputs based on area of expertise (taking into account both major and minor conflicts of interest).

55. For esteem and environment, each submission will be assigned to two members of the sub-panel who will take lead responsibility for an institution and read the RA3, RA4 and RA5 for the submission. The two assessors will independently produce a quality level for esteem, based on the indicators given for each member of staff, in order to take into account the career stage of individuals. They will also produce an overall profile for the environment, based on the environment indicators given for the department as a whole. Where there is agreement the profiles will be passed to the full sub-panel for ratification. Where there is disagreement the full sub-panel will discuss the matter and arrive at an agreed profile. It is expected that members will read every RA5 submitted and that the chair will read sections RA3, RA4 and RA5 of every submission in detail to ensure consistency of assessment.

56. Where submissions appear to cross UOA boundaries, the sub-group referred to in paragraph 54 above will initially review the submission, to identify that it does cross the UOA boundaries and will refer it to another UOA or specialist adviser as appropriate. Where outputs or

parts of a submission are referred to another panel, this will be for advice only and the final decision and weightings applied will remain with the Chemistry sub-panel.

57. All discussions of submissions will only take place at meetings of the sub-panel.

58. Provisional quality profiles will be presented to the sub-panel. It will reach a decision by consensus on the quality profile for the department to be sent for approval to the main panel. If a consensus cannot be attained, final quality profiles will be decided by a simple majority vote. The chair will have the casting vote.

59. Joint submissions will be assessed in the same way as submissions from a single institution.

**Additional information requested**

60. The sub-panel would wish for departments to explain the use made of support staff, both technical and those on teaching-only contracts, and how such support aids the research culture of the department. In seeking this information, the sub-panel wishes to recognise explicitly the role that such staff have in supporting the overall research strategy of the department. This will be considered in the assessment of environment.



This statement should be read alongside the statement for Main Panel E and the generic statement.

### Absences of chair and declaration of interests

1. A deputy chair has been elected from the outset, to cover any planned or unforeseen absences of the chair. Where members, including the chair, declare a current or recent major interest in an institution, they will withdraw from discussions. The deputy chair will assume the chair whenever the sub-panel chair is asked to withdraw, or is temporarily unavailable. The formal note of discussion provided by the secretary shall be the only part of that discussion which members who have been asked to withdraw will see.
2. The sub-panel will declare minor interests, to the sub-panel secretariat, in line with the guidance in Annex 4, and the chair will determine appropriate methods for handling any conflicts of interest arising. Members will not necessarily withdraw but may not be asked to lead the discussion.

### UOA descriptor

3. The UOA includes theoretical, computational and experimental studies of: quantum physics; atomic, molecular and optical physics; plasma physics; particle physics and nuclear physics; surface and interface physics; condensed matter and soft matter physics; biophysics; semiconductors, nanoscale physics, lasers, optoelectronics and photonics; magnetism, superconductivity and quantum fluids; fluid dynamics; statistical mechanics, chaotic and non-linear systems; astronomy and astrophysics, planetary and atmospheric physics; cosmology and relativity; medical physics; applied physics; chemical physics; instrumentation; pedagogic research in physics.

### UOA boundaries

4. The sub-panel is structured to judge coherently the quality of submissions under the umbrella of physics. In areas where the sub-panel lacks relevant experience, it may augment its own expertise by consulting external advice, eg, in the area of nanoscale physics. The sub-panel will appoint individuals of appropriate expertise who

will provide advisory judgements on selected work. The advisers' judgements will inform the sub-panel's overall assessment of research outputs. External assessments of esteem and environment may also be obtained when it is judged that appropriate expertise is not on the sub-panel.

5. The sub-panel may also refer outputs to and liaise with other sub-panels where work is at the boundaries of the UOA. The sub-panel asks departments to inform it of other UOAs to which they have submitted, and/or to which other UOAs they wish their work to be submitted for consideration. Where cross-referral has been requested by an institution – or if the sub-panel feels that a submission spans the boundary between two or more UOAs – it will cross-refer, via the RAE team, to other sub-panel(s) as appropriate.

6. Final responsibility for the assessment will lie with the sub-panel which originally received the submission.

### Research staff

7. The contributions of staff in Categories A and C will be treated identically for the purposes of producing a quality profile for research outputs of a group; however contributions of each group to the departmental quality profile will be weighted by the relevant number of FTEs in that group.

8. Departments should provide clear and substantial evidence, in RA5c, of the status of and contribution to the research programme made by Category C staff. Evidence of commitments might include a contractual agreement, supervision of students, address used on publications or significant length of the connection.

9. The contribution of staff in Categories B and D to the research environment at the census date will be considered in terms of whether the departure of such staff has been managed effectively and how they have been replaced. However such staff will not count towards the quality profiles for outputs and esteem. When considering such staff, consideration will be taken of the date of leaving. Institutions may also wish to make a case for the ongoing impact of such staff on the environment of the department.

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10. The sub-panel requests departments to bring to its attention, in section RA5b of the submission, specific staff circumstances (eg, sick leave, maternity leave, career breaks/delays, engagement on long-term projects) which have had a significant impact on the research programme. These are to be treated confidentially.

11. Early career researchers are individuals who entered the academic profession on employment terms that qualified them for submission to RAE2008 as Category A staff on or after 1 August 2003. Submissions containing early career researchers will not be disadvantaged, and their presence will be taken to indicate research vitality in a department. The sub-panel wishes institutions to indicate how they have encouraged the development of the potential of early career researchers and other new entrants; and to give any evidence of national and, if applicable, international esteem, so that full account can be taken of their contribution to the research programme and long-term development of the department.

**Research outputs**

12. Research outputs will be weighted at 60% of the overall quality profile.

13. Outputs relating to basic research and those relating to practical applications, including published patents, will be equally acceptable. Outputs should be self-contained and will be judged on the quality of the science demonstrated therein. The sub-panel will expect to see relevant evidence in cases where the practical applications are considered as important. The extent to which the research has wide implications over a broad field will, in appropriate cases, play a role in the judgements made by the sub-panel.

