



House of Commons
Innovation, Universities,
Science and Skills Committee

Science Budget Allocations

Fourth Report of Session 2007–08

Volume II

Oral and Written Evidence

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The Innovation, Universities, Science & Skills Committee

The Innovation, Universities, Science & Skills Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Department for Innovation, Universities and Skills.

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Publications

The Reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the Internet at www.parliament.uk/ius
A list of reports from the Committee in this Parliament is included at the back of this volume.

Committee staff

The current staff of the Committee are: Dr Lynn Gardner (Clerk); Glenn McKee (Second Clerk); Dr Edward Waller (Second Clerk); Dr Christopher Tyler (Committee Specialist); Dr Joanna Dally (Committee Specialist); Ana Ferreira (Committee Assistant); Camilla Brace (Committee Secretary); and Jonathan Olivier Wright (Senior Office Clerk).

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Oral evidence

Taken before the Innovation, Universities and Skills Committee

on Monday 21 January 2008

Members present

Mr Phil Willis, in the Chair

Dr Roberta Blackman-Woods
Mr Tim Boswell
Mr Ian Cawsey
Dr Ian Gibson
Dr Evan Harris

Dr Brian Iddon
Mr Gordon Marsden
Graham Stringer
Dr Desmond Turner
Mr Rob Wilson

Witnesses: **Professor Michael Rowan-Robinson**, President, Royal Astronomical Society, **Professor Peter Main**, Director of Education and Science, Institute of Physics and **Mr Tony Bell**, National Secretary, Prospect, gave evidence.

Q1 Chairman: Good afternoon and could I welcome our witnesses to this, the first evidence session with the Innovations, Universities and Skills Committee, looking into the science budget allocations. Could I welcome our first panel, Professor Michael Rowan-Robinson, the President of the Royal Astronomical Society, Professor Peter Main, the Director of Education and Science at the Institute of Physics and Tony Bell, the National Secretary for Prospect, the professional association representing many of the scientists in some of our universities and institutes. Professor Main and Professor Rowan-Robinson, in October 2007 the Government announced the Comprehensive Spending Review settlement for science, a 17.4% increase, one of the most generous settlements we have seen. This is building on two successive comprehensive spending reviews raising the overall level of resources for science. What on earth is the problem? Why do you have a problem with it?

Professor Main: You are absolutely right that government put a lot of money into science and it has really been very, very welcome. A recent international review of physics made the point of how much things had got better.

Q2 Chairman: Including physics.

Professor Main: Absolutely. I think what has happened here is that for a number of reasons—which, I have to say, are not entirely transparent from where I am sitting—the settlement for STFC, although it looks very impressive at 13.6%, in actual fact when you take into account the FEC and a number of other factors it has led to essentially a flat cash settlement. Due to the specific nature of STFC with its responsibilities for international subscriptions, for running national facilities, most of the cuts that will occur due to inflation and so on and due to the effects of the increase in international subscriptions have been concentrated in the elements of the STFC budget which are flexible, specifically the 25% cuts which STFC announced for grants.

Q3 Chairman: Overall you would agree that the 17.4% for science was a generous settlement.

Professor Main: Absolutely.

Q4 Chairman: The 13.6% for STFC appears to be a fairly generous settlement, so can I move to you, Michael. Were you expecting more than that in the overall budget.

Professor Rowan-Robinson: I do not think I knew enough about the whole budget of STFC to know what the settlement ought to look like. It is only when you see how STFC meets its various requirements and aims that you start to see that somehow it seems they have a hole in their budget of about £80 million. I want to reiterate what Peter said to make sure we give a positive remark at the beginning, that basically we are very conscious in the case of astronomy that the Government supported our entry into the European Southern Observatory in 2001; it found extra funds to do that. We are also very appreciative obviously of the full economic costs of universities which potentially have a very positive impact. The problem is that once one looks at the STFC plan the FEC increases are entirely negated by the 25% grants cut.

Q5 Chairman: I am trying to get to the point of why was this such a big surprise? Here you are, the Director of Education and Science at the Institute of Physics and the President of the Royal Astronomical Society, you are leading figures within your fields; surely the consultation that went on before the plan emerged led you to say that something is wrong and why were you not writing to the Committee at that point saying we really ought to do something.

Professor Rowan-Robinson: There was no consultation.

Q6 Chairman: None whatsoever.

Professor Rowan-Robinson: None whatsoever. Basically it was a complete bolt out of the blue. The first hint of it was the leaked announcement about the withdrawal from Gemini to which we reacted of course, not knowing that this was merely one straw

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in the wind. The second hint we had was the day before the announcement, I was leaked a figure of 25% cuts to grants. That was the first we had heard. Basically I think STFC did consult the panels it had set up, the Science Board, the PPAN Committee and so on; they were in the know.

Q7 Chairman: They did not speak to you.

Professor Rowan-Robinson: They were told they must not speak to anybody. I had a conversation with Keith Mason in this period up to the announcement and although he gave hints that things could be bad if the settlement was not good but he did not say that we were facing a huge hole in our finances.

Q8 Chairman: Tony, we have a situation here where you represent the scientists on the ground and as a trade union you did nothing to flag up these cuts.

Mr Bell: We were not aware of them; again there was no consultation with staff.

Q9 Chairman: You were not aware of them.

Mr Bell: No.

Q10 Dr Gibson: There are other research councils that are involved in getting settlements, have you ever heard of consultation taking place there in this current situation? Were they consulted about their success or failure, however the Government thought of it? Were you just differentially picked on, that is what I am asking really, as far as consultation is concerned?

Mr Bell: I believe the consultation in this area, particularly as it is likely to lead to hundreds of redundancies of employees of the STFC, was not done in the same way as it has been in other councils.

Q11 Dr Gibson: In what way?

Mr Bell: I would contrast it with the restructuring of the Centre of Ecology and Hydrology undertaken by NERC where there was a business plan produced, there was consultation with the stakeholder community, the unions were consulted with a view to avoiding the redundancies and to comment on the restructuring and we made a presentation to Council prior to the final decision being taken. In this event the funding model has been decided upon through the CSR; we are now being consulted about the impact in terms of redundancies, not with a view to it being changed.

Q12 Dr Gibson: So there was not even a phone call saying, "We're going to sack you"?

Mr Bell: When the CSR emerged certainly it was hinted it was going to be bad but there was no hint of it at consultation.

Professor Rowan-Robinson: If you compare STFC with PPARC part of the problem is that STFC had not got around to setting up a proper advisory structure. It created PPAN (Particle Physics, Astronomy and Nuclear Physics Committee) and it was clear when that was set up that although that committee or panel was supposed to recommend an advisory structure below it—which would have

involved far more of the community and I think in the previous council far more of the community were involved at a lower level in the structure—they would have been consulted about bits of the plan and they would have felt some ownership of the plan.

Q13 Chairman: I am now reading the Delivery Plan, "4.1 Stakeholder Engagement: STFC Council has established an advisory structure comprising a Science Board and two Science Committees—Particle Physics, Astronomy and Nuclear Physics Committee (PPAN) and the Physical and Life Sciences" so it was done but none of your members were on it.

Professor Rowan-Robinson: There are a couple of astronomers on it.

Q14 Chairman: But they did not speak to you.

Professor Rowan-Robinson: They were not allowed to speak to us.

Q15 Mr Wilson: I have a quick question generally about consultation. In recent times with the Government we have had no consultation before changes to the foundation degrees, no consultation about ELQs and the changes there and now we find there has been no consultation about this. In general have you found that government is not consulting the science community about changes they are making, or is this something new, something recent that they have not been consulting thoroughly enough with you?

Professor Main: That is not the easiest question to answer because different situations have led to different consultations. I would say that in general in science there has been good consultation and that in general we feel, in the physics community, that we have had an opportunity to put ideas forward to most of the research councils. I think this is a special case with STFC for two reasons, one is that two very disparate research councils came together very soon before the Comprehensive Spending Review which I think has made a large difference. The other issue to do with STFC which makes it different in this context is the number of fixed commitments that it has relative to EPSRC (which is the other main physics funding research council). EPSRC more or less does have flat cash and that has a less ferocious effect on the finances of physics departments than does STFC where most of the cuts have been concentrated in the areas to do with flexible money, as I said earlier.

Q16 Chairman: Trying to cut to the chase, this £80 million deficit that we all agree on—there are also other savings within the STFC budget going up to £120 million, that is what it says in the Plan—is this poor management on your behalf and the science community's behalf, the particle physics, physics and astronomy communities? Is it just poor communication as you have already hinted at? Or are there other factors?

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Mr Bell: I do not think I would necessarily agree with you that there is an £80 million deficit here. It does look to me that there is £80 million less than the Council hoped to acquire out of the Comprehensive Spending Review, there is no question about that. Quite clearly, as has been described in the earlier part of evidence, there is basically a level funding across the Comprehensive Spending Review. It strikes us and it strikes the staff that therefore there has been a decision by Council to make a radical departure from one area of science to another to the tune of £80 to fund the bits that did not receive that amount of money. In addition to that they have actually made a decision to increase the amount saved to create what they call a headroom of £40 million, so this is a Council decision.

Q17 Chairman: So with £120 million—£80 million plus the extra headroom to £120 million—you say it is displacement funding; it is taken from one to put into new research.

Mr Bell: Yes.

Q18 Chairman: Do you know where it is going?

Mr Bell: I know what is in the Delivery Plan; I am not going into any more detail than that.

Q19 Chairman: You just think that the rational explanation is that it has been a movement of funds from science which the Council no longer wishes to do to science which the Council wishes to do.

Mr Bell: That is how it looks to the staff, yes.

Q20 Chairman: Is that how it looks to you too?

Professor Rowan-Robinson: I do not see it quite that way. I think that having completed Diamond and the ISIS II they felt obliged to fund the running costs of those facilities fully and I think the £80 million deficit is a deficit against continuing the programme as it stands at present. It is a cut, I think, against a level programme. The STFC feels they have to do certain things; they have to run Diamond and ISIS II fully having only just built them; they have to invest in the campuses which they made a big feature of in their Plan. Having done that they then have to look around at what else there is and that is where the blow has to fall; it has fallen both on the labs and on the universities. The universities are facing potentially 25% cuts.

Q21 Chairman: Another possible explanation is the issue of Diamond and ISIS coming on stream and having to find extra money for that.

Professor Rowan-Robinson: Yes.

Q22 Chairman: That really backs up Tony's point.

Professor Rowan-Robinson: Yes.

Q23 Dr Iddon: Are you suggesting that the running costs for Diamond have not been budgeted for and that the outturn is greater than was in the original budget? Could you be specific about figures?

Professor Rowan-Robinson: I think you have to press the STFC about that. It is hard for us to have clear visibility about that.

Professor Main: We are told that the running costs were not underestimated but that there is a particular problem in fact with the success of Diamond. It is of course worth making the point that Diamond is used not just by physicists, about a third of its usage is medicine which of course is a major priority for the Government at the moment. I would certainly reinforce what Michael has been saying about where the problem lay for the £80 million. It is because of these fixed commitments and what is causing the problem is not so much the cut; had there been a cut due to inflation, due to the Government giving slightly higher priority to medicine and environmental science—which is fine, the Government of course can do that—that would not have been a problem. It is the concentration of the cut into the flexible funds which is causing so much pain.

Q24 Chairman: In terms of full economic costs which you mentioned earlier, do you feel that that has had a disproportionate effect within STFC? The other research councils do not seem to be reporting a problem with it.

Professor Main: I do not think it is a disproportionate effect in total. If one looks at EPSRC, for example, they had a rather larger rise than STFC but in fact when you take into account the effects of FEC on their funds it is flat, so it is about the same.

Q25 Dr Turner: I find it very difficult to understand why the difficulties with funding running costs of Diamond and ISIS should be a surprise; they should have been predictable. Were they not planned for?

Professor Rowan-Robinson: I think there have been some misunderstandings along the way and perhaps this is something that the Committee can pursue. I do not know for sure but my feeling is that there were two errors really, one is in the allocation so basically the DIUS wanted to focus the big increase in science especially on medical research which is an entirely justifiable thing to want to do. However, they went a little bit too far. The amount involved compared with the total budget is small; it is just that they overdid it. They did not appreciate that they were leaving STFC with a huge problem. I think that was an error.

Q26 Chairman: So it is the Government's fault.

Professor Rowan-Robinson: Yes, I believe there was an error in the allocation. I do not think it was their intention to hit astronomy and particle physics in the way they did. The second part of the error though was at STFC. I think that STFC, having been given this budget, could have managed it in a slightly different way. I think that they almost provocatively set this headline figure of 25% to all university grants which immediately feels like a catastrophe for all the departments concerned. If it had been 10% or 12% or something then it would have just been regarded as bad weather, but 25% sounds like the first step in closing the fields down.

Professor Main: Particularly since it is taking immediate effect.

Q27 Dr Gibson: If they had consulted you, what would you have said to them? Suppose they had phoned you up and told you you were going to get a reduction, what would you actually have said to them?

Professor Rowan-Robinson: I did have conversations with Keith Mason in the run up to this. I did not get a clear picture that this was coming at all. I did say to him, “Whatever you do, make sure you protect the grant side”. I have said that to him many, many times. He did not attempt to do that in my view. If you look at the Delivery Plan on page two, the introduction, it says, “Our overall strategy . . . support a healthy and vibrant university community”. Further down it says, “Investment in university departments is of strategic importance”. Then you go over to “Strategies” and “Priorities for the CSR Period” and you cannot find a single item in there which is directed towards supporting university departments and universities. I do think that the STFC could have fallen in line more clearly with their responsibilities for fundamental science which is a part of their mission and safeguarded it.

Professor Main: I think one of the big issues about this affair has been the fact that a number of fairly important and long-reaching decisions have been made in a very short space of time. We know from the meeting that STFC called when we were given a timetable that only the day before the launch of the science budget was the final Delivery Plan agreed. We know some very, very major decisions were made at very short notice. It is the nature of STFC, of course, that many of their projects are tens of years long.

Q28 Mr Boswell: I have a quick question about reputation in two respects. Obviously science at this level is an international business. Has this damaged the reliability or the reputation of reliability of British science? Secondly, in terms of the participants—your scientists at the coal face of this—is the credibility of STFC itself and the system to deliver a reliable flow of funds also impaired?

Professor Rowan-Robinson: Absolutely, I think you have hit the nail on the head. UK physics, UK astrophysics and astronomy and particle physics have a very high international reputation. They are a key part of why the UK score so highly in science ratings. If you look at citations and publications these are areas with the highest international reputation and real harm is being done by the news of this level of cuts. In the Royal Astronomical Society we have many overseas fellows and I get e-mails all the time from them wondering what on earth is going on.

Professor Main: We went to the trouble of contacting many of the people who did take part in the international review of physics just two years ago now and they made very similar comments. As a member organisation many of our members contacted us and I think it is fair to say that STFC has lost some of the confidence of the community.

Q29 Dr Gibson: How would you like to resolve this situation? If you had a clear piece of paper from this morning, how do you think you can get it to some kind of compromise situation?

Professor Main: We have spoken to DIUS, we have spoken to STFC and we have spoken to our community and all three of them seem to regret the current situation. No-one seems to have intended it but it is very difficult to unravel, as we have said. I think that what is important is that while Wakeham is spending the best part of this year reviewing physics and deciding what the medium term funding is according to the terms of reference we saw today, then I think we need to have something in place to prevent irreversible decisions being made in that period, decisions that later on we will not be able to unravel.

Q30 Dr Gibson: What would you say that something was?

Professor Main: Money, I would guess.

Q31 Dr Gibson: From whom?

Professor Main: I think the money should probably be made available from RCUK. There are various ways of doing this. One could top slice some of the other research councils; one could delay certain projects, introduce delays into the system. We are talking probably about £20 million—it is not a terrific amount of money—in order not to allow things to go beyond the point of no return.

Mr Bell: I think that is a crucial point that some irreversible decisions will be taken, the redundancies that are likely to impact on STFC we are being told need to be made almost immediately in order to make the saving in the Comprehensive Spending Review. At risk are not only those number of jobs but I think the critical mass, at least two of the sites and a huge capacity for science in the UK. I think that deserves a longer consideration. As far as the staff are concerned they do not understand why this is happening; they do not understand the logic behind the decisions and they are not brought into it. You asked the question about reputation, I believe not only the reputation of the STFC and therefore the UK outward looking, but certainly the reputation of STFC amongst the UK community, particularly among the staff, is now at rock bottom.

Q32 Dr Gibson: With all this concern then, are you going to take part in the Wakeham Inquiry?

Professor Main: Yes, of course we will.

Q33 Dr Gibson: Even though that is just physics and does not include astronomy, is that right?

Professor Rowan-Robinson: Astronomy is a loose term meaning astrophysics, cosmology, space science, solar system science. We call it astronomy because the public understands astronomy.

Professor Main: HEFCE calls the subject physics and astronomy.

Q34 Chairman: Can I just ask a rider to your earlier question? Tony, you did not give a response to Dr Gibson about the solution. One of the suggestions Professor Main made was top slicing the other research councils’ budgets because RCUK does not

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have any money itself. This would mean that for your members some of the grants they were expecting would go. Is that an acceptable solution to you?

Mr Bell: I think we need to have a look at why the decision has been taken for the funding to STFC.

Q35 Chairman: I am asking for a solution; would you support that as a solution, top slicing other research councils' budgets?

Mr Bell: I think the logic for us and for our members is that there has been no consultation; there has been no understanding as to why we have got to this position.

Q36 Chairman: I am asking you a question. Would you support that? Is that a possible scenario that you would actually support the top slicing of other research councils' budgets?

Mr Bell: I think there arguments to be said that some of the research councils—

Q37 Chairman: You would just make other scientists redundant elsewhere.

Mr Bell: Not necessarily; I think we have to look at what that funding is being allocated for. The key question that I have is why have the decisions been taken within STFC under which there is going to be a radical reduction in the science delivered in certain areas. I think it is a consideration that Council have gone through in private without consultation either with staff or stakeholders.

Q38 Dr Gibson: Whilst this Wakeham thing drags on—it will drag on, I am sure, because we are going to have a comprehensive review—people will be made redundant, the subject will lose its international status; you are prepared to live with it.

Mr Bell: No, we would want this issue to be resolved very rapidly.

Q39 Dr Gibson: What is “rapidly”?

Mr Bell: What we need to do is stop people being made redundant now. There has to be a moratorium for that for a proper and fundamental review of the decisions to be taken. After that then hopefully we can have a strategy. Not everyone is going to be happy if we accept that, but it is actually understand and is considered and stakeholders feel they have had a share in it. That is what we are missing at the moment.

Q40 Dr Gibson: Does the Wakeham Review accept that? Has the Wakeham Review Committee been set up yet?

Professor Main: No, it has not. The Royal Astronomical Society and the Institute of Physics have both been approached to try to nominate some members for the committee. You can ask Ian Diamond later, but I believe the committee is in the process of being set up now and the terms of reference of course have only been made available today.

Q41 Chairman: You would wait for that.

Professor Main: We would wait for it but it is absolutely essential that in the meantime could we have some moratorium.

Q42 Chairman: You would have a moratorium, you would wait for Wakeham and then make some decisions.

Professor Main: Yes.

Q43 Mr Wilson: I think your union has been talking about a couple of hundred redundancies and we know how difficult it is to get young people into science anyway. What do you think the impact of these redundancies is going to have inspiring confidence in school and university students to pursue a career in research?

Mr Bell: I have not actually mentioned 200; the numbers could well be more than that. What I would say is what future is there in a career in physics and astronomy when the capacity is being ripped out of the UK? It cannot send a positive signal at a time when we are having reviews about how we can encourage, particularly in the physics area.

Q44 Mr Wilson: So you think it is going to be a pretty devastating message.

Mr Bell: It has got to be.

Professor Rowan-Robinson: This is where I think all this is a mistake. I do not think it is an intended cut in this way because basically the impact of astronomy and particle physics is far greater than its actual size within physics. If you look at what draws school children into science in the first place you will find that very often it is things like astronomy, space science and so on. If you ask why students choose physics at university again it is astronomy and particle physics. We have had recent surveys of first year students suggesting that as many as 90% of them came into physics because of those kinds of subjects. When they get there they find out all the wonders of physics and they do not all do astronomy and particularly physics, which is just as well. They are needed in all areas of physics and the economy needs physics as a whole. However, if you hit astronomy and particle physics in the way they are being hit at the moment the impact is going to be devastating to the whole physics programme and eventually the UK economy, the UK science reputation. The knock-on effect is far-reaching.

Q45 Dr Iddon: I will put my cards on the table. I am a northern member of Parliament from the Greater Manchester area and when the original decision on Diamond was taken the north west group were very, very disappointed (that is the north west group of members of Parliament), we lobbied the Prime Minister and we got some extra money for Northwest Science, as you well remember. Of course we accept the Diamond decision; that was made and we were expecting 80 job losses during the current year and 30 next year as a result of that decision. I add that up to 110 job losses a result of the Synchrotron decision. I am reading that the STFC are putting it about that 180 job losses come out of that decision. There is a difference of 70 there I cannot reconcile, and altogether 350 jobs look as if they are going to be lost at Daresbury. Where are the rest coming from?

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Mr Bell: My understanding is that 80 were already planned in the reduction of SRS as you described. Further programme will be cut at the Daresbury site which will result in more redundancies. We do not know the numbers yet; it will depend on how many efficiency savings can be made or extra funding could be attracted, but those numbers that you describe sound entirely possible to me from what I understand.

Q46 Dr Iddon: I do not know what the status is of the fourth generation light source—I do not know whether anybody knows, we will ask STFC when they come in front of us shortly—but obviously there are going to be some job losses there if the programme is either suspended or especially abandoned. Let us assume it is going to be abandoned; to you know how many job losses there would be at Daresbury as a result of abandoning 4GLS?

Mr Bell: No, I do not, not specifically. We are in discussion at the moment about the implications of the actual numbers that are likely as a result of cutbacks of programme, but the absolute detail is not known to me.

Q47 Dr Iddon: Do you think that if two-thirds of the jobs go at Daresbury—because that is what it is looking like from the figures that are before me—science and innovation can actually survive on that site?

Mr Bell: I do not see how it can. We have already tasked Keith Mason with the obvious dichotomy in the statements in the business plan about encouraging a technology campus at Daresbury whilst withdrawing from the key science that would make it attractive. I cannot see how those two square up.

Q48 Dr Iddon: Does it look to you—as it looks to north west MPs—that the original fear that we had that science was being pulled into the golden triangle and that Daresbury was going to be abandoned is going to come true?

Mr Bell: It does look that way to me and it certainly looks that way to the staff at Daresbury.

Q49 Dr Iddon: Obviously there are three science and innovation sites that were declared by the last science minister, Lord Sainsbury—who I think did a good job and we were very pleased to hear that these three sites were going to develop as science and innovation sites—can you tell us something about cuts at the other two sites, the Scottish site and the Harwell site?

Mr Bell: Again the details are not yet there but quite clearly with the withdrawal from Gemini there will be an impact on the UK ATC and if you look at the Delivery Plan it is quite clear that a different model of governance is being looked at with regards to the UK ATC and I believe that the STFC no longer wish to actually own the site and the staff.

Q50 Dr Iddon: I am looking at 200 job cuts here at Harwell Rutherford Appleton alone and presumably more at the Scottish site. Has anybody calculated the cost of redundancies and severance packages that will

obviously come out of all these job cuts? Has that been allowed for in the STFC budget? Have you asked STFC this question?

Professor Main: I understand that the £27 million that they were allowed to bring forward in their budget was for restructuring costs which I assume are redundancy costs.

Q51 Dr Iddon: So it is covered in the budget.

Professor Main: There was some flexibility allowed to STFC. There was an extra £5 million a year they were allowed to bring in from their capital costs and £27 million, the self-loan, was able to be brought forward to allow for these restructuring costs.

Mr Bell: I think until you know the numbers you cannot say what the money will be, but it is going to be big.

Professor Rowan-Robinson: On the ATC I can give you a number. The number of potential job losses at ATC is 40 people I believe, so approximately 50% of the workforce there are facing redundancy consequent on the withdrawal from Gemini and the abandonment of the instrumentation programme there. It means that the capability to build instrumentation to support our membership of the European Southern Observatory and get a juste retour from our subscription to them may be lost.

Q52 Dr Turner: In addition to all the potential damage to Daresbury and the other sites, what is going to be the impact in your view of the research grant costs? What is going to be lost?

Professor Main: You mean in universities?

Q53 Dr Turner: Yes.

Professor Main: It will of course not be evenly spread but there at least half a dozen universities—some large, some small—whose dependence on STFC is about 75% of their funding or more and lots with about 50% of their funding so a 20% cut in that will be a 20% cut in their income. If you look at what the actual figures are—in terms of grants it is money in/money out because you spend it on the research—there are also now full economic costs and the direct costs that go into the university. Some universities are standing to lose about three quarters of a million pounds a year in terms of their direct costs, ie the money they will lose as a result of these cuts. Some departments, even some of the very largest, will suffer very badly. Some of the smaller ones with high dependence on STFC may really be under a lot of financial pressure, particularly since, as we know what I call the parachute funding for HEFCE (the extra £75 million that HEFCE found for certain subjects including physics on the teaching side) is due to in 2009–10. If these things all come together at the same time it will put a lot of pressure on physics departments.

Q54 Dr Turner: That also implies a further wave of redundancies.

Professor Main: It is perfectly possible, yes. What is so frustrating about this from my point of view because I have an interest in education as well as research is that we really did seem to have turned the

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corner in physics with more people doing A levels last year, a lot more people applying to go to university. I am personally convinced that the reason for that is that senior people in government have been sending out some very positive messages about the use of physics, the jobs in physics and how important physics is. What worries me most about this—and I do regret it so much—is that we are all perhaps sending a negative message out and that is very, very regrettable. I know that the Government desperately wants to avoid more physics departments closing; they want more to open. It would be very regrettable if, as a result of this, we lose physics departments.

Q55 Dr Turner: The message is: study physics and be redundant in a few years. That is not a good message, is it?

Professor Main: I think that might be exaggerating a little.

Q56 Dr Turner: It is not good though.

Professor Main: No, it is not good.

Q57 Chairman: Just to follow this point up, Tony said earlier in this conversation that this is not a loss of funding to STFC, this is a redistribution of £80 million—possibly £120 million—into this area. One of the big beneficiaries will be space which actually requires physicists and astrophysicists to actually go into that area. There will be a lot of new work for academics; there will be new work for scientists. Why are you not looking at this as a glass half full?

Professor Rowan-Robinson: In astronomy we have our subscription to the European Space Agency, we have our subscription to the European Southern Observatory so ESO will select the missions and the UK will try to get involved with instruments on that but they will be doing so with a budget that is 25% lower. The number of post doctorate researchers available in the universities will be 25% lower in three years' time. The possibilities of significant involvement in these space missions that ESO selects will be reduced. I think the net result will be that whereas currently the UK has a presence in most fields of astrophysics, solar system science and so on and is a major force in European astronomy, that will slowly disappear and we will find that all the opportunities have been taken by France, Germany, Italy or Spain and we will not be able to compete across the full range of science.

Mr Bell: The work we have done shows that those who are made redundant from science—we followed our members who had been made redundant—the vast majority of them do not remain so it is not as if you can make them redundant now and pick them up in two or three years at another location. A lot of them will have drifted out of science, they will have gone abroad, they will have changed careers or whatever; they do not just sit around in the wardrobe waiting to be lifted back out for another project.

Q58 Chairman: I was not suggesting that; I was suggesting that overall within the budget there will be new opportunities.

Mr Bell: But it is the lead time between one and the other; you will lose people.

Q59 Mr Marsden: Professor Main, earlier you referred to some of the international reactions or concerns that have been expressed about the cuts in this budget. I declare an interest as a north west MP and am profoundly concerned about any implications of savage cuts that would affect Daresbury's viability. My colleague Brian Iddon went through the job numbers but there are other issues as well. For example, Prospect, in their written evidence to us, say that if this results in the withdrawal of STFC from science programmes key to the future of the Daresbury site (they mention the Linac Prototype for a next generation light source and the EMMA project) that this again will completely nullify the intention of the department for Daresbury to act as a focal point for collaboration and knowledge. Is that too stark a prospect?

Professor Main: I do not think so. I find it very difficult to comment specifically on the Daresbury project partly—as Tony has hinted—because of a lack of transparency in the decision making process. We know next to nothing about how these decisions were reached. I have heard John Denham say in public that he puts Daresbury at the top of his priority list; he says that he will see that Daresbury will continue.

Q60 Mr Marsden: Tony Bell, could I ask you, because it was you who flagged this up in the evidence and echoing what Professor Main said, is it not possible that there is a huge dichotomy here between the declared and the sustained intention of ministers to diversify outside what I think one of my colleagues referred to as the “golden triangle” and what appears to have been a sort of handed-down very quickly and very regionally focussed decision. Would it be unfair for those looking at it from the outside to say that actually the STFC have taken advantage, potentially, of this situation to produce a rather slash and burn approach to Daresbury?

Mr Bell: It does look like there have been radical decisions taken in the Council in light of the CSR and certainly our members in Daresbury are saying, “Well, where will be the critical mass for this technology campus if those sort of programmes are being stopped?” They are very doubtful for the future for a technology campus at Daresbury.

Q61 Mr Marsden: So that is a central issue for Wakeham as well, is it?

Mr Bell: I would have thought so.

Q62 Dr Gibson: Just for the record, this will affect Scotland as well. You cover the work that goes on there and there is a very proud tradition of physics and astronomy. Edinburgh, for example, is very frightened that they are going to lose a lot of facilities which are international. Is that true?

Mr Bell: Absolutely.

Q63 Dr Gibson: Just to correct the record, everything is not just in the north west, it is right across the country.

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Mr Bell: Yes.

Q64 Chairman: Professor Main, we have been told that solar terrestrial physics is going to be removed totally from the UK's portfolio. What is going to be the effect of that?

Professor Main: Could I just say that one of the international people we did contact, Professor Roger Blandford, made the comment that it was a rather curious thing to be doing at a time when climate change is so important.

Professor Rowan-Robinson: Just to make clear, it is ground-based solar terrestrial physics facilities, it is the ground-based radars but there are still space missions doing solar terrestrial physics. The key point about the ground-based radar is they complete the picture of the interaction between the sun and the earth. If the sun is active in solar storms and so on it can trace them through space and then you see the impact at the earth with the ground-based radars. As an aside, they also track debris from the Chinese satellite destruction so they have a value for society basically. These solar storms, of course, disrupt electrical networks and cause potential harm.

Q65 Chairman: The other point we have received a lot of information on is really the International Linear Collider and the abandonment of any involvement in that programme. Surely the fact that we are continuing to invest significantly in the Large Hadron Collider demonstrates a commitment to this area of particle physics and therefore we do not need, given tight resources, to actually involve ourselves with the International Linear Collider.

Professor Main: The International Linea Collider of course is much further down the line. I think the biggest criticism we would put forward there is that the decision was made with very, very little consultation with the people involved. The people who have been involved—Brian Foster at Oxford is the European leader of the ILC programme—were not given any opportunity to present their case before the project was terminated. It is not useful at this sort of meeting to get involved in the ins and outs of whether it is a good thing; they are very complicated issues. It is really a question of the time available for the decision and the lack of consultation.

