MINUTES OF THE PROCEEDINGS

at the

Eleventh Meeting of the

COUNCIL

of the

IMPERIAL COLLEGE OF SCIENCE, TECHNOLOGY AND MEDICINE

The Eleventh Meeting of the Council was held in the Dining Room, 170 Queen's Gate, South Kensington Campus, at 9:00 a.m. on Friday, 25 September 2009, when there were present:

The Lord Kerr of Kinlochard (Chairman), Professor D.K.H. Begg, Sir David Cooksey, Mrs. P. Couttie, Professor M.J. Dallman, Sir Peter Gershon, Ms. C. Griffiths, Dr. M.P. Knight, Professor J. Kramer, Baroness Manningham-Buller, Mr. S. Newton, Ms. K. Owen, Professor S.M. Richardson, Professor S.K. Smith, the Lord Tugendhat, the Baroness Wilcox the President of the Imperial College Union and the Rector together with the Clerk to the Court and Council.

Apologies: Professor Dame Julia Higgins, Professor Sir Peter Knight, Ms. J.R. Lomax and Mr. J. Newsum.

In attendance: The Assistant Clerk to the Court and Council, the Director of HR (for Minutes 12 – 23) and the Director of Risk Management (for Minutes 24 – 32).

WELCOME

1. The Chairman welcomed the President of the Imperial College Union, Mr. Ashley Brown, and the Senior Dean, Professor Jeff Kramer, to their first Meeting of the Council as members.

MINUTES

Council – 10th July 2009

2. The Minutes of the tenth Meeting of the Council, held on Friday, 10th July 2009, were taken as read, confirmed and signed.

MATTERS ARISING

3. There were none.

RECTOR’S BUSINESS

Staff Matters (Paper A)
4. Paper A was received for information.

**Oral Report by the Rector**

5. The Rector opened his report by saying that the College had been successful in its bid for the Woodlands site from the BBC, the purchase of which had been completed on 1st September for £28M. For the College to obtain a 7.5 acres freehold site so close to the Hammersmith Campus was, he said, a once-in-a-lifetime opportunity. The Chief Operating Officer, Dr. Martin Knight would report further on the purchase and the opportunities this presented to the College as part of the Away Day, which followed this meeting, but the Rector just wanted to say that this purchase would not only provide the College with a highly visible site in West London, but would also allow it to provide more, much-needed postgraduate accommodation as well as freeing up space at the overcrowded South Kensington Campus. The purchase had also opened up other opportunities for collaboration with the BBC on research and development, an area in which it was particularly strong.

6. The Rector then said that he had, that morning, returned from Saudi Arabia where he and the Senior Principal, Professor Sir Peter Knight, had been attending the opening of the new King Abdullah University of Science and Technology (KAUST). Imperial College, along with a select few other leading universities around the world, had played a key role in KAUST’s development, helping it to recruit faculty and to develop curricula. Imperial had won contracts to support KAUST in materials science and chemical engineering and had been the only university to win two such contracts. The Rector said he had been very impressed with the new university and with the high quality of both the staff and students it had recruited. King Abdullah had also established an endowment of $20BN for the new university, a sum that immediately lifted the university into the ranks of the richest and most well-endowed universities in the world. The size of this fund also meant that KAUST would become an important global competitor in relatively short order and it was in the College’s best interests for it to maintain the strong relationship with KAUST that it had already established.

7. During the summer, the Rector had also visited India. While there, he had met with College alumni, government representatives and with important business leaders who were interested in working with the College, including Mr. Ratan Tata, Chairman of the Tata Group – India’s largest conglomerate. As part of his developing relationship with the College, Ratan Tata had promised to loan the College a Tata Nano car for display in the front entrance. The Rector reminded the Council that the Nano car had been designed to be the least expensive production car in the world, with a starting price of about 100,000 Indian Rupees (approximately £1,300). The car was very fuel efficient and had been hailed as a triumph of Indian engineering. The College was also considering increasing its international engagement in India, both in engineering and medicine. Although in the past conditions in India had not been conducive to educational collaboration, the Rector noted that this now appeared to be changing; two new bills were progressing through the Indian Parliament which, if passed, would make it possible for other countries to establish a footprint in India in the education and healthcare fields. While this was promising, the Rector said that progress on these issues could well slow down. Indeed, such a slowing would be advantageous to the College as it would be impossible for it to work on too many major international developments at once and its immediate priorities had to be Singapore and Abu Dhabi.

8. Turning to developments in Singapore, the Rector said that the College was working on proposals with the Singapore Government for the establishment of a Joint Medical
School and an Institute of Global and Public Health. The Pro-Rector for International Affairs, Professor Mary Ritter, had visited Singapore in July and would report back to the Council later, but the Rector was pleased to say that discussions were going well, with letters of intent having been exchanged. It was expected that a formal proposal for a Memorandum of Understanding with the Singaporeans would come forward for approval, either at the Council’s next Meeting in November or, more likely, in February 2010.

9. The Rector then reported on the College’s own student recruitment, which had gone well. Undergraduate admissions were above the 2009 intake target, most notably with over 100 more overseas students than in 2008. Postgraduate admissions were still continuing and looked set to rise above the 2008 figures as well, again notably for overseas students. Moving on, the Rector said the latest Sunday Times League Table had been published in September. The College had again been placed 3rd overall, but had been rated 1st for employability with Imperial graduates also commanding the 2nd highest starting salaries. HESA data produced in July showed that 93.9% of College leavers were either in employment or in full-time study six months after graduation. This was an excellent result at any time, but was particularly impressive in the current recession. The Rector then reminded members that the Times Higher Education World Rankings, in which the College was currently ranked 6th, would be published on 8th October.

10. The Rector said he was pleased to announce that the Departments of Physics, Chemistry and Chemical Engineering, along with the National Heart and Lung Institute, had all been awarded 2009 Silver Athena Swan awards. The Athena Swan awards were intended to recognise good practice in the recruitment, retention and promotion of women working in science, engineering and technology in higher education and research, so these awards to four of the College’s departments were particularly pleasing. As well as improving the position of women in science, the Rector said the College was also actively involved in widening participation and was especially interested in enthusing schoolchildren about science. To this end, the College had held a number of outreach events during the summer. During this time, it had played host to over 4,000 11-17 year-olds, who had attended both residential and non-residential courses at the College lasting from one day to two weeks. These courses gave these children hands-on experience of science (something that was, regrettably, increasingly rare in their own schools) plus a taste of life on a university campus. Many of the children attending these courses were from disadvantaged areas and the Outreach Programme was very successful in making higher education feel more attainable to them.

11. Bringing his report to a close, the Rector was pleased to say that the Eastside Hall had been completed on time and just under budget; a marvellous result and a tribute to all involved. The Hall actually comprised three halls, which had been named in honour of three of Imperial’s most notable staff members: the nobel laureates Denis Gabor and Sir Geoffrey Wilkinson and Sir Patrick Linstead, who had been the College’s Rector between 1954 and 1966. The Eastside Hall completed the building works in Prince’s Gardens and to mark this occasion the College had decided to hold a grand opening ceremony in early December, to which members of the Council would be invited.