14. The sub-panel will base its deliberations on the quality of a maximum and normal expectation of four outputs.

15. The sub-panel will examine all outputs; and no less than 50% of the research outputs will be examined in detail. Sub-panel members will use their professional judgement and their initial examination of the outputs to identify which will

be examined in detail. Books, edited works and review articles will carry weight if they contain new and original material and relate to work to which the author has made major contributions. Publication in academic journals with rigorous editorial and refereeing standards may be taken as an indicator of quality. However, the guiding principle will be that the sub-panel will base its deliberations on the quality and significance of the scientific work in the outputs submitted, regardless of the medium of publication.

16. In assessing work as being 4\* (ie, 'world-leading in terms of originality, significance and rigour'), the sub-panel will expect to see evidence of some of the following characteristics:

- agenda setting
- research that is leading or at the forefront of the research area
- great novelty in developing new thinking, new techniques or novel results
- major influence on a research theme or field
- developing new paradigms or new concepts for research
- major changes in policy or practice with respect to applied research.

17. In assessing research as being 3\* the sub-panel will expect to see evidence of some of the following characteristics:

- makes important contributions to the field at an international level
- contributes important knowledge, ideas and techniques which are likely to have a lasting impact, but are not developing new paradigms or leading to fundamental new concepts
- for applied work, a contribution is judged to have led to significant change to policies or practices.

18. In assessing research as being 2\* the sub-panel will expect to see evidence of some of the following characteristics:

- provides useful knowledge to the field, but lacks the potential for lasting impact

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- involves incremental advances which might include new knowledge or model calculations, using established techniques or approaches, which conform with existing ideas and paradigms
  - has influence outside the UK
  - for applied work, has influenced policy or practice.
19. In assessing research as being **1\*** the sub-panel will expect to see evidence of some of the following characteristics:
- useful but unlikely to have more than a minor impact in the field
  - influential at a national level
  - minor influence on policy or practice.
20. Research will be assessed as **Unclassified** if it is considered to fall below the quality levels described above or does not meet the definition of research used for the RAE.
21. The outputs will be considered and a quality profile produced, taking into account the context of the set of outputs within the research group. All outputs must be assigned in RA2 to one of the research groups in RA5 (see paragraph 36).
22. Where fewer than four outputs are submitted for an individual, a reason(s) must be provided in RA5b. There are two broad types of valid reason for the submission of fewer than four outputs:
- a. Absence from research, reasons for which might include continuous periods of absence for maternity and other parental leave, illness, and secondment to non-research posts for a substantial proportion of time.
  - b. Engagement in a substantial research project where the research has yet to produce an output which can be submitted as part of the RAE.
23. The sub-panel recognises that much of the research within its remit is collaborative in nature and naturally leads to multi-authored research publications. Collaborative work is a natural consequence of cross-disciplinary activity or of very large scale experimental projects, and the sub-panel has no wish to discriminate against outputs resulting from such activity. In particular, the sub-panel recognises that many members of staff named in RA2 will naturally wish to submit multi-authored publications as evidence of research quality, and that the list of co-authors could include researchers from the same research group, from a different department within the same institution, from different institutions, and from overseas.
24. In addressing the issue of how to allocate credit for the contribution by a submitted member of staff to a research output produced and published in collaboration, the sub-panel offers the following guidelines:
- a. Where the number of authors is small (fewer than five), the sub-panel will normally assume that any individual citing the publication has made a significant contribution to the work. The overall quality of that output will be credited to the quality profile.
  - b. Where the number of authors is large (five or more), the sub-panel will expect to see evidence of the extent of an individual's contribution to the research output. The sub-panel recognises that there are different practices across different areas of the subject with respect to how author lists are presented, ranging from alphabetical-by-author to explicit identification of 'lead author(s)'. Therefore, where there is any ambiguity, the sub-panel will expect to see the nature and extent of an individual's contribution defined in the 'Other relevant details' field of RA2.
25. The sub-panel will not normally expect to see the same publication appear more than once in a submission to this UOA from a particular department. However, there could be circumstances where two or more individuals have made clear and distinctive contributions to the output, eg, where a theorist and experimentalist combine to perform a coherent data collection, analysis and interpretation. In these circumstances, ie, where the same publication appears more than once in the submission, the sub-panel will expect to see an explanation in the

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‘Other relevant details’ field in RA2, including identification of distinctive contributions.

26. Departments may make appropriate use of the ‘Other relevant details’ field in RA2, up to a maximum of 50 words. This might include:

- a. An explanation of the role of an individual member of staff within a collaboration.
- b. An explanation of the role of an individual member of staff within a co-cited output.
- c. Information on and explanation of the current or potential significant use or application of research submitted.

27. It should be noted that explanation of authorship protocol for the discipline is not necessary. Institutions should not use the ‘Other relevant details’ field of RA2 to offer opinions on the quality of the output.

28. Research on the teaching of any of the disciplines covered by the sub-panel will be considered initially by the sub-panel then cross-referred to UOA 45 (Education) where necessary.

29. The final recommendation to the main panel on the quality profile will remain with the sub-panel which originally received the submission.

### Research environment

30. The research environment will be weighted at 20% of the overall quality profile. Assessment will be based on the evidence provided, which will include:

- a. Research income, numbers of postdoctoral research assistants, and success in gaining time at national or international facilities as indicators of the quality of the research as seen by funding agencies, especially when the research support is dependent on rigorous peer review or a competitive process.
- b. The number of research students and research degrees awarded, as an indicator of the level and quality of research.
- c. Where work is relevant to industry, the level of industrial support and resources provided will be taken into account, in terms of the evidence relating to the resources and opportunities available to staff.

d. The presence in the department of senior visitors, especially from overseas.

e. Other statements in RA5 relating to the vitality of research and to prospects for development.

f. The sub-panel will consider evidence concerning the research environment for the submission as a whole, and will use this evidence to form a quality profile for the research environment.

### Research students and research studentships

31. The sub-panel will use the standard analyses provided by the RAE team on research students, research studentships and number of higher degrees awarded to judge the quality of the research environment.