Q66 Mr Cawsey: I would like to ask a little bit about the headline increase of 17.4% for the research councils which disguises some considerable variation in the amounts received. What do you make of the range of increases that different research councils have been allocated?

Professor Main: It seems to me that the Government has the right to put priority where it thinks. It is the Government; it decides where the priority should be in the science budget. I think it is perfectly reasonable of course to put more money into medical research and perhaps the environment. I do not think we have any problem with that. I think the problem has been the way it has been concentrated on these specific projects and such a large cut was not intended when it made the original plan to allocate the budget as it is.

Q67 Mr Cawsey: You say that obviously the Government has the right to make priorities.

Professor Main: Yes.

Q68 Mr Cawsey: Do you generally agree with the priority calls they have made?

Professor Main: We would like to see that physics would be at the heart of all the sciences. One of the things about physics is that it is basic nature and I hope that the Wakeham Review will take that into account. I used to be at the University of Nottingham; my colleague Peter Mansfield is a physicist but he won the Nobel Prize for medicine. I think the actual priorities are fine but one has to recognise that the contributions to those priorities will not necessarily always come from medical schools in medicine, they will often be from physics.

Mr Bell: I think as well that we should be aware that the process is not as joined up as just looking at the CSR for science, I would imagine, because there is no coordination with the spend on science in other government departments. We are only looking at a microcosm of the UK science spend; the rest of it is vested in departments and I am not convinced that departments talk to each other and research councils talk to departments. We are only looking at that small part of it. The wider picture is not known to us.

Q69 Mr Cawsey: Is that what your members have been saying?

Mr Bell: Yes. We have been saying for ages that there should be a coordinated policy across government for spending in science. We already see the very point you are making, that there are large differences just within the research councils. When you start looking at government spend across the departments as well there are huge variations and that has impacts because they are all inter-related.

Professor Rowan-Robinson: Coming back to this point about unintended outcome, basically the intention was to have a big increase in science spending, tick; the intention was to focus that pretty much on medical research, tick. The unintended consequence was slashing cuts in key areas of physics. That was not intended and that, I feel, was an error somewhere along the line.

Q70 Mr Cawsey: Moving on from that, Professor Main, the Engineering and Physical Sciences Research Council received a funding increase of 18.6%, so why are you predicting a reduction in grants?

Professor Main: Shortly after the CSR Review was announced we spoke to officials from EPSRC—of course it is rather difficult because FEC is complicating the calculations—and in terms of their volume of research they are expecting a decrease over the CSR period roughly according to inflation. In other words, their allocation is flat in terms of the volume of research. What has happened of course with FEC is that more money will be going into the university sector as a result of the increases. This is to be welcomed; certainly the universities have been calling for it for some time. I was speaking to the chief executive of EPSRC just three days ago and he was

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saying that one of their key issues for the next year was educating universities in the use of the full economic cost funding. I think that will be very, very important. It was always the case that FEC money was not going to increase the volume of research; in fact, even in EPSRC there is going to be a slight decrease in volume as a result of getting flat cash.

Q71 Mr Cawsey: Some people are going to see a benefit of flat cash elsewhere.

Professor Main: There will be benefit within the universities and if the money is spent wisely in the universities it may give an overall benefit to science.

Q72 Mr Cawsey: UK subscriptions to international projects are currently compensated by the OSI to currency fluctuation but that is due to end at the end of March. I would be interested to know your view on what is likely to happen if there is a drop in the value of the pound post-April?

Professor Main: It is clear what will happen, there will be a further cut on the flexible funding that we have referred to, Michael's unintended consequences, and so the grants will be cut even more. I have to say that this change in policy is quite extraordinary. It could go the other way; it would be just as absurd for STFC to have more money simply as a result of a slightly stronger pound than it is for it to have less money due to a weak pound. I do not see this as a very sensible decision at all and it is quite out of kilter with most of the rest of our European colleagues.

Q73 Mr Cawsey: It is bringing in additional uncertainty.

Professor Main: Yes, absolutely. It is uncertainty in funding which, as any funder will tell you, is not what you need because you always have to have a contingency for that.

Professor Rowan-Robinson: It is not just currency fluctuation, it is also GDP changes so that drives several of the subscriptions as a proportion to GDP. If the UK does really well and has less funding then the subscriptions go up. Our belief is that these international subscriptions should be taken out of the budget basically, they should be paid either off the top or RCUK or at the Treasury or something like that. Fluctuations should not sabotage science planning.

Q74 Mr Cawsey: The review of physics is to be followed by reviews of other subjects. Is this something you welcome

Professor Main: Yes, although I would say one thing that slightly concerns me and that is the way that the subjects are split up and really there is a continuum in science, physics in particular. One of the things I always say is that if you look at where physics graduates go, they go everywhere, into all the sciences and engineering. You can visit any campus and you will find people with physics degrees in all sorts of different areas. The campus at UEA is an excellent example. They do not have a physics department at the University of East Anglia—as Ian Gibson knows well—but in fact they have several dozen people whose first degree is in physics.

Q75 Chairman: Tony, would you agree with the fact that disciplines with those caveats should be included in these reviews?

Mr Bell: Yes, I think so. I take the point as well that it is very difficult to make these arguments on rigidly academic discipline lines. There is a lot more integration of science happening which is surely to be welcomed and I think breaking it down into these little subheadings is not necessarily helpful

Chairman: On that note, where everyone seems to agree, could I thank very much indeed Professor Michael Rowan-Robinson, Professor Peter Main and Tony Bell for being excellent witnesses. Thank you very much indeed.

Witnesses: **Professor Ian Diamond**, Chair, Research Councils UK and **Professor Keith Mason**, Chief Executive of the Science and Technology Facilities Council, gave evidence.

Q76 Chairman: Could I welcome our second panel of the afternoon who have been sitting quietly, listening and observing. Professor Ian Diamond, the Chairman of Research Councils UK and Professor Keith Mason, Chief Executive of the Science and Technology Facilities Services, welcome to you both this afternoon. Could I start with an obvious question? Who is to blame for the STFC being £80 million in deficit?

Professor Mason: Firstly, I do not think there is anybody to blame. It is not a blame situation. We have, as we all know in this room, a rather good settlement for science but it was only constant volume and in the current economic climate that is nevertheless a good outcome. You know that FEC was a big component of that and that puts real money into universities. When we consulted on this a number of years ago it was quite clear that the universities would prefer to put their programmes on a sustainable basis rather than to increase the

volume. We all accept that as a good thing. The other aspect of course, is that DIUS made a decision to support medical research and we all know why and so MRC got a settlement which corresponded essentially to increased volume and that implies that every other research council has to have an increase which is less than that. In other words, we were not able to maintain volume and in most cases when you take FEC out we are pretty close to flat cash. That is certainly the case STFC; it is certainly the case for EPSRC. If you just do a simple mental calculation as to what flat cash actually means in the context of an inflationary scenario, if we take an inflation index of 2.5%—which is the usual number—then it is not hard to figure out that on a £400 million budget—which is what our near cash budget is—then the impact of inflation erosion over three years is £60 million, which is virtually the sort of numbers we are talking about in terms of the so called deficit. I have to say that to correct Tony's assertion that we are

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actually moving money from one place to the other. Basically what we are doing is filling in the hole created by inflation over a three year period and every other research council has that problem too. Essentially we have to be more efficient, to do more with less by that amount. You may recall when I appeared two years ago in front of your predecessor committee I said at the time in the context of PPARC that if we had another flat cash settlement we had no alternative but to reduce the breadth of programmes that we undertook. What we have now is exactly that situation.

Q77 Chairman: I would agree with all that you have said so far, Keith, but why, given that scenario which you have predicted for two years, have you not then been in deep consultation with the very people that you have now suddenly sprung these cuts on?

Professor Mason: I think there is perhaps the danger that it is a self-fulfilling prophecy to an extent but I would disagree that we had not been in consultation with people. The statement I made to you two years ago I have also made to the PPARC community in that context because I was CEO of PPARC at the time, and I made it in very strong terms. It is rather surprising when we get the settlement—which has been known since April—that people did not realise that a flat cash settlement of that sort would imply some programme cuts.

Q78 Chairman: You have two committees set up with your new organisation at STFC and you are saying to the members of those committees that you cannot even speak to your community. That is not consultation, that is something we would find in Russia.

Professor Mason: I disagree. Firstly I think we do consultation extremely well in STFC; I am very proud of the peer review system that we have set up, it is very effective, it does involve the community, it involves people who are able to look across the whole programme and I think it is a very good system. However, the period of time we are talking about is essentially a period where all the research councils are making bids to DIUS for funding and one of the reasons for so-called secrecy—or at least keeping this under wraps—is that it was a negotiating situation and I think to ensure a level playing field DIUS quite rightly insisted that these negotiations be taken under wraps because otherwise one would have had lobbying from all sorts of corners of the scientific community which would not have been necessarily helpful to a proper outcome.

Q79 Chairman: The big issue here—you will pardon me if I and members of the Committee have got information from other sources which may be wrong—is that this is really a cock-up. In reality, if we take the Diamond Light Source, for instance, you have failed to calculate the costs of actually running that once it goes into full operation.

Professor Mason: That is simply not true. The costs of running the Diamond Light Source were established when Diamond Light Source Ltd was

established in 2003. They were correctly determined at that point and they have not changed so these numbers have been known for a long time.

Q80 Chairman: To stop you there, two years ago you had a £10 million overrun on Diamond; last year it was a £20 million overrun on it; you have suddenly been presented with a £10.5 million bill for VAT on it. Are you saying that all those were planned deficits?

Professor Mason: Forgive me for not having these numbers immediately to mind, but in terms of the capital phase of Diamond it was essentially on budget and on time with a minor variance.

Q81 Chairman: Are you saying £10 million and £20 million is a minor variance?

Professor Mason: Ten million on a budget of approaching £300 million is not a bad outcome for such a major project of that sort of complexity. The running costs were correctly estimated in 2003; the £20 million number I think—if I am remembering the right number—is the variance compared to the very early estimates made in 1997–98 before anyone had really done any work on understanding what Diamond was. This was highlighted in the PAC hearing and the NAO report but it is not surprising that at such an early stage in the project you do not get the numbers quite right. The VAT is one of those items which was unexpected and does cause us problems to the tune of £4 million a year.

Q82 Chairman: Ten and a half it says in your submission.

Professor Mason: The VAT on the running costs is £4 million a year. You may recall the reason for that is that the Treasury determined that we were liable for VAT whereas originally we had presumed we were not.

Q83 Chairman: The final bit on Diamond is that on your Delivery Plan submission on light sources there was this final sentence which says: “Our ability to fully exploit the facility will depend on the success in making the savings elsewhere in this plan” so there is a clear statement there that in order to now run Diamond you really have to slash and burn elsewhere.

Professor Mason: It is true to say that the base line budget allocation to the ex-CCLRC (the predecessor organisation) was not fully raised to compensate for the running costs of Diamond and ISIS Target Station II. Of course there are savings which come in from closing the SRS and that was factored into the calculation. It is true that we are in a situation with flat cash settlements, the buying power of the budget is eroded and yet we are doing more things. Diamond is a great thing, ISIS Target Station is a great thing but they do require more running costs which means that we have to restructure the programme in order to pay for them.

Q84 Chairman: I came to the launch of the Science Budget Allocation as many other members of the Committee did. Sir Keith O’Nions and the secretary

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of state seemed to be a little taken aback by the sense of outrage there was from the physics particle, physics and astronomy community at that meeting. When were they briefed as to these changes which were going to hit their political wallets?

Professor Mason: I cannot really answer that in detail because I was not in the room when they were briefed. All I can say is that in our draft delivery plan—there were several drafts over several months—we made it clear what the consequences of a various funding scenarios were.

Q85 Chairman: So they raised no critique at all; they said it was perfectly fine to decimate the physics community.

Professor Mason: I am in a position with STFC—we will come onto this later—where I have fixed budget and I have to make hard choices as to what we fund. I think DIUS are in exactly the same situation. They had a fixed allocation which was only constant volume, they had to make hard choices and we know the choices they made—I cannot argue with those choices—to fund FEC and to put more into medical research—but the consequence of that is that other areas have to contract and I accept that.

Q86 Chairman: This is not the fault of the Government; this is entirely a consequence of your decision making within STFC.

Professor Mason: There are two levels, obviously. The overall allocation of STFC is a consequence of the decision making at the DIUS level; the remaining consequences are a result of the consequences of the decision making in STFC.

Q87 Chairman: So you are planning to cut £80 million—you have said it is a cut, it is not a re-allocation of resources—why are you actually upping that to £120 million given the fact that £80 million is going to be difficult enough?

Professor Diamond: The answer is again remarkably simple, rather than avoiding consultation and not using peer review we have quite the opposite stance, which is that we want to get peer review involved in making decisions about which programmes we cut and which programmes we continue with. The extra £40 million is basically the by-back space, as we put it, to allow decision making to be made about which programmes are continued and which are cut. That decision making is a process going on now, a process that has been undertaken by our PPARC panel with the review by our science boards, so the community are fully involved in that decision making.

Q88 Chairman: When Peter Main says that the physics community need roughly £20 million in order to actually plan sensibly for the future, you have already got £40 million in your back pocket of which you could actually pull some in. Is that right?

Professor Mason: The £40 million is not free money.

Q89 Chairman: What is the point in consulting on that extra £40 million if you have already made the decision to do the cuts?

Professor Mason: I think you are misunderstanding. We have a menu of possible programme elements that adds up to more £40 million. We have created headroom in our programme on £40 million and we are consulting with our science advisory system as to which of that menu we will put within the £40 million. These are programmes which, in some cases, are already started but we are getting the priority information from the peer review system as to which of the possible menu things that we could do that we should do in the next few years.

Q90 Chairman: So out of £120 million of cuts £40 million could be reinstated following peer review.

Professor Mason: Yes, that is correct.

Q91 Chairman: I think it is important to have that on record.

Professor Mason: Absolutely, I agree.

Q92 Dr Iddon: Could I just ask you whether you are running the current year's budget with an estimated surplus at the end of it? Do you have any money in reserves anywhere?

Professor Mason: We are required to plan on a flat cash budget and we have a flat cash settlement. We have to reduce the running costs of the Council by £30 million a year. The Council has actually worked very, very hard to come up with a plan which delivers the maximum value for money from the allocation that we have received. In order to do that we are going to have to do some restructuring of internal assets and essentially we have forced an effort to reduce costs in this year so we can take those costs forward in order to pay for that restructuring. This is a device which is essential in order for us to be able to balance our books. It does assume that we can actually carry those monies forward and that is not a given, as I presume you are aware.

Q93 Dr Iddon: What sort of figure are you talking about? £20 million? £30 million?

Professor Mason: Twenty million; £17 million actually.

Q94 Dr Iddon: What about reserves? You have not mentioned reserves.

Professor Mason: We do not have reserves; we have to come out with a zero balance sheet at the end of every financial year.

Q95 Dr Iddon: When the collision between CCLRC and PPARC took place I was under the impression that the physics budget was likely to be protected, at least that is what the physics community were led to believe. Now we can see that that has all crashed.

Professor Mason: The budget I received to run STFC was the sum of the budgets that were previously in PPARC and CCLRC. I think again there is a lot of misunderstanding perhaps about that statement but I interpreted that statement to be that the Government were not motivated to bring the councils together in order to save money and nor did they, we got the full budget for the combined.

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Q96 Chairman: You had to include, within your overall budget, part of EPSRC's budget.

Professor Mason: That is correct.

Q97 Chairman: Was that included?

Professor Mason: That was in addition. We had a transfer from EPSRC as well. Essentially the merger was cost neutral.

Q98 Chairman: Is flat cash the same as near cash plus non-cash?

Professor Mason: No.

Q99 Chairman: Can you give us a little note on that because I am terribly confused between flat cash and near cash.

Professor Mason: Yes.

Q100 Dr Turner: On the face of it the 17.4% headline increase for the research councils is very good news, but we have actually got a PR disaster in practice. How do you think we got here?

Professor Diamond: Let me start by saying very clearly that I think it is good news in the context of this spending review. It is an affirmation of the Government's support for science and, within that, a clear view that science can help to provide not only the brilliant science that we do but also economic impact and the quality of life improvements for the people of this country and indeed other countries. In saying that there is then a decision as to how that should be allocated and clearly some decisions were originally made around the funding for transformational medicine which were supported and secondly full economic costing was, in this spending review, fully involved in all the funding decisions. I think we have to go back to 2003 when the original consultation around full economic costing came in and at that time all senior managers in the university community, properly consulted, said they would prefer to have sustainability of funding through full economic costing than an increase in volume. I think it would be unrealistic to have expected that this spending review would have resulted in anything other, particularly as after full economic costing it was flat cash, than a reduction in volume. I have to say that across all research councils there is a degree of reprioritisation taking place and difficult decisions are being made. That there has been what you have described as a PR disaster I think is unfortunate.

Q101 Dr Turner: I have the suspicion that the 17.4%, although looking quite an impressive figure, is not that impressive because inflation for scientific research is not the same as inflation in the normal economy.

Professor Diamond: We would agree with that entirely.

Q102 Dr Turner: It is in fact significantly higher. Is that a factor which is adequately factored into these sorts of calculations?

Professor Diamond: It is a factor which we have to take within the research council community as an important issue when we are allocating our resources to our different funding areas. That is why across all research councils you will see reductions in success rates and reductions in volume. Having said that, more real money will be going into the universities for research because of full economic costing and the universities will have real increases in funds so long as they are successful in the competitions that take place. It is then for the universities to make strategic decisions on how this extra money, over and above inflation, is funded.

Q103 Dr Turner: The implication of what you have just said is that unfortunately we are going to see a diminution in the volume of projects that get funded and in fact we are starting to creep back towards the situation which most of us came into this place where a depressingly small percentage of alpha-plus projects in 1997 were getting funding.

Professor Diamond: I have to agree. I am absolutely clear in my mind that in every research council over the next few years there will be some of the most depressing letters that research council personnel have to write and that is, "I am terribly sorry, because of the budget we cannot fund this alpha-plus rated project". That is an incredibly difficult letter to write. You cannot explain why this grant was not funded, it is simply that a decision has had to be made that this falls slightly below the line. That means that world-class science will not take place. I have to agree with that, but at the same time extra money will be in the universities and the universities will have the opportunities to provide some kind of flexibility which may allow—but that will be for them to decide—some research to take place.

Q104 Dr Turner: It is a message which needs to be sent back to government, is it not, that if government policy, ie to grow and enhance British science, is actually going to mean anything it is actually going to cost more than the Treasury has put in so far.

Professor Diamond: In welcoming the amount of money that has come, I have no doubt in my mind that higher percentages would have resulted in very much more world-class science taking place. There is absolutely no doubt at all in my mind that all councils could very wisely spend more funds on truly world-class science. World-class is very much overused, but really cutting edge science. I am using science here right the way across arts and humanities, right the way through the piece.

Q105 Mr Boswell: Is the logic of what you have just said that as we have started with what might be called a quite serious apparent situation in STFC—although you have explained the reasons for that—we can look forward to similar situations arising in other research councils, possibly on a predicted, possibly on an apparently somewhat random basis as they restructure their affairs to meet the new situation over the next year or two. Is this just the first of many?

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Professor Diamond: Each council has its own strategy and each council broadly has a flat cash after full economic costing settlement. That means that each council will need to be very careful about how it manages its affairs. I suspect there will be reductions in success rates across the board. The way in which that impacts on different councils and therefore on different individual disciplines may work in different ways so that for councils which have one responsive mode it would not impact on an individual discipline but on those at the margin, whereas those with specific areas—for example in STFC—it is perhaps a little more visible on a particular discipline.

Q106 Dr Turner: Can you tell us something about the process of negotiating this research settlement? Were the heads of research councils involved in negotiating this? How did it evolve?

Professor Diamond: Late in 2006 each council was invited to set out priorities in the broadest sense for the then Office of Science and Innovation. These were discussed in a set of bilaterals in late 2006 and early 2007. In May or June of 2007 each research council received a formal letter with a template for a draft delivery plan and as part of that each council was invited by DIUS (or it may still have been DTI) to provide four scenarios, each of them after full economic costing: one, how you would manage a 5% cut after full economic costing; secondly, how you would manage flat cash; thirdly, what you would do with an increase of 5%; fourthly, what you would do with an increase of 10%. Each council provided those scenarios by early July. The allocations were then announced, as you know, in October and we were invited by the end of October to submit the final draft delivery plan on the basis of those allocations.

Q107 Dr Turner: So those of you like Keith, who have to take some fairly tough cuts, were invited to help construct their own decimation, as it were.

Professor Diamond: We were all invited to provide a strategic plan effectively of how we would manage various scenarios of budget over the spending review period and that required some deep thought and some consultation within each council.

Q108 Dr Turner: Keith's council is going to be immediately hit by the loss of protection against currency movements, over and above the pain that Swindon Town is already suffering, especially the pound against the euro, that is going to cost heavily. How did this come about? Who negotiated that?

Professor Diamond: I think you would have to ask Keith about that particular issue.

Professor Mason: Let me just describe the previous situation and the current situation. The previous situation was that the liability for exchange rate fluctuations, GPD variations fell on essentially the science vote in total so it was essentially top sliced at the RCUK level. Essentially AHRC would suffer if the subscriptions were to change. In the current round it was argued that it was more appropriate to put that risk onto the user councils, that is STFC and NERC, so we now have a situation where we are

liable for the first £6 million of any variation and beyond £6 million there is negotiation at the next spending review basically to undertake how that is split more widely, with a wider base. Our risk is capped but it is at the £6 million level and it does contribute some £10 million over the three years to the so-called £80 million that we are talking about. In other words, we have to allow for that risk; we have to allow a contingency for that risk. The previous arrangement was that that risk was carried by all the research councils collectively. This does lead to some non sequiturs as I think I have described in one of my previous appearances in front of your predecessor committee. We are in the situation, as I think one of the earlier witnesses said, that if the economy of the country does really well we can actually do less science which does not feel right to me. There is no easy answer; it has to be borne at some level and it is a question of whether you see these subscriptions as something that benefits the physics community or something that benefits the nation and I can argue the case as you wish.

Q109 Dr Iddon: There is something in this debate I do not quite understand. We have all supported full economic costings as being part of research grants; there is no argument about that. You are having to find the money to do that and it is causing pain, we can all see that. However, somebody was supplying the money to carry out that research at universities before. It may not have been as much money as you are now providing through full economic costs but the universities were actually supporting research. Where has that money gone that was supporting research previously? Has it been transferred to the science budgets? That is an argument I do not understand.

Professor Diamond: The money that was in the universities or the fact that the universities were funding research.

Q110 Dr Iddon: Yes, previously.

Professor Diamond: You would need to ask the vice chancellors that. The one or two that I have asked have said they were running at a loss and managing at best they could. Now they are able to fund research as it should be funded. The one thing I can say to you is that the research councils are, as we have said over the last couple of years that we would always do, just about to start a review of full economic costing, its process and what it is being spent on. That report will report round about September or October 2008 and I would be delighted to send you a copy as soon as it is finalised. We are all very comfortable that the process is working but I think that will enable us to answer that question of exactly what the funds are being spent on now.

Q111 Dr Iddon: Vice chancellors are always maintaining that teaching was subsidising research. We would expect to see the teaching budgets increase significantly this year if that is the argument the VCs have used in the past.

Professor Diamond: I think you would have to ask the vice chancellors that question.

Q112 Dr Turner: The Royal Society has suggested an independent group of experts to advise the Director General of Science and Innovation on science budgets. Do you support that suggestion?

Professor Diamond: As I understand it that is a return to the position in the late 1980s and early 1990s. I have to say that my own sense is that this allocation has been undertaken extremely professionally and that the research councils were given the opportunity to present the case not only for the individual councils' science but also Research Councils UK presented a draft delivery plan, although there was a budget and the idea there being to highlight the cross-council priorities that were seen, for example, around some of the real cross-council programmes in energy and environment for example. The process was done incredibly professionally and used the budget in a reasonable way. Whether one would have got a different answer had there been a group of wise people advising the Director General, I am not able to say.

Professor Mason: Let me just add to that that in my view I do not see evidence that the outcome would have been any different.

Q113 Dr Turner: Finally, the Wakeham Review. We know its terms of reference and it is entirely possible that it will come up with some conclusions that will have funding implications but for the next three years you do not have any available. How do you see yourselves responding to the physics review?

Professor Diamond: I think it is worth saying that no sooner has one spending review finished than the next one starts. Certainly the Wakeham Review will report as we are in the thrust of preparing the case for the next spending review and it will have an opportunity to feed into that case. The second thing I would say is that we will wait and see what the Wakeham says before answering firmly that question. I think it has an interesting and exciting set of terms of reference to enable us properly to look across the entire spectrum of what is physics research and how it contributes right across the five research councils which currently provide funding in physics.

Q114 Dr Gibson: Why has it not happened before the Wakeham Review? None of this is new really. Physics has been having trouble for years, getting students at one time when you gave students new programmes and so on. Why are they putting it in now? Is it just a smokescreen for the real problems?

Professor Diamond: RCUK, as I am sure you will have seen from our Health of Disciplines Annual Report, has looked very carefully at the health of all disciplines, particularly looking at the demography of the academic community.

Q115 Chairman: Why do you need to do it again then?

Professor Diamond: What we have not done until now is to have a really in-depth scientific cross-council review of the science and the medium term needs. I think it is important that this is now done across a range of areas because of the real

importance of inter-disciplinarity and the need, if we are to accept inter-disciplinarity as being absolutely cutting-edge but applied across two or more disciplines, to ensure that we have a place to do that while maintaining the core discipline itself. Physics is a really important example that there is a really good reason for doing that and then to follow it with others.

Q116 Chairman: Could you make this absolutely clear to Des and Ian's point, that the Wakeham Review will have no effect whatsoever on the current plans in the Delivery Plan proposed by STFC? It is totally detached from it; this is looking at something else.

Professor Diamond: It is not the intention that this will impact on the budget of STFC in this spending review.

Q117 Chairman: So waiting for it to be concluded and delaying these cuts until that point is not an option.

Professor Mason: No, it is not an option.

Q118 Chairman: It is not an option at all; it is just a smokescreen in that sense.

Professor Mason: The Wakeham Review is, as Ian says, a valuable exercise but it was never intended to address the current situation.

Q119 Dr Gibson: What do you think the Wakeham Review will find out that we have not known for ages? We know how important physics is. You were having trouble getting students; we managed to get round that and the student numbers are increasing, thank goodness. Physics is interacting with other subjects which it was not doing at some point in its evolution. Molecular biology evolved from physics; there is a huge great record there and I think that has been recognised. What I do not understand is what more is there to find out?

Professor Diamond: I think you have just summed it up beautifully and perhaps your knowledge of the base is so great that we should invite you to be a member of the committee. It is important that we continue always to look at where disciplines are going and where the priorities are laying and physics, it seems to RCUK, is an area which not only has been through some difficulties but which is evolving extremely quickly, it is one of the most exciting areas of science. I think you need to look across the piece because there are five research councils funding physics and if you look at the funding of physics between the spending review of 2000 and the spending review of 2007 then you will see a 70% increase, broadly, in the funding of physics. I think we have to be absolutely clear that full economic costing does mean that more money across the entire research council base will be going into physics.

Chairman: Of course the whole of the RC humanities research programme goes into grants which are affected significantly by full economic cost. The same applies to BBSRC; the same applies to every one of the other research councils. This is the only

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one that is suddenly praying in aid of full economic cost, which it has known about now for the last three years in terms of preparing for, to actually say that this is the big problem.

Q120 Mr Boswell: We cannot wait for Wakeham and if we were to wait for Wakeham the analysis of the physics side would not by itself be sufficient necessarily to determine the reallocation of resources across the piece. I just want to be clear about that.

Professor Diamond: In this spending review, no.

Q121 Mr Boswell: My next question is something I asked our earlier witnesses about reputation more generally, but specifically about international subscriptions. If we are pulling out of international subscriptions is this going to be damaging to our reputation internationally in a way which will make us difficult to be partners in the future?

Professor Mason: It is part of our strategy to protect the major international subscriptions and we do that because we have a long term commitment to them and they are extremely valuable to the country, not only in terms of science but also in other ways and we are protecting them. We are withdrawing from a couple of relatively minor commitments—minor in monetary terms—but what I look for in international partners for is me is people who tell it as it is. We are being straight with our international partners. We have notified them of our intention to try to negotiate a withdrawal from the Gemini programme. We have told them that we do not believe that the current strategy for the ILC is the correct one and we cannot participate in that. We are being very upfront and very direct. What would be unfortunate in terms of international reputation is if we try and pull the wool over people's eyes and not tell it as it is. Quite the contrary, we are telling it exactly as it is.

Q122 Mr Boswell: Is it your judgment that any of these projects will fail on account of our withdrawal?

Professor Mason: In terms of the International Linear Collider you will be aware that the US has also withdrawn funding for the next year and I think this is a signal that we actually need to re-think the future of particle physics and find a more sustainable way to go onto the next stage. That is my own personal opinion. What happens to the ILC project is perhaps debatable, but I am pretty sure at some stage there will be a next generation Linear Collider. In terms of Gemini all the indications are that there are other users who would wish to take up the slack that we leave and I emphasise again our decision to withdraw from Gemini is not that there is anything wrong with Gemini but we are involved in the European Southern Observatory as well. There are four eight metre telescopes in the southern hemisphere—Gemini provides a fifth—and in terms of our overall strategy I think it is clear to the Council that we have to give priority to ESO. I think we have made our rationale clear and I hope people respect us for being open and honest about it.

Q123 Dr Blackman-Woods: We have had a briefing from the Russell Group of universities that says that these cuts, the £80 million, will add to the general pressures on physics, the closures of departments concerned (we have already heard about the supply of graduates) and increased competition from international competitors. They also say that this will increase the vulnerability of physics departments, that the impact of grant cuts will mean that not only will there be further demoralisation of staff but there will be fewer opportunities for post-doctoral research and for post-graduate research, and that the utilisation of leading facilities will be adversely affected. My first question is, do you agree with their analysis of the impact of the cuts?

Professor Mason: As we have said earlier, when asked a question would you prefer to maintain the volume or to have full economic costing the unanimous advice from universities was to have full economic costing. This gives them a huge extra resource in order to manage their budget, their research strategy and their research activities. There is at least the option there for universities to handle their research staff in a very responsive and creative way and I hope they will take that, it is obviously not under my control. I do not accept that the opportunities for trained scientists in this country are diminishing; quite the contrary, they are increasing. Maybe it is physics to bio-medicine but the skills of physicists are in huge demand and I do not see any reason at all why physics students or post-docs should be demoralised. The other point I would make in relation to our campuses and to correct a statement that was made earlier that the redundancies that we are talking about will affect the viability of the Daresbury campus in particular, again I do not accept that. We are pursuing a new model for doing science in this country which involves partnership with the private sector and local authorities in order to get more science done. Daresbury is a shining example of this and we are planning huge additional investments from all these sectors into Daresbury; I think Daresbury has an absolutely shining future. The number of jobs that we are going to have to sacrifice for the spending review will be dwarfed by the number of new jobs coming into those areas in a very short timescale.