UPDATE ON THE COLLEGE’S PENSIONS PROVISION (PAPER B)

12. The Director of HR, Mr. Chris Gosling, joined the Meeting to present Paper B. He said that reports on the College’s pension provision and the potential cost increases
associated with the current benefits structure had previously been presented to the Audit Committee and the Remuneration Committee. This present report built on and updated those reports, but also set out the background to this issue for those members who had not been privy to the earlier discussions. Mr. Gosling noted that the report was fairly detailed and highlighted the following issues in particular:

a. the potential pension liability was a serious issue for the sector as whole and, if not addressed, represented a significant risk to the College’s finances as well as those of other universities;

b. the situation was not being ignored, either by the College or by the sector. The employers were conducting vigorous negotiations with the Universities and Colleges Union (UCU) and with the provider of the sector’s principal scheme, the USS, to agree a range of reforms to secure the long term sustainability and affordability of the scheme;

c. the College itself was approaching this problem proactively and creatively. While the best hope for securing the future was sector-wide reform, the College could not rely on this as the only solution. A variety of options were therefore being explored by Imperial.

13. Mr. Gosling then said that the proposals being put forward by the employers’ group were quite radical and involved replacing the current final salary scheme with a career average revalued earnings (CARE) scheme for new entrants; increasing the normal pension age to 65; and introducing a cost-sharing formula for future increases in contribution rates. Taken together these would go a long way to de-risking the scheme and making the future liabilities manageable for employers. However, he cautioned that the USS had a somewhat arcane governance structure. Negotiating changes in benefits was the responsibility of the Joint Negotiating Committee (JNC) comprising representatives from the employers and the UCU and chaired by an independent chairman with a casting vote. Whilst this should in theory facilitate change, the opposite had been the case in the past with the Chairman traditionally voting in favour of the status quo. If no prior accommodation could be reached with the UCU, the sector would have to look to the Chairman for support.

14. The Chief Operating Officer, Dr. Knight, said he hoped the Council could appreciate the steps the College was taking to address potential pensions liability. The most radical option, withdrawal from the scheme, simply wasn’t an option as this would trigger a ‘debt payment’ equal to that College’s share of the total scheme deficiency, which would be prohibitively expensive. Dr. Knight said that there now appeared to be a much more realistic understanding of the scale of the problem across the sector; this in turn made it more likely that an agreement would be reached and the next scheme valuation in 2011 would be a powerful spur to action.

15. Mr. Gosling said that the employers’ final proposals had now been prepared for discussion on 9 October and the intention was to complete negotiations by the end of the year. Although he recognised that discussions with the UCU were likely to be difficult it was in neither side’s interest to wait until 2011 to make the necessary changes as at that point the regulator would require a “rescue plan” to be implemented.

16. Mrs. Couttie noted that when the Audit Committee had received a report on the pensions exposure it had been felt that, although the situation was difficult, the College was doing all it reasonably could to address the problem and push for a
sector-wide solution.

17. Mr. Newton said that he had read the report with a great deal of interest. In his view the USS’s investment performance had been sub-optimal and the weighting towards return seeking assets in contrast to the more cautious strategies adopted by most other pension schemes was clearly concerning. Mr. Gosling agreed and said that, in a more favourable financial and funding climate, the USS had counted on universities underwriting the scheme. Unfortunately, de-risking the investments in the current climate would now be very expensive.

18. Mr. Newton agreed that this was a very serious issue, not just for the College but for the whole sector, particularly if no agreement was reached before the scheme revaluation date. Whilst the potential increases in employers’ contributions that might be imposed by the regulator would be extremely difficult for the College to bear, they would be crippling for the weaker universities within the scheme to the point that they could force a number of these weaker institutions to close completely. It would be unthinkable for UK universities to be forced to close because of their pension liabilities. At the very least there was the prospect of significant job losses.

19. Mr. Gosling pointed out that the post '92 universities were members of the Teachers Pension Scheme, a public sector scheme that was similar to those in local government and the NHS. If the USS scheme had to be adjusted, this could lead to the paradoxical situation where the pension provision for staff in the country’s most prestigious universities was considerably worse than for those in institutions without a strong research base. The Chairman doubted that this discrepancy would be material in terms of movement between the two halves of the sector. Professor Begg agreed that this comparison was not decisive but noted that staff were interested in their overall remuneration package and that, if the College had a limited pension offer, this was likely to be reflected in a demand for higher salaries when recruiting high quality staff.

20. The Chairman said that the College should explore all the options open to it. While it was clear that complete withdrawal from the USS scheme was not feasible, he asked for greater clarification regarding the possibility of making alternative arrangements for new entrants. The Council needed to see clear legal advice on whether offering new entrants the option of no pension arrangement (but a higher salary) would trigger a section 75 claim by the USS. Mr. Gosling said he believed that this too risked breaching the College’s agreement with the USS with the potential to trigger the very expensive debt repayment that the College was keen to avoid but undertook to take legal advice on the issue.

ACTION: DIRECTOR OF HR

21. Mr. Gosling said that the College could expose itself to competitive recruitment disadvantage if it acted unilaterally in such a sensitive area. Dr. Knight also cautioned that the USS pension scheme was highly valued by the academic community and that a unilateral reduction in the pension offering could have a deleterious impact on the College’s ability to attract the best staff. The Chairman doubted whether many new entrants were much motivated by pension considerations; conceivably a higher salary might be more attractive.

22. Mr. Newton said there was an argument that all of the pension schemes in higher education should be funded on the same basis; it was inequitable if the government was underwriting the Teachers Pension Scheme used by the new universities, but not the USS used by the old universities. This was, he said, a further argument for government intervention to prevent the serious financial consequences for those
universities worst affected by the USS deficit. Dr. Knight said he thought that, given the state of public borrowing, government intervention was unlikely. The sector’s best hope was still to take control of the potential deficit before the 2011 revaluation. Mr. Newton accepted this analysis, but said it would be sensible for the College and the sector to confront this issue on as many fronts as possible, including government lobbying and investment de-risking. For clarity, Professor Kramer asked how the negotiations were being taken forward. Mr. Gosling said that the employers’ forum, of which he was a member, represented the employers affected by pensions affordability issues. There was, he said, a consistent message from all universities that urgent action was required and that failure to act now would have serious consequences for the sector as a whole.

23. The Chairman thanked Mr. Gosling for his report. This was, he said, a serious risk for the College and one which the Council should keep under review and seek to limit. He therefore asked for it to be provided with regular updates as the negotiations continued. The actions proposed in the paper, and the College’s approach to dealing with this potential liability, were sensible and were endorsed by the Council, but additional ways of limiting the liability should also be explored.

OPTIONS UNDER CONSIDERATION FOR THE REACTOR CENTRE (PAPER C)

24. The Director of Risk Management, Mr. David Forbes, joined the Meeting to present Paper C. He reminded members that, in October 2008, the College thought it had an in principle understanding with the Nuclear Decommissioning Authority (NDA) on the way forward, whereby the College would fund the first £8M of decommissioning costs, with the NDA being responsible for the remainder. It had been agreed at that time that the College and the NDA would undertake further scoping work and that, provided this was satisfactory, the Reactor would be designated in May 2009. However, when the College met with the NDA again in May, circumstances had changed significantly. It was made clear that the former understanding no longer pertained and that Imperial would now be expected to fund the full costs of decommissioning itself. Furthermore, once the Reactor had been de-fuelled, it would be mothballed by the NDA and only dismantled at a much later date. This meant the College would have to fund all of the costs, without having any control over the project. This was clearly unacceptable and the College decided not to pursue designation of the Reactor. This left the College to manage the decommissioning itself. While this would be expensive, at least Imperial would be in a position to control these costs and ensure that the project was completed in good time and in a way that would not disadvantage the College. In order to defray the continuing operational costs, the College had then looked at range of possible uses for the Reactor which would at least provide an income stream in the short to medium term. At that point, it had been suggested that the Reactor might be suitable for use as a proof of concept demonstrator for an Accelerator Driven Subcritical Reactor (ADSR). Although the ADSR concept was not new, it would help to address a number of current nuclear issues and was therefore an attractive option. Furthermore, while it would cost in excess of £500M to build a new ADSR - a huge investment for a proof of concept - adapting an existing reactor could be done at relatively little cost. To further explore this option, the College had issued an Expression of Interest to the research councils and the Department of Business Innovation and Skills whom had expressed support for the proposal. The Nuclear Installations Inspectorate (NII) had also expressed support, thus removing a potential regulatory obstacle. An ADSR was therefore an exciting prospect which appeared to be generally supported and the next step would now be to secure funding. However, Mr. Forbes said, for the College to proceed with an ADSR, it would have to be sure that it would be treated as a
national asset, that it would have a secure funding stream for its full life and also that agreement could be reached on sharing the costs of its eventual decommissioning.