32. All sources of funding for research studentships will be regarded equally.

### Research income

33. Research income (as per the definition of research income in RAE 03/2005 ‘Guidance on submissions’) gained after a competitive process or rigorous peer review will carry the greatest weight. Its absolute magnitude will be judged in relation to the needs of the areas of research concerned. Allocation of central facilities and resources, whether reported numerically or textually, and including satellites and observatories, both national and international – will be seen as important and will carry similar weight. Support through international agencies will carry weight in judgements of the environment. In the case of applied work, research income may be used as evidence of the potential practical importance of such work.

34. The sub-panel will assess how capital income by a department supports its physical infrastructure. The sub-panel would therefore like to receive a separate statement of income from:

- non-institutional infrastructure such as the Joint Infrastructure Fund
- institutional infrastructure support such as the Science Research Investment Fund and similar sources.

35. Support in kind can be brought to the attention of the sub-panel in RA5a.

### Research structure

36. The sub-panel will wish to be informed of the research groups within a submission. Provision of information on research groups in RA1, RA2 and RA5 is mandatory for UOA 19, and it is essential that the information provided in RA1, RA2 and RA5 reflects these groups and that clear cross-references are made. Research groups should relate to the staff listing in RA1.

Submissions should include, as appropriate, comments about the sizes of these groups, their primary activities and achievements, and the resources provided by the institution, including research infrastructure.

37. Attention should be drawn to important collaborative activity, at both the national and international level. Interdisciplinary research should be clearly identified in the submission, and the key features of the work and its internal support highlighted. The sub-panel affirms that multidisciplinary and interdisciplinary submissions will be given the same weight as single-discipline submissions, and subjects which, by nature, are interdisciplinary or multidisciplinary will not be classed as intrinsically inferior. The sub-panel expects to use the expertise of other sub-panels and external specialist assessors to judge multidisciplinary and interdisciplinary research as appropriate. Departments are asked to indicate to which other UOAs this or related work has been or should be submitted for consideration.

### Staffing policy

38. The sub-panel will wish to take into account those members of staff returned as research active, whose research contribution is not necessarily evident from the outputs. Likewise, attention should be drawn to early career members of staff, who have not yet had the opportunity to complete a substantial amount of work for publication. Relevant information about both categories of staff must be provided in RA5b.

39. The sub-panel will wish to consider information on arrangements for developing and supporting staff in their research, including how

this fits with their non-research duties. It will also wish to receive information on how staff new to research or at the early stages of research are supported and developed, and integrated into a wider research culture.

### Research strategy

40. The sub-panel will look for an organisational structure within the submission that promotes research of high quality and will lead to vigorous development in the future. The sub-panel will expect to see evidence of a strategy for maintaining the vitality and quality of the department over the six years from the submission date.

41. Departments are invited to comment on their strengths and weaknesses and to provide information about the main objectives in research over the next six years. If appropriate, the sub-panel will wish to be informed as to the extent that the plans submitted in RAE2001 have been achieved.

### Indicators of esteem

42. Research esteem will be weighted at 20% of the overall quality profile.

43. Departments should report indicators of peer esteem and national and international recognition which relate to the individual staff submitted. Esteem will be assessed in relation to the career stage of an individual. Indicators might include:

- a. Invited papers at major national and international conferences, as indicators of national and international recognition.
- b. Involvement of research-active staff in national and international planning and committee work relating to research, including editorial work and the organisation of the scientific programme of major conferences.
- c. Any prizes and awards gained by the research-active staff, as indicators of national and international recognition.
- d. Any fellowships that have been competitively awarded (eg, by the Engineering and Physical Sciences Research Council, Particle Physics and Astronomy Research Council, Royal Society) and other fellowships.

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- e. Where work is relevant to industry, the level of industrial support and resources provided will be taken into account particularly where it is competitively sought.
  - f. The involvement of research-active staff in scientific advisory boards of companies, government departments and public bodies.
  - g. The presence in the research group of senior visitors, especially from overseas, as an indicator of international recognition.
44. The sub-panel will consider evidence of esteem by research group and will use this evidence to form a quality profile for esteem. Information should be made available in such a way to allow this.

### **Applied research and practice-based research**

45. In the assessment of applied research outputs, the sub-panel will ask departments to provide an explanation in the 'Other relevant details' field in RA2 of significant use or application of the research submitted for assessment.
46. In the assessment of esteem and environment, sub-panels will consider the extent to which staff interact with bodies external to the HE sector.
47. Research on the teaching of any of the disciplines covered by Main Panel E will be considered initially by the relevant sub-panel and then cross-referred to UOA 45 (Education) where necessary, with a request for a judgement to be returned to the relevant sub-panel. The final assessment will lie with the sub-panel which originally received the submission.
48. The sub-panel will augment its expertise by consulting with external specialist advisers where appropriate. In all cases, such advice will inform the sub-panel's overall assessment of research outputs.

### **Individual staff circumstances**

49. In assessing submissions, the sub-panel will normally expect the number of outputs listed for staff to be proportionate to the time they have had available for research. While the sub-panel

will consider each case on its own terms, it will normally accept a reduction in the number of submitted outputs to take account of the circumstances described in paragraph 39 of the generic statement. In the case of early career researchers, although the sub-panel will consider specific circumstances on a case-by-case basis, it notes that, given, publication patterns in this discipline it is anticipated that the vast majority of early career staff will be able to submit four outputs for assessment.

50. The sub-panel will also be mindful of health and safety restrictions imposed on pregnant and breastfeeding women which may have prevented them from undertaking some types of research during the assessment period, and have therefore had a negative impact on their research activity. Such impacts may include issues relating to esteem.

51. The sub-panel will look for information on an individual's return to scientific momentum, and the support provided to them by their department will be illustrative of the research environment. Institutions may also include information on personal circumstances that may have affected the research esteem of individuals, such as circumstances limiting the ability to attend international conferences.