Professor Diamond: You mentioned it was the Russell Group that wrote to you and it is the Russell Group that receives the bulk of research council funding, so it is the Russell Group which will receive the bulk of the real additional money that is coming in through full economic costing.

Q124 Dr Blackman-Woods: You are more or less not agreeing with them is, I think, what you are saying. Can you tell us a bit more about how the decisions were made regarding which programmes to cut? I am totally confused about whether there was consultation or whether there was not consultation because we have had different answers today. I think you need to say something more about that.

Professor Mason: I will be very happy to. If you analyse our Delivery Plan in terms of decisions, we made two and a half decisions, to put it very bluntly.

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Those were strategic decisions. We made a strategic decision to withdraw from Gemini; we made a strategic decision to withdraw from ILC. These were not ill-considered decisions made overnight; these were based on advice that we got from our science community over the last year in terms of relative priorities and the fact that we cannot do everything. The half decision was in relation to STP ground-based facilities which was actually a decision that we made at the last spending review but we are confirming this time because clearly within a shrinking budget we could not restore the cuts that we needed to make at the last review. All the other decisions, as I said, are being handled through this £40 million headroom process where we have peer review committees sitting down, as we speak, drawing up a priority list for using that money, so they are fully involved.

Q125 Chairman: I am confused now. The 25% cut in terms of grants is still open for review.

Professor Mason: I was talking about programme cuts, cuts to projects like Gemini and ILC.

Q126 Chairman: In the Delivery Plan you said there were three things.

Professor Mason: It is unfortunate that we have to make cuts to research grants but research grants actually make up the bulk of the money that we spend in universities so you cannot make the books balance unless you put a reduction on them. I do think actually that people misunderstood but the impact of those cuts is not as great as people are perhaps expressing in some circles. It is 25% of new commitment year on year; it is a gradual rank down on grants and against an aspirational programme that would have been an increase. The actual reduction in research, in the numbers of PDRAs in astronomy for example, will be some 10% down on what they were in 2005 by the end of this period, not 25%.

Q127 Dr Blackman-Woods: Can I try to summarise what I think it is you are saying and please correct me if I have got this wrong. You are saying that there should not really be this hoo-ha from affected departments because, although they may lose out a bit, they will have some compensation because of full economic costs, they will have new programmes that they may be able to apply for and they should be looking at new methods of funding and perhaps looking more to the private sector or other sources of funding. Because of those three things they should not really be complaining to the extent that they are.

Professor Mason: From my point of view I do not want to belittle the problems. We do face collectively as research councils challenges in getting quarts out of pint pots; we do have to tackle the inflation problem et cetera. There is real loss of potential here which I do not want to underestimate, but on the other hand I think this is an opportunity to sit down, through the Wakeham Review and wider, to think about our scientific strategy in this country and what we want to do as a nation. Science is quite clearly an important component of the future economic

wellbeing of this country. We need to plan it properly; we need to be aware of all the wrinkles, all the difficulties and talk about them in a fully open and calm and collected way. I do not want to comment on the reaction of certain elements of the community, but I think we do have real problems that perhaps have been overstated in some circumstances and in some circles. We actually need to look at the facts and plan our way forward.

Q128 Chairman: Keith, it would be enormously helpful if the answer you gave to Roberta, which was particularly in terms of the grants, and the actual analysis that you have made of the impact of your cuts in grants could be given to the Committee because that is in direct contradiction to the evidence that we have been receiving from a vast number of physicists and astronomers in the community.

Professor Mason: I think there is a genuine misunderstanding here which I am happy to correct.

Q129 Dr Harris: Professor Diamond, is it your view that there is anything in the Haldane principle that prevents the Government from switching money from one research council to another to deal with problems that require additional funding over the short term?

Professor Diamond: I do not know the answer to that off the top of my head. I cannot think of a reason why not other than, of course, the other money has been allocated very properly. The allocations have been made and the councils have already made decisions on how to spend that money. The amount of spare cash in any individual council at the moment is minimal.

Q130 Dr Gibson: Why can people not apply to the MRC for money if they are doing medical research that is important?

Professor Diamond: They can; it is absolutely not a problem.

Q131 Dr Harris: We know that the Government has been known to take money out of the science budget. We know it did that once and we know that it has taken money from the MRC's innovation fund. Presumably what the Government taketh away it can giveth again. I just wanted to clarify that there is no reason of research council independence that prevents research councils receiving money from the Government. You are not going to reject money on the basis that that is interference.

Professor Diamond: The research councils are very clear in the great majority of funding that each research council receives comes in grant in aid from the Government and we are very thankful to it and we use it incredibly wisely. Therefore if the Government were to choose that it wished to make additional allocations to the science budget then that would be for the Government to choose, and I do not see anything against and I do not see anything in the Haldane principle to prevent them doing so.

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Q132 Dr Harris: On this question of the health of physics before we leave it, you said there would be plenty of jobs for physicists because physics is funded by other means, but do you understand what the implications are for people who progress down a career in a certain area of physics? It is not something—as I understand it and this probably applies in other disciplines as well—that you can switch out of, from astrophysics into biophysics. Can I suggest to you that if you accept that, if you were going to make a strategic change in the way you wanted to put your investment—as you might be entitled to do based on good science and evidence—you would want to have a lead-in time so that you did not lure people into PhDs when there were no post-doc jobs available after that in that field and have specialists stuck in a post-doctoral area with nowhere to go. Do you accept that that would be a good way of doing strategic re-prioritisation?

Professor Mason: I do not accept your statement. I think there are many instances—one was quoted by a previous witness—of people who have very successfully changed fields. I think that is one of the beauties and one of the strengths of inter-disciplinary research, that we need to encourage people to branch out and think beyond their own narrow disciplines and how they can apply their skills more widely.

Professor Diamond: There are a number of research councils, for example EPSRC, who have things called discipline hopping grants which enable people to retrain. It happens an awful lot. One of the things also is that many particle physicists have found careers in the city, not doing particle physics but using their skills to be able to apply them in particular areas. People are prepared to re-train in those arenas. I think it is the case that re-training is part of a career in some instances.

Q133 Dr Harris: This is a vital point, may I say. You cannot be serious in saying that the solution to wrecked careers, of dead-end careers—whatever the reasons for it—is to become a stockbroker. That cannot be what you are saying.

Professor Diamond: I am not saying that.

Q134 Dr Harris: Before you answer that, I understand that when one does collaboration—as one does collaboration with other fields—I can understand that someone can develop an interest from those collaborations and seek to go into it. Do you accept that there is a difference between that voluntary interest-led approach and the suggestion to say to somebody that unless you go right back to an area you know nothing about—let us say you are involved in solar terrestrial physics—there will be no future in your career for you.

Professor Mason: I cannot agree with virtually anything you have said because I think that the sort of training we give to people both as students and post-doc level is more widely applicable than in the field. This is one of the reasons we do it. We train far more students than can ever go into particle physics and astronomy, for example, because the skills that they pick up in doing those subjects have a very

broad range of applicability. Similarly, as was referred to earlier, we need physicists in the bio-medical area, we need physics for bio-medicine, we need people to discipline hop and to apply their skills more widely. It is the way of the future in terms of driving the maximum benefit from the investment we put in science. We need to think across the whole patch and not just think as a solar terrestrial physicist but look at the whole climate system.

Professor Diamond: One of the excitements across the piece is people broadening and going into areas, looking in new areas and not just ploughing the same furrows. Those opportunities are essential and that is why, right across the research council base, the training of PhD students is to include the broad base of transferable skills which enables people to transfer, not only into a career in research. When you undertake a research studentship you do not say “I am going to spend the rest of my life in research”—although many people do—there are many avenues that people with PhDs have ended up in, some of them sitting to your right. The skills they learn are entirely useful in those arenas.

Q135 Dr Harris: I am just astonished at the spin you put on this because I thought that our world leading researchers had a publication record in their field. Some of them need laboratories and have senior people below them able to teach because they are specialist in that area. My understanding was that you could only teach specialism as a specialist.

Professor Mason: There is no reason why you cannot change your specialism and there are many people, as I said, who have a broad range of specialisms.

Q136 Dr Iddon: Lord Sainsbury created three leading science and innovation campuses; how many jobs are we losing at each of those?

Professor Mason: I cannot tell you the answer to that because I do not know. What we have done is to put target savings on the costs of running our centres internally and those target savings can be achieved by a number of ways and we are pursuing all those ways. One is certainly redundancies but also by looking at efficiencies in the way we run our operations. There will be reduction in programme and we are encouraging our scientists to look elsewhere for funding. For example, somebody mentioned applying to the Medical Research Council, that is precisely what we should be doing because that is part of our mission. The numbers that might have been banded around, with the exception of SRS where there is a well-defined, long ago defined number, the other numbers that might have been banded around are absolutely worse case if we totally fail at these other avenues. We are working as hard as possible and we are consulting and talking to unions and to our other stakeholders about how to actually minimise the loss of skills, recognising that in the cases of both Daresbury and Harwell actually we are looking at a situation where the requirement for skilled jobs is going to mushroom in the next few years if our strategy comes off, which I am sure it will. In the case of

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Edinburgh we are not as far along in terms of our plans for Edinburgh because this is something that has come along with the creation of STFC basically, but again I am very keen to explore the possibility of a wider partnership that makes use of the very unique and useful skills that we have in the ATC in order to apply them to a wider portfolio. I have to say just one other thing in regards to the ATC, that the original concept for the ATC was that it should be a group of about 40 people but because it was very successful in the pre-ESO era in winning contracts for telescope building and operation it has actually turned into an organisation of about 100 people. We have known for a long time—it is nothing to do with the spending review—that the work available to the ATC is going to drop off because we are now a member of ESO. We do not have our own telescopes to maintain and build instruments for so we are always looking at a roll off to a number which is not far from the one we first thought of, about 40. As part of the strategy of that roll off we do not want to lose those skills so we are exploring how we can use them in the wider context. There is not enough work for those people in building telescopes any more but they have skills that are generic and can be applied in other areas which are very valuable. As I said, we are beginning a process of working with the local universities and local funding agencies to explore how we might use a similar model to Daresbury and Harwell up in Scotland.

Q137 Dr Iddon: On 14 December, according to my inside information coming out of Daresbury, your director of administrations, Paul Hartley, told the staff there that there would be 140 jobs left on the site. There are 490 jobs there at the moment and if you do the calculation that is 350 job losses at Daresbury, roughly two-thirds of the staff. Does that support David Sainsbury's leading science and innovation campus idea for Daresbury?

Professor Mason: Yes. Firstly, Daresbury is a place that is growing. We have an innovation centre at Daresbury which is overflowing; we need more buildings for new companies coming in. What you see happening is a change in the model where instead of having a research staff solely funded by the research council we are moving to a mixed economy where we are, like I said, in partnership with private industry and with local universities and local funders. We are actually growing the Daresbury campus. The numbers that my director of administration mentioned to the unions were, as I said, worse case numbers; that is where we will be if we fail in all these other avenues but I am sure we will not fail so they are worse case. The exception to that, of course, is the numbers for the SRS and the closure of the SRS was something that was decided before my time. There is a known number of redundancies and a known cost to that. What happened was that the jobs that will be lost in SRS have already been created at Diamond so it is essentially because of the position and location of Diamond that those jobs moved to Harwell.

Q138 Dr Iddon: I have seen Daresbury described as a technology gateway centre. Does that phrase mean that instead of scientific discovery on the Daresbury site we are going to have a science technology campus? You have mentioned involvement of private industry already and there is some there of course at the moment.

Professor Mason: One of the things we anticipate doing is setting up a number of gateway centres across the two campuses. I do not know where the term “technology” came from but these are science and technology gateway centres. Basically these are facilities that allow users to come in and use the high value facilities that we have across the two campuses (it is a dipole model) most effectively and very easily to increase the amount of science they can do, to increase the amount of economic return that might come if we get industry involved. There is no conflict in these terms and we are fully committed to developing what is already a very successful site to be even more successful.

Q139 Dr Iddon: I wanted to press you further, Keith, on Daresbury, but time has obviously run out. However, I will just ask this one final question. Tom McKillop is being brought in in some way to look at Daresbury. The Wakeham terms of reference have been released just this very day, can you tell us what Tom McKillop's role is going to be and what his terms of reference are likely to be when they are produced?

Professor Mason: I cannot tell you; I can try to get hold of them and let you have them. I understand that Tom McKillop is doing a review of issues in the north west and he has been asked to extend it to include the specific issue of the Daresbury area. I would imagine that it is an extension of his current terms of reference, but I can try to get you chapter and verse on that.

Q140 Dr Harris: Assuming you are right to restructure in the way you wish to, would you not have preferred to have been able to do this over a longer lead-in than what you have, or do you think the way to do it is through a call of voluntary redundancies which may happen in departments where actually you do not want to reduce budgets for.

Professor Mason: It has been claimed that voluntary redundancies equate to a scattergun approach, well that is simply not the case. We are looking for voluntary redundancies; we are not bound to accept applications for voluntary redundancy and we would not in skill areas that we absolutely know we need to keep.

Q141 Dr Harris: Let us take solar terrestrial physics because that is quite a wide field with a lot of things in that and you are going to cease all funding for ground-based work. That is one way of saying that you are taking one subject and you are not going to fund of it. An alternative way might be to fund just the best science here. Is it consistent with a

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philosophy of funding the best science to say that you are going to cease all funding for a particular area?

Professor Mason: As I said that decision was actually made by PPARC at the last spending review based on a programmatic review that ranked all the activities that PPARC funded. For reasons which I will not go into that particular area came low down on the list.

Q142 Dr Harris: You say you will not go into it but my understanding was that research councils—this was certainly my understanding of what the Science and Technology Committee's understanding was—funded the best science. There are reasons you will not go into, but they are science based reasons, are they not? The science there is not good.

Professor Mason: It was lower priority and we were in a situation of making hard decisions. We get this in grant applications all the time where we have five excellent proposals but we can only fund three.

Q143 Dr Harris: So it is either lower quality or lower priority. I accept you can set your priorities in quality areas, but it begs the question why something like solar terrestrial physics—which is relevant to subjects like satellite communications and climate change—is seen as a lower priority than the formation of galaxies. I do not dismiss the formation of galaxies as being fascinating but one could say, in terms of what you are asked to do, surely communication systems and climate change should be a priority and therefore it must be a quality issue.

Professor Mason: To be fair communications and climate change were not part of PPARC's remit. The priority of these facilities—we are talking about funding again with international subscriptions in many of these cases—was judged to be down the priority of what PPARC needed to do.

Chairman: I think you have made that point; I do not want you to go over it again.

Q144 Dr Blackman-Woods: I think an obvious question to ask at the moment in the context of the controversy over the science budget allocation is how is your relationship with DIUS developing?

Professor Mason: Our relationship with DIUS is excellent. All research councils' relationship with DIUS is excellent.

Professor Diamond: We supported the formation of DIUS. We think it is entirely right that we get a situation where the whole of higher education and skills is put in one department. There is an extremely good relationship between the research councils and Keith and I in this group. There is an extremely good relationship between the research councils and the ministers when we have the opportunity—and we regularly have the opportunity—to interact with them.

Q145 Dr Blackman-Woods: How do you feel about the independence that you have? Has it been affected at all by DIUS or is the relationship exactly the same as it has always been?

Professor Diamond: With regard to that specific question around independence the relationship is entirely the same as it was with DTI. The allocations are made and we then organise the allocation of those resources.

Q146 Dr Blackman-Woods: When I asked the secretary of state in an oral question last week where responsibility lay for these cuts he made it fairly clear that because he had got to the above inflation supplement and because of the independence he could not actually affect where you were making the cuts but these cuts were very much up to yourselves and not the responsibility of the department. It seems quite clear cut to me what he said; you do not seem to have said something that is quite as clear cut this afternoon.

Professor Diamond: I am sorry, I thought we had spoken in exactly the same way. The allocations were made by DIUS having seen our draft delivery plans, we have then implemented the plans against the budgets that we have given and those decisions have been made by the individual research councils independent of the view of the department.

Q147 Chairman: Professor Diamond, could I ask you in terms of the science budget itself, would you like a guarantee from DIUS that it is ring-fenced throughout this CSR period and beyond? Have you had that assurance?

Professor Diamond: In the context of the allocations that we have?

Q148 Chairman: The money that is within the CSR for the science budget in total will not be affected at all by interference from government.

Professor Diamond: Our plans are all made on the basis of the allocations that we have been given for the next three years.

Q149 Chairman: Have you asked for that guarantee?

Professor Diamond: We have not explicitly asked for that guarantee but we have been given allocations year on year on year and our plans are all based on the trust with DIUS that these allocations will result in funds within each spending year.

Q150 Chairman: On that note can I thank Professor Ian Diamond and Professor Keith Mason. I am sorry we have overrun but you will appreciate that this is an important area and we are incredibly grateful for your time and also for the very frankness of your replies.

Professor Diamond: Could I just say that if there are other questions you wish to ask us as you reflect on this issue we are only too pleased to respond to you at any time either in this form or in written form.

Wednesday 20 February 2008

Members present

Mr Phil Willis, in the Chair

Dr Roberta Blackman-Woods
Mr Tim Boswell
Mr Ian Cawsey
Dr Ian Gibson
Dr Evan Harris

Dr Brian Iddon
Mr Gordon Marsden
Graham Stringer
Dr Desmond Turner

Witnesses: **Ian Pearson MP**, Minister for Science and Innovation; and **Professor Sir Keith O’Nions**, Director General, Science and Innovation, Department for Innovation, Universities and Skills, gave evidence.

Q151 Chairman: I welcome this morning Ian Pearson MP, the Minister of State for Science and Innovation at the Department for Innovation, Universities and Skills, and Professor Sir Keith O’Nions, Director General of Science and Innovation at the Department for Innovation, Universities and Skills in this evidence session about the science budget allocations. Sir Keith, we have met you on many occasions during our previous incarnation as the Science and Technology Select Committee and this may well be your last appearance before this Committee—great sadness is expressed all round; the shorthand writer writes “sighs and cries in the gallery”—and we would like to thank you very, very much indeed for the work that you have done within the old OSI and DTI and the work you have done in terms of DIUS. Thank you very much indeed for the contributions you have made to our Select Committee over the time that you have been Director General. Thank you very, very much indeed.

Professor Sir Keith O’Nions: Thank you. That is very kind.

Q152 Chairman: I will begin with a very simple question to you, Minister. You announced in Church House a 17.4% increase in the science budgets. Why has it turned into such a PR disaster?

Ian Pearson: Firstly, thank you for the opportunity to come to this Committee and to give evidence. What I want to say to begin with is that I think that 17.4% overall is a good settlement for science; it builds on significant investments that we have seen since 1997 when the science budget has doubled and it will have tripled by 2010–11. If you look at the international comparisons as well, the UK does well. The US has had below inflation increases in its science budget for four years in a row.

Q153 Chairman: May we talk about this settlement.

Ian Pearson: Our settlement is higher than Germany. Denmark and Norway have had settlements below the level with inflation as well. So, overall the 17.4% increase is a good one for science. Of course, in any increase, by the law of averages, there will be some that do better than average and some that do less well than average and I suspect that we are going to focus this

morning on those that have got less than the average 17.4% settlement, but I would like to point out that the Medical Research Council, for instance, is seeing a 30.1% increase over the next three years. We have been pumping £2 billion into medical research through the Medical Research Council. The overall budget for medical research will be £1.7 billion a year by 2010–11. We have also seen significant above average increases for the BBSRC where we have potential great advances in biomedical science at the moment and it is right, I think, that we make decisions on what we think are the right priorities overall for us as a government.

Q154 Chairman: We will come back to MRC and I do not think that we would disagree with much of what you have said. When Professor Ian Diamond came before us, he basically admitted that each council has got a broadly flat cash settlement once full economic costs have been taken into consideration and that in fact the success rate of grants across the board in all research councils is likely to decrease over the next three years. Surely that was not a source for fanfares in terms of your announcement, was it? Was this not a bit of glossing that you did on it?

Ian Pearson: Well, 17.4% as an increase over the CSR period is better than most Government Departments have received. It is a good settlement for science. I do not pretend that there are not some difficult decisions that some research councils have had to take as a result of the overall settlement, but that is the nature of things. Nothing stands still in this world and it is right that research councils rigorously look at what their priorities are in a changing world and it is right that Government looks at that strategic level at what their priorities are as well and that is what we have tried to do in this overall science budget settlement. May I say something on the full economic costing because this is not just a flat cash settlement. Full economic costing is helping to ensure that our universities are put on a sustainable footing when it comes to research. That has been widely welcomed by the research community and, when we have spoken with the research community about this, they have always said to keep full economic costing and that was one of the key principles behind the decisions that we took as part of the CSR.

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Q155 Chairman: We will not disagree with you. I think this Committee and indeed the former Committee is very, very supportive of the whole principle of full economic costing, that must be right. The point I am making to you is that you knew that once the full economic costing was actually put into the budget, what really was happening in all the research councils other than in MRC was a flat cash settlement when in fact there was going to be a reduction in grants. My question to you is, did you foresee that because you looked a little shell-shocked at Church House when you received such a battering that day particularly from the particle physicists, the astronomers and others who basically said that this was the sell-out of our science.

Ian Pearson: Firstly, I can assure you that I was not shell-shocked about this.

Q156 Chairman: You expected it?

Ian Pearson: Secondly, I do not think you are being entirely accurate in saying that, apart from MRC, everybody else has just got flat cash plus full economic costing. That is not the true position. I do accept that some research councils’ volumes will go down overall. We should not forget the significance of full economic costing and I hope that the Committee, when it comes to write its report, will recognise the importance of full economic costing and the additional resource that is going into university research departments as a result of it which is very significant indeed.

Q157 Chairman: We can assure you that that will be the case because I think that we are incredibly supportive of that proposal. The Royal Society made a suggestion that, in terms of actually, if you like, overseeing and scrutinising the allocation of resource to the research councils, there ought to be a panel of independent experts and you rejected that. Would you tell us why.

Ian Pearson: What I do want to say on this is that I know that there is this suggestion from the Royal Society about improvements to the process and we will consider carefully what the Royal Society have to say on this matter, but we are in a situation where, once the overall science budget is decided upon, we reach a stage of negotiations with the individual research councils and there are lots of vested interests out there. I suppose the question I put back to you is, if we did have a committee of the great and the good advising the Government, would it produce a different decision overall or would it just produce a decision where the people who were not inside the room giving advice to Government were critical of those who were inside the room giving advice to Government? I think that we really need to think through whether there is strong merit in a proposal to have an advisory committee. This is something that was once recommended 20 years ago. It is not something that I would want to dismiss out of hand but I think that we need to look carefully as to whether you could construct a committee that would really significantly add value in addition to the rigorous process that I believe was gone through as part of the CSR07 settlement.

Q158 Chairman: One of the fundamental concerns of this Committee—and this is my last point before I bring my colleagues in—is of course the preservation of basic science. There is a strong belief amongst the Committee—and I am sure that it is shared by Sir Keith—that, unless we maintain the highest quality blue skies research, there is very little to translate in the future, and there is a suspicion that this CSR in fact is moving in the direction of greater emphasis on translational research in terms of wealth creation and best guessing basic research and that that is being downgraded. What is your response to that?

Ian Pearson: I think that that suspicion is misplaced and, as a government, we have always believed that you have to do both: you have to have world-class basic research and you have to have research that does translate some of that basic research into potential new discoveries and inventions that are going to benefit humankind in the future. What any government will have to do is to strike the right sort of balance between those two elements of research. In many ways, these all come together.

Q159 Chairman: Are you aware of that criticism?

Ian Pearson: I am aware that there are people out there who say, “You are moving too far in the translational direction”. There are others who say, “You are not moving far enough in the translational direction” as well and, when I listen to a variety of views, as I do as Science Minister, I actually think that the balance is about right. We have seen big increases in both basic research and in more translational research over the last ten years and again I hope that the Committee, when it comes to write its report, will reflect the fact that we have put huge amounts of additional resource into basic research as well as putting more money into translational research and wanting to focus more on economic impact as well.

Chairman: In terms of economic impact, I would like to bring in Graham Stringer.

Q160 Graham Stringer: The Committee visited Daresbury on Monday and one of the big surprises that I was not aware of before we went was that the scientists at Daresbury told us—I am going from memory, so I may not be exact—that only 3% of the total basic science that was not done on universities was done in centres outside the golden triangle and most of that was at Daresbury. Do the Government have a regional policy when it comes to science expenditure? Are the Government at all interested in the spatial impact of science?

Ian Pearson: The Government very clearly is committed to Daresbury and Harwell as science and innovation campuses; we have said that and we continue to say that. We want to develop Daresbury as a world-class centre for science and innovation. When it comes to decisions about allocations of research funding, those are done on the basis of peer review through the research councils. So, there is not a particular regional focus to that, but I would say that the north-west universities do very well indeed

out of that peer review process and I think that one of the biggest concentrations of research anywhere in the UK will be found in the north west.

Q161 Graham Stringer: I am not clear from that answer what you are saying about a regional policy. Are you saying that you do not have a regional policy? I understand your response that you do not want to say, “That is the driver for that accelerator’s fund as opposed to that accelerator”, I understand that, but surely it is reasonable to say that money should be spent on basic science in Newcastle or outside Newcastle or somewhere else. What is the Government’s regional policy when it comes to science expenditure?

Ian Pearson: Let me be very clear. We do not say to individual research councils, “You must spend so much of a percentage of your budget in the north-west, so much in the north east, so much in the West Midlands or East Midlands”, and I think it would be entirely wrong to do so.

Q162 Chairman: Do you think that it is wrong to have a regional policy for science expenditure? It does not matter to you whether the money on science is spent in Manchester or Camden?

Ian Pearson: Clearly, we want to see a situation where we have world-class science being conducted in very different parts of the country and we want to see centres of expertise in all parts of the country as well, but what I do not think you can do, Graham, is get to a situation where you are actually dictating to research councils that a certain percentage of their budget has to be spent in a certain region. What we do have to do is to allow the research councils to make the best decisions based on peer review evidence.

Q163 Graham Stringer: I come back to the same point that you are saying that you would like science to be dispersed throughout the UK but you have no levers whatsoever nor do you want any levers which would enable you to focus money elsewhere within the United Kingdom.

Ian Pearson: If you look at how the science budget is allocated, you will find that the Government overall sets some strategic priorities. For instance, we actually say full economic costing was a strategic priority for us going into discussions on resource allocations. We say that we are committed to developing Harwell and Daresbury as science and innovation campuses. We are saying that we want to see cross-council programmes which address some of the Government’s biggest strategic priorities such as ageing, such as living with environmental health, global threats to security and energy. We say all that as a government. We do not specifically say then, “You have to spend a certain proportion of your budget in a particular area” and I do not think that it would be right to do so.

Q164 Chairman: Minister, in some ways, the point that Graham Stringer is making here is that you have gone on record, as has the Secretary of State, saying

that you want to have world-class—world-class—science and innovation campuses at Harwell and Daresbury.

Ian Pearson: Yes.

Q165 Chairman: That is regional policy by default, is it not? It just so happens that Daresbury is in the north-west, but that is regional policy by default. How on earth can you move from that to saying, “We have no interest in having world-class facilities on the Daresbury site” and that you are prepared to allow it to just disappear?

Ian Pearson: I am not saying that at all and in fact, as a government, we have said very strongly that we want Daresbury to be developed as a world-class science and innovation campus.

Q166 Chairman: Without world-class science.

Ian Pearson: With world-class science.

Q167 Chairman: What does that mean? What does world-class science mean at Daresbury?

Ian Pearson: Firstly, if you look at the STFC’s delivery plan and if you look at their published statements about Daresbury as a science and innovation campus, they talk about developing the Cockcroft Institute which will have world-class accelerator science; they talk about the Hartree Centre which we anticipate will have world-class computational science and they talk about setting up a centre for detector systems as well. As you will be aware, Daresbury has been working on SRS and the next generation light source.

Q168 Chairman: They are all going, Minister. They are all going. You are not making a guarantee for any of those. All that science is disappearing. It is just hot air.

Ian Pearson: It is not true to say that all that science is disappearing. The fact that SRS was going to close has been known for a considerable period of time.

Q169 Chairman: I agree.

Ian Pearson: And there are redundancies associated with that which have already been announced. As you will see from the STFC’s press release on this matter, apart from the SRS closures, there are not intended to be any compulsory redundancies certainly before the McKillop Review reports and one of the things that the Government have done, as I am sure you will appreciate, is that we have asked Sir Tom McKillop to conduct a review about the future of Daresbury. I actually believe that Daresbury has a very bright future indeed and I expect that, over the next few months, we will be able to see some positive announcements about Daresbury, but it is undoubtedly a fact that, as a result of the decisions on Diamond which were taken a number of years ago and the decision that was taken last year on 4GLS, there are problems in the interim and I cannot deny that.

Dr Iddon: I am sure you are aware that the formation of Cockcroft Institute on the Daresbury site was a combination pulling together Liverpool University, Manchester and Lancaster Universities. They were

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attracted to come on to that site because of the world-class accelerator and work that was going on there, some of which has moved now and some of which is uncertain. The Director told us on Monday when we visited the site that he was attracted to come to Daresbury all the way from the United States of America and indeed three other people came on the reverse brain drain because of the creation of Cockcroft on that site and because of the facilities there: the computational facilities, the fact that there were engineers there who could build advance instruments that the world has not seen before, because there was a world-class library on the site which we hear is going to close or it has potential to close. He told us frankly on Monday that he is clearing off and other people who were attracted on the reverse brain drain will also clear off unless some definite decisions are taken about the future of Daresbury. The general feeling on the Daresbury site on Monday was that a decision has been taken behind the scenes by the TFC to concentrate basic science at the Harwell site and to develop Daresbury as a technology park and we heard also that three major new companies were coming on to the site to join the others. I put it to you: do you believe that world-class companies will be attracted to the Daresbury site if the basic science there is being run down as it clearly is at the moment?

Q170 Chairman: That is the key point, Minister.

Ian Pearson: Clearly, there are decisions that follow from the closure of SRS which has been known, as I say, for some considerable period of time and following the review on the next generation light source where it was decided that neither 4GLS nor Sapphire were likely to be appropriate. Let me very clear on this. Let me quote from the press release that the STFC issued. It says, “At its meeting on 29 January 2008, the Science and Technologies Facilities Council confirmed its commitment to the development of the Daresbury science and innovation campus as one of two national science and innovation campuses that it will develop”. It goes on to say, “The Council is committed to retaining key scientific and technology expertise at Daresbury in high performance computing, accelerator and detector research development for next generation facilities and underpinning technologies and is looking to expand expertise on this site as its plans develop”. There is undoubtedly a period of change going through which is very difficult for those who are working at Daresbury, but the STFC have stated on the record and through their Council that they are committed to developing Daresbury and that is exactly what we want to see as a government.