25. Before ending his report, Mr. Forbes raised another issue with the Council. The Office for Civil Nuclear Security (OCNS) continued its regulatory oversight of CONSORT and were in the process of reviewing their "Nuclear Installations Security Regulations" with the likely consequence that, in line with all other nuclear establishments, security costs were likely to increase. The College was currently in discussion with the OCNS about its categorisation of the Reactor and hoped to persuade it that a proportionate response was appropriate.

26. The Chairman asked what interest there was in an ADSR. Mr. Forbes said that the College was in contact with the research councils and the Department of Business, Innovation and Skills about possible funding opportunities and also to alert them to the College's interest in providing an ADSR, in case they were considering funding a facility elsewhere. Professor Smith asked if the College had also discussed the proposal with any potential industrial partners. The Faculty of Medicine was, he said, in discussion with Hitachi over the provision of a Proton Beam facility, and there were clear synergies if the College was to site another cyclotron next to the Reactor. Mr. Forbes said the College was not pursuing industrial funding as yet as the most likely source of guaranteed funding for the life of the project would be from government or the research councils but that the potential for dual use for Proton Beam Therapy would be examined in the Business Case.

27. Sir Peter Gershon asked if the NDA had given the College any undertakings about funding the decommissioning and, if it had, if there were any legal remedies open to the College as a result of the NDA’s sudden volte-face. He said it seemed odd that the NDA should agree to fund the decommissioning of various commercial reactors at the country's expense, but should refuse to fund this decommissioning simply because it had now run out of funds. Mr. Forbes said the NDA had not given the College any written undertakings and he understood that there was little the College could do legally to force it change its decision. Dr. Knight agreed and said that one problem was that the commercial reactors were all listed under the Energy Act and were therefore clearly the NDA’s responsibility. The Consort Reactor was not listed in the Act and it was therefore at the NDA’s discretion whether or not to fund its decommissioning.

28. Mr. Newton asked if the Reactor was fully owned by the College. Dr. Knight confirmed that it was and that provision was made in the accounts for its decommissioning. Having said that, although a provision was made in the annual accounts, if the College had to fund the full cost of decommissioning it would still need to find the cash to do so.

29. The Chairman then noted that the decommissioning the Reactor was not the only cost to the College; the value of the Silwood Estate was affected by the continued presence of the Reactor on the site. Once this had been removed, the value of the Estate would increase. The College was therefore losing this additional value while the Reactor remained in place. In making a decision on when to decommission the Reactor, the Council would, he said, have to take this additional consideration into account.

30. Baroness Manningham-Buller noted OCNS’s regulatory oversight of the security arrangements in place at the Reactor. She asked if OCNS’s concerns were due to the state of the Reactor or were simply a result of its presence on the Silwood site. Mr. Forbes confirmed that the Reactor had an excellent safety record and that OCNS
were only concerned with the security of the site. Baroness Manningham-Buller cautioned that the annual costs of providing this level of security would only increase. This too would have to be taken into account by the Council.

31. Ms Griffiths noted that a feasibility study had yet to be conducted and she asked whether there was a risk that it would not be possible to convert the Reactor to an ADSR. Mr. Forbes said that the next step would be to construct a business case for the ADSR and that a feasibility study would be conducted as part of this process. However, he said that if the modifications required to allow the reactor core to be activated by a proton beam from an accelerator were technically quite simple. The main issue was whether the research councils or another funder would fund this modification, the construction of the particle beam accelerator alongside the Reactor and the ongoing operational costs. The Chairman wondered whether the public expenditure climate would be propitious for new research council funding.

32. The Rector reminded members that, even if the ADSR proposal came to fruition, the Reactor would still have to be decommissioned at some point. This proposal would delay the start of that process and might also provide an interim use and income stream for the Reactor. However, he suspected that the College would in the end still be liable for the decommissioning costs.

33. The Chairman agreed the situation was highly unsatisfactory and there appeared to be no good solution. The College should investigate the options for seeking a legal remedy as a result of the NDA’s decision not to fund decommissioning. Because of the potential financial cost to the College and the interim opportunity cost and custodial costs, the decision on whether to proceed with an ADSR could not depend only on whether the research councils would pay. He believed that this should ultimately be a Council decision so that all the other factors which had already been noted could also be taken into account. Finally, he asked the College to assess the impact of the alternative Reactor options on the value of the Silwood Estate so that this could be included in the Council’s assessment.

IMPERIAL COLLEGE BUSINESS SCHOOL RESTRUCTURING (RESERVED) (PAPER D)

34. The Chairman reminded members that the contents of Paper D constituted a reserved area of business as defined in the College’s Statutes. This meant that the student member of the Council could not participate in the consideration of this item of business and, furthermore, that Paper D should not at any time be available to students. The ICU President, Mr. Ashely Brown, therefore withdrew from the Meeting at this point.

35. The Principal of the Imperial College Business School, Professor Begg, introduced Paper D, which was concerned with a proposed restructuring of the Business School, which could result in eight academic posts being made redundant.

Resolved:

That the Rector, or another person so authorised by the Rector, be given delegated authority in accordance with the procedures set out in Ordinance D11, the Dismissal of Members of Staff by Reasons of Redundancy, to implement the selection process

1. As the contents of Paper D constitute a reserved area of business, it is confidential and is not included with these published Minutes.
and subsequent proposed redundancies if the Rector or his nominee consider this appropriate following the comments and counter-proposals gathered during the consultation period.

ANY OTHER BUSINESS

Appointment of the Chairman

36. At the conclusion of the Meeting, the Chairman left the Meeting and the Deputy Chairman provided the Council with an oral report from the Nominations Committee. He reminded members that the Chairman’s first term of office would conclude on 30 September and said that the Nominations Committee had agreed to recommend that the Chairman be appointed for a further term of office of four years.

Resolved:

That the Lord Kerr of Kinlochard be re-appointed as the Chairman of the Council for a further term of office of four years with effect from 1 October 2009.

NEXT MEETING

37. The Clerk reminded members that the Council’s next Meeting would be held on Friday, 20 November 2009.
SENIOR APPOINTMENTS - DEANS

Professor Richard Vinter, Department of Electrical and Electronic Engineering, has been appointed one of the Deans for the Faculty of Engineering, with effect from 1 September 2009, for a period of three years.

Professor Nigel Gooderham, Professor in Molecular Toxicology, in the Division of Surgery, Oncology, Reproductive Biology and Anaesthetics, has been appointed Non-clinical Dean for the Faculty of Medicine with effect from 1 September 2009, for a period of three years.

Professor Chris Phillips, Professor of Experimental Solid State Physics, Department of Physics, has been appointed as one of the Deans for the Faculty of Natural Sciences with effect from 1 September 2009, for a period of two years.