### **Working methods**

52. The assessment will be one of peer review based on professional judgement.
53. The assessment of the quality of research will be based on the sub-panel's judgement, knowledge and expertise in the subject area as informed by the submission. Where the sub-panel identifies areas in which it does not have the necessary expertise to assess an output, external advice will be sought. Alternatively, when appropriate, the submission (or parts thereof) may be cross-referred to other sub-panels for comment. All such contact will be via the sub-panel secretary and the RAE team, and not by sub-panel members directly, in the initial stages. Sub-panel members may contact the specialist advisers once the outputs have been considered, to discuss any issues that may have arisen.

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54. All members of the sub-panel will read RA0, RA1, RA3, RA4 and RA5 of all submissions.
55. When considering the research outputs, sub-panel members will use their professional judgement and their preliminary reading of the outputs to identify which outputs will be examined in detail.
56. For each research group within a submission, two or more nominated members of the sub-panel (taking into account subject specialisms, conflicts of interest and requirements for cross-referral) will be responsible for the examination of outputs. The cited outputs will be considered and a quality profile produced, taking into account the context of each output within the whole set of outputs for the research group.
57. The members of the sub-panel responsible for the examination of the outputs will present the profile for the research group to the sub-panel.
58. Judgements made by the sub-panel will not be affected by the size of a research group or submission. It is recognised that groups of all sizes can produce work of the highest quality.
59. Where four outputs have not been submitted for an individual, the reasons for this, as given in RA5b, will be discussed by the sub-panel. If the reasons are not deemed satisfactory, an Unclassified grade will be awarded for the missing output(s). Where the reasons are deemed satisfactory, the missing outputs will not be further considered.
60. The profile for esteem for a research group will be drawn up by the two sub-panel members who have been assigned that research group's outputs, and will be based on the evidence presented.
61. Two sub-panel members will be assigned to a submission in order to assess the research environment and produce a profile for the submission as a whole, based on the evidence presented. The overall environment quality for a department may be moderated to take into account particular areas of strength or weakness that might be identified.
62. The final profile for the submission will be weighted according to the FTE number of research-active staff in each of the research groups. Account will be taken of activities which span two or more research groups where this leads to enhanced quality.
63. In cases where consensus is not attained, final quality levels will be decided by open voting among sub-panel members. The chair (or deputy chair as appropriate) will have the casting vote should this be required. The sub-panel will recommend to the main panel a quality profile for each submission returned within the UOA which is consistent with its published criteria.
64. Joint submissions (from more than one institution) will be assessed in the same way as submissions from a single institution.
65. Weight will be attached to other information available to the sub-panel, as follows:
- a. Factual information provided by the Research Councils' observers.
  - b. Any external advice received in cases where members of the sub-panel feel that this may assist them to form a reliable opinion.



## Annex 1

### Quality profiles and definitions of quality levels

Table 1 **Sample quality profile\***

Unit of assessment A	FTE Category A staff submitted for assessment	Percentage of research activity in the submission judged to meet the standard for:				
		4*	3*	2*	1*	Unclassified
University X	50	15	25	40	15	5
University Y	20	0	5	40	45	10

\* The figures are for fictional universities. They do not indicate expected proportions.

Table 2 **Definitions of quality levels**

4*	Quality that is world-leading in terms of originality, significance and rigour.
3*	Quality that is internationally excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence.
2*	Quality that is recognised internationally in terms of originality, significance and rigour.
1*	Quality that is recognised nationally in terms of originality, significance and rigour.
Unclassified	Quality that falls below the standard of nationally recognised work. Or work which does not meet the published definition of research for the purposes of this assessment.

1. Sub-panels will use their professional judgement to form a view about the quality profile of the research activity described in each submission, taking into account all the evidence presented. Their recommendations will be endorsed by the main panel in consultation with the sub-panel.

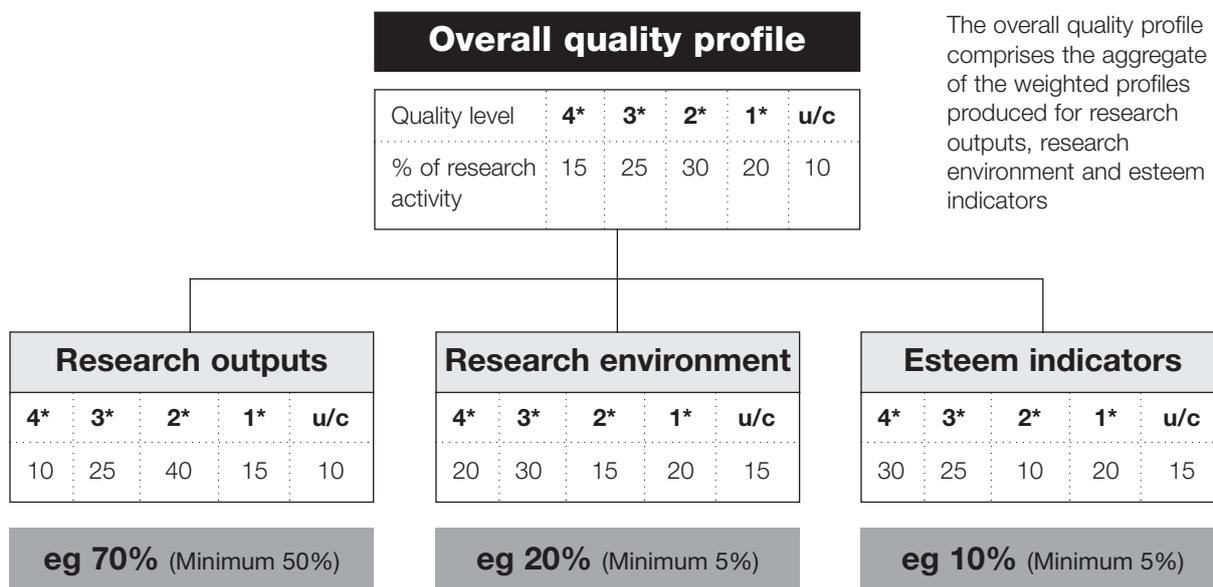
2. ‘World-leading’ quality denotes an absolute standard of quality in each unit of assessment.