Q171 Dr Harris: You do not believe everything that is in a press release even your own, do you? It is not a statement of fact, it is an aspiration and, if that aspiration comes to fruition—

Ian Pearson: This is a decision that has been taken by the STFC Council and it is confirming its commitment to this which is exactly what the Government have said they want to see because, as

a government matter of policy, we want to see the development of Daresbury and Harwell as campuses.

Q172 Dr Harris: Let me tell you what the Cockcroft Centre actually said to us. “Are the plans to make Daresbury a Science and Innovation campus viable?” and that is a term you used. “We fear the answer is ‘No’. Lack of support of the STFC leadership for scientific flagship facilities on the Daresbury campus by design renders as such a plan incredulous. The Cockcroft Centre by itself, without a thriving Daresbury Laboratory will have no reason to be on the site and will retreat to the universities failing the lofty DIUS goals”. Does that not give you pause to think that maybe the STFC are not going to be able to deliver for you your policy objectives?

Ian Pearson: What it says to me is that there is low morale at Daresbury at the moment and I understand that and it is a difficult time and, when you are seeing a situation where work is finishing on SRS, then undoubtedly there is going to be a period of uncertainty. I want to assure people at Daresbury that the Government remain resolutely committed to developing Daresbury as a world-class science and innovation campus.

Q173 Dr Harris: That is not enough in itself and it is not just SRS. 4GLS has been delayed for two years and no-one we met at Daresbury was confident that that would eventually come to Daresbury. ERLP, the Alice Programme, is under threat—and Dr Iddon may have something to say about this—and that undermines the potential for another project for (?). They do not think and I am concerned that you are not aware that it is not just morale but its intentions to not stay at that site for the basic science.

Ian Pearson: Again, let me be as clear as I can be on this. It is government policy that we will develop Harwell and Daresbury as world-class science and innovation campuses and we will do that. The STFC understands that that is a firm commitment of the Government and the STFC’s published statements and its delivery plan say that they will develop Daresbury as a world-class science and innovation campus.

Q174 Dr Harris: If STFC thought it was not viable, would you let them not do that or are they forced to try and try to implement your policy objective?

Ian Pearson: This is the policy of the Government and it will remain the policy of the Government. Obviously in areas like next generation light source, we have to be guided by what the science says and when the science looked at 4GLS and looked at Sapphire, the conclusions of an international peer review suggested that neither was likely to be appropriate and we have to accept that, but the strategic commitment to Daresbury by the Government remains.

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Q175 Chairman: Minister, there is a fundamental flaw in what you are saying and what STFC are saying. I do not think that any member of this Committee doubts your commitment and I say that really quite openly and honestly.

Ian Pearson: What you are suggesting is, can we deliver on it?

Q176 Chairman: Yes.

Ian Pearson: I am saying to you that I believe that we can deliver on this, that we will see the developments of the three centres that I talked about—the Cockcroft Institute, the Hartree Centre and the Detector Systems Centre—and we will maintain strategic capability to do work on the next generation light source.

Q177 Chairman: Minister, genuinely we are not doubting your commitment and intention, but the Deputy Chief Executive Officer at Daresbury, the Deputy Chief for STFC, believes that you can have a striving Cockcroft without having the new basic large facilities on that site. Everybody else feels that that is incredulous. I do not think that you have fully understood the connection—I am perhaps doing you a disservice—between having 4GLS or having some major facility and in fact retaining this as a world-class science site and not just simply any other science business park.

Ian Pearson: I think that you are doing me a disservice, to be fair.

Q178 Chairman: Well, I do not mean to.

Ian Pearson: It would be great if a decision could be taken on what is the next generation light source and then a decision was taken on location. We are not at that stage though because, as you know very well, it has not been fully determined what the next generation light source should look like, let alone a decision on what its location should be. I personally very strongly believe that, if we get to the stage where we can make a decision that it is right to have a next generation light source project and we know what that project is, then its location should be at Daresbury, but we are not in that situation at the moment.

Q179 Dr Iddon: I think that the problem is the Haldane principle. As the Chairman said, we do not deny that the Government’s intention is to have world-class science on the Daresbury site, but can you break the Haldane principle? Can you tell the STFC what they should be doing on the site when indeed they do not have the money to reach some of the commitments? I think that the two words which are important are “critical mass”. We had critical mass on the Daresbury site but from what we were hearing on Monday from all the scientists from all the divisions at Daresbury—we saw an awful lot of people on Monday—the message was coming over clear: the future here is so unsure that we are clearing off now. The critical mass is crumbling. Cockcroft is crumbling. It does not look as if Hartree will even arrive on the site because, the way we are going, they will be lucky to complete. Can you break the

Haldane principle of what the STFC do on the site? I can tell you that there are clear rumours behind the scenes that the STFC have been considering closing down basic science on that site.

Ian Pearson: I hope that the Committee is very careful in terms of its conclusions in this matter because the last thing that I think we ought to be doing is talking down the prospects of Daresbury as a science and innovation campus. We will not do that as a government. We are fully committed to developing Daresbury as a science and innovation campus and the STFC know that. They know that it is a strategic priority for us as a government and that is why it is reflected in their delivery plan. We would not have approved the delivery plan for the STFC if we thought that it did not have in it the development of Harwell and Daresbury as science and innovation campuses. I know that there is a great desire to have what you might colloquially call a big piece of kit and that, as 4GLS has not been proceeded with, that piece of equipment is not there. There is certainly the commitment from the Government however to develop Daresbury and to ensure that world-class science is conducted there. We need to look at this and it is one of the reasons why Sir Tom McKillop is producing his report which will set out a vision for Daresbury. There is a vision of Daresbury being developed with those three centres that will conduct world-class science and, I believe, will make it an extremely attractive location for scientists who want to do world-class research and produce the additional benefits of having companies that want to be associated with that. I think that Daresbury has a very bright future, but it is obviously going through a difficult time at the moment and I think that the last thing we ought to be doing is saying that we are gloomy about the prospects for Daresbury because I just think that is reading the long-term situation completely wrong.

Q180 Mr Marsden: Minister, you know that the history of government decisions is littered with a list of unintended consequences and I think that what this Committee is trying to say is that if you will the end to Daresbury without fundamentally breaching the Haldane principle, you have at some point to will the means before the (inaudible). I want to address you further on the relationship between the Government and the STFC’s delivery plan because, when the Secretary of State came before this Committee on 16 January, he said very straightforwardly that the Government had responded to concerns over STFC funding in the areas of physics and astronomy by commissioning a review from Professor Bill Wakeham. However, when Professors Diamond and Keith Mason came before the Committee, they told the Committee quite straightforwardly that the Wakeham Review had no impact on the delivery plan at all. I have to ask you therefore, is this not another example of the STFC cutting across clear departmental steer and actually undermining the points that were made originally?

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Ian Pearson: No, I do not think it is a question of that at all. The Wakeham Review is a major piece of work. It is the first of a number of reviews looking at the health of the disciplines, in this case physics. The simple fact is that we have a science budget and it has been already allocated, so there is no new money, but we will obviously want to pay full attention to what Bill Wakeham says in his report about the health of physics and I do not think it is right to speculate on what is going to be in the Review. Bill, as I understand it, is in the process of taking evidence and will produce a report in due course. I think that what the Secretary of State has said is completely right, that we have set up this review and we will want, as a government, to consider its conclusions.

Q181 Mr Marsden: Minister, I am not asking you to prejudge the Wakeham report. The point I am making is a rather different one. Here we have the Secretary of State commissioning a report after some very strong concerns in the physics and astronomy community and we have no idea as to whether that report’s outcome, whatever it is, will have any impact on some of the basic fundamental decisions that are being made in that community by STFC. When Professor Mason came before the Committee, he said that it was not an option to delay any of the existing cuts. If it is not an option, then what is the point of having a review which may suggest a fundamentally different approach?

Ian Pearson: I think that there is every point in having a review that looks at the health of physics overall and that is exactly what the Wakeham Review will do and, as a government, we will consider carefully its findings because we have a responsibility overall to ensure the health of physics for the future. It is not the responsibility of government, respecting the Haldane principles, to make detailed decisions in terms of how a research council should allocate its budget. That is up to the STFC and its decision-making processes which involve the scientific community.

Q182 Dr Blackman-Woods: Minister, I would not want you to gain the impression that we are talking Daresbury down. We went to see it to find out the information. The information that we got on Monday was very much that the scientists there do not feel that their future is being invested in properly. They have gone to great lengths to recruit excellent scientists from a global market and they are losing those scientists at the moment. What the Committee is trying to press you on is, are you aware of that and can anything be done in the short term so that we do not lose the excellent scientists there?

Ian Pearson: I am certainly very aware of the situation at Daresbury. I have, as you know, regular contact with north-western MPs. Officials have been to Daresbury. I have been due to go twice, once yesterday when we were required to vote on other things, but I hope to visit there myself to talk to people there about the situation. Daresbury is going through a transition—there is no doubt about that—and that is a difficult situation and any process of change creates uncertainty. What we do not want

to do is to damage the strategic capability of Daresbury as a science and innovation campus. I fully understand the concerns of the Committee which are obviously relaying the views of people who currently work at Daresbury. I just want to assure the Committee that we are very well aware of that and we want to maintain that strategic capability, we want to see it develop and we want to work with the STFC that has the operational decisions to make in these matters to ensure that Daresbury is developed as a world-class science and innovation campus.

Chairman: Graham, we side-tracked you and I am very sorry!

Q183 Graham Stringer: I would like to finish with one point. It is not a question of being propagandist for or against Daresbury, it is trying to look at the objective facts and they look pretty sad at the moment when we talked to people there. What I am interested in is democratic accountability. If basic science at Daresbury goes to the wall, if, as is happening, solar-terrestrial physics is decimated, astronomy is decimated and particle physics are decimated, whose head do I ask for? Who is responsible for those policies? That is the basis of democratic society. I do not want those things to happen. Who is responsible for them happening?

Ian Pearson: May I say first of all that I do not accept any of the “ifs” and let me say something about that in a moment. In terms of accountability, it is the Government that decides at a high level overall strategic priorities at the start of a budget allocation process and it is the Government that will make the final decisions on allocations according to those broad decisions and based on our understanding of delivery plans for the research councils. It is not our responsibility to make a decision about how many telescopes we should have, where they should be located, what the priority is between research on an international linear collider or subscription to the European Southern Observatory or subscription to the European Space Agency or to CERN. Those are decisions that have to be taken by science.

Q184 Graham Stringer: What I am trying to get at is that there is a fundamental change taking place in the fundamental science that is being undertaken at the moment. Is that or is that not government policy? Do the Government support those huge changes in basic science and in physics that are taking place? Is it ministers who are pursuing that policy? Is it an accident or should we be asking for the head of the STFC?

Ian Pearson: May I put some facts on record. Firstly, if we look at the issue of research grants where there has been a lot of press coverage over the last few weeks and there has been an impression out there that swingeing cuts are taking place, the fact is that when you include the impact of full economic costing, overall funding for astronomy exploitation grants will have risen by 67% in this coming financial year compared to 2005–06 and again, for particle physics, when you include full economic costing, the amount of funding in this area will be 43% higher in

2008–09 than it was in 2005–06. So, there is significant extra funding going in to university research departments for these activities. The STFC have confirmed that this year, which has seen a big increase in astronomy grants from 278 to 329, will, in the coming financial year, see 323 grants awarded, so a broadly flat position. I also asked officials to compare the three years of the SR04 period with the three years of this CSR07 period and, from the figures that I have had, 854 astronomy research grants were awarded through the SR04 period and it is anticipated that there will be 855 during this CSR period. So, no net decrease in astronomy research grants at all.

Q185 Dr Gibson: How many were turned down?

Ian Pearson: I do not have the—

Q186 Dr Gibson: That is what counts, is it not, because that means 800 turned down, 800 grants, 800 laboratories . . .

Ian Pearson: I do not have the figures for how many were turned down under the SR04 period over the last three years and obviously I do not know how many applications there will be for research grants in this coming financial year. If you look at the volumes for astronomy grants, the volumes over the next three years will be exactly the same, according to the latest figures that I have, as they were in the previous three years and, as we have heard elsewhere which we discussed at the start of this meeting, the situation is that, in other research councils, there will be some reductions in volume because of full economic costing.

Q187 Dr Turner: A much more representative measure is percentage success rate of alpha plus rated projects. Are you able to give those figures?

Ian Pearson: I do not have those figures to hand for previous financial years and obviously they are not available for the future as well. If the Committee would like that, I would be happy to write to them with details.

Q188 Chairman: I think that would be useful.

Ian Pearson: Again, to emphasise the basic points including full economic costing, a 67% increase in funding and, for astronomy grants, the same number of astronomy grants in the next three years as there were in the last three years. This is not a crisis.

Chairman: This is not a crisis, okay. I have a crisis of time now and I ask the Committee to be fairly speedy.

Q189 Dr Turner: Sir Keith, you told our late lamented predecessor Committee and gave them an undertaking that Swindon Town Football Club would not inherit any financial difficulties from the merger with the CCLRC. How does this square with the actual fact that STFC have had to make £80 million worth of cuts in their grant-awarding budgets?

Professor Sir Keith O’Nions: Let me put a few facts on record.

Q190 Chairman: Can you do that as fast as you can, Sir Keith.

Professor Sir Keith O’Nions: I will try and go as fast as I can but I would like to get the facts on record. When CCLRC and PPARC were merged, we did have the NAO undertake due diligence and it was clear that there were no deficits in either council upon merger. Previously, we had an independent review of finance and planning in CCLRC, which indicated that their processes were satisfactory.

Q191 Dr Turner: May I clarify that. There may not have been any actual existing deficits, but were there future funding gaps implied by strategic decisions that had been taken but which were not funded?

Professor Sir Keith O’Nions: Let me stick with the facts and then I will try and answer that question. The NAO due diligence that was carried out did not reveal any deficits and in fact, in the year 2006–07, both research councils underspent by a total of £31 million. EYF of some £66 million was taken forward into STFC from the combined councils. We had previously had an independent audit of CCLRC because we were concerned about whether planning was suitably strategic in financial terms and whether they had a management capability to deal with costs that are very easy to get out of control in these very big science and big physics facilities. Basically they got a clean bill of health in planning capability, so there was no particular reason to assume that this was going to carry an impossible situation. Were they carrying difficulties at that time? In some ways, yes. That is one of the reasons why STFC was formed. In big physics and big science, these are complicated things to manage, they are very long term, there are international subscriptions, they are often pro-rata to GDP and so on. So, it does require a level of long-term strategic planning and decisions which may be quite different to what would take place, for example, in EPSRC where they do not own big facilities. We were quite aware that there was the potential for these areas running out of control without very close management and that was our aspiration for STFC, having a very good management control on areas that are difficult to manage in all countries.

Q192 Dr Turner: Where has the management control failed?

Professor Sir Keith O’Nions: I have not said that the management control has failed.

Q193 Dr Turner: The evidence speaks for itself in the cuts that STFC—

Professor Sir Keith O’Nions: Wait a minute, let us talk about cuts. You have fallen into the trap of the same statement. It is an £80 million cut on what a research council would have liked to have done. It is not necessarily an 80% cut on what it is able to do. May I put one other fact on record because I am rather troubled by some of the comments around here particularly language like “decimation” because, frankly, if you trot out that sort of language, it is sure to hell going to get us there when there may not be the justification for

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doing so. Let me put on record some numbers—and I want to get them correct—which may well show you how perplexing it is in what is a budget settlement for science and a problem that most other countries would like to have rather than call it a crisis. Putting the Medical Research Council to one side as the Chairman suggests—and we know that this is a big priority for the Government, a big opportunity with the NHS and translational research—there are six other research councils. They are all allowed by the Treasury to plan ahead at flat cash. So, every research council, by definition, must have a plan going ahead for flat cash because that is their planning envelope. In this spending review, they were able to plan ahead a flat cash plus FEC and remember, in this spending review, there is going to be more than £700 million worth of FEC go into the research universities. These are huge numbers: £700 million in this coming CSR and £400 million in the last. So, they were able to plan ahead at FEC plus flat cash, a planning assumption for all research councils, prior to the settlement. Relative to that, STFC had the best increase percentage settlement of any of the other six research councils: it got a 3.2% increase over flat cash plus FEC. My advice to ministers was that that is actually as strong a place as we can be in. Just for reference, EPSRC was minus 1%, NERC is less than 2%, AHRC is also minus 1%. That is the reality. It is therefore perplexing, with numbers like that, that you might have out there a crisis—it is the end of the world as we know it; the universe is over—when actually physics expenditure from the five research councils is increasing overall over this CSR.

Q194 Dr Turner: Does this not bring into focus the fundamental difficulty of combining these two research councils and STFC where you are putting very large, very expensive big kit facilities with all sorts of imponderables together with a council working primarily in response mode and they make some inevitably uncomfortable bed fellows? Was this in retrospect a wise decision?

Professor Sir Keith O’Nions: I think it is a fair comment and I think it is a fair comment as to what the challenge is and it is fair to say that if you are in the Department of Energy in the United States, actually running these enormous facilities is also a big problem. The International linear collider has gone there in the US also. These are very difficult management problems. I think it is right you have research grants closely tied to the existence of big facilities. We spent £700 million on the collider at CERN; it would be dumb to spend £700 million on it and then not have grants to go with it. I think it is right to have them alongside, but I would agree with you, this not a trivial management challenge. When we put STFC together, we were very impressed with some aspects of both research councils where they had managed these very big and difficult projects successfully. So, it is a very big management challenge, however you put this together.

Q195 Dr Turner: Following the precise point that you have been making there, does it worry you that STFC, in making the hard decisions they have had to make, have focused on the large facilities at the expense of precisely the response mode grants which you rightly say need to be associated with them and what deleterious effect has it had on our science reputation in innovation?

Professor Sir Keith O’Nions: Myself, colleagues, ministers, everybody took very seriously the depth of concern that was present in the astronomy and particle physics community. To remove some of the more shrill remarks that have been made, there are a lot of very sensible people who have expressed very considerable concerns and numbers like 25% reduction in physics across the nation are things that took hold and took root. Now that we have the benefit of Sir Peter Knight’s science advisory input to STFC which I think has now been published by STFC, the facts are now on the ground and there are two sets of facts. One is that there are some facility reductions that the independent advisory group has proposed. Astronomy grants, which grew rapidly through the last CSR, are maintained with no more than about a 1% change during this year. Remember that through FEC universities have much more flexibility to manage these, it is not purely a grant issue. There are no changes in particle physics grants this year. The Wakeham Review will add valuable information as to how STFC and indeed the other four research councils that support physics should respond. So, we are certainly not in a crisis situation for this year and those grants are well maintained, at least as well as other research councils are able to do it. Just remember that physics overall will be £500 million a year at the end of this spending review.

Ian Pearson: I want to reinforce the point that Keith made about the myth of the £80 million. The £80 million was based on the sort of budget that the STFC might have wanted to have, it was not based on its baseline. I do not know how you do budgets but I tend to base them on what my baseline is, what I am spending at the moment, and the facts which I would encourage you to look at when you come to write your report is that there is 13.6% increase from the STFC’s baseline, so we are not talking about cuts in that sense of the word and I would reject that as a characterisation, and the STFC will have an additional £185 million over the spending review period compared with its baseline.

Q196 Dr Gibson: What did you ask for in terms of money? What did you ask the Government to pay to keep the science base where it is and to move it on? You are enjoying the 17% increase but did you ask for a 30% increase?

Ian Pearson: The decisions on the science budget were actually confirmed in March before DIUS started as a government—

Professor Sir Keith O’Nions: I am happy to make a comment on that because this is the agreement that the Secretary of State in DTI, Alistair Darling, made with the Treasury at that time. I think what is absolutely clear is that everybody pushed very hard to maintain the commitment that was set out in the

much lauded 10-year framework for science innovation published in 1994 and I think we have agreed at previous sessions that the best reading of that carefully crafted language is to grow the science budget over that decade at about the rate of GDP growth. That was the commitment that we were looking for. Obviously we would always ask for more than that. I think that, at the time, it was considered to be quite a success to receive an award for these three years that maintained was in the commitment set out in that 10-year Framework.

Q197 Dr Gibson: But you did ask for more.

Professor Sir Keith O’Nions: I always ask for more and sometimes I am successful.

Q198 Mr Boswell: I want to come on to the issue about reputation briefly. I am troubled—and we had evidence on this matter—about the implications of this for the wider community, the international community. We have had representations, for example, from the Institute of Physics in Australia. Is it your view that these consequences which are clearly concerning are simply a matter of, as it were, professional persons scratching each other’s back and backing up their own position or is there something that we should be worried about both in terms of the withdrawal of subscriptions to international organisations and also the implications for the personnel science workforce?

Ian Pearson: Let me begin and, Keith, who has obviously been immersed in the science community for many years, will obviously have additional insights. I want to begin by saying that I appreciate that the way that this science budget settlement has been portrayed in the wider community has been unfortunate. I do not think that it has been realistic. I think that some of the facts that I have put out today, which I hope will be reflected in the Committee’s report, demonstrate that there are overall increases in funding and that physics overall will actually see an increase in funding over the next three years which—

Q199 Chairman: May I bring you back to the question that Tim asked.

Ian Pearson: What I am saying is that there should not be reputational damage because internationally the UK is seeing increases in funding across the science base over the next three years. When people look at the figures, I think they will understand that. Obviously, a couple of the decisions that the STFC have taken in terms of large facilities can cause problems in some quarters. I happen to believe that when you look at the detail of the decision on the International Linear Collider for instance, it seems to me as a lay person to be a sensible thing.

Q200 Chairman: Gemini?

Ian Pearson: When I see reported that Ray Orbach from the United States has called for the International Linear Collider to be delayed until the results come in from the Large Hadron Collider then I listen to people who say that. I think Congress when it made its decisions recently on the

International Linear Collider reflects this scientific opinion, so I do not think in that area there is reputational damage. I know there has certainly been some criticism of the decision to withdraw from Gemini. The STFC, as I understand it, and I know you are going to be meeting with them again next week, has not yet withdrawn from Gemini; it is paying its subscription to July this year; and it has been looking through its peer review process as to how Gemini stacks up. One of the reasons it made its decision on Gemini, and Keith Mason told you this in his appearance, was that on the peer review process Gemini was a lower priority than the European Southern Observatory. Again I think it is recognised in the scientific community that the European Southern Observatory ought to take priority. Just on Gemini, the STFC still do want to ensure that researchers can have access to facilities in the Northern Hemisphere and I hope they can be successful in concluding negotiations on that. I know that a negotiating team from the STFC will be meeting with the Gemini Board next week.

Professor Sir Keith O’Nions: Can I make a quick comment on reputation.

Q201 Mr Boswell: May I just press the Minister on one point. Just for the record, I think from some earlier exchanges that you had with my colleague, you indicated that as part of your general responsibility for science policy that issues of reputation and, as it were, international relations would be within your remit and I would like you to comment that whatever the means or the outcome, in that sense, you are regard yourself as responsible for safeguarding the reputation of British science and its international credibility.

Ian Pearson: I want the UK to be seen as a place where we conduct world-class science and innovation, and so our ability to conduct world-class science, and our reputation internationally to do that is something that is very important. That is why we need to ensure that all the scientific disciplines are in a healthy condition. It is one of the reasons why we have set up the Wakeham Review. Your comments about back-scratching I will leave to Keith because Keith will understand this situation very well.

Professor Sir Keith O’Nions: Thank you for that endorsement. Can I say I think you are absolutely right to bring to attention reputation and reputational damage, and I think it is a proper and sensible point to focus on. The UK is really quite pre-eminent in science; we must not forget that. We are second only to the United States and our position globally is still improving in basic science and basic science output and we are getting better at translation. We have been extremely attractive to other scientists around the world in our universities which now have proper infrastructure, so reputation is immensely important. On this settlement, we all know no matter how much money you have got you will never have every bunny happy at the same time and you expect some criticism. What was totally unexpected to me was that we would have such an uproar in this particular part of physics. That is a

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problem because there are a lot sensible people that have expressed these concerns. I have no doubt that there is a very significant degree of orchestration and that also is unsurprising given the depth of concern that a lot of sensible people have. It is also my belief that now we have got all the facts on the table about the overall increase in physics, the real state of astronomy and research grants in STFC, and the fact that we have the Wakeham review—reviews tend to be inflationary in my experience—is likely to be making sensible and supportive recommendations about physics in general, is a situation, that very few other countries could identify that as a crisis but, instead, rather a nice problem to have. I suspect that it is going to take some time in these particular areas, I suspect, to repair that reputation. It is unfortunate but I do not think ultimately the facts justify the damage that has been done. It is very fair of you to identify it.

Q202 Mr Boswell: Very briefly on this, if there is an issue for the future it may well be lessons learned in terms of the handling and presentation of this issue as well as the substance.

Professor Sir Keith O’Nions: I think there are lessons to be learned from here and there are always lessons to be learned after every allocation round. When I was given this job until March by Brian Bender two years ago, I said, “until Christmas,” he said, “No, you have got to stay to March and take any flack that you might get from the allocations,” and here we are!

Chairman: This is a polite discussion, Sir Keith.

Q203 Dr Harris: Would you agree with Sir Keith that there has been damage (f I got you right Sir Keith) to the UK’s international reputation in respect of being a partner for international collaborations?

Professor Sir Keith O’Nions: I hope I used the word “potential”; if I did not I will correct the manuscript immediately.

Q204 Dr Harris: Has there been damage, is my question to you, Minister?

Ian Pearson: I agree that there has been potential damage in the short term as a result of the way the science settlement in the particle physics and astronomy community has been perceived. When you get the facts on the table, as Keith has said, then I do not believe that we should be in a situation whereby we are challenging the extremely strong reputation that the UK has for conducting world-class science.

Q205 Dr Harris: Let me tell you what Professor van Eyken, who is the Director of the Scientific Association of EISCAT, said in a letter to you: “I would like to emphasise the implications of the UK withdrawal from all ground-based Solar Terrestrial Physics which was announced—seemingly with no warning or consultation whatsoever—in the first Delivery Plan to be issued by the STFC last week.” (The letter is dated 21 December) He says: “. . . I would like to make some comment on the reputation

of the UK scientific community, and their trustworthiness in international collaborations. The prospect of the UK belonging, for several more years, to an international association, namely EISCAT, which it does not then exploit, is very damaging to its credibility as a competent research nation. That the UK would not honour its commitment, thus also destroying its reputation as a trustworthy partner for international collaboration, is presumably quite unthinkable.” That does not sound like potential damage to the UK’s reputation; it sounds like damage. I have to take the car into the garage when there is damage, not potential damage; it is damage.

Ian Pearson: You talk and quote about the issue of solar terrestrial physics. My understanding of the situation is that the STFC’s predecessor took the decision to withdraw from ground-based solar terrestrial physics in the last Spending Review SR04. My understanding also is that that was taken as a result of peer review which said that ground-based solar terrestrial physics was a low priority activity. I understand that since then there has been a subsequent peer review process conducted which also confirmed that ground-based solar terrestrial physics was a low priority activity—

Q206 Dr Harris: --- That is not my question; I just want to ask you about the reputation.

Ian Pearson: --- And said that we should continue to withdraw from it. For a number of years the STFC has announced its intention to withdraw from ground-based solar terrestrial physics. I would also point out that ground-based solar terrestrial physics is actually funded through the EPSRC as well as through the STFC. As far as the STFC is concerned, and it makes decisions on its priorities based on peer-reviewed research—

Q207 Dr Harris: That is not my question. My question was about has there been an actual dent in the UK’s reputation. If there has, how is it that they think there has been no warning if you are saying this was a decision that was made or presaged four years ago?

Ian Pearson: You are quoting from a letter from an eminent Professor, and he has not drawn attention in his letter to you the fact that the STFC have looked at ground-based solar terrestrial physics and whether they should fund it over a considerable period of time. He has not drawn to your attention the fact that for a long period it has been known that the STFC was withdrawing from that activity. You should not necessarily believe as gospel the pleadings of one individual in a letter.

Q208 Dr Harris: That is not my point. My point is that our reputation is the view of people like that. You cannot say his view is not that view because it is up to him to say that is his view. I think you are a great guy; you cannot say that I do not think you are a great guy because it is for me to say. Is that not evidence that the UK’s reputation is damaged?

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Professor Sir Keith O’Nions: Can I just point out that there are representations from many other areas of physics that come to DIUS and come to ministers that do not reflect the view that these decisions are damaging, and what ministers have to balance is views from some other physicists that are really rather indifferent to this plight. I think the overall damage to physics in reputation terms is not great. There is a serious point in this particular area but not every physicist would agree with the letter.

Chairman: I am going to stop you there because my reputation will be damaged irreparably we do not move on. I would ask the Committee to be as succinct as possible.

Q209 Dr Iddon: I just want to clear up some confusion that I am detecting this morning about Wakeham. I thought you said earlier, Ian, to Gordon Marsden that we had to wait until Wakeham reported until some decisions were made, but I thought I also heard, and I think I read in the press, that the decision on Gemini is to suspend, and I think you have confirmed that this morning, but you have also indicated I think that the International Linear Collider decision has been made. These are two important aspects of Wakeham and therefore I ask you if the Gemini and ILC announcements this morning are correct, why can we not wait until Wakeham has reported on everything?

Ian Pearson: As Sir Keith Mason actually said in his evidence to you, the STFC’s delivery plan has made two and a half decisions. One was on the International Linear Collider; the second one was on our intention to withdraw from Gemini; and the half a decision was the withdrawal from ground-based solar terrestrial physics. He says it was only half a decision because it had been taken a long time before, which I was pointing out to Evan a few moments ago. Those decisions have been taken. The Wakeham review has had clear terms of reference and you have seen as a Committee the terms of reference and the membership of the Committee. What is very clear is that where the issue of the health of the disciplines is concerned, the primary concern has been on post-doctoral research grants, and the situation with regard to particle physics will be unchanged, apart from the International Linear Collider research, because none of these positions is up for review in this coming financial year. As we have said, the situation with astronomy is broadly flat as well, having gone up significantly this year, so there is time for Bill Wakeham and his Committee to do their work and for us to consider what their findings are.

Q210 Dr Iddon: Let me just go back to solar terrestrial physics for a minute. It may be dropping in the priorities of the STFC but this Committee has heard from scientists that are funded by NERC that solar terrestrial physics is quite critical to some of their work. Therefore my question to you is: have you investigated or do you intend to investigate escape routes, for example, for solar terrestrial physics? Could NERC, for example, not take on

board that part of the work at least, if not all of the work of solar terrestrial physics so that their scientists’ interests are preserved?

Ian Pearson: I do not think it is for me to get involved in individual detailed decisions about research grants. They have to go through a peer review process and it is the responsibility of the research councils to do that. You are absolutely right to point out that as far as the Natural Environment Research Council is concerned, some of the observations and research that can provide important information come from ground-based solar terrestrial physics, which is one of the reasons why it has funded that sort of research in the past. It will depend on NERC’s view of its priorities and the quality of applications (which will be peer reviewed) as to how much ground-based solar terrestrial physics it will support. It could quite easily be the case that some of the people who are currently working on projects that have been funded by the STFC will migrate to projects that will be funded by NERC in the future. That can only be done on the basis of an assessment of the excellence of the research, which NERC will have to make.