HEAD OF DEPARTMENT OF LIFE SCIENCES

Professor Ian Owens, who was appointed Head of the Department of Life Sciences on 1 August 2007, has been reappointed to the post for a further five years.

PROFESSORS

Professor Pierre Gressens, currently Director of the UMR 676 (Unité Mixte de Recherche), INSERM, Paris, and also Consultant in Paediatric Neurology at the Robert-Debré Hospital, Paris, has been appointed, on a part-time basis, to the Chair in Perinatal Neurology, in the Division of Surgery, Oncology, Reproductive Biology and Anaesthetics, Faculty of Medicine, with effect from 1 July 2009.

Professor Ralph Hans Knöll, currently Professor of Cardiovascular Molecular Genetics and Head of the Working Group on Cardiovascular Molecular Genetics at the Georg August University, Göttingen, Germany, has been appointed to the Chair in Myocardial Genetics, in the National Heart and Lung Institute, Faculty of Medicine, with effect from 1 October 2009.

Professor Dominic J Withers, formerly Reader in Metabolic Medicine, at Imperial College London, and currently Professor of Diabetes and Endocrinology and Director of the Centre for Diabetes and Endocrinology, at University College London and also Deputy Director of the UCL Institute of Healthy Ageing and Senior Physician at the University College London Hospitals Bariatric Service, has been appointed to the Clinical Chair in Diabetes and Endocrinology, in the Division of Clinical Sciences, Faculty of Medicine, with effect from 1 November 2009.

READERS

Dr William G Proud, currently Head of Fracture and the Shock Physics Group at the Cavendish Laboratory, Cambridge, has been appointed to the post of Reader in Shock
Physics, at the Institute of Shock Physics, Department of Physics, Faculty of Natural Sciences, with effect from 1 October 2009.

**Dr Maha Barakat**, currently Research and Medical Director of the Imperial College London Diabetes Centre (ICLDC) in Abu Dhabi, has been appointed to the post of Reader in Metabolic Medicine, in the Department of Investigative Science, Faculty of Medicine, with effect from 22 July 2009. Both posts will run concurrently.

**VISITING PROFESSORS**

**Professor Jeremy Farrar, FRCP (Ed), FRCP, FMedSci**, formerly Professor of Tropical Medicine, Oxford University and Director of the Wellcome Trust Major Overseas Programme and the Oxford University Clinical Research Unit, Vietnam, has accepted an association with the College as Visiting Professor in the Division of Epidemiology, Public Health and Primary Care, Faculty of Medicine, with effect from 1 July 2009 for a period of five years.

**Professor Richard (Dick) Gordon Derwent, OBE**, who previously held the Chair in Atmospheric Chemistry at Imperial College London, has accepted an association with the College as Visiting Professor in the Centre for Environmental Policy, Faculty of Natural Sciences, with effect from 1 August 2009 for a period of two years.

**Dr Jeremy Burroughes**, previously Chief Technology Officer at Cambridge Display Technology Ltd, has been offered an association with the College as Visiting Professor in the Department of Physics, Faculty of Natural Sciences, with effect from 1 August 2009 for a period of three years.

**Dr Ronald Winter**, formerly Distinguished Scientist at the Atomics Weapons Establishment (AWE), has been offered an association with the College as Visiting Professor in the Department of Physics, Faculty of Natural Sciences, with effect from 1 July 2009 for a period of three years.

**RETIREMENTS**

**Professor David John Briggs**, Chair in Environmental and Health Sciences in the Division of Epidemiology, Public Health & Primary Care, Faculty of Medicine, retired from the College on 31 July 2009.

**Professor Colin Atkinson, FRS**, Professor of Applied Mathematics, in the Department of Mathematics, Faculty of Natural Sciences, will retire from the College on 30 September 2009. Following retirement an Emeritus title will be conferred and he will continue his association with the College as a Senior Research Investigator.

**Professor Christopher John Isham**, Professor of Theoretical Physics, in the Department of Physics, Faculty of Natural Sciences and currently Senior Dean, will retire from the College on 30 September 2009. Following retirement an Emeritus title will be conferred and he will continue his association with the College as a Senior Research Investigator.

**Professor Keith Leonard Clark**, Professor of Computational Logic in the Department of Computing, Faculty of Engineering, will retire from the College on 30 September 2009. Following retirement he will continue his association with the College as a Distinguished Research Fellow.
RESIGNATIONS

Professor John Robert Bessant, Professor of Innovation Management at the Business School, has resigned with effect from 30 June 2009. Following his resignation, he has accepted an association with the College as a Visiting Professor for a period of three years.

Professor Antonio Mello, Chair in Finance at the Business School, has resigned with effect from 15 August 2009 to take up an appointment at the University of Wisconsin, USA.

Professor Mervyn Maze, FMedSci, Clinical Professor in the Division of Surgery, Oncology, Reproductive Biology and Anaesthetics, has resigned with effect from 31 August 2009.

Professor Aldo Roberto Boccaccini, Professor of Materials Science and Engineering, in the Department of Materials, Faculty of Engineering, has resigned with effect from 30 September 2009. Following his resignation, he has accepted an association with the College as a Visiting Professor for a period of three years.

Professor David Joseph Balding, Professor of Statistical Genetics, in the Division of Epidemiology, Public Health & Primary Care, Faculty of Medicine, has resigned with effect from 30 September 2009.

Dr Kevin Gregory-Evans, Reader in Molecular Ophthalmology in the Division of Neurosciences and Mental Health, Faculty of Medicine, has resigned with effect from 31 August 2009 to take up an appointment as Professor in Ophthalmology at the University of British Columbia, Canada. Following his resignation, he has accepted an association with the College as a Visiting Reader for a period of one year.
PAPER B

PENSIONS UPDATE

A Note by the Director of HR

INTRODUCTION

1. Pensions issues are an important subject for consideration by the College’s Executive; and the Audit Committee received a full briefing on developments at its February meeting, with an update in June. This paper provides some important context for members of Council and sets out the latest position. A glossary of terms used in this paper is attached as Appendix 1.

CURRENT PENSION PROVISION IN THE COLLEGE

2. The College currently participates in three pension schemes, the NHS scheme (in which a number of our clinical academics participate), the USS for academic and senior administrative staff and SAUL (Superannuation Arrangements for the University of London), which covers lower graded staff not eligible for USS. The latest costs and membership details are set out in Appendix 2.

3. These schemes are final salary, defined benefit (DB) schemes offering very similar benefits and are comparable to the majority of the schemes in the public sector – Local Authority, NHS, Teachers (which also covers HE staff in the post ‘92 sector) etc. (1) Whilst such schemes remain an important part of overall public sector remuneration provision and were once common in many blue chip private sector organisations, they are now becoming increasingly rare in the private sector; where they persist they are nearly always closed to new members whose pension provision is usually money purchase (defined contribution – DC) based.

MANAGEMENT OF THE SCHEMES

4. The management of the NHS scheme is determined by government departments and broader political considerations and lies outside the scope of this paper.

5. The management of the USS and SAUL are in some ways very similar. Both have the requisite Boards of Trustees comprising representatives from the employers and the unions as well as independent trustees. Both are, of course, advised by professional actuarial and investment specialists. A key difference, however, lies in their ability to effect change particularly in regard to negotiating changes with employee representatives. SAUL has a negotiating committee which, in common with virtually all joint bodies, achieves changes ultimately by consensus following the usual assessment by both sides of the merits of the argument and the strength of the case. Recent successes have involved the unions agreeing to share the costs of a contribution increase as well as other, more minor, rule changes. USS by contrast has an independent chair with a casting vote. Whilst this should in theory facilitate change, the opposite has been the case in practice with the chair

1. The Civil Service is a leading public sector scheme that has closed its final salary (though not its defined benefit status) to new entrants; pensions accrual is now based on revalued career average salaries.
 traditionally voting in favour of the status quo. The corrosive effect of this constitutional anomaly is explored in para 19 below.