3. ‘World leading’, ‘internationally’ and ‘nationally’ in this context refer to quality standards. They do not refer to the nature or

geographical scope of particular subjects, nor to the locus of research nor its place of dissemination, for example, in the case of ‘nationally’, to work that is disseminated in the United Kingdom of Great Britain and Northern Ireland.

4. The profile for a submission that contains no research which meets the 1\* threshold will be 100% Unclassified. A submission that contains no research (that is, no work that meets the definition of research for the RAE) will not be awarded a quality profile.

Figure 1 **Building a quality profile**



The percentage weightings for the three elements are illustrative. Panels should allocate these weightings. The minimum weighting for the research outputs profile is 50%. In this example the overall quality profile shows 15% of research activity is at 4\* level. This is made up of 70% x 10 (research outputs), 20% x 20 (research environment) and 10% x 30 (esteem indicators), rounded as described in paragraphs 12-15 below.

## Building a quality profile

5. Panels are required to consider all the components of the submission when reaching an overall quality profile (see Figure 1). The components equate to the different data collected in the RAE, namely submitted staff information (RA1), research outputs (RA2), research student data (RA3), research income (RA4), and the supporting statement on research environment and esteem indicators (RA5a).

6. These different components will be assessed under three over-arching elements: research outputs, research environment, and esteem indicators. Research outputs (RA2) will always be assessed as one of these three elements.

7. Main panels have decided whether the components of submissions other than research outputs (RA3, 4 and 5) will be assessed under the 'Research environment' or 'Esteem indicators' element. For example, a panel may consider that research income contributes to the research environment, or that it is a measure of esteem in its subject area. Similarly research student numbers, research student completions and

research studentships may either be part of the research environment or an indicator of esteem. Main panels explain in their statements of criteria and working methods their reasoning for assigning components of the submission to a particular element.

8. Main panels have allocated a percentage weighting to each of three elements – research outputs, research environment and esteem indicators – which indicates the extent to which the different elements will contribute to the overall quality profile of a submission. Given the primacy of expert review in the process, the weighting allocated to research outputs must be at least 50% of the overall quality profile: some main panels have decided that research outputs should be weighted more highly. Main panels had to allocate a significant weighting to each of the other aspects (environment and esteem) as they saw fit, but since the quality profile will be defined in multiples of 5%, the minimum weighting in either case will be 5%. Main panels have defined their reasoning in their criteria statements.

9. Sub-panels will assess research outputs and develop a quality profile for this element. Sub-panels will also assess the evidence within the components of the submission assigned to the research environment and esteem indicators elements, and draw up a quality profile for each.

10. Sub-panels will sum the three weighted quality profiles to develop an overall quality profile for the submission. They will use the rounding methodology described in paragraphs 12-15 of this annex to round the overall quality profile. Overall quality profiles will be published in steps of 5%.

11. Sub-panels will finally confirm that, in their expert judgement, the overall profile is a fair reflection of the research activity in that submission, and that their assessment has taken account of all the different components of the submission.

### Rounding

12. All sub-panels will adopt a cumulative rounding methodology to ensure that the overall quality profile for any submission will always round to 100%, and to avoid the unfair consequences that simple rounding can produce. They will first sum the weighted quality profiles for outputs, environment, and esteem and then adopt a cumulative rounding methodology.

#### Worked example

13. Using the example in Figure 1, first calculate the initial overall profile, that is, the sum of the weighted profiles for outputs, environment and esteem.

	4*	3*	2*	1*	u/c
Outputs	10	25	40	15	10
Environment	20	30	15	20	15
Esteem	30	25	10	20	15
Weighted					
70%	7	17.5	28	10.5	7
20%	4	6	3	4	3
10%	3	2.5	1	2	1.5
Initial profile	14	26	32	16.5	11.5

14. Cumulative rounding works in three stages:

a. The initial profile is:

4*	3*	2*	1*	u/c
14	26	32	16.5	11.5

b. Stage 1: Calculate the cumulative totals (for example the cumulative total at 3\* or better is 26+14=40).

4*	3* or better	2* or better	1* or better	u/c or better
14	40	72	88.5	100

c. Stage 2: Round these to the nearest 5 %, (rounding up if the percentage ends in exactly 2.5 or 7.5).

4*	3* or better	2* or better	1* or better	u/c or better
15	40	70	90	100

d. Stage 3: Find the differences between successive cells to give the rounded profile. So, for example, the percentage allocated to 2\* is the difference between the cumulative total at 2\* or better, minus the cumulative total at 3\* or better (70-40 =30).

4*	3*	2*	1*	u/c
15	25	30	20	10

15. Cumulating totals the other way (rounding down if the percentage ends in exactly 2.5 or 7.5) gives exactly the same answer.

## Annex 2

### Units of assessment and main panels

Main panel	UOA	UOA name
A	1	Cardiovascular Medicine
	2	Cancer Studies
	3	Infection and Immunology
	4	Other Hospital Based Clinical Subjects
	5	Other Laboratory Based Clinical Subjects
B	6	Epidemiology and Public Health
	7	Health Services Research
	8	Primary Care and Other Community Based Clinical Subjects
	9	Psychiatry, Neuroscience and Clinical Psychology
C	10	Dentistry
	11	Nursing and Midwifery
	12	Allied Health Professions and Studies
	13	Pharmacy
D	14	Biological Sciences
	15	Pre-clinical and Human Biological Sciences
	16	Agriculture, Veterinary and Food Science
E	17	Earth Systems and Environmental Sciences
	18	Chemistry
	19	Physics
F	20	Pure Mathematics
	21	Applied Mathematics
	22	Statistics and Operational Research
	23	Computer Science and Informatics
G	24	Electrical and Electronic Engineering
	25	General Engineering and Mineral & Mining Engineering
	26	Chemical Engineering
	27	Civil Engineering
	28	Mechanical, Aeronautical and Manufacturing Engineering
	29	Metallurgy and Materials
H	30	Architecture and the Built Environment
	31	Town and Country Planning
	32	Geography and Environmental Studies
	33	Archaeology