Q211 Dr Iddon: Could I turn to another aspect which we have not considered this morning that has made life difficult for the STFC and that is in previous years the international subscriptions (which are susceptible of course to exchange rate fluctuations) the exchange rate fluctuations have always been carried by the main science budget, but this year of course that responsibility has been transferred to the STFC.

Professor Sir Keith O’Nions: We made some of those transitions in SR04 actually and, up to a limit, the fluctuations are carried by STFC, beyond which they are not. This is quite a tricky area. Our judgment is that the burden and uncertainty that is put on the £1.9 billion budget, which is what STFC have across the SR, can go plus or minus and is not great, and that is the judgment we have reached.

Q212 Dr Iddon: Can you put a figure on it for this year?

Professor Sir Keith O’Nions: I can put the figure on it but it is not in my mind. I am very happy to let you have it precisely and the arrangements and what was organised with those councils back in 2004.

Q213 Chairman: Minister, you say that so far as solar terrestrial physics is concerned that in principle, provided the research councils sorted it out, you would have no difficulty with some of the solar terrestrial physics going to NERC and in fact being supported by NERC, but that that is their decision?

Ian Pearson: Let us be clear, we are talking about ground-based solar terrestrial physics rather than solar terrestrial physics.

Q214 Chairman: You have no objection in principle for ground-based solar terrestrial physics going to NERC?

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Ian Pearson: What I am saying is it is not a matter for me; it is a matter for researchers to apply to research councils with proposals and for those to be peer reviewed through the normal process.

Professor Sir Keith O’Nions: If I might just add, Chairman, the advice that we have to give ministers is whether research councils have an adequate peer review process to come to what may sometimes be unpopular but rational judgments about priorities. The detail of whether the British Antarctic Survey, which is the wonderful viewing place for solar terrestrial physics, is a high priority within the British Antarctic Survey and NERC programmes vis-à-vis others has to be left for peer review processes, and I think ministers have to be assured that a proper process exists. I do not think it is the position of government to ask the minister whether he thinks NERC should be running a solar terrestrial physics programme.

Q215 Chairman: I was just asking in principle was there an objection and clearly there is not. In terms of the ATC in Edinburgh, would again there be any objection in principle for the ATC to be subsumed within Edinburgh University and the excellent department it has in terms of astronomy?

Ian Pearson: My understanding of the situation with regard to the ATC in Edinburgh is that the STFC are at early stages of discussions with the ATC about their future. One of the options that they are discussing is whether there should be closer links and a tie-in with the University of Edinburgh. There is the example from BBSRC of the Roslin Institute which has moved into the University. It is my understanding that people working at the ATC have different views about what their future might be. I am keen that the STFC listens to those views and comes up with a satisfactory outcome.

Q216 Mr Boswell: A very small point, I wonder if Sir Keith can help. Particularly within STFC is there any attempt to lay off any of the exchange rate risks of subscription?

Professor Sir Keith O’Nions: You mean do they hedge?

Q217 Mr Boswell: Hedge might be rather—

Professor Sir Keith O’Nions: Can I add that to the note because I do not know.

Ian Pearson: It would be too small to do that.

Q218 Dr Blackman-Woods: Is there anything that you think the Government could have done differently in terms of setting up the STFC to have avoided this situation?

Ian Pearson: In terms of setting up the STFC, I probably ought to hand over to Keith because it was set up before I arrived as a DIUS Minister, but from my reading of all the paperwork around the setting up of the STFC, it was clear that due diligence was undertaken as part of that process. Keith referred to the NAO Report, so I think proper steps were taken to ensure that the STFC was not created with a deficit which would create future problems. I do not know whether you want to add to that, Keith?

Professor Sir Keith O’Nions: I would agree entirely with what the Minister says. I do not think there is anything in the setting up of the STFC that we would have done differently, even with hindsight. Returning to an obvious point, however, given the difficulty that we have had prior to all the facts being properly on the table and well understood in the community and FEC, there will be lessons to be learned from that and other allocations by other research councils.

Q219 Dr Blackman-Woods: Was it given enough time to adequately consult with the community about where the cuts would be or indeed about priorities for the budget?

Professor Sir Keith O’Nions: Looking at it from the DIUS point of view and looking across research councils, we do not see very much difference in process. This process kicked off in 2006 with the predecessor councils, but with a vengeance in 2007, so delivery plans have been discussed at all stages over the last year. My understanding from STFC is that their Science Advisory Council, which is quite independent, have seen these at all times and our expectation is that councils and advisory committees will be consulting and inputting information from the community, so in terms of process I saw no evidence for intervening or advising Ian that the processes that were set up were wholly inadequate for getting advice. I do know that there are people in the community that feel that consultation was inadequate, but in terms of the process that STFC and other research councils carried out, I think they were broadly comparable.

Q220 Dr Gibson: Can I come in briefly just to try and get some excitement into the proceedings; this is a bit boring! What has the STFC done in terms of initiatives and new things? What ideas has it got? Something that is challenging and helpful to the nation; what is it doing? It is getting attacked a little but what is it doing really?

Ian Pearson: There are lots of very positive things but I think the hugely exciting thing will be the Large Hadron Collider coming on-stream in July. That is a huge bit of kit.

Professor Sir Keith O’Nions: £700 million UK investment.

Q221 Dr Gibson: So when will we see the result? Will you be around?

Ian Pearson: It will be starting its full operation in July this year, is my understanding.

Professor Sir Keith O’Nions: For a bit of excitement, it is the biggest international physics experiment ever; and the questions that are addressed, if you are interested in fundamental particle physics and cosmology, are amongst the profound questions in field theory that exist, so boy is that exciting!

Chairman: Right, we have had our bit of excitement, we cannot cope with any more.

Dr Turner: The answer is 42!

Q222 Dr Blackman-Woods: Sorry to bring you back to the mundane but I think this issue of consultation is quite important. How do you account for the fact that so many people in the physics community feel that they were not consulted at all about these cuts or the priorities, if you are saying that the process was fine and was the same as every other research council?

Professor Sir Keith O’Nions: From where we sit—and that is having personally sat through all the meetings on delivery plans and PowerPoint presentations and we have people attending councils of STFC—although we do not participate in this—we understand that the Science Advisory Council at each stage has been involved, and the normal process with councils and the preparation of their strategic plans is to be feeding information into this. Whether or not we decide to have a closer look at that as we learn the lessons from this, I think is a separate issue, but answering your point, as we were going along, were there massive alarm bells that this council was completely out of order and out of line? I do not think there were, but that does not mean to say we are not obviously going to think quite carefully and see what lessons can be learned from this. I think the rest of that question will have to be addressed to STFC, frankly.

Q223 Dr Blackman-Woods: Do you intend to look at all at the structure of the STFC Board? It is constructed in a slightly different way from some of the other research councils. It has got ten members, three of them are executive members of the STFC, so there is quite a small representation from the wider academic community compared to some of the other research councils. Is that the sort of thing that you might consider looking at?

Professor Sir Keith O’Nions: Obviously we looked at the Board quite closely and discussed it at length with Keith Mason when he set it up. The structure that he set up was a rational structure. The sub-board committees and the Independent Advisory Board seemed absolutely right. I believe an announcement was made on Monday and Keith Mason is making very significant structural changes in his management of the STFC. Of course we will take a close interest in that and, as I say, there are lessons to be learned here in slower time. I think when you talk to Keith Mason you will discover that he really is responding and getting a grip on some of these issues.

Chairman: You will be delighted to know that we are going to move off STFC for a short time and I am going to bring in Gordon Marsden.

Q224 Mr Marsden: Thank you Chairman. Whether the delight will be unmeasured remains to be seen! Can I ask specifically about the situation with the funding award to the Arts and Humanities Research Council resulting from the overall settlement. Our information tells us that out of the seven research councils, AHRC received the smallest increase, and that was a 12.4% increase, and its share of the science budget fell from 2.8% in 2007–08 to 2.6% in 2010–11. The implications of that, at least initially, are quite

severe: they are cutting the post-grad awards from 1,500 to 1,000 in 2008 and over the whole period the fall in awards amounts to a reduction of 19%. I just wonder what sort of message you think that is sending out to the arts and humanities in terms of the overall budget and particularly in terms of inter-disciplinary co-operation?

Ian Pearson: I will start on this and then Keith may want to say a few words. You are right to say that the Arts and Humanities Research Council received an increase in funding, in actual fact £26.3 million more over the CSR period. I would also point out that the Arts and Humanities Research Council did well in the last Spending Review where its budget increased by 20.5% over the previous three years of SR04. The situation, as Keith outlined earlier, is that AHRC will have received its full economic costing increase and then its budget is probably minus 1%, so it is somewhat of a surprise to me to learn that it is planning to see such a major reduction in the first year in terms of its number of research grants. I will want to enquire why that is the case. When you look at the numbers with the budget going up maybe not as much as it would have liked of course, as with the other research councils, but still a rising budget, you would not necessarily expect to see such a significant reduction.

Q225 Chairman: What will you do about it if in fact that is confirmed?

Professor Sir Keith O’Nions: I am similarly perplexed as is the Minister, and we do not know the detail between us. However, when you look at the figures there is an increase in the budget, FEC paid for, otherwise a pretty much flat cash with perhaps a 1% reduction, you would say that overall there will be a small reduction in volume but you would not—

Q226 Chairman: 500 less PhDs?

Professor Sir Keith O’Nions: I am looking at the cash. Overall you would expect some small reduction in volume in as much as inflation is not paid for. Would you expect swingeing cuts? No, frankly and I think we do need to understand more. I just hope that this and other research councils are not being so conservative that they are going to underspend, because the biggest single risk that all research councils carry is not overspending, it is underspending. We do not know the details but reductions from 1,500 to 1,000 are not the sort of numbers that we would expect. That is as much explanation as we can offer you; we will take a close interest in it.

Q227 Mr Marsden: Can I pursue this point, and in fairness to the overall figures, as I say, in the overall figures the reduction is about 20%, but I would agree with you that it does seem rather curious. It would be useful for the Committee to know what the implications of the cuts in these post-graduate awards are going to be particularly for collaborative and inter-disciplinary work across the piece because that is surely something that we ought to be promoting.

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Professor Sir Keith O’Nions: Or even if those are included.

Q228 Mr Marsden: Or indeed if those are included.

Ian Pearson: Yes and it may well be the case that because the AHRC is participating in a number of collaborative cross-council programmes and that it is not factoring the awards that are going to be made in those areas into its calculations, so the reduction in volume might not be as much as it seems to be saying in its report to you. I do think that one of the things that we will need to do is to talk to the Arts and Humanities Research Council to understand better their assessment of their priorities and why they are making these decisions.

Mr Marsden: Through you Chairman, could I therefore ask that when you have been able to do that you might be able to write further to the Committee on this matter. I know my colleague Tim wants to come in on something.

Q229 Mr Boswell: I have really got two points. I would group the first under flexibility and the second under autonomy, if I may. As I understand it, some of these cuts go back to the reduction in end-of-year flexibility resulting from the science budget cut-back that happened a year ago, the £68 million. Can we have an assurance from the Minister that the CSR07 budget will be honoured so that the councils can plan their budgets properly and they are not going to find themselves caught short by further cutbacks?

Ian Pearson: I do not feel the need particularly to go back over the old ground of the £68 million. The Committee is very well aware of the situation and the Government’s view on this. I can confirm that the AHRC’s share of this was £5.3 million and, like other research councils, the AHRC had to make some adjustments to its budget for 2007–08 to reflect that. There still is the situation however where its overall budget has gone up, not as much as I accept it would have liked, but it has seen an increase in budget allocation for the next three years. As far as a guarantee on the ring-fence of the science budget, I cannot bind the hands of people who might make decisions in the future, but the Government has always remained committed to a ring-fenced science budget and it is certainly the Government’s intention that we will keep committed to that.

Q230 Mr Boswell: That is helpful. My second is perhaps smaller in that context but it is about flexibility for research councils in their recurrent activities and particularly CSR overlaps, and the more they have a degree of flexibility, particular in relation to their larger programmes even if those are not typically so large in the humanities, it is going to be easier for them to manage these difficult interfaces. How do you feel about that? Would you be inclined to give them as much flexibility as you can?

Ian Pearson: We certainly look to use all the flexibilities that exist within the system to make sure that we get maximum benefit, so for instance if there are underspends in particular areas often they can be balanced by overspends in others, and that is part of

what you would expect of good financial management of a department. Keith will have operational responsibility for this.

Professor Sir Keith O’Nions: Good financial management of these budgets is very important. If you actually look at the figures, you can see that you often do not get a smooth increase over a three-year spending period. It maybe very flat in one year and typically they often have quite large rises towards the end of the Spending Review. In order to manage the sort of profile of a research council spend over that period, which is a much smoother curve, you are obviously going to have to accumulate some underspends and EYF and spend it somewhere else. Our job is to try and manage that. Good financial management will involve end year flexibility and cross-CSR transfers, but we have to persuade councils not to be so conservative that they carry enormous amounts of EYF which ultimately there is no prospect of spending, and that is part of my job.

Q231 Mr Boswell: My final question is simply about the management side. It slightly concerned me, and my eyebrow metaphorically lifted, given that the announced impact on AHRC has been known for some little time, that it is only now that you appear to be, as it were, undertaking to call them in to talk about it. Everybody, from whatever previous experience they have, understands that there are Haldane principles and you should not be digging up research councils by the root every few minutes. It does slightly concern me that apparently the information links are not, as it were, immediate and readily operating in both directions so it appears almost to have caught you by surprise.

Ian Pearson: Can I say that it does slightly concern me as well because when I read the AHRC’s delivery plan it did not come screaming out at me that there was going to be a major reduction in research grants. I expected some small decrease in volume over the CSR period as with some of the other research councils, but I did not expect to see that, which is why I said I was surprised. That is one of the reasons why I would want to take this away.

Q232 Dr Harris: Some straightforward questions just on this point, is it fair to say that for the EPSRC that significant funds that would have been allocated to it were instead directed to the new Technology Strategy Board and the Energy Technologies Institute, around 3% of its annual budget?

Ian Pearson: It is fair to say that the Government believes that the Energy Technologies Institute is a strategic priority and it is fair to say as well that the Government agreed with the research councils as part of our response to the Sainsbury Review recommendations that the research councils combined would commit a total of £120 million over the CSR period to collaborative work with the Technology Strategy Board. Overall, when you add both of those, that is a relatively small and modest proportion of EPSRC’s budget.

Q233 Dr Evans: It is not the volume. You will not be aware that myself and the Chairman were at an SI committee that set up the Technology Strategy Board and I asked: “Will the new research council’s funds come from the DTI in the normal way, or is there any likelihood of money that had been allocated to other research councils through RCUK being transferred to the new body”. And Malcolm Wicks said that funds would be allocated to the board in the normal way depending on the Comprehensive Spending Review. “We hope that adequate funding will be provided, given the priority that we give to the matter.” And I confirmed to the Liberal Democrat spokesman “that money will not be taken from other research councils to fund the new board; the money will be allocated in the normal way by the DTI.” Is what you have just described not a contradiction?

Professor Sir Keith O’Nions: That is a wonderful gizmo you have there, I must say, it is a very impressive piece of high technology.

Q234 Dr Harris: That is all to the purpose of asking these questions.

Professor Sir Keith O’Nions: The undertaking that was given has been adhered to. There is no transfer of money from research councils to the Technology Strategy Board. The arrangement is actually quite welcome by the research councils. It is an alignment of spend. The strength of the proposal is that there is a clear line between where the TSB spends its money in collaborative arrangements with business according to state aid rules and where the research councils spend their money is on aligned programmes, funding what is appropriate for their priorities in their councils in universities. They are not transferring money to industry and to the TSB. We have discussed this before. It is not a subtle point, but actually the undertaking has not been reversed at all. Just remember that EPSRC has a very large proportion of its budget behind missions that logically underpin some of the challenges that face the TSB.

Q235 Dr Harris: Time prevents me from exploring the subtleties.

Professor Sir Keith O’Nions: It is not subtle.

Q236 Dr Harris: Would you agree with what Mr Watmore told us when he and John Denham came to see us that the financial side of the settlement was previewed before we turned up, so the science budget had been announced in the Budget of 2007?

Ian Pearson: Yes it was and it is a matter of record, is it not?

Professor Sir Keith O’Nions: The broad structure was determined in the Budget. There was a commitment in the Budget settlement to the national challenges issue, to the implementation of Cooksey, to support of the Energy Technologies Institute and, most importantly, to full economic costing, so the broad structure was there.

Q237 Dr Harris: I will come to my point. The Treasury claw-back from the MRC of £92 million was decided, I think, in the summer of 2007 by the Treasury. Is that correct?

Professor Sir Keith O’Nions: We can give you the precise date but it might have been a bit earlier.

Q238 Dr Harris: A bit earlier? May?

Professor Sir Keith O’Nions: Can we send you the precise date. It was June apparently.

Q239 Dr Harris: So that was after the science budget had been announced in the Budget. I do not understand how it could be said that that clawback was known about before the science budget was set and was compensated for in an enhancement in the science budget. If you get the timings correct it does look as if the science budget was set, then the Treasury intervened—that is not your fault and I am not blaming either of you—and took away £92 million from the commercial fund of the MRC. The figure £92 million is not unadjacent to the £80 million that the STFC is down on and so it is fair to say that there was no compensation in the science budget for that clawback.

Ian Pearson: Again you are wrong to quote the figure of £80 million when it comes to the STFC. The simple fact is that there has been an increase in the STFC’s budget, but not as much as it would have liked. In fact, all research councils would have liked more money.

Q240 Dr Harris: All I am saying is 92 is close to 80.

Ian Pearson: Even the MRC would have liked more money, but the fact is that it is getting a 30.1% increase in its budget over the next three years, and I think that is widely welcomed in the medical research community. To get back to your original point about the MRC’s commercial fund, the situation has been that the MRC’s commercial fund has been producing an income stream but without any authority to spend that. The normal way in which organisations produce income streams are accounted for by the Treasury is that they will factor those into their normal budgetary allocation processes. That was not taken into account at the time of the CSR settlement, and I think you will find Treasury argue that if you would have taken that figure into account, we would not have given so much to the science budget in terms of its headline allocations.

Q241 Dr Harris: I am not with you, so what you are saying is that the budget was set and then this £92 million was taken out and that is just because of Treasury rules? Is that what you are saying?

Ian Pearson: The MRC’s commercial fund did not have authority to spend the money in the MRC commercial fund and the agreement reached with the Treasury was that £92 million would transfer to the Treasury but £106.9 million would be available to spend by the MRC over the next three years.

Q242 Dr Harris: That was money it already had; it was not in exchange for the 92. The point I am making—

Ian Pearson: Can I just carry on and try and explain a bit more. That was a process of regularising the position so that the MRC commercial fund could operate like other parts of government that generate income because it had not been operating on that basis before. The agreement is that post this CSR period that the MRC commercial fund will produce information indicating its income levels. Those will be part of the budgetary process during the next CSR period and the general rule that applies all across government is that you will forecast your income, you are allowed to keep that income, and you are allowed to keep 20% above that income, and again the agreement with the MRC is that that will hold for the next CSR period.

Q243 Dr Harris: Do you think that is a disincentive?

Ian Pearson: And if there need to be negotiations in the future as well because there are one-off windfall gains that that can come from, then we will have a separate negotiation with the Treasury on this.

Q244 Dr Harris: You are very keen on knowledge transfer and translation and the entrepreneurial stuff shown by the research councils. Do you not think it is a bit of a negative message to send to research councils that if you do better than you plan, and we all hope to do better than we plan in everything—you will get 20% of it but 80% of it is for the Treasury when it is entrepreneurial work of the research councils?

Ian Pearson: I think it is a good point to raise and certainly we want to encourage organisations to be entrepreneurial and to raise income where it is appropriate.

Q245 Dr Harris: So why not give the Treasury 20% and given the research councils 80?

Ian Pearson: Where I have sympathy with the Treasury—and I think you need to think carefully with this—is what incentives do you provide for people to correctly forecast their income. I think there is a point there and if you have a system whereby you are saying whatever money you generate you can keep, I do not think that provides any real incentive to get accurate information of what is likely to be raised as income as part of this.

Chairman: I must bring this to an end.

Q246 Dr Harris: If they get it wrong and if they underperform according to their budget they lose 100%. The Treasury does not come into the rescue with 80%, so they only lose 20% on that side, so it is not really fair, is it, that if they do their best guess and fall short they lose 100% of that funding, because it is indicative, as you say, in their spending plans, and if they overperform they only get 20%; it is not fair.

Ian Pearson: I think the system at the moment, which has been a system that has applied right across government for quite a while, has tried to strike a

balance between providing incentives and getting proper information so that the Treasury can be aware of the financial position.

Q247 Chairman: I think the big concern we have here, Minister, is that this £92 million was in fact not unallocated, it was very much earmarked for the St Pancras development and that was built in, and even the Chairman of the MRC knew nothing about it until after the settlement. That seems to be a totally inappropriate way of managing the affairs of what is going to be a major project.

Ian Pearson: I certainly am aware that the MRC very strongly felt that these monies were legitimately theirs and that they had indeed earmarked them for projects. What I can say though is, subject to the business case, that the Government has confirmed that it is very strongly supportive of the UK CMRI and other big, exciting projects such as the Laboratory for Molecular Biology at Cambridge, and we do believe that there is sufficient resource in budgets that can be available to make sure those projects come to fruition.

Q248 Chairman: So “Minister guarantees project” is the statement from this morning?

Ian Pearson: I can definitely confirm, subject to all the caveats about it being good value for money and a proper business case that the proposed St Pancras development is extremely exciting and offers a prospect of really world-class science and international leadership and we want to see it continue.

Q249 Mr Cawsey: Having joined this Committee knowing nothing about how science funding works, and heard all the evidence, I now definitely know nothing about how science funding works, but at least I am certain about it now! I want to move on to the relationship between the Department and research councils. You have been going for a few months now with the new department. I wondered how you feel the relationship between yourselves and research councils is developing. Is it just business as usual with you having a different name or is it all very different from the old OSI?

Ian Pearson: I only saw the OSI from the outside of course because I took an interest in these matters and have done for a number of years, but just as an interested MP rather than as a minister with responsibility. What I can say is this: like any new job I have made it my business to get to know the senior staff in research councils and to personally build up a relationship. I have started a programme where I will see a chief executive of a research council once every fortnight, so there will be a regular period of communication, and I would like to think that is what you would have expected of an active minister that wants to be involved and engaged. The basis of the relationship is still very much one of accepting the Haldane principles when it comes to making decisions. It is not my job, and frankly it would be irresponsible of me, to try and second guess decisions that research councils take on the basis of peer review.

Q250 Mr Cawsey: So are you confident that these lines of independence that the Haldane principles hold up and they are still in place and the relationship is not being tested in that way in any respect?

Ian Pearson: What I can say is that as a Government we clearly need to take a view on what the strategic research priorities are for our future. I think there is a debate that we will continue to have about to what extent we want to focus research spending on some of the big challenges facing society and our economy today. That is why we have talked about the grand challenges such as environmental and climate change, energy, global threats to security, aging, and it is why those are reflected in the programmes of the research councils. However, if you look in that broad area you would say that it is right for government to say we want research done in these areas because they are strategically important; it is right for the government to say things like the digital economy and nanotechnology are areas where we want to see research being done. It would not be right for us to say that that particular nanotechnology research project should be funded and that one should not. That is where the Haldane principles and the peer review process need to strongly come in. I think we have got the right sort of balance but we need to continually review this.

Q251 Mr Cawsey: It is interesting you say that because is it not true that politicians do not spend years and years climbing up the ladder to give it all away when they finally get there. If you look at what has been happening and you see the fEC and cross-council programmes and other pre-determined expenditure being set before things get through to the research councils, it could look like the Department and the Treasury are setting most of it. What would you say to give a degree of reassurance that you are not micromanaging the research councils specifically about how they spend the money that has been allocated to them?

Ian Pearson: I would say look at the facts and I think the facts demonstrate that we are not looking to micromanage. The facts are that we have some overall strategic priorities as a government, but we make broad funding decisions in allocating money to research councils, and we agree at a relatively high level their delivery plans and then we let them get on with it, and that is what we do. There is a question when you look at the cross-council programmes that I was talking about such as Living with Environmental Change and the others as to whether we should be encouraging research councils to spend more money in those areas. There is an argument that says, yes we should because these are important to our future and that we ought to encourage greater funding. At the moment when you look at it we are putting through the research councils some significant money in these areas, but there are still tremendous opportunities across all the research councils for response-mode funding for blue-skies research, and there will always be a peer review process, I believe, because that is the best way to allocate resources.

Q252 Dr Iddon: Finally we are looking for some clarification on how full economic costs have worked. I assumed, rightly or wrongly, that this has been a three-year phased programme and in the next financial year we are going from 70% full economic costs to 80% full economic costs. I may be wrong.

Professor Sir Keith O’Nions: Can I just correct you. We have been 80% since September 2005. Next year with the restructuring of the capital funding it will effectively be 90.

Q253 Dr Iddon: So we are going from 80 to 90, so the figure of £700 million to universities that you mentioned earlier, Sir Keith, represents that extra 10%?

Professor Sir Keith O’Nions: We spent something in excess of £400 million on full economic costs in the last Spending Review. Obviously we started with zero and we ramped up to 400+. It is our estimate that it will be in excess of 700m.

Q254 Dr Iddon: That ramping up has been over a three-year period?

Professor Sir Keith O’Nions: It started in September 2005 but of course it was a trickle fund and it still building up, but it will be more than £700 million in this next Spending Review.

Q255 Dr Iddon: My question is one that I put down as a parliamentary question three weeks ago to this Department, DIUS, but for some mysterious reason the parliamentary question has been transferred to the Cabinet Office. I put it to the Minister straight this morning: if all seven of the research councils had been responsible to meet full economic costs, of which we have all approved on this Committee, some of those economic costs for running research came from other budgets previously, so what has happened to the money in those other budgets, perhaps QR money, perhaps the universities themselves were funding the cost of that research? Have those budgets been transferred in any way whatsoever to the research councils to help them meet the full economic costs of 90% next year?

Ian Pearson: Firstly, I do not understand why your question should have been transferred to the Cabinet Office—

Q256 Dr Iddon: --- Neither do I.

Ian Pearson: --- So I will make enquiries. Secondly, just to confirm, full economic costing is part of the science budget. There is a well-established ring-fenced science budget. There was in SRO4 and full economic costs were part of that and similarly with SR07 the science budget settlement contains money for full economic costing, and as Keith says, that will be £700 million-plus over the next three years.

Q257 Dr Iddon: Before we had full economic costs somebody was funding the research.

Professor Sir Keith O’Nions: What was happening before full economic costs, as all the analysis has shown—and by the way there has been no shift since QR from HEFCE and the other funding councils also increased apace over the this same period, so

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there is something of a golden age here—and then one gets beyond analysis into anecdote, that, in effect, the volume of research had expanded in universities through the 1990s into the early part of this decade and the expansion was actually unfunded. Some universities were probably taking money out of teaching and the teaching infrastructure, in others it may just not have been fixing the roof of the laboratories and so on, but in effect it was on a trajectory that was absolutely unsustainable into the future. What we are seeing is how much money it takes to get back into a sustainable situation where our universities in the UK, I believe, are as competitive and as attractive as anything in the world and you can see that in terms of the ability of our major universities to appoint global talent, and you are working now and competing for global talent, which costs a lot of money over a long period of time, but it has not raided other budgets; it just was not funded.

Dr Iddon: That is what we wanted to clarify, thank you.

Q258 Chairman: Could I ask either the Minister or Sir Keith to drop us a note because we have run out of time. It really goes back to this question of the MRC’s commercial fund and the fact that all the research councils and indeed the universities also will be making significant income from intellectual property in the future. You gave a hint that the Treasury was going to re-visit that relationship between those commercial funds into actually pocketing the profits thereof. Could you give us a note to say what discussions you have had with the Treasury about that and if there is a timescale for actually developing a new proposal?

Ian Pearson: The MRC situation has been regularised. There is not a new proposal, but I am happy to write to explain the detail in terms of what is going on.

Chairman: On that note, could I thank you very much indeed, Minister, for giving us a very, very frank exchange this morning and again thank you, Professor Sir Keith O’Nions.

Wednesday 27 February 2008

Members present

Mr Phil Willis, in the Chair

Dr Roberta Blackman-Woods
Mr Tim Boswell
Mr Ian Cawsey
Dr Ian Gibson
Dr Evan Harris

Dr Brian Iddon
Mr Gordon Marsden
Ian Stewart
Graham Stringer
Dr Desmond Turner

Witnesses: **Professor Swapan Chattopadhyay**, Inaugural Director of the Cockcroft Institute, and **Professor Richard Holdaway**, Director of Space Science & Technology, Rutherford Appleton Laboratory, gave evidence.

Q259 Chairman: Good morning, everyone. May I welcome our witnesses to our final session on investigating the science budget allocations for the next comprehensive spending review. We have two panels this morning. We need to be very quick because we know that Swapan has to be on a flight to warm parts very shortly and we are very grateful for your time. I wonder if I could ask you both to introduce yourselves and to say where you are from this morning, starting with you, Professor Holdaway.

Professor Holdaway: Good morning, Chairman. I am Richard Holdaway. I am Director of Space Science and Technology at Rutherford Appleton Laboratory and here wearing the hat of Head of the Department. I chair the British National Space Centre Advisory Council. I have an overview of parts of the community and their involvement in the CSR outcome.

Professor Chattopadhyay: Good morning. I am Swapan Chattopadhyay. I am the Director of the Cockcroft Institute and hold the Sir John Cockcroft Chair of Physics at the Universities of Liverpool, Manchester and Lancaster.

Q260 Chairman: The STFC Delivery Plan was written over a period of time in consultation with the advisory committees which were set up by STFC and DIUS. How were you consulted?

Professor Holdaway: Perhaps it would help if I explained the general setup within STFC first of all. There are effectively two distinct parts: there is the strategy part which deals with strategy and the peer review process, the budgets, the allocations, the decision on cuts and the interface with DIUS; and then there is a Chinese Wall effectively to the operational part of STFC which is where the bulk of the 1,500 scientists and technologists sit. Those are the gentlemen and ladies who build instruments, operate facilities and interface on a day-to-day basis with the community within those three groups. Within that part there are seven operational departments, so particle physics is one department, space science and technology is another department, and we lead those departments. In that sense we are pretty much in the same position as the heads of university departments where we are given an allocation by the strategic part of STFC and we operate within that allocation. We are part of the

community in that sense and so there is an exchange of information on the types of programmes that may be funded or may not be funded, but we are not part of the decision-making process.

Q261 Chairman: How did you find out about the cuts?

Professor Holdaway: Through the first sighting of the Delivery Plan at pretty much the same time as the rest of the community.

Q262 Chairman: As the Director of Cockcroft, were you involved at all in the decision-making in terms of the strategic plan?