THE ACCUMULATION OF COSTS AND THE RISKS FOR THE HE EMPLOYERS

6. The main potential exposure for the College and the prime focus of activity within the HE sector concerns the pension scheme for academic and senior management staff - the Universities Superannuation Scheme (USS). As already indicated, this scheme offers a range of benefits similar to most public sector pension schemes (at least as they are currently constituted) basically comprising a pension and lump sum based on final salary.

7. Cost pressures impacting on all such schemes have been widely aired in the media as well as in more specialist quarters and include longer life expectancy and the fall in equity markets. Less frequently rehearsed, but still significant, is the stance of the Pensions Regulator who, as guarantor of the integrity of pensions entitlements, is required to take a cautious view of actuarial assumptions. A prospective shortfall in funding levels inevitably means an additional contribution from employers and/or review of benefit levels; the days when employers could be given “breathing space” in the hope of recovery in the longer term are long gone. For any scheme in significant deficit a “rescue plan” has to be put in place for resolving the shortfall, normally within ten years.

8. But added to these problems shared by all such schemes are two additional pressures specific to HE. The first of these is the recent pay growth in the sector which has outstripped both private and public sector norms and has kept well ahead of inflation – see Appendix 3. These increases will increase liabilities by more than accounted for in the historical actuarial assumptions because pensions will be higher than anticipated. The second is that, because the USS has historically been able to rely on the cost of pensions being borne by the contributions from staff and employers, the USS’s investment strategy has been opportunistically (if atypically for pension schemes) skewed towards “return-seeking” investments, primarily equities. This has meant that the decline in the value of the scheme’s assets following the recent market falls has been commensurately greater. At the depth of the recent share collapse the value of the fund reduced by about a third from its £29B valuation as at 31 March 2008. Though it will have recovered somewhat since then, the fact remains that if the USS valuation had been scheduled for 31 March 2009 rather than 2008 the employers would now be facing a substantial deficit and the position would be even worse than that described below. The key question now is whether the scheme will be in deficit at the time of the next triennial valuation due in March 2011.

9. So the combination of general and sector specific financial pressures means that we are now faced with a serious position – the costs of the existing pension provision are rising at just the time when the employers are facing the prospect of severe cuts in funding from government and other sources. Just how serious the impact of the increased costs might be is illustrated below.

THE IMPACT OF INCREASES ON HEIS

10. The potential increases in employer contribution rates are based on assumptions set out in the USS’s own sensitivity analysis. Under USS rules, these costs would fall on the employer as guarantor of the scheme.

a. A 2% increase already proposed following the valuation in 2008 (moving contribution rates with effect from 1 October 2009 from the current 14% to 16% of members salaries or an extra £3.25m cost to the College)
b. A further projected 2% increase to reflect recent sector salary growth (moving contribution rates to 18% or an extra (total) £6.5m cost to the College)

c. A further projected increase of 1.5% to reflect increased longevity assumptions (moving contribution rates to 19.5% or an extra (total) £8.94m cost to the College)

d. A projected 3% increase that may arise in relation to the probable deficit following the 2011 valuation, and assuming a 30 year recovery period (moving contribution rates to 22.5% or an extra (total) £13.81m cost to the College). This figure may be optimistic - the Pensions Regulator rarely allows a recovery period in excess of 10 years.

11. Were the USS to endeavour to "de-risk" the investment strategy and move to a lower dependence on return seeking assets (see para 8 above) this would further add to the cost projections in para 10.

EXPOSURE

12. The potential exposure from the prospect of increased contributions is a cause for profound concern. Another way of looking at this is to consider the College’s proportion of the potential scheme liabilities. Because the USS is a group scheme and the exact split of each employer’s share of the overall liability is not currently identifiable, we are not required to disclose the College’s share of the pension deficit under the FRS 17 accounting rules in the College’s financial statements. Were it possible to identify our share, however we would be obliged to record a deficit on the balance sheet broadly estimated to be in the region of £200m as a prior year reserves adjustment. (There would be no impact on the current year income and expenditure outturn).

13. USS remains a premier component of academic remuneration in all pre ’92 institutions. Were the College to opt out of the USS for new entrants it would place us at a significant competitive disadvantage over our Russell Group rivals especially in respect of those mid-career professorial recruits (from the UK and elsewhere) for whom the USS is a crucial component of their remuneration package. There is the additional anomaly that, with the post ’92 institutions covered by the Teachers Pension Scheme, we would be offering a poorer pension provision than institutions seen (by our academics at least) as being of inferior status. But perhaps most significantly such a move would result in the College incurring a “section 75 debt” to the USS, which would be prohibitively expensive.

14. This problem arises from the “employer debt legislation” (section 75 Pensions Act 1995, and subordinate regulations) which requires that when an employer in a multi-employer scheme ceases to participate at a time when other employers continue to participate, and there is a funding deficiency at that time, the withdrawal will trigger a debt payable by the withdrawing employer to the scheme, equal to that employer’s share of the total scheme deficiency, calculated on a “buy-out” basis (i.e. the cost of securing all accrued benefits by purchasing annuities). The College’s current section 75 exposure has been conservatively estimated at £200m.

15. And even if we were minded to do this we would, of course, have to put some sort of pension provision in its place which itself would have a cost.
OPTIONS

16. The sector is alive to the peril posed by this level of potential exposure and discussions with the USS and the Universities and Colleges Union (UCU) have been ongoing for a number of months. During that time, the impact of the economic crisis has deepened. What began as a longish term review of sustainability has become an urgent programme of radical reform. Whilst the desire to retain an attractive retirement benefit as a staple part of the overall remuneration package is shared by all VCs they are now very keenly aware that an outcome which does not reduce financial exposure to manageable levels could result in institutional failure. The proposed changes, following extensive analysis and discussion with the USS, have now been put forward to VCs as essential elements in a survival strategy:

a. The introduction of a CARE (career average revalued earnings) scheme for new entrants and for future service accrual of existing staff; this would replace the current final salary basis of the scheme;

b. A normal pension age (NPA) of 65 (it is currently 60) for future service and increases in future in line with the state pension age. Employees would have the choice of taking actuarially reduced pensions from age 55

c. A cost-sharing formula to be applied to future increases in contribution rates so that the burden of risk is shared between employers and employees;

d. a limit on increases in pensions in payment for future service with discretion for increases above the limit if scheme funds would allow this without additional contribution cost;

e. a phased retirement scheme within the cost context of the measures described above.

17. Depending on the detail (principally the conditions on which the CARE arrangements are constructed - see glossary) these measures should take out between 4% and 7% of costs from the scheme. Apart from the impact of mitigating cost increases, a move to CARE would also have the benefit of de-risking the scheme in the longer term by making it less sensitive to salary growth.

18. VCs have already indicated their informal agreement to the reform package. A formal period of consultation is now in train as VCs inform and involve their councils in the process. The intention is to achieve agreement with the UCU by the end of 2009. The next valuation due at the end of March 2011 represents the strongest possible spur to action.