<b>Main panel</b>	<b>UOA</b>	<b>UOA name</b>
I	34	Economics and Econometrics
	35	Accounting and Finance
	36	Business and Management Studies
	37	Library and Information Management
J	38	Law
	39	Politics and International Studies
	40	Social Work and Social Policy & Administration
	41	Sociology
	42	Anthropology
	43	Development Studies
K	44	Psychology
	45	Education
	46	Sports-Related Studies
L	47	American Studies and Anglophone Area Studies
	48	Middle Eastern and African Studies
	49	Asian Studies
	50	European Studies
M	51	Russian, Slavonic and East European Languages
	52	French
	53	German, Dutch and Scandinavian Languages
	54	Italian
	55	Iberian and Latin American Languages
	56	Celtic Studies
	57	English Language and Literature
	58	Linguistics
N	59	Classics, Ancient History, Byzantine and Modern Greek Studies
	60	Philosophy
	61	Theology, Divinity and Religious Studies
	62	History
O	63	Art and Design
	64	History of Art, Architecture and Design
	65	Drama, Dance and Performing Arts
	66	Communication, Cultural and Media Studies
	67	Music

## Annex 3

### Definition of research for the RAE

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(Changes in phrasing from the definition used for the 2001 RAE are in **bold**.)

'Research' for the purpose of the RAE is to be understood as original investigation undertaken in order to gain knowledge and understanding. It includes work of direct relevance to the needs of commerce, industry, **and** to the public and voluntary sectors; scholarship\*; the invention and generation of ideas, images, performances, artefacts including design, where these lead to new or substantially improved insights; and the use of existing knowledge in experimental development to produce new or substantially improved materials, devices, products and processes, including design and construction. It excludes routine testing and **routine** analysis of materials, components and processes **such as** for the maintenance of national standards, as distinct from the development of new analytical techniques. It also excludes the development of teaching materials that do not embody original research.

\* Scholarship for the RAE is defined as the creation, development and maintenance of the intellectual infrastructure of subjects and disciplines, in forms such as dictionaries, scholarly editions, catalogues and contributions to major research databases.

## Annex 4

### Declarations of interest

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#### Major interests

All panel chairs, members, secretaries, observers and specialist advisers are bound by the following arrangements for avoiding conflicts of interest.

1. All main panel chairs and members, sub-panel chairs and members, panel secretaries and assistant secretaries, observers and specialist advisers (hereafter collectively called panel members) are asked to make a declaration of their interests. For the purpose of the RAE, interests are defined as:
  - a. The institution(s) at which the individual is employed.
  - b. Any institution at which the individual has been employed since January 2001.
  - c. Any institution(s) at which the individual has been engaged in substantial teaching or research since the start of the assessment period (1 January 2001); this might include institutions at which the individual has the status of visiting lecturer/fellow/professor or similar.
  - d. Any institution(s) at which the individual's partner and/or immediate family member is employed.

#### Panel procedures

2. A complete list of the declared interests of panel members and others involved in the assessment will be prepared by the RAE team and made available, in confidence, to panels when they start their work.
3. Individuals will be asked to update the RAE team regularly on any additional interests. Complete lists of declared interests will be updated and circulated accordingly on an *ad hoc* basis.
4. As a matter of principle, individuals will withdraw from panel meetings when submissions are discussed from the HEIs in which they declare to have an interest. Each main and sub-panel will publish in its criteria statement its protocol for dealing with declared interests, in line with this principle.

#### Requests for information

5. Panel members are likely to receive numerous invitations to discuss issues concerned with RAE 2008. Although the RAE team seeks improved clarity and transparency during this exercise through the dissemination of information, we do not wish panel members to compromise their position by entering into discussions which could be perceived to give a particular individual or institution an unfair advantage.
6. It is therefore strongly recommended that panel members should not discuss issues concerning individual departmental or institutional submissions. However, they may accept invitations to talk at meetings where a number of different institutions are represented, for example those arranged by a professional body or subject association.
7. If any member has concerns over a potential conflict of interests or the propriety of a proposed action s/he should discuss it with the RAE manager.
8. Panel members are not expected to suspend normal relations with their colleagues and peers during the exercise. They should not feel in any way obliged, for example, to withdraw from external examining, or participation in appointment committees. They are, however, asked to exercise caution in dealings with individual departments, or with subject associations or similar bodies, where there is an actual or clearly inferrable connection with their panel membership.

#### Minor interests

9. The RAE team has also invited main and sub-panels to consider operating a policy whereby panel members declare minor interests on an *ad hoc* basis, so that they can be minuted in panel meetings and handled on a case by case basis. The following were offered as examples of minor interests and possible methods of dealing with them. They are illustrative and do not constitute an exhaustive or prescriptive list:
  - a. Panel member supervises or co-supervises one or more doctoral students from a submitting

- 
- institution. Panel member declares this for the panel to note.
- b. Panel member supervised a doctoral student who went on to become a research active staff member within a submission made to the panel. Panel member declares this and does not take lead/sole responsibility for assessing the published output linked to that individual.
  - c. Panel member was supervised as a doctoral student by a research active staff member within a submission made to the panel. Panel member declares this and does not take lead/sole responsibility for assessing the published output linked to that individual.
  - d. Panel member is co-investigator or co-holder of a grant with the submitting institution. Panel member declares this and does not take lead/sole responsibility for assessing the published output linked to that individual.
  - e. Panel member is on the editorial board of a journal series published by a submitting department or unit, or has co-organised a conference or conference series with a submitting department. Panel member declares this and does not take lead responsibility for assessing the research environment and esteem indicators element of that submission.
  - f. Panel member has acted during the assessment period as a member of an appointment or promotions committee for a submitting department or unit, or has provided references for staff members returned in the submission. Panel member declares this for the panel to note.
  - g. Panel member acts as an external examiner for research degrees for a submitting department or unit. Panel member declares this and does not take lead/sole responsibility for assessing the research environment and esteem indicators element of that submission
  - h. Panel member studied at a submitting department or unit before the assessment period. Panel member declares this and does not take lead/sole responsibility for assessing the research environment and esteem indicators element of that submission.
  - i. A member of the panel member's wider family studies or works at a submitting department or unit. Panel member declares this for the panel to note.
10. Panels might wish to invite a panel member who declares a number of minor interests in one institution to treat that institution as a major interest.