Professor Chattopadhyay: No, I was not. I should probably give you a preamble about where I stand. Everything I say today is from the perspective of somebody who is new to the United Kingdom. This is my tenth month in the job after about 30 years of a successful career serving in the US Department of Energy, at two national labs, the Lawrence Berkeley Lab and Jefferson Lab, and two major universities, the University of California at Berkeley and Harvard. When I speak about my Institute today, the Cockcroft Institute, I am really using it as an iconic symbol that really represents an entire community of excellent scientists and technologists throughout the UK, including our sister institute, John Adams at Oxford and Royal Holloway, Imperial College and particle physicists and natural scientists throughout the UK. The Cockcroft Institute has five stakeholders, the three universities, Liverpool, Manchester and Lancaster, STFC, which is a strong stakeholder, and the North West Development Agency. I happen to be employed by the universities and for reasons of propriety I have been kept entirely out of the process of the STFC Delivery Plan.

Q263 Chairman: As the Director of Cockcroft and as the Director of the Space Science and Technology at Rutherford Appleton, you were kept out of the decision-making process, were you not?

Professor Holdaway: Kept out of the decision-making process and, quite rightly, that is how it was before STFC was formed. In our case the decision-making process on which programmes to fund was

made by PPARC, it was not made by CCLRC and we are still in exactly the same position now and quite rightly so.

Q264 Dr Gibson: Did you try to give them information about what you thought should happen?

Professor Holdaway: We were able to provide our views on that as members of the community in exactly the same way as the heads of university departments, yes.

Q265 Chairman: So it was no surprise to you then when these cuts came about?

Professor Holdaway: It was certainly no surprise that there were some cuts. When the whole community, including ourselves, heard that there was a funding problem because of the size of the allocation from DIUS it was clear that cuts would have to be made. That in itself was no surprise. In terms of which programmes were cut initially—and we will know on Monday of next week what the next round of cuts are in terms of specific programmes—we have no direct involvement in that and, as I said, quite rightly so. You need that Chinese Wall between the operational part of the operation and the strategic part of the organisation.

Q266 Chairman: Let us talk about the actual cuts themselves and the decisions about them. If we accept that there was going to be a reduction in budget and therefore some reduction in programmes had to take place, what do you understand as the process of actually deciding which bits get dropped?

Professor Holdaway: The process is undertaken by the peer review panels. So there is a science board and there are two peer review panels that sit below that and those are the bodies that always have and still do make those decisions. They take advice from the community in different ways. There is a difference between the current system and the previous system which is that there are, to all intents and purposes, no advisory panels under STFC whereas there were under PPARC. So it is slightly more difficult for the community to get its input into that process. There are ways of doing it but it is not quite as regulated.

Q267 Chairman: Swapan, there is a peer review system which looks at funding the best science. The peer review system says we need to make particular cuts because this is not the best science. What on earth is wrong with that? This is how science should operate.

Professor Chattopadhyay: I have two observations to make. There has been an active request made to the STFC stakeholder representation in the Cockcroft Institute not to share any information about the decision-making process of the STFC Delivery Plan. There was some level of secrecy until the very end of November when it all came out despite my requests to get information out. I am not an STFC employee. First of all, on this whole business of communication, transparency and the review process, I have brought it to the attention of

STFC senior management multiple times through electronic messages and discussions with people directly, but I regret to say that there has not been the inclusion of Cockcroft's concerns in this regard in terms of protecting the skills base in accelerator science and technology for the UK. Secondly, as for the so-called peer review process that people talk about here, which I am taking to be below the level of PPAN and PALS, for the last 35 years I have been used to a very inclusive process where the community that is being reviewed knows they are being reviewed and the people that you choose as the members of the review committee are chosen with input from the community about the most respected scientists that could judge the field. Eventually, when the report comes out, you share the report with the community for factual accuracies and courtesy and to ensure there are no political, parochial and scientific conflicts. There have been three reviews that I have partially participated in or been asked to give input to: one was the light source review, one is an ongoing accelerator science and technology review and one is a particle physics review. I think the committee members were handpicked by STFC despite my pointing out to them that at some point --- In the case of the light source review, I even wrote a letter to the committee that chose the so-called peer review committee which was judging on the light source about the incompleteness of that committee.

Q268 Chairman: The Chief Executive has said to this Committee that he is very proud of STFC's peer review system. Obviously you do not share that view.

Professor Chattopadhyay: From where I sit the due process has not been followed, the process has been flawed and hence you cannot expect anything but flawed recommendations from such peer reviews.

Q269 Chairman: Do you share that view?

Professor Holdaway: Peer review panels have a very difficult thing to do.

Q270 Chairman: Do you share that view?

Professor Holdaway: My concern is not about the nature and the make up of the peer review panels themselves. They had a very difficult job to do and I think they have done it perfectly adequately. The concern of the community, which I share to a certain extent, is how they get their advice. I think the communications and the advice there has not been what it should be and I am confident that that will be rectified for the future, but it has not been that way in the past.

Q271 Mr Boswell: Coming back to your concept of Chinese Walls, I can see why that might happen, not least because of people who might wish to compete with you in certain respect, for example, in the university sector. It is an attempt to produce an "all fours" situation. I do not think we would object to that in principle. As for the argument about Chinese Walls and the disclosure of strategic decisions only at the last moment and as a result of a process which is closed to you, is it your feeling that that is in a

sense being used either as an excuse by STFC or that it is somehow just reducing the quality of the review process through inhibiting dialogue?

Professor Holdaway: No, I do not think so. The community that I work with within the laboratory and outside is a very close community and of course from time to time we compete with the university groups. Most of the time we are competing alongside university groups. I think we all have pretty much the same view. The community understands fully the need for cuts and that certain projects need to be cut. The problem for individuals is like unemployment, ie unemployment may only be a few per cent but if you are unemployed it is 100%. The same is true of the small areas of the community where the cuts have fallen, they feel aggrieved, rightly or wrongly. In this country we concentrate on the bad news rather than the good news. Yes, there are some cuts that are affecting some people very, very radically. On the other hand, 80 or 90% of the programme is continuing. There are some exciting new programmes coming up and the community recognises that as well. It just wants to be sure that the decision-making process has the proper governance.

Q272 Dr Gibson: I think that is a general problem in science and the peer review system. Did you know who the peers were going to be? Who chose them?

Professor Holdaway: They were chosen, as far as I know, by the Chief Executive. You can check that in the next session.

Q273 Dr Gibson: And you saw the report?

Professor Holdaway: And I saw the report.

Q274 Dr Gibson: Do you think the peers would be chosen in different circumstances? Strategically there are going to be cuts so you pick the peers who know what to do, but if they are suddenly going to double your budget presumably you would pick other peers. Is that true?

Professor Holdaway: I can conjecture. That may have been the process. I think I am the wrong person to ask. Keith Mason will be able to answer that very, very clearly for you. I have seen no evidence that the panel was picked to come up with a particular decision. I think an interesting issue is whether there was any direction from DIUS in terms of the outcome of the review. I have no evidence from where I sit to know that there was but there may have been and that might then dictate the members of the panel.

Q275 Dr Gibson: Where would that influence come from within the Department, Permanent Secretary level or somewhere else?

Professor Holdaway: I would not have thought so. If you look at specific cuts in my own area on STP and on Gemini, I cannot imagine for a moment that decisions of that nature would be made within DIUS.

Q276 Dr Gibson: Do you think it goes beyond the Department to the Treasury?

Professor Holdaway: Only at a high level. The Treasury may have a view on whether it believes particle physics and space are worthy areas of pure science. In the case of space, I think there has been a big change in the attitudes both of Government in general and the Treasury in particular as a result of the space strategy and the various audits of space science and technology. The oft quoted number by the last three ministers was £200 million investment in space and £7 billion downstream manual turnover. That is a story that speaks for itself.

Q277 Dr Gibson: What would you say if I said everybody moans about peer review when they do not get their grant?

Professor Holdaway: Of course. That is a problem with peer review and it has always been the case.

Q278 Dr Gibson: Is there another system you would accommodate in your work?

Professor Holdaway: The only alternative is one slightly closer to the American system. The problem with peer review, as I am sure everybody in this room knows, is that when you come to the decision-making process you throw out of the room anybody that knows anything about the subject because if they are any good at their subject they are almost certainly involved in the consortium that is bidding for the grants to get input into the programmes. So that is always a problem. This is why it is very important for those peer review panels to have the right advice before they make their decision and you need the right structure to do that. I think that is part of the community's concern as to how the decisions are made and whether there is transparency in those institutions.

Q279 Chairman: In terms of the International Linear Collider and Gemini projects, in your opinion was there adequate peer review prior to the stopping of those two projects?

Professor Holdaway: I cannot comment on the Linear Collider. In terms of Gemini, there was consultation with the community. Gemini has been going 14 years, which is quite a long time for a programme. I know that within parts of that community the feeling was that with things that are coming up, like the VISTA programme which is just about to go online, the exciting new programmes with the extremely large telescope and so on, there are big opportunities for that same community. Those directly involved in the Gemini programme, however, have a problem, which is that if it is cut very quickly they are out of a job tomorrow and that is not really the right way to manage things. That is why I think there has been a change in the situation with Gemini which no doubt Keith Mason will talk about in the next session.

Q280 Chairman: And the International Linear Collider, do you feel that there was adequate peer review before that decision was taken?

Professor Chattopadhyay: I have very fundamental concerns about the whole business of so-called peer reviews conducted by STFC to the point that I

would think that the position of the Government, in holding its principle of allowing research councils to make their own judgments, might be compromised once the integrity of the process is not kept preserved. In the case of International Linear Collider, as far as I know there has been no consultation or review with the community about their decisions and no consultation with the international community that we know of. It came out of the blue. In the case of the light source review, the committee members were chosen entirely by STFC's management. In my letter of 30 April I pointed out the inadequacy of that review, with committee members not having much expertise in the field of light that, for example, the GLS was trying to promote. In the case of accelerator science and technology, none of the members that are being contemplated has been put in based on input fed back from the community. That struggle is going on. If the review process is not inclusive and if the community and the agency do not take ownership of it together it is going to be flawed and biased. This is something I feel very strongly about.

Q281 Dr Gibson: How many peers were there?

Professor Chattopadhyay: In the case of accelerator science and technology there are four and many of them do not even stand up to the standards of UK scientists who are being reviewed, they are inferior.

Q282 Dr Gibson: Be careful with the libel laws!

Professor Chattopadhyay: In the case of the light source review, they picked community members who had interests in a field totally orthogonal to what they were reviewing.

Q283 Dr Gibson: Richard, how many peers did you have?

Professor Chattopadhyay: Four.

Q284 Dr Gibson: Four in both?

Professor Holdaway: Correct.

Professor Chattopadhyay: There was no detailed consultation. Let us say the community gives 25 names, they pick four out of these 25 and that is okay. That process was not there.

Q285 Dr Gibson: Was it a unanimous decision of the peers? Did it split two:two and the chairman decided? How did it work?

Professor Chattopadhyay: No. As an outsider I complained that the committee was flawed to start with. I had warned the Director of Strategy it was flawed in a letter. The committee went ahead and did the review anyway and I think you got a flawed recommendation.

Q286 Ian Stewart: Could you outline how the Delivery Plan will affect the Daresbury site in general?

Professor Chattopadhyay: I am going to address Daresbury only as an example of a troubled syndrome that could very well apply to the Rutherford Lab as well as other institutions. I am really addressing a very generic syndrome that

troubles me. The Delivery Plan calls for a significant reduction in staffing at both the Daresbury Lab and Rutherford Lab. It is a bit more at Daresbury Lab because of the closure of SRS. People have been anticipating that for quite some time. Right now the practical consequences of the Delivery Plan are such that with a planned reduction of about 90 or so due to the closure of SRS 300 letters have been sent alerting scientists and engineers to the fact that their positions are at risk. About 50 employees in STFC belong to the Cockcroft Institute. Most of them have been able to put the United Kingdom in the front row in molecular science internationally. Most of them would probably survive. Although they are at risk, it is probably due to legal reasons that STFC is giving out these letters to these employees. However, as you know, fast track molecules disappear fast. These people can write their own cheques, they can get jobs at multiple places. There will be multiple offers from the United States, Germany and France. Twelve people out of Cockcroft's 90 staff have volunteered out of this call and none of those 12 is intended to be separated from the lab. We really are being threatened by a loss of talent that the United Kingdom would need at Cockcroft, Daresbury Lab and Rutherford Lab and at the other universities in the future.

Q287 Ian Stewart: We understand the redundancy exercise is a voluntary exercise for some. Is that why you are saying that there is a question mark about whether people with the high level skills that we need to retain may choose to go?

Professor Chattopadhyay: Yes. The voluntary reduction is only a first step towards if we have to impose a compulsory redundancy. I have gone through five of those in the United States and the hope is that if you get the sufficient number of the right type of people volunteering to go you probably will not have to impose compulsory redundancies. However, the nature of that consultation had been deficient in discussions with stakeholders. I will give you one example. In the Human Genome Centre at the University of California there are three stakeholders, government, Genentech (the industry) and the university. When there was significant instability in one of the stakeholders, the Department of Energy, that agency sat down around the table with the Director of the Human Genome Centre and discussed how they could mitigate the loss of skills for genetic science and engineering. The Director happened to be a professor from the University of California. That process never took place. In the case of STFC, there were only inward looking and secretive discussions within STFC without bringing in the university and other stakeholders.

Chairman: We are going to probe a little bit here. Can I bring in Brian?

Q288 Dr Iddon: Professor Chattopadhyay, could you tell us what brought you all the way back from America, along with some colleagues of course,

which you told us about last Monday week? What was it about the Cockcroft Institute which excited you to come back to Britain?

Professor Chattopadhyay: Thank you for asking the question. As I said, I was serving in a major executive capacity in a major national lab in the United States and most of that time we would expect such persons to be coaxed into other positions for 10, 15 years and then retire. What I saw in the UK's pre-eminence in this field—and they have been able to attract back many of the people to the UK, and I have lured back in my 20 years here about 12 of them—is this vision, which is I guess a DIUS vision, which I admire of integrating universities, academia, national research facilities and industry under one umbrella to generate wealth for science, which is scientific knowledge, at the same time as generating wealth for the common man on the street. That attracted me. They have described that in the past in the United States but they did not quite succeed. I thought maybe the UK as one of the members of the G7 nations could be put in the front row with the top nations surpassing the United States and could maybe make it work. That, coupled with private interest from the Cockcroft family and the fact that we see a tremendous investment in the UK in this field, that the whole world looks at the UK as the premier place to be, dislodged me. The United States is following suit to create a couple of institutes like Cockcroft.

Q289 Dr Iddon: Could you tell us what you actually need on that site to retain the Cockcroft Institute on that site and what you object to losing most from the site which would interfere with the concept you came to promote?

Professor Chattopadhyay: Again I am going to use Cockcroft as an example, I just want to make sure that you understand I am really representing all my colleagues, Cockcroft is just an iconic symbol but it applies to the Daresbury Lab, scientists at Rutherford and John Adams. I think the site in an institute like Cockcroft, the academic side, is keeping its part stable and strong—we are recruiting professors and lecturers at the three universities—the development of an agency with a local economy which is strong and giving us infrastructure and the industrial connection that we need. Given the nature of STFC, we should expect operational scientific facilities on site and expert labour so that Cockcroft could be complete. What I see as the fundamental flaw in the vision of the Daresbury site is, as I heard the chief executive particularly say, the fact all operational facilities are supposed to be concentrated in one site and Daresbury would be comprised of major technological development centres, and the way it is evolving it is going to be a business park with a call centre for technologists to solve a particular problem. If you look at major scientific break-throughs in countries like the United States, all those science parks have evolved around some core scientific unit either university-driven or a lab-driven, like Stanford or Berkeley. Cockcroft by itself, having experts there without any operational

scientific facility around and technical expertise around from STFC, is not going to be attractive to stay on the site.

Q290 Ian Stewart: What would the Daresbury science campus be for without a new facility?

Professor Chattopadhyay: Daresbury had a facility, which was the synchrotron radiation one, before that there was a synchrotron for nuclear physics, there has always been a facility which is the engine which drives science. Even if you have technology centres, you need scientific facilities on which to develop the technology.

Q291 Ian Stewart: So what happens if they do not have the new facility at Daresbury?

Professor Chattopadhyay: Then it will cease to be a scientific campus.

Q292 Dr Iddon: If I could follow that up a bit more bluntly, if we lose ALICE (there is some doubt about ALICE), 4GLS has been postponed, there is some doubt about EMMA, and we heard that the Daresbury Library is closing, my blunt question is, can basic science survive on the Daresbury site if all those things come to happen?

Professor Chattopadhyay: If such a thing happened to Daresbury or the Rutherford Lab, no lab can survive with that kind of diminution of capacity. It is a very flawed vision for a site.

Q293 Dr Iddon: What is the minimum which would keep you at Daresbury?

Professor Chattopadhyay: Scientists would not survive there and it is kind of moot whether I hang on physically or not. I came here for the right reasons but I ask these questions myself every day and I think I invite you to draw your own conclusions. But I am a fighter and I did not come here to lose.

Q294 Chairman: Sat in your seat last week was the Minister who gave a commitment that there would be world class science on the Daresbury site. Do you have any indication from where you are sitting, as the Director of the Cockcroft Institute, that following the closure of the major facilities there will be any world class science available on that site?

Professor Chattopadhyay: Given this plan, if it is true, I doubt it. However, I must record for your sake that I think Her Majesty's Government did not probably intend such a consequence for any laboratory, not just Daresbury or Rutherford. I think there is a mixed message coming to me from the highest level of Government, that there is a commitment to the Daresbury site for science and operational facilities but that stands in stark contradiction to what I have been hearing from STFC in the strongest possible terms. Under those conditions there has to be a very critical review of the managerial capacity and vision of STFC and one must not hide behind the Haldane principle.

Q295 Dr Turner: Richard, you are at the centre of things as far as STFC is concerned at Rutherford Appleton, what is your view of the impact of the delivery plan on institutions such as your own and the activity across the piece?

Professor Holdaway: I am the centre of the activity certainly in terms of the delivery of science and the technology, but as I said earlier on not at the centre of the decision making process. Can I come back to something Swapan said, which is that I absolutely agree it is essential there is a strong science component in each of the STFC laboratories. I should add as well however I do not think a strong science component means necessarily having facilities. On space, we do not have any space facilities at the Rutherford Appleton Lab, we build them and then we throw them 500 miles up in the air, or we have them in remote fields in some far flung part of the world, but the science component part of that is absolutely essential; you cannot develop the technology if you do not have the science background and sufficient numbers of people doing the science. So that is the really key issue. In terms of the effect of the cuts at RAL, cuts are nothing new, over the last ten years I have probably seen 30 programmes cut or stopped, but then I have seen 40 new programmes set up. It is a fact of life, things come to an end, either because they come to their natural end or the priorities change and so we stop things, but then we start new things up, and the really key issue then is what are the new things starting up, are they exciting, are they front line science and technology, is the decision which leads to which programme will be funded made openly and transparently? I think there transparency is really key. Communication is the key to everything. Every organisation lives or falls by its communications and it is a contact sport, so you have to do the communications face-to-face with people, not just in emails and things like that. So we have to get the communications right between and amongst the community as well as between DIUS and STFC and STFC and each community including the part I represent. In terms of hard numbers, the delivery plan calls for cuts of around 150 people at RAL, that process has begun. It has begun on the knowledge of the programmes we know so far, but if there are additional cuts coming we will find out about that, as I said, next week.

Q296 Dr Turner: Given the cries of pain from the community that we have been hearing, it strongly suggests these cuts are of a different order from the kind of cuts you are used to seeing.

Professor Holdaway: They are bigger cuts than we have seen for some time, that is for sure. As I said earlier, it does affect particular parts of the community and for them it is a 100% cut. But there are ways of managing that and I think what is missing at the moment is the way of managing it in a practical sense which enables people to shift their careers in a planned way rather than saying, "Your funding will stop the week after next, go and do something else."

Q297 Dr Turner: I am trying to tease out what makes this round different from previous experiences. You have told us already that you were not surprised that there were cuts but you clearly have been surprised in some way, so is it the manner or the impact of these cuts which has been a surprise to you?

Professor Holdaway: Looking at the size of the settlement from DIUS, it was clear there had to be cuts. That was the first indication. Then you have the issue of what you cut and how you make those cuts. I think part of the community's concern, and I am integrated inside that community, is that there is clearly a very large cut falling on physics, particularly that represented by the pure sciences, so astronomy, space science and particle physics. I think the community perception, amongst many other things, is it is somewhat odd to be doing that at a time when Government, when the Institute of Physics, when the Royal Society, when the Royal Academy, are trying actively to encourage children to take an interest in science and for those children to go on and do science and technology and engineering in universities because we have a great shortage in those areas. So the two are not quite compatible. So the question there is, is the way in which the cuts have fallen the right way to meet the Government's strategy of encouraging science and technology. Whether we like it or not, despite the fact that the science and technology in neutrons, synchrotron radiation and so on is all very exciting, it is particle physics and space which motivates kids, far more than anything else. So we have to be very careful, the Government has to be careful, DIUS has to be careful, STFC has to be careful, that it does not throw the baby out with the bath water and cut the wrong areas of science.

Q298 Dr Turner: We have already heard about the implications for Daresbury and the Cockcroft Institute and so on, is your operation going to continue to be viable as a major player in the light of these cuts?

Professor Holdaway: If by mine you mean space science and technology, the answer is yes. We are in the process now of cutting staff, it looks like in the first instance it will be of the order of 10 people out of a department of 200, so we are talking about 5% already. I have no idea what that is going to be after next week's announcement on the programme cuts. We will manage it in some form, we will certainly be involved I am sure in some of the future programmes, we are also looking very, very carefully at external sources of funding through direct funding from NASA and ESA, where they provide money rather than us providing instruments for their programmes, and looking at other sources of funding from industry and other government agencies. There are a lot of sources out there. We have that flexibility, we just need to make sure it happens in a way we can manage. I do not want to fire 20 people next week and find I need those same 20 people in six months for new programmes which are coming up. What I want to be able to do is have the flexibility to be able to keep the really good

people for the new programmes and manage that. It is not rocket science—if you will pardon the pun—to actually do that.

Q299 Dr Turner: It has given you a big headache?

Professor Holdaway: Life is full of headaches, is it not? It is not unmanageable.

Q300 Mr Boswell: Can I turn to Gemini for a moment. It is a seven-country collaboration, as it were the potential for a natural break at 2012 when it can be renegotiated, it is not clear to me at the moment whether we are in or out, so I would like your comments on that. Secondly, whether, quite apart from the HR issues here of the things you have been talking about, the international reputation of the UK is being helped or damaged by this process?

Professor Holdaway: In a sense two separate issues. Are we in or not? The answer is, we are in. We were in and out and in and out and now we are back in again. We are in to the extent there is an agreement between STFC, the strategic part and the Gemini Board, that we are back in the programme, have access to data and science in both Gemini North and Gemini South. That is the situation as it currently exists I believe and again Keith Mason will confirm later on no doubt that position will be reviewed over the coming weeks and months. I think there is a longer term issue of how long we stay within the programme and also whether we provide instrumentation for future programmes, which is also a key part of the future of ground-based astronomy. For the moment, we are certainly back in the programme for both telescopes and have access to data from both telescopes. That is really important I think for the community. In terms of reputation, it is a really important issue right across the whole patch of science and technology. The UK has a pretty good reputation internationally because it has been a good partner and—we throw out this phrase regularly but I think it is true—we punch above our weight. However, we do that with a background of integrity on what we do and we need to maintain that integrity and make sure that when we have obligations we fulfil them and at the moment STFC is continuing to do that. My concern parochially at RAL is that with the development of the campus—and there are some incredibly exciting opportunities there, as they are indeed at Daresbury Laboratory—part of the remit there is to bring in not just national organisations but international organisations and we have to make sure they do not see us pulling out of international agreements and say, “What the hell do we want to move on to the site at Harwell or Daresbury if the UK is going to renege on international agreements?” I do not think that is happening but I think there is a danger of that and we have to make sure we get that communication right.

Chairman: I am even more confused about Gemini than where we are but we will pick that up with Keith Mason later. Evan, can you be as brief as possible?

Q301 Dr Harris: Have you seen the letter we have received from van Eyken, the director of EISCAT?

Professor Holdaway: Yes I have, Tony van Eyken.

Q302 Dr Harris: What did you make of what he said about the impact on the UK’s reputation in terms of not just Gemini but going wider and the commitment they now think the UK has to this area of physics?

Professor Holdaway: I believe the situation is that approximately two years ago the UK agreed to continue subscription for another five years; five years from two years ago. However, I think it is actually a five-year rolling programme so if you want to withdraw you have to give five years’ notice. So we are still in the EISCAT project from that point of view. The issue for the community of course is then access to data information and the support for the EISCAT programme as well as for other parts of ground-based solar-terrestrial physics. STP is in a very different position from EISCAT. STP is a truly cross-disciplinary programme and the system, whatever the system maybe, does not really know how to handle yet cross-disciplinary programmes. So part of the STP programme is relevant to STP’s core programme including the planetary programme, the potential new planetary programme coming up, but STP is also relevant and increasingly relevant for space weather and climate change, to the NERC Agenda, and it is relevant in some ways even more importantly for operational reasons to the Ministry of Defence and for industry which operates sat nav systems, telecoms satellites. So there is that whole programme there that is truly cross-disciplinary. At the moment, STFC is, to be frank, lumbered with paying the whole cost of that.

Q303 Dr Harris: But it is going to stop all investment in ground-based solar-terrestrial physics, is it not?

Professor Holdaway: That is the current plan—

Q304 Dr Harris: That is right. We have had lots of letters from people both within your vicinity, your department, and outside saying that is a bad idea in terms of what the policy aims should be of UK science—as you mentioned yourself, climate change, satellites and communications, space weather which relates to both of those. Do you share that view?

Professor Holdaway: I certainly share the view that it does not make sense for UK plc and the national capability to stop the whole of that programme. There are parts of that programme actually which it would not be unreasonable for STFC to continue to fund but it certainly should not be funding the majority of the programme, it needs to find other people to do that and maybe act as a co-ordinating point.

Q305 Dr Harris: But they have not done that, have they? So there are two questions. Should they be funded? Yes. Need they be funded by STFC? You are saying no. The STFC said, before it said it was going to withdraw funding, people were going to start leaving—I put it to you that we have heard people will start leaving because they will grab what they can get—are you aware of STFC seeking other

funding or giving a lead time to enable these programmes, undamaged, to be taken over by relevant funders?

Professor Holdaway: I think one or two dialogues have taken place. I know Phil has talked to Alan Thorpe—

Q306 Dr Harris: That was not my question. Sorry, I am clearly not being clear and I will try a third time. Are you aware whether STFC has instigated any dialogues with alternative funders early enough to prevent people leaving whether it had planned to or not?

Professor Holdaway: And I have just started saying, the answer to your question is yes. Whether it is early enough, I suspect it is just about in time. There is just time to put together a package and a solution which will satisfy the majority of the needs of the community.

Q307 Dr Harris: Right, but that is happening now, not when they originally announced—

Professor Holdaway: That is correct.

Dr Harris: Thank you.

Q308 Graham Stringer: Swapan, you said earlier there was a possibility that Daresbury would end up being a business park. Do you believe that is the policy of the STFC to move everything out of Daresbury and leave it as a science business park?

Professor Chattopadhyay: I can tell you what the perception is both within the Laboratory and in the international community, and I tend to agree with that perception, it is that STFC still does not really know exactly what it wants to do in terms of the future portfolio. The two organisations, the CCLRC and PPARC, which came into being are still not integrated in one. The primary function of the senior management will be to make STFC first of all an organisation, a functional unit, and then to determine the future, and that has not taken place. They do not have an adequate understanding of their business needs, and the vision espoused for the two campuses and international science is considered to be incomplete and a reflection of the fact they are coming to grips with the future. Sir Keith actually admitted that STFC management is coming to grips with it, which is reflected in the restructuring of STFC management and staff. Given what I have heard, that it is going to be three centres of technology—computational science, further detector science and technology and possibly science instrumentation—and nothing else, I would think that if that is by design by STFC then there is a flawed vision there. It is not for me to tell you whether that is really intended by STFC or not, but since I am getting mixed messages from the Government which expects me to deliver on science and knowledge exchange I think there should be scrutiny of the vision put forward by STFC for the two sites.

Q309 Graham Stringer: So you are really saying it is a sin of omission rather than commission; it is ignorance rather than a direct objective of turning it into a science park?

Professor Chattopadhyay: I think it is a flawed vision. I came into this situation as the two agencies were merging. I had a meeting with the most recently appointed CEO in the first week of my appointment and I had a hint of this vision coming from him. I was dismayed by that and I registered my concern with him at the end of April last year.

Q310 Graham Stringer: I have just read back through the evidence of the predecessor committee of this Committee, the Science & Technology Committee, about the original decision to move the radiation source from Daresbury. Although it is confusing, one of the complaints of Wellcome, which was one of the funders, was that the management of the park at Daresbury overall was poor. Is that your view at the moment? What are your views of the current management of the park?

Professor Chattopadhyay: I do not think the STFC has a proper understanding of its managerial role and flow of control of its people and line management at the two sites. Daresbury Laboratory is not a laboratory, it does not have a leader of its own, it does not have a director, by choice by STFC which wants to look at the two sites. The person who claims to be the chief of the Daresbury site also is supposed to develop the Harwell campus, so there are internal conflicts of interest in that position and he cannot be the champion of one site or the other. The vision put forward by the local chief of Daresbury Laboratory clearly is put forward without consultancy with the scientific constituency of the entire region. I have not been party to that vision, the Cockcroft Institute Director, despite my repeated requests to be at the table to at least outline a vision of what Cockcroft could bring for the nation through being on that site, and I think that is a flawed process. It is a flawed process which has been employed, not the outcome necessarily but the process is flawed.

Q311 Graham Stringer: You have obviously made a personal commitment to Daresbury but do you think it is important that there are national facilities at Daresbury? Would it make any difference to science as a whole if they were amalgamated on the Appleton site?

Professor Chattopadhyay: I did not make a personal commitment to Daresbury, I made a personal commitment to the Cockcroft Institute as an iconic symbol of the delivery of science and technology to the nation which is for the UK's benefit. It happens to be at the gates of Daresbury National Lab but Cockcroft is not the Daresbury Lab. Cockcroft happens to be on the north west but we have people working at the Rutherford Lab, people working at Oxford and I am not telling you that it should be in one place or another. I think it should be consulted upon, there should be wisdom sought in the process, the stakeholders should be consulted, and whatever comes out of such consultation and transparency

and proper review should be the goal of UK science and technology. If it is decided it should be at Rutherford, it should be at Rutherford.

Q312 Graham Stringer: Thank you. If I can just ask Professor Holdaway, this refers really to the evidence you gave at the beginning about peer review. The Government has a policy they want centres of national excellence outside the south east, they have national policies that they are in favour of space research and particle physics research and inspiring young people into physics and science. Is there a point at which peer review undermines or conflicts with those policies, because peer review if it is done in isolation can actually come to quite different decisions than that national policy indicates it should do?

Professor Holdaway: I think that is a very good point. There can be a clash because it may be that, based purely on the quality of the science, programmes could be approved and funded that do not necessarily meet with some other strategic target, whether it is science leading on to technology leading on to wealth creation or quality of life. But I think the way round that, and I think it happens reasonably successfully now, is that the peer review panels have the overall strategic remit and work within that framework. So it is not a framework which should not be able to work.