19. Negotiating these changes presents a number of challenges; the UCU can be a difficult union to engage with. That said, the pressures for change are now so overwhelming and the consequences to the sector so detrimental, that some accommodation may be possible. The constitutional arrangements of the USS are, however, as indicated in para 5 above, unhelpful in this regard. Clearly our best endeavours must be to seek the agreement of the UCU to a package of reform thus avoiding the need for the Chair to be pressed into having to make a casting vote in favour of reform against the wishes of the UCU. The “Plan B” fallback is to make a convincing case to the chair (the recently appointed Sir Andrew Cubie) that the future of the USS in doubt (which it potentially is) and that the viability of much of HE is in peril (which it certainly is) and that he should, therefore, side with the employers on this occasion.
20. In the event that the employers fail in their current endeavours the options range from bringing parliamentary pressure to change the USS constitution (something an incoming Conservative administration may do without prompting in view of its official stance on public sector pension provision) to merely saving as much money as possible by holding down pay levels. Whilst the latter is a fairly dismal prospect, the College’s unique freedom to negotiate pay locally does give us a degree of flexibility that other HE institutions do not enjoy.

THE COLLEGE STANCE

21. Energetic participation in, and support for, collective action represents the most likely way in which to safeguard the College from the growing financial challenge of the pensions crisis. Imperial (through the HR Director) is strongly represented on all the lead decision making bodies – the Employers Pension Forum, the USS Negotiating Committee, and the Support Services Pension Group. As HR Director of Imperial he is also a SAUL Trustee.

22. But there is one additional possible way to reduce our exposure to the USS that the College could consider and which has already been aired at the February Audit Committee and this relates to the current pension arrangements for support staff.

SAUL

23. SAUL (Superannuation Arrangements for the University of London) is a well run defined benefit, final salary scheme for support staff offering benefits very comparable to the USS but at lower cost. The financial pressures on SAUL are similar to, if less acute, than those for USS but there is a healthy tradition of members sharing cost increases with employers and a more realistic approach to benefit provision.

24. SAUL was also subject to triennial valuation in 2008, but no increase in contributions was proposed as a result. The SAUL Trustee took the view that it was reasonable to release some of the prudent margins held against adverse experience thus allowing SAUL to be fully funded on its technical provisions. SAUL’s exposure to equities is lower than the USS, enabling it to weather the current storm more easily; salary growth patterns for support staff are not as acute as for career academic staff so this pressure too is eased. That said, the recent funding review has indicated that there is a potential shortfall that needs to be addressed but it has been articulated as a statement of policy that benefit revision rather than cost increases will be the preferred way of dealing with future financial pressures; employers and unions will shortly be consulted about a change to a retirement age to 65 and a move to CARE in line with what is being proposed for the USS. Crucially employers’ and employees’ contributions will remain the same.

25. Having sought the advice of independent legal and actuarial pensions expertise there is a way in which SAUL could be used to reduce our exposure to USS.

26. Eligible employees are defined for USS purposes as all employees of a participating institution, who are employed in an academic, research or related post. Those not employed in such posts may also be eligible if employed “in a role comparable to an academic, research or related post in terms of responsibility and/or salary and by reference to that institution’s job-evaluated pay structure” and it is under this provision that middle level administrative staff and above have traditionally participated throughout the HE sector in the USS.

27. The difficulty is that USS operates an “exclusivity clause” under which institutions are not permitted to offer alternative pension provision, the sanction for any breach being a
triggering of the crystallisation of liabilities and the potentially enormous penalty identified in para 14 above.

28. However, because the College (uniquely in the sector) has, since 2004, maintained a separate pay spine for academic and non-academic staff, there may be scope to argue in the College’s case that the more senior non-academic staff who are currently covered by USS should be reclassified as “non-eligible” and could therefore be put into SAUL. This would need careful handling with the UCU to avoid any challenge to the classification but could possibly be introduced for new entrants. The legal view from Farrers is encouraging in this regard.

29. USS may, of course, contest this view. But the prospect arises that we could, over time, reduce our dependency on the USS by putting all new non-academic staff into SAUL. Given that such staff account for 29% of the total USS membership at Imperial this would be a considerable prize. It would, of course, take time for this benefit to feed through in its entirety. Over the last five years, however, the turnover for these staff has been nearly 50%. The recession has, admittedly impacted adversely on turnover in recent months but the benefits of this policy would begin to be felt over time – see Appendix 4.

CONCLUSION

30. The College will continue to put its full authority and energy behind the major programme of pensions reform for the pre ’92 HE sector. This represents the best hope for avoiding the potential funding difficulties outlined in this paper. Maintenance of status quo is simply not an option and all the indications are that VCs, encouraged and supported by their respective councils, appear ready to take on the employee relations challenge.

31. But the College does have, as indicated in para 26-29 above, a potential means of reducing the exposure albeit more modestly. The advice from our solicitors has been encouraging but this is still unchartered territory and it has to be anticipated that USS will not give in without a fight.

32. The most prudent way forward would therefore appear to be:

a. To give the current reform programme a reasonable chance to deliver significant future savings;

b. in the absence of any progress (or indication that progress can realistically be achieved) (a) to approach SAUL with a view to putting all new non-academic recruits into that scheme (para 29), (b) to consider changes in the College’s pay structure and annual pay review mechanism to ensure that the overall cost of remuneration (pay plus pension) is contained (para 20), and (c) to take an influencing and authoritative stance in any long term changes in the governance structure of USS (para 20) by legal and broader political means.

CG
August 2009
GLOSSARY OF TERMS

DB Defined benefit: a scheme where the pension is fixed by a formula – usually one-sixtieth or one-eightieth of final salary multiplied by years of service. The risk of a funding deficit is borne by the employer. According to the Pensions Regulator more than 8.5 million people are still in DB schemes.

DC Defined contribution: a scheme where the amount contributed is known but the person relies on the performance of the fund, passing the risk to the employee. About 5.5 million people belong to registered occupational DC schemes.

Deficit The amount by which a pension scheme’s liabilities exceed its assets.

FRS17 an accounting standard for the presentation of DB schemes in company accounts, introduced in 2003. Requires deficits and surpluses to be stated using current market conditions, meaning pension costs cannot be averaged out over years.

Rate of accrual The element of the formula for calculating final salary pensions (for example, the “one-sixtieth”).

CARE Career average revalued earnings: an alternative to Final Salary whilst still preserving a scheme’s defined benefit status. Pension is calculated by averaging out earnings over the course of a career uprated by some index – RPI, CPI, Salary Index etc. The rate of accrual, see above, is also an important determinant of the eventual value of the pension paid on retirement.
PENSION MEMBERSHIP AND COSTS

**USS**

Employers' contribution - 14% (was 18.55% until January 1997 and will go up to 16% in October 2009);
Employees' contribution - 6.35%;
Membership uptake - 3196 or 67% of those eligible;
Current cost to the College £22.3m p.a.

**SAUL**

Employers' contribution - 13%;
Employees' contribution - 6%;
Membership uptake - 1577 or 57% of those eligible;
Current cost to the College £5.93m p.a.

**NHS**

Employers' contribution - 14%
Employees' contribution – 6% to 8.5% depending on salary level;
Membership uptake – 474 or 99% of those eligible;
Current cost to the College £4.23m p.a.
The cumulative total of the HE pay awards in the years from 2001 to 2008 is a figure of at least 36.5% (it is a higher figure for the lowest paid staff).

In the period 2001 to 2007, HE pay award increases exceeded inflation in every year bar one. They have also exceeded the private sector median increases in four out of seven years and have been equal in two. They have exceeded the public sector median twice, been equal twice and lower three times.

In 2008, HE staff benefited from pay increases of 3% in May 2008 and 5% in October 2008 well ahead of awards in the economy as a whole, running at a median of 3.5% in October 2008 (IDS).