## Annex 5

### Confidentiality arrangements

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All panel chairs, members, secretaries, observers and specialist advisers are bound by the confidentiality arrangements described in the following letter.

#### **CONFIDENTIAL**

Dear

#### **Research Assessment Exercise 2008: Confidentiality arrangements**

##### *Purpose*

1. This letter sets out arrangements for ensuring that all information contained in RAE submissions made by institutions for the 2008 RAE is maintained and treated confidentially by panels<sup>1</sup>. As for the 2001 RAE, apart from personal data and details of confidential outputs, information from submissions will be published on the internet following completion of the assessment: we expect to publish this early in 2009. The arrangements described below provide for maintaining the confidentiality of all submission information unless or until such time as it becomes freely available in the public domain.
2. The letter also deals specifically with the treatment by panels of any confidential research outputs that may be cited in submissions. Research outputs in the 2008 RAE are defined as publicly available, assessable outputs of research in whatever form. However, institutions may submit for assessment confidential outputs provided they mark them as 'confidential' in submissions and make them available to panels.
3. The letter also describes arrangements for ensuring the confidentiality of panels' discussions about submissions, or other information deduced from or generated as a result of submissions.
4. We have two objectives in placing confidentiality obligations on panel members. Firstly, subject only to any legal obligations on HEFCE to disclose further, we wish to ensure that the starred quality profile awarded to each submission and the brief feedback given in confidence to heads of institutions by the panel via the RAE team stand as the only public

comment from panels and their constituent members on any individual submission. Secondly, we aim to discourage parties who are not involved in the assessment process from approaching or placing pressure on panel members to disclose information about the panel's discussion of particular submissions. In other words, maintenance of confidentiality is essential if panel members are not to be inhibited from expressing their opinions freely in panel discussions, and therefore essential to the effective operation of the RAE as a peer review. In legal terms, a breach of confidentiality by a panel member may, in certain circumstances, constitute a breach of data protection legislation and/or a breach of a common law duty of confidentiality, may give rise to financial losses, or may infringe or impact upon intellectual property rights in research outputs.

5. The obligations set out below will subsist indefinitely.

#### **Obligations on panel members**

##### *Information contained in RAE submissions*

6. The higher education funding bodies, through the RAE team, collect a range of information from institutions in RAE submissions for the purpose of assessing the quality of research. In recognition of this purpose, you shall use any information which you receive in RAE submissions from institutions only for the purposes of carrying out your functions as a panel member.
7. You shall not make copies of such information except as is necessary to carry out your function as a panel member. You shall destroy, or return to the RAE manager, originals and any copies you may make of such information, as soon as they are no longer needed for that function or on the request of the RAE manager, whichever may be sooner. This provision applies equally to paper copies or those stored in electronic or other non-paper formats.
8. You shall not disclose the information received to any other person except your fellow panel members and panel observers and secretaries. You

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<sup>1</sup> In this context, 'panels' refers both to main and sub-panels. The same arrangements for ensuring confidentiality will apply, so far as they are relevant, to chairs, members, observers and secretaries of main and sub-panels and to specialist advisers.

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shall take all reasonable steps to ensure that other people cannot have access to the information, whether held in paper or electronic copy. In particular, it is important to remember that computer systems and specifically e-mail are not necessarily secure, and you agree to exercise appropriate caution when using them. Full guidance on the storage and transmission of RAE information will be included in the guidance to panels which will be provided to panel members and made publicly available in January 2005.

### ***Confidential research outputs***

9. Confidential research outputs will be indicated as such in submissions and will clearly be marked 'confidential'. You shall treat as confidential all such information, including the research outputs themselves and details of their sponsors or commissioning organisations. Even if you personally consider that the designation 'confidential' may be wrong, you agree to accept any designation of confidentiality which an institution has placed upon part or all of its submission. If you feel in a particular case that this inhibits you from carrying out your function as a panel member, you should raise the issue with the RAE manager who will be able to provide or seek advice.

10. An institution's submission may contain material which is patented or patentable, which is subject to other intellectual property rights, which is commercially sensitive, or which the interests of the institution and/or its researchers require to be kept confidential or given a restricted circulation. Institutions make submissions to the RAE on the understanding that their position in these regards will not be prejudiced by the fact of submission. You shall respect and honour that understanding and act accordingly. You are in particular reminded of the danger of 'prior disclosure' in the case of potentially patentable material, and the paramount need therefore to respect the confidentiality of such material.

### ***Discussion about submissions and information deduced from submissions***

11. You agree that you shall restrict your discussion of submissions and of research groups

described within submissions to panel meetings and to related dialogue between yourself, the RAE team, panel secretary and assistant secretary and members of the main and sub-panels with which you work. You shall not discuss with anyone who is not involved in the assessment process, as described above, either the submission or the assessment of an identifiable institution or group of institutions whose individual members could be identified, still less the work of individual researchers named in submissions, even if ostensibly anonymised. You may, of course, comment on the process and conduct of the 2008 RAE in general terms. If you are at all unsure as to what is covered by 'in general terms' you should seek advice from the RAE manager.

12. Nothing in this agreement prevents you from disclosing information after it becomes freely available in the public domain (without the breach of any obligation of confidentiality), or which you are required by law to disclose, or which was already known to you and not subject to confidentiality obligations before being disclosed to you in the context of the RAE. It would be prudent, however, to contact the RAE manager in advance to discuss any possible disclosure. Some information provided to or generated by RAE panels may be disclosable under the Freedom of Information Act 2000. However, if you receive any request for information which falls or may fall under that Act you must pass it to the RAE manager for consideration and action, and you should not respond to such requests yourself. If you are in any doubt with regard to any issue of confidentiality, either in general terms or in relation to a particular piece of information, you should seek advice from the RAE manager or, following completion of the RAE, the Director (Research and Knowledge Transfer) at HEFCE.