Professor Chattopadhyay: I am used to presidential initiatives which come down from high up, from the US President, and the fact of the matter is you have to let that initiative be known to the people and then you can move on. You cannot just have an initiative which is coming down. That is why I think if it is the policy of the Government of the UK, people should know urgently that is the case, that strategic decisions are always taken and you do not need peer review for everything.

Q313 Graham Stringer: So there is a point where the Government has to say that the Haldane principle might indicate we should not interfere, but this is of such national importance that we should on these priorities?

Professor Chattopadhyay: Yes.

Professor Holdaway: Yes.

Dr Iddon: Just as recently as last evening at a meeting of the Parliamentary Scientific Committee in the House, Colin Whitehouse gave a very glowing picture of the future of Daresbury with its bipolar structure, interrelationship between RAL and Daresbury, scientists moving backwards and forwards, the attraction of very large companies on to the Daresbury site because there was basic science on that site; he painted a glowing picture of the future of Daresbury. Why are we getting both that kind of picture from an important person like Professor Whitehouse and the picture you have been painting this morning? It is very confusing for us politicians; we do not know where to stand in this discussion.

Ian Stewart: Yes.

Q314 Chairman: It was usually the Liberals who were bipolar!

Professor Chattopadhyay: The bipolar model is not my model. You should ask Colin Whitehouse and his role in this. I can simply report that as a scientist and a scientific director of an institute whether I have contributed to that model, and I have not. The evolution has been historical and in the last ten months I have not had a daily input from Cockcroft into that vision. From my perspective, I consider the vision and the scientific leadership to be flawed and I have brought it to the attention of the CEO. If you talk to the scientists on the site at Daresbury you can witness their reaction yourselves.

Q315 Ian Stewart: In your representations earlier, Professor Chattopadhyay, you gave a negative indication for Daresbury with the lack of a new facility, but you also mentioned the staff and I think both of you implied the staff felt as though they had not been fully consulted on this. Would the setting up of a site director for each of the sites have assisted the flow of concerns from the staff to the STFC? Would that have been helpful?

Professor Chattopadhyay: I must say that the management of STFC as an agency distributed over two sites, the way it is managed and administered and the information flow which happens, even the senior management at STFC do not appreciate. I am not used to such management, I am used to national laboratories with their own facilities and with their own directors who all work together to deliver the product for the Government. I personally would feel that Daresbury and the Rutherford Lab would have benefited tremendously from having a local scientific director championing their cases together working hand in hand.

Q316 Ian Stewart: The last point I would like to ask you about is redundancies. They appear to be happening in a very short period of time.

Professor Chattopadhyay: Yes.

Q317 Ian Stewart: The impression I have personally got from discussions, open and private, with the Minister for Science and the Secretary of State is that the redundancies should not be happening as fast. There are certain reviews going on and the Government is committed to bringing new innovative facilities to Daresbury. Have you got the same impression or is there such a pressure to have the redundancies quickly?

Professor Chattopadhyay: First of all, I question that urgency, basically because I do not understand the need for it just to save pounds in Daresbury's budget over a short period of time. I have written to the Council and I have written to STFC that if you do not do it properly you throw out the baby with the bath water; those same skills you will need for future facilities in the UK you will find you do not have. Right now I would say there are less than 100 bodies of trained skills in this area, in this site, not only in Cockcroft but in John Adams, in the universities, the Rutherford Lab and Daresbury Lab, and they are so good and internationally placed that the UK has a

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front row seat in this field, and we really run the risk of losing a valuable bunch of people from this small group of people in the nation. It is not just redundancies from the two labs, you also have the grants being reduced, the ILC has been stopped, and we are looking into employment laws and regulations in real time for people. This is not just a fiction. We are looking at losing a few dozen people from this field and that will leave us with a very weak workforce to work with.

Q318 Chairman: Richard, you did not get a chance to answer Ian's question about a scientific director at RAL. Would you support that principle?

Professor Holdaway: It as a solution. I think there are other solutions. It comes back to communications all the time. Remember there are

four sites within STFC—RAL, Daresbury, ATC in Edinburgh and there is Chilbolton. ATC has a director and communications there I think work very, very well. If there was a director at RAL and a director at Daresbury I think communications would improve but there are other ways of doing it. Having a director is just one of those ways. But whatever the organisation does, it has to improve its communications and it has to do it by having somebody on each side who actually knows how to operate and run operational departments and facilities with the right sort of experience. That is the key, rather than whether it is specifically a director.

Chairman: On that note, can I thank you very much indeed, Professor Richard Holdaway and Professor Chattopadhyay, for being so frank with us this morning.

Witnesses: **Professor Keith Mason**, Chief Executive, and **Mr Peter Warry**, Chairman, Science & Technology Facilities Council, gave evidence.

Chairman: We move on to our second panel and thank you very much indeed, Professor Mason—we meet again, Keith—and Mr Peter Warry for joining us this morning. We will go straight to my colleague, Roberta.

Q319 Dr Blackman-Woods: Professor Mason, the last time you were in front of the Committee you said, “I think we do consultation extremely well in STFC; I am very proud of the peer review system that we have set up, it is very effective . . .”. I have to say from our visits and evidence we have gathered so far not everyone shares that opinion. We have spoken to people who have immense international standing in the physics community who simply do not agree there was proper consultation about these cuts or that the system is working effectively. How do you account for that divergence of opinion?

Professor Mason: I think we are talking about several different things actually. I was speaking about our Science Strategy Board and the sub-committees we have underneath it—PPAN, particle physics, astronomy and nuclear physics, and the physical and life sciences committees—which are new structures we have set up under STFC which actually do the peer review and which actually conduct things like the programmatic review. These are very difficult exercises to go through, particularly over such a wide remit as STFC has, and I am genuinely proud of how these committees and how the people on these committees have actually responded to this huge challenge. You heard earlier some discussion about the challenges of peer review. Peer review is not easy, peer review over such a broad range as we have is doubly, trebly, difficult, and the fact we have within ten months been able to arrive at a system which can integrate physics and physical and life sciences and the particle physics, astronomy and nuclear physics requirements into a single set of recommendations to the Science Board and then onwards to Council I think is something to be proud of. There was some, I think, confusion in

the discussion earlier about the various peer review bodies and the issue of consultation is one which I take very, very seriously, and it is an area which we are actively working on in order to improve things for the future.

Q320 Dr Blackman-Woods: Would you accept that parts of the science community, in particular the physics community, have been really affected by the decisions which have been made by STFC? Do you feel they have not been adequately consulted and that something has to be learned from this process?

Professor Mason: Yes, indeed, and we are actively learning that lesson. Again there is a misunderstanding of the process and what the effect of consultation would have been. If we are talking about the PPAN area now, which derived from the old PPARC, we had consultative panels in that structure which reported on strategy only a few months before the programmatic review. So the reality is, had we had such a structure in STFC from the beginning, it would not have made any difference to the delivery plan output because we were not missing that element because it is carried over from PPARC. One of the tasks that the PPAN committee was set at its inception was to derive and devise a better system of community consultation which is an exercise which is not yet completed because, for one reason, its business has been dominated by the delivery plan and the programmatic review so it just has not had the time to put the thought in. But this has always been on our agenda and it will be put in place in the future. In terms of the current programmatic review, this is an exercise we went through two years ago in PPARC and following the programmatic review the next stage was an unofficial consultation with the community. We intend to do exactly the same thing but this is now an official consultation period just to make it absolutely clear that we are seeking people's views on the outcome, we do not just take the outcome of the programme as reviewed and say, “It is cast in

concrete”, we want to hear what people think about it simply to optimise the science we get out. We have a certain amount of money that we can spend, we want to get the maximum amount of science from that, we rightly always have and always will involve the community in doing that, and it is really just a question of time.

Q321 Dr Blackman-Woods: I think the community would accept that peer review is difficult, what we are not seeing is confidence in the peer review system across the sector. Are you clear the changes you are bringing in are going to lead to a greater confidence in peer review?

Professor Mason: Well, if they do not, we will change them again. It is absolutely clear that we need to have this confidence. I have to say we are living in a situation where two research councils have been merged, there were many people who had doubts about that merger and are waiting to see the proof of the pudding, and are rightly putting us under very close scrutiny. But actually, if you look objectively at what we have done in the ten months we have been in existence, I think we have done pretty well actually in getting these structures together, in conducting a very comprehensive exercise, and we have to see what the outcome of that will be.

Q322 Dr Blackman-Woods: You have just announced changes to the structure of STFC’s senior management, what is the rationale behind that if everything is working well?

Professor Mason: STFC is a very complex organisation which has come together. It is much more complex than any of the other predecessor councils and I think it is right we be evolving structures to deal with the challenge that we have. We started off with a management structure which I frankly was not particularly happy with from the outset—it was too flat and too unresponsive—and I had always intended to evolve that as time went on. This is a reflection of that evolution. The motivation behind the evolution—this stage of it at least and there will be more, it is not finished—is to provide greater responsiveness in terms of dealing with the challenges we have, to really tackle the issue of culture change within the organisation, to ensure that STFC becomes that that vision that we have and not a relic vision from the old research councils, and to ensure that vision is enshrined in the staff and in the community that we are serving. We have also made changes to the focus on the campus development, which is really important, and the KE agenda. With the campus developments both at Daresbury and Harwell we clearly need to up our game because we are now getting into very serious territory with joint venture partners, et cetera, and we need to manage that much more proactively, and we have made the changes to put that in place. I see these as the correct response to the challenges we have and, as I say, I am very determined that as we move forward we will continue to make changes to adapt to the situation we are in.

Q323 Dr Blackman-Woods: Do you intend to widen the Council? As you know, you have ten people, three are senior members of STFC, that is smaller than other councils, do you intend to make it more representative because that seems to be the charge that is levelled against you, that it is not fully representative of the community?

Professor Mason: No, but we are piloting a new model for research councils here and this was something done in discussion with DIUS. I think the structure we have is a Council which concentrates on governance and we have a Science Board which deals with the science strategy, and we also have advisory systems which deal with knowledge exchange and other aspects of the Council. So I think the new slim look Council is actually working very well. It meets more often than typical councils do, it is much more responsive, it is much more engaged. Peter could comment on this but I think it is working much more effectively than certainly the predecessor councils did.

Mr Warry: I absolutely agree with that. I do not think, because our community is so large, we could actually get representatives of the whole community on to a council and get it sensibly to function; it would be very large to get in all the different aspects of it. Indeed I think it is an advantage that people are not there as representatives but they are there actually to look at the big picture and try and make those decisions. It is a much more effective council in the sense we have had some very difficult decisions to take which I think would have been extremely difficult with a very large council. Because we have had to do these things which affect people’s jobs and their careers, the Council has needed to spend a lot of time looking at that—we actually met four times in two months which is probably unique for a council and we stared long and hard at those things because we actually really regret having to make those sort of decisions. We believe we made the right decisions, there is only one pot of money, we cannot spend it twice over. It would be difficult to make it without the sort of council we had, so I think it was very helpful. If I could finish by saying that there is real pain in what we are doing but there are also some big science we are still going to be able to do it. Our scientists actually have £1½ billion-worth of new facilities which are coming on line in this CSR that they are going to be able to address, so there is a lot of grief which we feel, and I feel personally, but there is also some science as well.

Q324 Dr Blackman-Woods: However, the accusation which is often levelled against you is that you do not have the full breadth of knowledge you should be drawing on in your strategic advice and your peer review panels. Are you taking that on board and are you going to do something about it or are you going to continue to say that everything is fine and this is a bit of pain that we are managing quite well?

Mr Warry: Keith has already said that the proposal is that we are going to introduce advisory committees which are effectively sub-committees of

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the Council to pick up that point. So, yes, we recognise that and it is an important point to take on board and we will be doing that.

Professor Mason: To finish off, one should not forget that even with the top level committees we have, not to mention grants panels and all the other structure we have below, we are talking about 30 people or so, so it is not a handful of people in a room, it is a lot of people and they are spread across the whole range of expertise that we cover.

Q325 Mr Boswell: Thank you, Professor Mason, you have explained the background to the changes you have had to make and the underlying rationality, as it were, from the management viewpoint. On the other hand, you both acknowledged, could have hardly failed to do so, there is a good deal of concern at the staff end and may I perhaps concentrate on that area particularly in relation to the process. You will have heard also the exchanges about Daresbury. You commissioned the views of the various departments at Daresbury but, as I understand it, you have not discussed either their methodologies or their conclusions with the staff there, and we have been told by your lawyers that these reviews are confidential. It does seem an odd way of conducting peer review. Why so confidential? What is going on there?

Professor Mason: There is a huge amount of misunderstanding about what these reviews are and what they were intended to do.

Q326 Mr Boswell: Could I interpose a moment. Are they peer reviews as you know them and I may broadly understand them to be?

Professor Mason: Let me understand what they are because there is a danger of putting labels on things and misrepresenting them. The subject matter of these reviews is the in-house research effort, so we are not talking about the bulk of the programmes which are undertaken by the Daresbury, ATC, RAL Laboratories, but we are talking about that fraction of the research effort which is equivalent to the research effort in university staff, and generally that is conducted by a handful of people in each group rather than the staff as a whole. It is their own personal research as opposed to the research programme of the council. So when I took over as CEO of STFC I was aware that there had been a lot of discussion, even criticism, of the in-house research effort and whether it was competitive with the research going on in university groups, because they are competing for the same resources. So I wanted to have an independent view of whether we were doing the right research and whether this research was at world level or whether it was second rate, basically to guide me in future planning as to how much research ought to be done in-house and what the subject areas were. One of the criticisms which had been levelled in the past is that such reviews had involved internal staff and internal managers who had a vested interest to maintain the research of their group. So I deliberately set this up with completely independent panels, with international representation, and we had I think 11 panels

covering the whole of the research council, so quite a major exercise, so they are peer review panels in the sense they are independent experts who are not related to the research council. I told them, "You can be as honest with me as you like because this report is coming to me to advise me, it is not going to be shared with my managers or staff, so you can tell me what you really think." I said to them at the outset, "Please tell me exactly what you think so I am informed, so I know how to take this forward, and be honest." So that is the reason for the so-called confidentiality around these reports, they are reports to me and not shared with my managers, so that I can get a really bona fide gold-standard opinion as to whether the research going on in these groups is truly world class which we should continue or whether it is just sucking resources away from things that universities might be able to do better.

Q327 Mr Boswell: You would accept then that these conclusions of these reviews, whether labelled as peer reviews or otherwise but certainly independent of the organisers, those conclusions, the advice tendered to you, are not contestable? It is not, for example, possible for the participants who have been reviewed to say, "It is not so"?

Professor Mason: That is right but it depends on how they are used. As I said, my purpose in setting up these reviews was to inform me long-term as to which areas to invest in in the research council and which areas not to invest in and perhaps to move outside. It is a process which has not got any further than that because it is not related to the delivery plan, it is not related to the other strategic decisions we are taking. In effect, it has been put on hold because we are dealing with a different set of problems.

Q328 Mr Boswell: If that is the case, how can you reassure staff, for example, that you have not merely cooked up or selected a group of persons to give you the advice you were predisposed to wish to accept?

Professor Mason: You are caught between a rock and a hard place with that one, because in order to get the independent advice there has to be some level of confidentiality involved.

Q329 Chairman: Are you not also indicating that standard review panels do not say what they think?

Professor Mason: There is a danger in a peer review situation where the information is made public that people are reticent about criticising their peers naturally.

Q330 Dr Gibson: Do you trust your managers?

Professor Mason: Do I trust them?

Q331 Dr Gibson: Did you trust them?

Professor Mason: Yes.

Q332 Dr Gibson: So why did you not incorporate them and show them the stuff as it went along and took their views alongside? That would have been the smart thing to do, would it not, in retrospect?

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Professor Mason: As I said, one of the criticisms which has been levelled is that the managers have a vested interest in the outcome.

Q333 Dr Gibson: Do you?

Professor Mason: Well, indeed, I have a—

Q334 Dr Gibson: Anybody has a vested interest.

Professor Mason: --- I have a vested interest in making the research council as competitive as possible and making sure there is a level playing field. As I say, the problem is that this exercise, which was started in all innocence and for a background level purpose, is taking on a significance that it never was intended to have and does not deserve. In the light of that we will be making the reviews public and people will be able to see what they say, and I can tell you that by and large they are very supportive of what is going on and I was very encouraged to read them.

Q335 Dr Gibson: Will they be unabridged versions?

Professor Mason: They will remove reference to—

Q336 Dr Gibson: Will they have black marks in them and names and things crossed out?

Professor Mason: As I understand it, they will remove references to individual people.

Chairman: It does not sound to be a very healthy organisation where you do not trust the peer review which exists, you have secret reviews. Sorry, I am getting carried away.

Q337 Mr Boswell: Can you just say for the record, in terms of self-assessment by those who are conducting the science themselves, is that something you would want to aim rather heavily off, to discount, in your decision making process? That is separate from the peer review or independent review process, but do you think your managers are capable of telling you what they think?

Professor Mason: Of course they are, and how you take an organisation like this forward is by using a multitude of tools. I would never act literally on the outcome of these reviews, these were to inform me as to where the problem areas might be, mostly where the areas which had not got any problems were because then you can just leave those alone and not worry about them.

Q338 Mr Boswell: Finally on the communications, do you hope your new structure will itself smooth, ease, the communication process with staff which is obviously a concern?

Professor Mason: Absolutely. One of the areas I have been concerned about since the organisation started is the communication area because essentially STFC is a much more complex organisation by an order of magnitude, I would say, than its predecessor councils in terms of its capacity, and we really need to tackle communications in a much more thorough and broader manner, both internal communications and external

communications. That is something we are actively working on and it is something we have recognised for a while, but these things are not fixed overnight.

Q339 Mr Marsden: On that specific point, you seem to be saying that what you will do is release information about these boards on what we might call a Chatham House basis, in the sense they will not refer to individuals. If you are so concerned about not telling your own staff what particular individuals have said about them, do you accept the Chatham House principle in all your doings in the future, that when you have these reports you do actually share them with your staff which would be a good way of proceeding?

Professor Mason: This is generally what we do. This would be my guiding principle. As I said, the reason for making an exception at this time was to make it absolutely clear that this was an external view of the organisation and one which gave it a legitimate gold stamp, if you like, in terms of probity that there were no internal conflicts of interest in what was produced.

Q340 Chairman: On the issue of the grants to the university physics community, when figures of cuts of 25% were being mooted, you pooh-poohed that and said that was not realistic, and yet it was you at the town meeting on 13 December who actually made that comment that there would be a 25% cut in the grants. As briefly as you can, can you tell us first you were right, then you were wrong, then you were right again?

Professor Mason: I do not think I pooh-poohed it, that is not my style. Both statements are correct and I think—

Q341 Chairman: They both cannot be correct.

Professor Mason: Of course they can. It depends what question you are asking. It is a 25% cut against a rising profile, so it is a real 25% cut in what we had aspired to fund. Incidentally, the reason that we had planned to increase the number of grants, post docs and grants, is that the community is expanding and this is something which needs to be looked at by the Wakeham Review in particular. We have seen an increase of 40% in the number of researchers doing astronomy in universities in the last two years, which is a huge increase. So against that planned profile, we were making a 25% cut, which essentially brings us back to a zero increase. So having announced we would be making this 25% reduction, people then concluded that there would be a 25% hit on physics departments and that is what I tried to clarify at my last appearance, that because this is on a rising profile actually it is not a 25% cut on physics departments, it actually brings us down to more or less level funding rather than at the increased funding.

Q342 Chairman: I am just a humble politician, unlike my colleagues, but when the Institute of Physics informs me that we are about to see very serious cuts in physics departments across the country, particularly those in major universities

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which have very serious physics departments, then I have to take notice of that. But you are saying that is just nonsense? There will not be any cuts at all?

Professor Mason: We have provided the figures for you but in this first year of the Spending Review there will be no cuts in exploitation grants. As we go forward we are making a 25% cut on the original plan for new commitments so there will be cuts which come in in later years, but we will still end up in a position where over the next Comprehensive Spending Review we have the same number of post docs in universities as we had in the last Spending Review. So it is clawing back on the planned increase and flattening it out.

Mr Warry: On the ILC, on the people involved in the programme, there will be cuts there.

Professor Mason: This is exploitation grants.

Mr Warry: Exploitation grants.

Q343 Dr Gibson: So it is a lot of fuss about nothing really, is it not? Is that what you think?

Professor Mason: It depends where you are coming from. As I said, the astronomy community in particular has grown by 40% in the last two years, so by holding the number of grants steady, level, the success rate will go down. But what is not clear to me, and I hope that Bill Wakeham's panel actually looks into it, is why there has been a 40% increase in astronomy. I can think of some reasons but I think somebody needs to do some research there.

Q344 Dr Harris: What is the right metric for working out what the health of the grants to these parts of physics is? Is it the total spend or is it the number of grant allocations?

Professor Mason: One measure is the ratio of academic staff to grant-supported staff.

Q345 Dr Harris: What about the total number of grant applications provided? Is that a good measure or does that depend on whether there are lots of small ones instead of a few big ones?

Professor Mason: It is a complex issue.

Q346 Dr Harris: So you would not rely on the total number of grant allocations?

Professor Mason: No. To illustrate that, in particle physics there are 15 large grants and that is it, there are lots of small ones but 15 large grants, whereas in astronomy there is a multitude of much smaller grants.

Q347 Dr Harris: So it is not meaningful to use the total number of grants?

Professor Mason: No.

Q348 Dr Harris: Just a couple of quick questions and hopefully quick answers from Mr Warry, does the Council take the advice generally of your Science Board on science issues?

Mr Warry: Yes, we have so far.

Q349 Dr Harris: When it comes to issues to do with the Haldane principle, if the Government were to seek to tell you—I am not saying they have—that

you must spend a certain amount of money in a certain geographical place, let alone on the actual project, would you say that is your decision rather than theirs to make?

Mr Warry: I think the Government is in a position where it can ring fence money, so—

Q350 Dr Harris: Okay, but if it does not? Short of ring fencing, if it says to you, "Out of your overall budget we think, we would like, we require you . . .", any of those, ". . . to spend a certain amount of money in this certain geographical location", would you say that is something you were bound to follow, would you say it was inappropriate, would you say, "We are going to go by our other priorities, including science but not only"?

Mr Warry: I would actually be at the far end of that spectrum, which is that if they have not ring fenced the money then the job of the Council is to use that money in the wisest way it can. Clearly there is a lot of competition for these funds, as we know, so I would be reluctant to be swayed by the Government saying—

Q351 Dr Harris: I would ask the same thing to any research council chairman. So it would be inconsistent with the Haldane principle for you to be directed to spend money which you are free to spend in a certain geographical area at the behest of the Government?

Mr Warry: I am not an expert on Haldane, but what I would say is that there is probably a difference between them saying, "You must invest in this project", which is then taking a scientific decision so to speak, and "You should invest this sum of money in the science you choose". That may be different but I am not an expert in this field.

Q352 Dr Harris: So what you are saying is that it would not be acceptable to say, "This project", unless the Government ring fenced it, but it might be appropriate for them to say, "Whatever you decide to fund, we want you to spend it in Newcastle"?

Mr Warry: I would want them to ring fence that if they did that.

Q353 Dr Harris: I think we are agreeing. In respect of the investment in Daresbury, your Science Board in a note to your Council meeting on 21 November said that its view was, "to minimise overheads and maximise synergies, Science Board felt that there is no alternative to closing the Daresbury Laboratory in the current budgetary climate." That is pretty clear actually. Yet your decision does not appear to be that, I think, because—

Mr Warry: Our decision is absolutely not that.

Q354 Dr Harris: That is a bit strange, is it not?

Mr Warry: No, it is not. That is the Science Board giving the Council some advice about how it should manage its overall budget. The Council has responsibilities which go beyond science. We have a responsibility to provide facilities to make economic impact and so on. So I can well understand that if

you look at this purely from maximising science, then let us focus everything on to a single point, but we have wider responsibilities.

Q355 Dr Harris: I am grateful to you for the brief and very clear answers. So the job of your executive officers is to take on board the science but to take into account in their advice to Council some of these other issues you have mentioned. You would rely on your chief executive to do that?

Mr Warry: Or the Council.

Q356 Dr Harris: Or indeed the Council. The chief executive said in his note, before the Science Board put in their view, that his proposal was to "... concentrate most if not all core in-house capability on the Harwell campus and plan for all future national large facilities to be located there. This would mean ...", second bullet point, "... working with the private sector and the NWDA to develop the Daresbury campus primarily as a private sector venture with some core scientific and/or technology expertise retained either within the STFC or transferred into a university or private sector company." Your press release of 21 January and perhaps other notifications do not even seem to back the advice of your chief executive either.

Mr Warry: No, they will not. What you are seeing there is the on-going Council discussion. Because we have had to pare back the programme, it is absolutely appropriate that we should look long and hard at doing some of the drastic things and you have mentioned one, we looked also at getting out of a major subscription such as CERN, we looked at all these extremely unimaginable options before we actually came down and said, "That is wrong." You are just picking on a point in the debate.

Q357 Dr Harris: We are interested in scrutinising your decisions. I cannot see, and maybe we have not got it all—perhaps you could send it—the documentation, the advice you got, which was so convincing that it persuaded your Council to ignore the advice of the Science Board and indeed to reject the recommendation, as you describe it, of the chief executive. I have not seen that and we have been seen a lot of stuff. Was there something or did it just emerge in discussions? Was there perhaps a phone call from the Government?

Mr Warry: There was not a phone call from the Government, let me tell you that.

Q358 Dr Harris: A fax, email?

Mr Warry: No, not even that. We had four meetings, as I said, on this—four very long meetings because of the gravity of the issues we were dealing with—and we looked at all of the uncontentable things, and Keith produced several notes in the process of this and you have one, and we looked at the variety of options we could do and then sub-options of those. We did take on board the Science Board's scientific advice, we did not take on the Science Board's suggestion about—

Q359 Dr Harris: That is fine, you are repeating now. I understand that. It would be useful if you could send us the advice you got, if there was any, other than something which emerged in discussion, which led you to take the decision you took. Is it a sensible decision? This is what we were told by the Cockcroft Centre—this is in the document they gave us which they have allowed us to quote from—"Are the plans to make Daresbury a Science and Innovation Campus 'viable'? We fear the answer is 'NO'. Lack of support of the STFC leadership for scientific 'flagship' facilities on the DL campus by design renders such a plan incredulous!! The Cockcroft Institute, by itself, without a thriving Daresbury Laboratory, will have no reason to be on site and will retreat to the universities, failing the lofty DIUS goals." I think the founding director of the Cockcroft Institute confirmed that view just this morning.

Mr Warry: Yes, indeed.

Q360 Dr Harris: So were you aware that was their view when you rejected the option of doing what they think is inevitable? Was it a shock to hear this view?

Mr Warry: I was aware of their view. I do not agree with their view because the plans we have for Daresbury mean we believe—and Colin Whitehouse's presentation last night was referred to earlier—we have a very viable future for that campus.

Q361 Chairman: Nobody believes that. Nobody on the campus believes that.

Mr Warry: The reason why they do not believe it at the moment is because we have not physically got it on the ground. We are moving forward on that. In our delivery plan we mention one of the things we want to do is to set up a Hartree Centre for world class computer modelling and simulation, and we have now got the first leg of that signed off, because that is now part of the RCUK proposals on capital. It still has to be signed off by Sir Keith but I am pretty confident he will tick that. That is one very major tick in the box. The centre follows on from that. We also—and we cannot announce this yet because it is not fully signed off—are in very serious discussions for two world class science based businesses to come on to the campus.

Q362 Dr Harris: Science based business, we understand that and we are aware of that because we were up there. My final approach here is to say that you cited, in aid of your view you can retain world class science on this site to make it more than just simply a private sector or innovation centre, the Cockcroft Centre, but you cannot force them to stay. It is not in your gift. You can say you disagree with their view, you clearly do, but it is their view and their right. Given that the fourth generation light source project has been put off for two years, we are told the funding for ALICE is uncertain, which means the prospects of EMMA getting off the ground are highly questionable, surely it is a logical view, and indeed that taken by your Science Board

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whom one expects are logical people, that this is not going to be viable as a world class science and innovation centre, and is it not fairer to the staff there for you to accept that and tell the Government that you cannot deliver what they want you to deliver, it is inappropriate for them to ask you to do that and unfair on the staff there?

Mr Warry: No, is my short answer, I do not agree with that. I do believe we can make it viable and I do believe the Council has a duty to try and do its best by the staff there, and that I think is securing as much employment as we sensibly can on that. That does not mean to say we can avoid the redundancies which are already in train, we cannot reverse a decision which was taken long before the STFC came into being.

Professor Mason: On the Daresbury issue, because I think this is a very important one, I think it is worth emphasising here that the problems of Daresbury are deep-seated and long-term and they stem from the decision to close the SRS and put Diamond at Harwell. That of course pre-dates STFC by many, many years, so we come into existence and we inherit a situation where the SRS is closing and we need to understand how to take Daresbury forward. I think we have been very energetic over the past ten months in trying to find a new way forward for Daresbury. One of the things which struck me when I took over as CEO is a lot of hope is pinned on 4GLS and hopefully that will still come to pass in a bigger and better form and without much delay, but the fact of the matter was that 4GLS would not have started construction until 2012 and therefore however you looked at Daresbury there was going to be this big hole in terms of facility provision. So we have been actively working on how to fill that hole with things like the Hartree Centre, with things like a detector centre, which as Peter says has now passed the first stages of approval, and we are really pushing that agenda forward. We do have a commitment to having science on that campus because we share the vision that the campuses are a good way forward and they are on behalf of UK plc and not regional centres. The fact we operate Daresbury and Harwell as a single unit is a reflection of that and that comes back to the discussion you were having with Swapan earlier about site directors. We do not have a director at Daresbury, we do not have a director at RAL, because we do not want to be in a situation where Daresbury and RAL are competing with one another which is what has happened in the past. This is a system we inherited from CCLRC and it makes sense to take these forward as a unit. We have marvellous new facilities at Harwell, those can support the Daresbury campus as well as the rest because they are supposed to be national, and what we need to ensure is that we retain the scientific expertise at Daresbury and we are working the problem, as they say, as to how we can do that.

Q363 Chairman: It is hard to take that seriously though, is it not, when we find your own advice to the STFC board is to close the Daresbury site?

Professor Mason: That advice was made at a time when the financial situation, believe it or not, actually looked worse than it currently is. This was in a situation immediately after we received our allocations, in the intervening time what we did was to work with DIUS to essentially change the profile of that allocation so we can actually deal with what was originally a big problem in year one, which means we do not have to take the drastic action we had originally envisaged. To take another example, that drastic action included a 50% cut in grants, not 25%.

Chairman: Okay, I will leave that there.

Q364 Ian Stewart: Keith, you have been well aware, and you too, Peter, that the Government's intention is to keep a world class science facility at Daresbury. You have mentioned keeping a science facility at Daresbury. Why the discrepancy?

Professor Mason: There is no discrepancy, we are singing from the same hymn sheet.