Both HE and wider economy employees have recorded earnings growth well ahead of inflation. Specially commissioned ASHE data, however, showed that the HE sector recorded faster earnings growth in 2001-08 than seven broad comparator groupings (all employees, all public sector, all private sector, public administration, education, human health activities and social work).
BENEFITS OF MOVING TO SAUL FOR NEW NON-ACADEMIC RECRUITS

The main advantage of a change to the current pension arrangements for support staff is risk reduction. SAUL has declared that it will peg employers’ contributions at 13% and adjust benefits rather than increase costs as a way of dealing with future funding difficulties.

This change would, however, also result in reduced employers’ pension costs. Based on a projected turnover of 46% over the next five years for the relevant category of staff, we could expect to achieve an annual saving by year five of:

- £570k when compared to the known USS employers’ contribution of 16%
- £950k when compared to a possible USS employers’ contribution of 18%

**Projected five year turnover of relevant staff group**

<table>
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<tr>
<th>01-Aug-09</th>
<th>01-Aug-14</th>
<th>Leavers</th>
<th>Turnover</th>
<th>Av leavers pa</th>
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<tr>
<td>759</td>
<td>410</td>
<td>349</td>
<td>46%</td>
<td>70</td>
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**Cumulative savings**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cumulative saving - 16%</th>
<th>Cumulative saving - 18%</th>
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<tr>
<td>Year 1</td>
<td>£114,574</td>
<td>£190,956</td>
</tr>
<tr>
<td>Year 2</td>
<td>£229,147</td>
<td>£381,912</td>
</tr>
<tr>
<td>Year 3</td>
<td>£343,721</td>
<td>£572,868</td>
</tr>
<tr>
<td>Year 4</td>
<td>£458,294</td>
<td>£763,824</td>
</tr>
<tr>
<td>Year 5</td>
<td>£572,868</td>
<td>£954,780</td>
</tr>
<tr>
<td>Saving during first five years</td>
<td>£1,718,603</td>
<td>£2,864,339</td>
</tr>
</tbody>
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INTRODUCTION

1. At the previous Council meeting in July, the Council asked to be provided with an update on the options being considered for the Reactor Centre (CONSORT) at its next Meeting. This paper meets that request.

2. The Council will recall the College has, for some years, been working with the Nuclear Decommissioning Authority (NDA) towards ‘Designating’ CONSORT under the Energy Act. Designation has the benefit of transferring all liabilities for defueling and decommissioning CONSORT to the NDA.

PROGRESS

3. Making any progress with the NDA and its sponsoring Department, the then Department for Business, Enterprise & Regulatory Reform (BERR) has been exceptionally slow, but in October 2008 BERR and the NDA recognised that Designation was an appropriate way to proceed but that substantial issues still needed to be resolved. In particular, arrangements for the lease and return of the property, an agreed scope cost and schedule for the work and Imperial’s financial contribution to the cost of defuel and decommissioning needed to be resolved. There was, however, an undocumented but clear implication that Imperial would contribute c. £8m, which would cover the cost in the first 3 (Comprehensive Spending Review) years with BERR covering the remainder. This £8M coincided with the size of provision in the College’s accounts. It was also agreed that Imperial and NDA would work together to agree the scope, cost and schedule of defueling and decommissioning within 6 months with a view to designation at that time.

4. In late 2008, responsibility for the NDA was transferred to the Department for Energy and Climate Change (DECC). By May 2009, DECC’s position had changed such that, whilst they agreed that, for security reasons, CONSORT should be defueled as soon as possible and Designation was probably the most appropriate means of achieving this, Imperial would have to meet all the costs of defueling and decommissioning. Additionally, whereas previously the NDA had indicated that they had budgeted for the work necessary to validate and agree the scope cost and schedule, they now stated that they were not in a position to validate the extensive additional work done by Imperial. They also stated that, post Designation, their focus would be on defueling only and that, whilst they would arrange for the removal of the fuel as expeditiously as possible (within 3-5 years), the Reactor Centre would then have to be mothballed for several decades as NDA addressed other higher priority work.

5. As a consequence, Designation now appears a most unattractive option. The NDA would still assume all the liabilities and responsibilities for CONSORT but the financial implications of those liabilities would now be underwritten by the College but without any control of the project schedule or cost.

6. Imperial, DECC and NDA have agreed to 6 monthly meetings to review the situation but, in the current political and economic climate, progress seems unlikely.
ALTERNATIVES

7. In anticipation of the above, a working group of academics, Reactor Centre staff and government (DECC – Office of Nuclear Development) was established in March 2009 to consider all the alternatives for CONSORT. This meeting identified that, as there was sufficient fuel for at least 7 and potentially 10 years of operations and as CONSORT was the UK’s last remaining civil research reactor, there could still be unrealised intellectual capital to be exploited. The following possibilities were considered:

8. **Education.** It was quickly established that, due to the security constraints imposed by the Office for Civil Nuclear Security, the opportunities for using CONSORT in undergraduate education was neither cost effective nor, for non-EU nationals, possible. Opportunities for MSc and PhD students are, however, still being explored.

9. **Training.** Companies involved in Britain’s new nuclear programme have been approached with a view to using Consort for Training. To date E.ON, RWE, AREVA, Rolls Royce and Westinghouse have declined. The MoD has indicated some minor interest, whilst EDF have yet to respond.

10. **Commercial.** Previous customers have been advised that Imperial is considering operating CONSORT for at least a further 3 years and new customers are being sought with the help of Commercial Development. There are a number of prospects being pursued with a reasonable possibility of £200k of income during FY 09/10. Increasing this in subsequent years is presently a significant challenge, although a number of prospects are being explored.

11. **Research.** Other research universities have been approached with a view to a collaborative research project but with no success to date. However, a proposal to operate CONSORT as a proof of concept demonstrator for an Accelerator Driven Subcritical Reactor (ADSR) is currently being considered (description at Annex A). An Expression of Interest (EOI) has been forwarded to STFC, EPSRC and BIS. College Business Development are now conducting due diligence on this proposal and will work with academic and operational colleagues to work up a business case. The current estimate is that, if approved, this would require c. £25M over 4-5 years. On the face of it this is an exciting possibility; it certainly appears to represent the best chance of a ‘future’ for CONSORT and of minimising cost to the College.

OTHER CONSIDERATIONS

12. The College also has an aspiration to undertake Proton Beam Therapy (PBT) and the accelerator required by an ADSR could, potentially, also be used for PBT. Technically it is considered feasible for one accelerator to provide a beam to both the ADSR and for PBT. It appears unlikely that Silwood could accommodate the other requirements of PBT clinical treatment. However, it may be feasible to install a Carbon accelerator which could be used for PBT clinical trials whilst also being suitable for use with the ADSR. This option will be fully explored in the business case and has been flagged in the EOI.

OPTIONS AND COSTS

13. Regardless of the ADSR potential, we have to look at other options and cases. There is a saying that ‘nuclear time is akin to geological time’ and whilst this is an
exaggeration it illustrates the realities that normal 3 or 5 year accounting practices do not adequately reflect the long term costs associated with nuclear projects. Accordingly, costs at Annex B are worked up for a 20 year period (including inflation) to better reflect CONSORT’s true liability.

14. The table at Annex B outlines the options and their associated estimated (and possible worst case) costs. Additional comments follow:

15. **Security.** Should the Office of Civil Nuclear Security require enhanced security at CONSORT, currently viewed as highly probable, annual running costs could escalate from c. £1.5M pa to c. £3.5M p.a. This cost increase would occur irrespective of the option selected regarding CONSORT’s future. This risk is included in the worst case column at Annex B.