13. Acceptance of these confidentiality obligations is a condition of your appointment as a panel member. The four higher education funding bodies reserve the right to amend the membership of RAE panels in the event of any breach of the confidentiality obligations on panel chairs and members.

## Annex 6

### Word limits for RA5a, RA5b and RA5c and RA2 'Other relevant details' field

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#### RA5a

The maximum word count for the textual commentary section (RA5a) will vary based on the number of Category A FTE staff in the submission as follows:

FTE Category A staff	Word limit
1-5	3,600
6-10	4,200
11-15	4,800
16-20	5,400
21-30	6,600
31-40	7,800
41-50	9,000
51-60	9,800
61-75	11,000
76-90	12,000
Over 90	12,750

Note that these word counts equate to at least the page limits per FTE used in the 2001 RAE for RA5 and RA6 combined.

#### RA5b and RA5c

For all UOAs, RA5b (individual staff circumstances) and RA5c (information concerning Category C staff) will be a maximum of 300 words per researcher.

Institutions should refer to the generic statement and to each sub-panel's statement of criteria and working methods for further advice about the information to be returned in each case.

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## RA2 'Other relevant details' field

Each sub-panel has set a maximum word limit for the 'Other relevant details' field in RA2. Please refer to the appropriate sub-panel statement for details of the information required in this field.

Sub-panel	UOA	Word limit
1	Cardiovascular Medicine	50
2	Cancer Studies	50
3	Infection and Immunology	50
4	Other Hospital Based Clinical Subjects	50
5	Other Laboratory Based Clinical Subjects	50
6	Epidemiology and Public Health	50
7	Health Services Research	50
8	Primary Care and Other Community Based Clinical Subjects	50
9	Psychiatry, Neuroscience and Clinical Psychology	50
10	Dentistry	50
11	Nursing and Midwifery	50
12	Allied Health Professions and Studies	50
13	Pharmacy	50
14	Biological Sciences	50
15	Pre-clinical and Human Biological Sciences	50
16	Agriculture, Veterinary and Food Science	50
17	Earth Systems and Environmental Sciences	50
18	Chemistry	50
19	Physics	50
20	Pure Mathematics	300
21	Applied Mathematics	300
22	Statistics and Operational Research	300
23	Computer Science and Informatics	300
24	Electrical and Electronic Engineering	100
25	General Engineering and Mineral & Mining Engineering	100
26	Chemical Engineering	100
27	Civil Engineering	100
28	Mechanical, Aeronautical and Manufacturing Engineering	100
29	Metallurgy and Materials	100
30	Architecture and the Built Environment	300
31	Town and Country Planning	50

<b>Sub-panel</b>	<b>UOA</b>	<b>Word limit</b>
32	Geography and Environmental Studies	50
33	Archaeology	50
34	Economics and Econometrics	50
35	Accounting and Finance	50
36	Business and Management Studies	50
37	Library and Information Management	50
38	Law	50
39	Politics and International Studies	100
40	Social Work and Social Policy & Administration	100
41	Sociology	100
42	Anthropology	100
43	Development Studies	200
44	Psychology	100
45	Education	150
46	Sports-Related Studies	100
47	American Studies and Anglophone Area Studies	300
48	Middle Eastern and African Studies	300
49	Asian Studies	300
50	European Studies	300
51	Russian, Slavonic and East European Languages	300
52	French	300
53	German, Dutch and Scandinavian Languages	300
54	Italian	300
55	Iberian and Latin American Languages	300
56	Celtic Studies	300
57	English Language and Literature	200
58	Linguistics	300
59	Classics, Ancient History, Byzantine and Modern Greek Studies	300
60	Philosophy	300
61	Theology, Divinity and Religious Studies	300
62	History	300
63	Art and Design	300
64	History of Art, Architecture and Design	300
65	Drama, Dance and Performing Arts	300
66	Communication, Cultural and Media Studies	300
67	Music	300

## Annex 7

### Standard data analyses for all sub-panels

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The following data analyses will be available to sub-panels for each submission (and a total for each UOA).

1. Headcount number of research-active staff, by category.
2. Full-time equivalent (FTE) number of research-active staff in Category A.
3. Headcount number of research-active staff in Categories A and C together.
4. Headcount number of research-active staff in Categories A, B, C and D together.
5. Headcount number of research-active staff in Categories A and C together, with each of 0, 1, 2, 3, and 4 outputs submitted for assessment (five separate totals).
6. Headcount number of research fellows.
7. FTE number of research fellows.
8. Total number of outputs submitted for assessment.
9. FTE research assistants (from RA1).
10. FTE research assistants (from RA1) per FTE research-active staff.
11. FTE research students (from RA1).
12. FTE research students (from RA1) per FTE research-active staff.
13. FTE research students (from RA3a).
14. FTE research students (from RA3a) per FTE research-active staff.
15. Median FTE number of research students (from RA3a) per FTE research-active staff.
16. Number of doctoral degrees awarded, by year.
17. Number of doctoral degrees awarded, by year, per FTE research-active staff.
18. Number of doctoral degrees awarded, by year, per FTE research student (student numbers taken from RA3a).
19. Number of masters degrees awarded, by year.
20. Number of masters degrees awarded, by year, per FTE research-active staff.
21. Number of new studentships (total across all years), by sponsor.
22. Number of new studentships (total across all years) per FTE research-active staff, by sponsor.
23. Number of new studentships (total across all years) per FTE research student (student numbers taken from RA3a), by sponsor.
24. Median number of new studentships (total across all years) per FTE research-active staff (total across all sponsors).
25. Research income (total across all years), by source.
26. Research income (total across all years) per FTE research-active staff, by source.
27. Median value of research income (total across all years) per FTE research-active staff (total across all sources).

There will be two separate sheets of figures: one in which figures per research-active staff will use FTE Category A staff numbers; and another in which figures per research-active staff will use headcount Category A plus Category C staff numbers.

These analyses are in addition to the standard listing of data and information presented to panels in RA1 to RA5.

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