16. **Decommission:** As identified above, the College had been anticipating that government would assist with the cost of decommissioning with the associated designation of CONSORT under the Energy Act. However, the current stance of DECC makes designation an extremely unattractive proposition. It is assumed, therefore, that Imperial will undertake and manage any defueling and decommissioning project. Although this increases the risk of schedule and thus cost overrun (as Imperial will have less influence with NDA site managers who will be required to take the fuel and Intermediate Level Waste), this is a small risk compared to the costs inherent in Designation and the consequent requirement to mothball the reactor post defuel.

17. **Mothball.** This is the most expensive option with the most intractable management challenges.

18. **Operate and Refuel.** Refuelling CONSORT with an alternative fuel has also been considered. It is a very poor option because this would require substantial re-engineering of the fuel rod support structure which, in addition to the design, reconstruction and fuel development costs, would involve over 80% of the same work and cost as decommissioning. As there are no other overriding benefits, if life extension beyond the 10 year fuel life is required, it would appear better to develop a new research reactor.

19. **Replacement Reactor.** A number of companies in the nuclear manufacturing and operating field have been approached with a view to developing a collaborative research reactor to replace CONSORT. The only expression of interest has been from Rolls Royce and an initial exploratory meeting is scheduled for late September; all other companies approached have declined. This option would still require the existing reactor to be defueled and decommissioned.

**WAY AHEAD**

20. In the absence of government support for defueling and decommissioning there is nothing to be lost by operating CONSORT for a further 3 years whilst exploring options to release the commercial and intellectual capital potentially present in the plant.

21. Should these avenues fail to be realised then, assuming the government’s position remains unchanged, it is proposed that the most cost effective option is for Imperial to undertake the 13 year project to defuel and decommission CONSORT.
ACCELERATOR DRIVEN SUB-CRITICAL REACTOR

1. All current reactors require sufficient nuclear fuel to achieve criticality; that is the point at which the neutrons being produced equal those being lost or absorbed. In practice this means that reactors require a surplus of fuel and thus have the potential to go super critical and become an uncontrolled reaction. Control is exercised by the use of control rods that govern the reactivity of the core.

2. An Accelerator Driven Subcritical Reactor (ASDR) has a sub critical mass of fuel and thus can never go super critical. The additional neutrons required for criticality are provided from a target (spallation) source in the reactor core which is activated by a proton beam from an accelerator. This feature renders the reactor more stable as turning off the proton beam immediately renders the reactor safe from a super critical accident.

3. Apart from the inherently better safety profile, there are a number of additional advantages to an ADSR:

   a. Waste fuel from previous reactors can be converted into a material with a considerably shorter half life that is thus toxic for considerably less time than the source material (c. 150 years vs Millennia).

   b. Thorium can be used as a fuel thus greatly expanding the world’s supply of fuel.

   c. Unlike current reactors it is flexible in its load delivery allowing efficient operation over a dynamic range of power generation

   d. Neither the fuel nor the waste material can, without extreme technical challenges, be used to make a nuclear weapon. It is thus postulated that countries might safely operate these nuclear power plants with much reduced danger of nuclear weapons proliferation.

4. The ADSR concept has been known since the 1940s and over the last decade the concept revitalised with a number of projects being proposed and full reactors designed; none of which have proceeded and the concept has never been proven. That such an apparently beneficial breakthrough in energy generation has not been adequately explored hitherto is, to say the least, surprising and clearly invites scepticism. This has been discussed with Sir Peter Knight, academics from the departments of Physics, Materials, Chemical Engineering and senior operators of the Reactor Centre. The reasons for this lack of progress are complex and appear to be a combination of some or all of the following:

   a. Early nuclear power generation was little more than a cover for the production of weapons grade material.

   b. Subsequently, the commercial market for nuclear power generation was only active in those countries with nuclear weapons there was thus no commercial incentive to develop an alternative to current power generating reactors.

   c. Despite there being in the region of 200 research reactors worldwide, since this work would probably require cessation of all other research activity, none has been both available and suitable to conduct proof of concept work.
d. Due to unanswered questions over both accelerator reliability and the non proliferation aspects of ADSRs Governments have not been persuaded to prioritise research into these reactors; although both the UK and Japan have funded research into advanced accelerators.

5. It appears that CONSORT could be easily adapted to operate as an ADSR. As a research reactor it already possesses the ability to insert and remove objects from the core. The target source could be easily inserted in place of one of the current insertion tubes. Sub criticality is achieved using the current control rods and experiments could be conducted as to the optimal level of sub criticality, by adjusting rod position.

6. A small accelerator would need to be built on site and it appears that a cyclotron could fit within the current Reactor Centre workshop, thus avoiding any planning difficulties. Current accelerator reliability would be acceptable for an experimental reactor. The proton beam could be directed through one of CONSORT’s ‘beam tubes’ or other devices already in place to allow access to the reactor core. As the changes to CONSORT will be minimal, obtaining regulatory approval should be less demanding than if substantial physical changes were required and the Nuclear Installations Inspectorate have reacted positively to initial proposals.
## Annex B

### CONSORT OPTIONS AND COSTS TO IMPERIAL OVER 20 YEARS (2009-2029)

<table>
<thead>
<tr>
<th>Options</th>
<th>Total</th>
<th>Worst case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Operate 3 years &amp; Decommission</td>
<td>34,532</td>
<td>44,232</td>
</tr>
<tr>
<td>- The first 3 years of the defuel and decommission process are taken up by safety case and regulatory submissions. There is thus an advantage to continued operation for 3 years as any income derived will more than offset the marginal increase in costs incurred by continued operations. The end date remains the same at 2022.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Operate to end of extended fuel life &amp; decommission</td>
<td>54,463</td>
<td>66,563</td>
</tr>
<tr>
<td>- An alternative would be to operate to the end of extended fuel life (2019) and then decommission (complete 2029).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Operate 3 years and Mothball</td>
<td>56,084</td>
<td>116,084</td>
</tr>
</tbody>
</table>
| - Like defueling & decommissioning the first 3 years are taken up by safety case and regulatory submissions. Mothbailing the reactor is an unattractive option.  
  - The regulatory requirement to maintain a full complement of Suitably Qualified and Experienced Personnel results in limited reduction of staff and the lack of meaningful work creates an intractable retention problem.  
  - Whilst over a 3 or 5 year period mothballing may be marginally cheaper than decommissioning, in the long term every permutation of Mothballing costs more than decommissioning and the on going liability remains with consequential increased regulatory and security risks. |
| 4 Remove Fuel and Mothball                   | 54,035 | 68,035     |
| - Represents likely scenario if CONSORT was 'designated'. Once the fuel is removed the risk of enhanced security is significantly reduced and this is reflected in the lessened worst case cost. The 20 year representative period fails to capture the on going liability of this option. |
| 5 Operate & refuel with current fuel type    | 38,376 | 81,376     |
| - This option would be strongly opposed by the regulators as it is the specific type of fuel used in CONSORT that most concerns the security agencies. Additionally, there is no manufacturing facility in the UK for this type of fuel and it would need to be imported from overseas; assuming the political complications could be addressed. |
| 6 ADSR proof of concept & research           | 4,017  | 55,971     |
| - Assumes 3 years to achieve ADSR proof of concept and 3 years operation as ADSR all funded by Research Councils. Best case is that either commercial partner or ‘national asset’ programme then decommissions CONSORT and covers costs. Worst case is that Imperial bears cost of defuel and decommission with worst case risks realised |

Notes: The costs in Black are the estimated cost over 20 years (2009 – 2029), inflated. The costs in Red (worst case) are the cost over 20 years assuming that all identified risks are realised; inflated.