Q365 Ian Stewart: If that is the case, the Government—

Professor Mason: My point earlier was that if there is a new facility to be done at Daresbury, it will not be there for eight, ten years at the soonest. What I am concerned to ensure is that we bridge that gap. I believe that Daresbury has an exciting future in other ways and we are exploring new models in order to ensure that.

Q366 Ian Stewart: There is a difference between having a science park and having a world class science facility. Understanding the SRS redundancies and that there was concern whether there would be enforced redundancies for those who are working on 4GLA, the Government has put out a press release that there should be no rush to redundancies and that it is committed to doing everything in its powers to keeping Daresbury as a world class facility. Why are you pressing for the redundancies to take place so fast?

Professor Mason: We are not.

Q367 Ian Stewart: That is not the impression the staff have.

Professor Mason: It is not correct. We are pushing forward with the SRS redundancies, and that is a fact. We have a voluntary redundancy scheme across the whole of the research council, including Daresbury.

Q368 Ian Stewart: How do you maintain the skill levels with a voluntary system like that?

Professor Mason: That is the whole point of the voluntary system. You do not have to accept the volunteers. What you do have to have is a level playing field across the whole of the organisation, you cannot protect one part at the expense of somewhere else. Every body has to have the same opportunity to take voluntary redundancy but we do not have to accept those.

Q369 Dr Turner: Peter and Keith, it seems to me that you have in the form of STFC inherited an extremely poisoned chalice. Most of these problems are endemic in the very structure of putting together responsibilities like the CCLRC's for very large communal facilities essentially and responsibility for funding universities all in one council, and then in the Comprehensive Spending Review allocation you end up with a flat cash increase over the next three years while everybody else is climbing steadily up, and you of course are servicing their activities through the large facilities, so the pressure on your budgets is clearly enormous and there is clearly only one place where it is going to come out and that is your smaller, response-moded grants, hence the pain. When did you realise you would be put in the position of fall guys?

Professor Mason: I think I have to clarify some of the things you said first of all, just to be correct. First of all, we are not the only research council in the position of having to deal with an effective flat cash settlement, every other research council apart from MRC does.

Q370 Dr Turner: I have the figures in front of me. It does not look like that, unless I cannot read a graph.

Professor Mason: I think the figures there are slightly misleading and include FEC and a lot of other things. If you take FEC out, every research council is dealing with a flat cash situation, so we are not unique in that respect. The other point you make is that the pain has been disproportionately felt by small grants, that again is not correct. We have a solution to this problem which essentially spreads the pain. It did not have to be that way but it turns out it is essentially spread between the ex-PPARC community and the ex-CCLRC community. Had we had a similar settlement in PPARC, had it still been in existence, we would still have been making the same sort of reductions to our aspirations because flat cash means we are suffering the effects of inflation and the volume has to go down, and that was a recognised feature of funding full economic costings, which I think we have all agreed is a good thing to do and we have done it.

Q371 Dr Turner: I think my point is still valid because although you are correct to say that taking out FEC makes everyone else flat cash, they have been given a bigger allocation in the first instance?

Professor Mason: No, that is not true.

Q372 Dr Turner: The MRC have.

Professor Mason: The MRC have, yes.

Q373 Dr Turner: Spectacularly bigger.

Professor Mason: Yes, but MRC is the exception, the others have not.

Q374 Dr Turner: And you are of course underpinning their activities.

Professor Mason: Yes.

Q375 Dr Turner: But you have not been given concomitant resources with which to do that. If you had been given a slightly higher percentage of the CSR allocation, you would not be in quite such a difficult situation, would you?

Professor Mason: That is clearly true and we have been given a hard job to do and we are doing it. We are not ducking it. It is not an impossible job, I think we have a way forward which does cause pain, which I regret, Peter regrets. I would much rather be sitting here—well, not sitting here in fact!—talking about a situation where I can give everybody exactly what they want. Whenever you have to say no to somebody, it is painful. It is painful for them, it is painful for us, and we do not like to be in that situation, but we have to live within the allocation we have been given, both for the science vote and for our independent councils. We are in a very fortunate situation in having aspirations which far exceed what we can actually fund and it would be terrible if we were in the opposite situation. I could usefully use twice as much money as I have without a reduction in quality.

Q376 Dr Turner: It is not made easier by the split in facilities between Daresbury and Rutherford Appleton, is there not a case—well, the case has been made—for unifying the science facilities on one site which would clearly have great immediate cost savings? How do you justify trying to maintain Daresbury at a competitive level in terms of science facilities when in fact there is serious doubt as to whether you have the resources to do so?

Professor Mason: STFC is a national organisation. We need to make decisions which benefit UK plc in the best possible way. Some of the discussion that Evan was reading out earlier refers to exactly your point, in other words, how do you reduce the overheads and operate multiple sites to get the maximum out of them. The discussion did not come across in the way it should in the sense what we were doing initially in our discussions was saying, "Does STFC need to have its own facilities at all at Daresbury", or should we adopt the Cockcroft model where there is STFC investment directly but we do not own Cockcroft, the universities do. That is a new model for developing sites. As I have explained, the accommodations we were able to reach in terms of the profile of the settlement mean we do not have to go that far, but there is an element of new model both at Harwell and at Daresbury and we want to propagate the same thing to ATC where instead of having national laboratories with direct vote money going to maintain facilities they become partnerships with local authorities, with local authorities, with industry, the net result being you get more science out than you otherwise would. I think that is an exciting new model to pursue, one we are pursuing and one where I think, when we come back in five years' time, you will see Daresbury as a shining success story; I firmly believe that. There will be thousands of new jobs on the site, much more science going on.

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Chairman: Okay, Keith, we have got that message.

Q377 Dr Turner: What is your rationale for the cost savings targets you set for various sites, Daresbury £6 million-odd, RAL £12 million, ATC nearly £4 million? What is the rationale behind those? Has there been a lot of expensive over-administration going on on those sites?

Professor Mason: Not at all. This reflects a prioritisation of the programme elements we need to deliver. The question has been raised, so I will get to it, why the proportion of cuts is higher at Daresbury than it is at RAL. The answer is again very simple, we have Diamond and ISIS target station two and central laser facility and we have a lot of investment at RAL which we need to support, and clearly it would not make any sense to not to run ISIS or not to run Diamond. Therefore you have to maintain a certain cadre of people just to be able to do that. The structural imbalance between Daresbury and RAL in terms of facilities is, as I have said, something we inherited and I cannot re-write history, I have to deal with it as it is. My focus has been to move forward and clearly we are going to develop Harwell, it will be an exciting place, but Daresbury also has an exciting future and we are getting to grips with how to actually deliver that. As Peter says, we now have commitments to put the detector centre at Daresbury, and the Hartree computational centre at Daresbury, and we will continue to invest in Cockcroft. Those are an exciting scientific nucleus around which we can build. It is not sufficient but it is a good start.

Mr Warry: Could I just say on these cut-backs, it is definitely wrong to say that we think there is a big lump of administration fat in these things. This is simply that we have to pare back our budget right across the piece and the facilities have to bear their share of it. So it is painful everywhere and it is not a statement, "This is good, that is bad."

Q378 Dr Iddon: The message we got when we visited Daresbury a few days ago was that it was the critical mass of scientists, engineers, the fact there is a world class library open at Daresbury which we understand is in danger of closing also, and it was that critical mass which existed on that site which attracted so many world class scientists, including the director of the Cockcroft Institute who we heard earlier, and that in turn has pulled in companies to interact with that critical mass. I cannot believe that that critical mass is going to remain from what I have heard from both sides of the discussion, yourselves and the people on the Daresbury site. What assurances can you give to the director of the Cockcroft Institute that there will be enough critical mass left on the site for him to remain on the site with the Cockcroft Institute?

Professor Mason: In terms of Cockcroft, I believe it is true that the funding of Cockcroft will continue at broadly the same level as it has been in the past. We will not be able to ramp it up as we had hoped with some programmes but it will continue as we have in the past. I think inevitably, with the loss of SRS, there will be a period where the mass, whether it is

critical or not, actually goes down. That is inevitable. What we are focusing on is how to ramp that back up as quickly as possible in order to make sure that I can say in five years' time we do have the vision which I have for Daresbury, which is thousands more jobs, much more excitement, much more activity going on, both in science and technology and in translational activities. I think they all go together and we are working towards that end. As I said, we have already announced the first set of—

Q379 Chairman: Yes, you have said that.

Professor Mason: There will be more.

Q380 Mr Cawsey: Professor Mason, when you appeared in front of this Committee earlier in this inquiry you told us that the decision to withdraw funding from ground-based solar-terrestrial physics facilities was a decision taken by PPARC and that the STFC was simply implementing it now. In fact we understand the decision was to close the facilities but to maintain a capacity for ground-based STP. Would you accept that with the benefit of hindsight your earlier comments were perhaps misleading?

Professor Mason: I think they were spot on. PPARC two years ago made the decision to withdraw from ground-based STP facilities, but as in all cases that does not mean we will not accept grant applications in those areas and they will be judged on their merits. The point was made earlier, I think by Evan, did we suddenly pull the plug on these people or did we consult with them and give them time to find a new way forward? Given the decision was made two years ago—actually it was made before I took over as CEO—I can nevertheless remember going to a community meeting of that community and telling them exactly why that decision had been made, because they were not being competitive in peer review and advising that they needed to seek a broader base.

Q381 Mr Cawsey: Are you saying therefore that you agree with the original PPARC decision but you want to maintain a capacity for ground-based STP?

Professor Mason: Personally I think that would be a very welcome thing to do because ground-based STP has a role to play, but in a much broader arena than just STFC science. I think the way forward for STP, and I will say it quite clearly, is that they need to be developing a broader base, so we have mechanisms for dealing with broad cases but they need to come forward with that case, and that will receive a sympathetic hearing.

Q382 Dr Harris: I did not understand your answer to Ian Cawsey because the decision and the outcome of the programmatic review paper published in April 2006 was, "Although PPARC wishes to maintain a capacity in ground-based STP, it has become necessary to close some of the facilities", and your latest plan says you are going to withdraw from all. There is a difference between "some" and "all", is there not?

Professor Mason: There certainly is but the two are not incompatible.

Dr Harris: This will be interesting!

Q383 Chairman: This is very strange science to us!

Professor Mason: Welcome to my world, is all I can say.

Q384 Chairman: Right.

Professor Mason: The thing is, we could not withdraw from EISCAT because we had just recently entered into a five-year commitment, as has been indicated earlier. So essentially the PPARC statement was meant to reflect the fact we would withdraw when we could without breaking international agreements. We remain in EISCAT for another three years.

Q385 Dr Harris: You are just reading in words. It does not say that.

Professor Mason: I am telling you what the situation is, which is that the plan was to roll down at these facilities but maintaining our international agreements, and we have done, and we continue to do that because we are still in EISCAT.

Q386 Mr Cawsey: There have been some criticisms anyway about the way in which PPARC decisions have moved across to STFC because you work under very different remits, as I understand it. What have you done since you set up as your organisation to actually review those decisions as they are going to apply in the future but under the remit you now have?

Professor Mason: In the specific case of STP, the remit has not changed and, as I said, my advice to that community is that they should be making applications against a broader remit than either PPARC or STFC, but the remit in terms of STP is the same as it was under PPARC. The general point is that one of the main jobs of our Science Strategy Board, the Science Board, is to do exactly that and to be continually reviewing the rationale and the case for the decisions which have been made and will be made in the future, and that is what they did in the context of the ground-based STP. Basically their conclusion was that the situation is the same as it was two years ago and in the financial circumstances they could not see a case for reversing those decisions.

Q387 Mr Cawsey: You no doubt saw the comments of the director of EISCAT who said, "It is not at all clear that any changes have been made to the STFC interpretation of the programmatic review to ensure that the economic impact of projects like EISCAT are genuinely given more weight than they were in the PPARC regime."

Professor Mason: That is correct because our remit has not changed and my message—

Q388 Mr Cawsey: So you think his understanding of what your remit is is probably wrong?

Professor Mason: It might well be. I cannot obviously vouch for his understanding. What I am saying, and I want to say quite clearly, is that I

believe the remit for ground-based STP is broader than STFC and that the community should take note of that and formulate its applications accordingly. If they did that, it would have a much better impact and much more likelihood they would be funded.

Q389 Dr Turner: We understand that ATC is likely to lose a contract to build an instrument for Gemini. Would you accept that the uncertainty surrounding our participation in Gemini has led to more consequences than simply for astronomers directly using the instrument?

Professor Mason: Gemini, as all these things are, is a complex situation. I think there is a lot of misinformation going around about Gemini which I can explain to you if you wish but it probably is not relevant. The issue that we were dealing with in Gemini is that when we originally signed up to the Gemini partnership the intention was that both the operation, the current facilities, and the development of new facilities would be paid for out of that subscription budget. Subsequently, it has been decided by the Gemini Board that they cannot afford to do that within that subscription so they are looking for extra contributions to build the next generation of instrumentation. Our current agreement is to remain in Gemini until 2012 but the new instrumentation will not come on-line until 2014-2015, so there is an urgent need for us in the UK in particular to decide what our long-term future in Gemini is so we are not building instruments we will never use. This whole Gemini discussion really revolves around the need to have a clear understanding with the Gemini Board about what our long-term engagement with Gemini will be. Yes, there has been a lot of hoo-ha about what our intention was, there was a misinterpretation by the Gemini Board who thought we were withdrawing immediately, which was not our intention, that has created a lot of uncertainty, but we have been working behind the scenes to rectify that and I think we are getting back on track. I think we have to have a serious discussion as to whether this particular instrument forms a future part of Gemini and, if it does, then maybe there will be work for the ATC which will be very welcome and we will certainly be pushing for that. But it is part of a longer term strategic decision about how the future of ground-based astronomy evolves, recognising we do have access in particular to other northern telescopes coming along—Subaru and GranTeCan in La Palma—so we need to have a joined-up picture of what provision we need and how we should invest in it. It is a zero sum game—if we take money from one, we cannot give it to another—and it is very important we have a long-term plan to inform our strategy going forward, and that is what we are doing.

Q390 Dr Turner: Finally, can you clarify your fairly abrupt decision to withdraw funding from the International Linear Collider, when that had been funded on the basis of peer review but the decision

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to withdraw was not? How do you justify this? Was it in fact a response to the American withdrawal of funding?

Professor Mason: No, we made our announcement two weeks before the American decision and it was completely independent. It is not true to say that was an abrupt decision. We had been having discussions within the old PPARC science committee about the balance of funding which was required for ILC compared to the second generation of LHC instrumentation—large hadron collider—at CERN. We had started the ILC programme, and even though it was labelled ILC actually it was generic accelerator and detector development, so generic developments. We were now at a point where the ILC project was wanting to move forward to specific ILC instrumentation and to ramp up those costs, and it was clear to us for a long time and to our peer review bodies that under a flat cash regime we could not afford to do both that and to invest in LHC. So the decision was not made overnight, it was not made rapidly, but it was informed by considerable discussion over many months, even years, about the direction of this programme and whether it was sustainable. As you know, one of the issues which concerned us greatly was the fact that the cost of the ILC was rising, the timescale was stretching, we were in danger of threatening the future of particle physics essentially by putting all our eggs into a basket which might never deliver chicks.

Q391 Chairman: That is an interesting metaphor. You told us previous, Keith, that delaying the implementation of the delivery plan was not an option. We now seem to have had a slight change in terms of Gemini. The Wakeham Review you said you could not wait for, but we now understand—and perhaps you would confirm this—the Wakeham Review is not going to report in the autumn but probably June or July. Given the fact also that you have something like a £27 million under-spend on your budget this year, surely simply waiting for the Wakeham Review to come in will send out a very strong signal that you are seriously looking at the future of STFC and its programmes in the light of the future of the physics and particle physics community? Surely that is the least perhaps we could get out of this morning's session?

Professor Mason: We are waiting for Wakeham, in the sense that, as I have indicated, we are not doing damage to physics in the first year; what we have decided to do is not to fund the increase that we had previously planned. So I stand by what I have said earlier, we had to take that decision because had we funded that increase we were committed to that for five years, so that would have made any further adjustments downstream much more painful than they will be. In terms of waiting for Wakeham, we are not going to be doing irrevocable damage to physics departments in the time between now and when Wakeham reports, and we will certainly look at the outcome of Wakeham to inform how we take this process forward. The comment I made earlier was reflecting the fact that we will not get any more money in the Spending Review, is my

understanding, so what we have is what we have got. All we can do is re-profile and play with it and that is what we are doing in order to maximise the amount of science we get in this period. The comment—and I think Ian Diamond made the same point—was that Wakeham is going to inform really the next Spending Review and we do not expect to receive manna from heaven to help us out in the short-term. We have to deal with that.

Q392 Chairman: In terms of ATC, are discussions actively being carried out with Edinburgh University about an approach to that?

Professor Mason: Yes.

Q393 Chairman: Secondly, in terms of ground-based solar-terrestrial physics, are you in discussions with NERC about a possible solution long-term for that community?

Professor Mason: We have had discussions with Alan Thorpe but, as I think I said in my letter to you, the mechanisms for dealing with the joint STFC-NERC applications are already in place, they have been in place for a number of years. The onus is on the community to come forward with a proposal.

Chairman: I think that is a good message there. One very final point.

Q394 Dr Harris: I thought Professor Holdaway had said you were on the case in negotiations with NERC. My question is about access charges for facilities, which is an option you have considered or at least floated. That would mean, particularly the MRC, or MRC-funded users, would pay a contribution. That would require a change of policy, and if it was applied to Diamond they would have to change their policy, but presumably the Government would agree, but that would be a way of sharing your pain. Have you asked for that or do you think it is a non-starter?

Professor Mason: There are difficulties with the proposal. It has been tried, we had what was called the ticket system, where users, when they got time on a facility like Diamond, were given essentially a voucher that they gave to the operator of Diamond or ISIS, which was cashed into pound notes to run the facility. What was found when that system was tried was the problem is that running something like ISIS is a fixed cost, it is £X, and if you have £X minus £1 you cannot run it, or 10% less than £X you cannot run it, so you have to collect £X to run it. In order to collect £X basically you have to adjust the price of the ticket so it adds up to £X, so the number of tickets times the ticket price adds up to £X.

Q395 Dr Harris: I understand.

Professor Mason: So basically this is a very expensive administrative way of getting the number you first thought of. In other words, you have to track all these tickets all the way through different research councils just to come back with the number you knew from the outset.

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Q396 Dr Harris: But it would be new money in.

Professor Mason: That is a good question, is it not? I predict that if we were to go to that system the first thing which would happen is it would be a transfer of money out of STFC to the other research councils so they could pay for STFC—

Q397 Dr Harris: That would be sensible but if that did not happen, that would be an option. If RCUK or whoever makes these decisions says, “We think that is fair because you have these big facilities, they are being used a lot, other people have grants to increase their use of them, you are not seeing any benefit from that”, that would be possible with political will.

Professor Mason: That would be a dream solution as far as I am concerned, but I am sure the other research councils would say they do not have the money to pay that.

Chairman: It is a dream solution but one we hope you will seriously look at. Could you send us a timetable for decision making and implementing cuts from now on, so the Committee can be kept accurately informed about what is happening as a result of the decisions you make? I think that would be useful.

Ian Stewart: And a timetable for redundancies please.

Chairman: Thank you. Finally, could I thank you very much indeed, Professor Mason and Mr Warry, we understand these are not easy decisions and we are grateful to you for your frankness this morning.

Written evidence

Memorandum 1

Submission from the Arts and Humanities Research Council

ALLOCATIONS OF THE SCIENCE BUDGET 08/09 TO 10/11.

1. The Arts & Humanities Research Council (AHRC) welcomes this opportunity from the Committee to share its views on the recent allocations of the Science Budget, and looks forward to working with both the Committee and the Department on matters relating to the funding of arts and humanities research in the future.

2. Late last year the AHRC published its delivery plan for the period 2008-2011, which details our priorities and the vigorous contribution that the arts and humanities will make towards the ambitions of the Science & Innovation investment Framework 2004–2014. We also published our updated Vision and Strategy for the period 2007–2012, which sets out our vision for supporting world class research and post-graduate training, alongside the aims we have to strengthen the cultural, social and economic impact of arts and humanities research via knowledge transfer. A recently convened task group will further investigate the impact of arts and humanities research throughout the coming year.

3. In January this year the AHRC released a general statement to the research community, providing detail of the breakdown of the allocation of the funding we will receive from the Science Budget and explaining the decisions we have made regarding how this will be distributed amongst our portfolio of opportunities. Whilst it is true that this has led to some negative reaction from within the research community (as it will inevitably lead to a drop in success rates in some areas) it must also be noted that there is a great degree of enthusiasm for the increasing potential for fostering innovation and collaborative working across a range of AHRC supported initiatives. Cross-council strategic research will be strengthened as a result.

4. It is also hoped that the payment of higher levels of Full Economic Costs, which is also a recommendation of the Comprehensive Spending Review, may help Higher Education Institutions to devote additional resource to their own support of individual scholarship.

5. In particular, we would draw the Committee's attention to the strategic research themes that the science budget will allow us to fund. These include capitalising on the UK's cultural assets via the development of research between the arts, humanities and science and technology disciplines; potentially contributing directly towards the UK's vibrant tourism industry. Also, we will stimulate and support innovation in the knowledge economy by facilitating access to arts and humanities research for the creative industries and digital service sectors. The AHRC will also bring the unique research insights of the arts and humanities to the cross-council Global Threats to Security programme.

6. In response to Lord Sainsbury's report *The Race to the Top*, we will also use funds to develop exciting collaborations with organisations such as the Technology Strategy Board (TSB). Work has already begun, for example, to enable the TSB to build upon our successful Knowledge Catalyst¹ scheme in achieving their aim of delivering a nationwide mini-Knowledge Transfer Partnership programme.

7. In terms of our international activity, the AHRC has recently signed a memorandum of understanding with the German Research Foundation;² to add to those already signed with the US, Taiwan, South Korea and Japan. These links will enable a dynamic exchange of knowledge and expertise across cultures, strengthening our presence as a leader in the global knowledge economy and allowing the UK to share the skills and expertise present within new and emerging research cultures worldwide. The allocations of the Science Budget will allow us to fund the development of research collaborations in this endeavour.

February 2008

¹ For further detail please see http://www.ahrc.ac.uk/about/ke/knowledge/knowledge_catalyst_scheme.asp

² Press release at http://www.ahrc.ac.uk/news/news_pr/2008/dfg.asp

Memorandum 2

Supplementary submission from the Arts and Humanities Research Council

1. THE REDUCTION IN AVAILABILITY OF EYF IN JANUARY 2007

The Committee has asked the AHRC about the circumstances of the reduction in availability of EYF in January 2007 as relevant to the context for the CSR result and the impact and consequences of that reduction.

RELEVANT CIRCUMSTANCES

The AHRC had an EYF of £14.8 million on 1.4.2006. The majority of this sum was transferred to the OSI from the DfES when AHRB became a Research Council in April 2005. It had previously been agreed with our funders at that time (the four Funding Councils of the UK), and with the DfES, that we would actively seek to build up an EYF pot as we established a range of programmes over a period of five or so years. As the programmes became fully operational we had a plan to utilise our existing EYF progressively up to the end of 2007–08.

To implement this plan, we had put in train a number of new strategic programmes, and accelerated and enhanced others. The rationale behind these actions was made explicit in our Delivery Plan, new Strategic Plan and the early drafts of our CSR submission.

Research Councils programmes take significant time both to get started and to stop once they are started. Reductions in expenditure in 2007–08, whatever action we took, would result in repercussions in future years. We had limited flexibility regarding those areas of activity that could be “switched off” or “turned down” so as to affect the level of spend in the next financial year. Nevertheless, we provided a suite of actions that we could take. After discussions with our Council, the reduction of £5.3 million of EYF was managed by:

- Reducing the sum available for awards in Research Leave by £2 million
- Reducing the Strategic Programme Management Fund by £0.57 million
- Deferring the Strategic Resource Enhancement programme for 1 year, releasing £1.5 million
- Reducing the budgets for KT Partnerships and KT catalyst schemes by £300,000
- Reducing the funding for collaborative research training schemes by £200,000

By making the required cuts in our responsive mode programmes in the first instance, we also retained sufficient resource to pursue the delivery of our strategic priorities.

IMPACT AND CONSEQUENCES OF REDUCTION IN EYF

Reduction in Research Leave allocation:

This is a popular scheme, delivering added value to the arts and humanities research community and the HE sector, as well as having an impact in society more widely. Consistently high quality outputs are generated from this area of activity, with hundreds of outputs being generated each year.

Reduction in Strategic Programme Management Fund:

We lost some of our flexibility to respond to opportunities to support new and emerging initiatives that would fit well with our strategic aims, and where research is urgently required.

Reduction in Knowledge Transfer Partnerships/Knowledge Catalyst Scheme:

Dissemination and Knowledge Transfer are central to AHRC’s Strategic Plan. Reductions in budgets directly affect the volume of awards that can be made. Opportunities for KT between SMEs and the research base were reduced.

Reduction in Collaborative Research Training awards:

This scheme is our main mechanism for supporting subject-specialist research skills training and encourages HEIs to collaborate in the formation of training networks. The budget reduction impacted upon the provision of essential subject-specific research training for doctoral students and limited opportunities for inter-institutional collaboration in this area.

2. THE CSR SETTLEMENT

The Committee has asked the AHRC what level of resource we would have needed to maintain our current suite of programmes at the existing level.

Based on our projections of current and planned expenditure, we had forecast that to maintain volume in our existing programmes to engage appropriately with the Cross-Council challenges, fund FECs at 80%, and develop those strategic areas that we had identified as priorities in our Strategic and Delivery Plans, we estimated we would have required about £345 million over the CSR period. In the event, we have received £316.7 million, including our estimated £58.4 million for FECs over the period.

Our allocation provided to us, as to the other Research Councils, enables us to:

- Commit a minimum of £2.5 million in collaboration with the TSB in the CSR07 period.
- Participate in new cross-Council multi-disciplinary research programmes.
- Cover our contribution to the Shared Service Centre at a level agreed with RCUK.
- Fund our share of the costs of RCUK, including programmes on research careers and diversity, science and society and the funding of the RCUK contribution to the new International Fellowships scheme, as well as the RCUK secretariat, RCUK's international offices and other agreed joint activities.

We welcome the opportunity, building on our existing relationships, to engage with the other Councils and with other stakeholders, such as the Technology Strategy Board, in a wide range of important strategic programmes, where our research community are rightly seen as indispensable partners.

The Committee has also asked us to provide information on the consequences and impact of the CSR, especially in relation to our finances.

As a result of the settlement, the AHRC has had to make further changes to its planned programme of activities to enable us to achieve the targets above.

In responsive mode, we reduced the allocations to our Research Grants, Research Leave and Creative and Performing Arts awards.

Our suite of cross-Council strategic programmes has benefited from the advice from DIUS that we should aim to fund these programmes as though we had received an additional 5% funding allocation.

The Committee has expressed particular interest in our postgraduate provision. Over the three years of the CSR, the volume of awards made is projected to fall from around 4500 to around 3650—a reduction of 19%. These reductions have fallen across both Masters and Doctoral programmes and the resource generated from them has been redirected into priority strategic areas.

At the most general levels impact, our community already receives a lower level of funding proportional to the size of the community than many of the science based subject areas. The AHRC's share of the Science Budget falls from 2.8% in 2007–08 to 2.6% in 2010–11. The impact of this will be harder in the first two years, with some relief in the third year.

Nevertheless, we have set out in our previous note to the Committee the exciting array of work in research, postgraduate provision and knowledge transfer that we will be able to undertake in the three next three years and we refer the Committee to that note.

February 2008

Memorandum 3

Submission from the British Antarctic Survey

SCIENCE BUDGET ALLOCATION

Executive Summary

1. As a stakeholder in UK solar-terrestrial physics, the British Antarctic Survey is concerned about the impact of the current Science and Technology Facilities Council Delivery Plan³ on national capability in solar-terrestrial physics, which is of importance to a variety of stakeholders in science, commerce and government.

³ Science and Technology Facilities Council Delivery Plan 2008–9–2011–12
http://www.scitech.ac.uk/resources/pdf/delplan_07.pdf

2. We recommend:

- 2.1 Reviewing the representation of STP within STFC and whether it should be funded wholly within another research council.
- 2.2 Restoring funding for fundamental and applied research, education and training in solar-terrestrial physics.
- 2.3 Reversing the proposed closure of all ground-based solar-terrestrial physics facilities.

INTRODUCTION

3. The British Antarctic Survey (BAS) is a research institute of the Natural Environment Research Council but has traditionally shared a common interest with the Science and Technology Facilities Council (STFC) and its predecessor PPARC in conducting research in Solar-Terrestrial Physics (STP).

4. This submission expresses our concern about the impact of the current STFC Delivery Plan¹ on national capability in STP, which is of importance to a variety of stakeholders in science, commerce and government.

WHAT IS SOLAR-TERRESTRIAL PHYSICS?

5. STP is essentially the study of the effects of solar variability on the Earth's environment. The most obvious manifestation of this interaction is the aurora (also known as the northern or southern lights) but its effects occur from the ground throughout the Earth's atmosphere to its outer reaches in near-Earth space. Details of what STP is and the UK's involvement can be found on the public outreach site www.sunearthplan.net.

6. STP research provides essential knowledge on the environment occupied by satellites which have become part of our everyday lives (from communication to GPS to weather forecasting) and on the influence of solar variability on climate change.

7. STP is traditionally regarded as a sub-discipline of astronomy. However it is very distinct because it concentrates on the space environment around Earth whereas astronomy is interested in much more distant and exotic space environments mostly far outside our solar system. In this respect STP is more akin to an environmental science and has direct relevance to the activities of society and the Government's knowledge exchange agenda as explained below.

8. Historically, STP has received minority funding within the overall astronomy budget of STFC and currently experiences no representation within STFC decision-making bodies.

9. During the consultation process about the formation of STFC, NERC offered to accept the transfer of solar physics and STP from STFC with appropriate resources.

Recommendation 1: Review the representation of STP within STFC and whether it should be funded wholly within another research council, recognising the distinction between STP and Astronomy and the lack of representation of STP in the STFC decision-making process.

WHY IS SOLAR-TERRESTRIAL PHYSICS IMPORTANT?

10. STP is of importance to a variety of stakeholders in science, commerce and government. UK STP research is internationally recognised as world-leading. The 2005 International Review of International Perceptions of UK Research in Physics and Astronomy⁴ stated that "UK researchers have an exceptionally strong standing in solar physics as well as space-based and ground-based space physics".

Key areas of importance for STP research are:

11. Sun-climate links. Researchers are becoming increasingly aware of links between solar variability and the Earth's climate. It is critical that we establish the relative importance of solar-induced effects on climate change so we can predict more accurately the man-made influences on climate. The InterGovernmental Panel on Climate Change⁵ reported that the current level of understanding is very low and Sir Keith

⁴ Second International Review of International Perceptions of UK Research in Physics and Astronomy 2005, p.18, http://www.ras.org.uk/images/stories/ras_pdfs/2005review/2005%20Review.pdf

⁵ Climate Change 2001: The Scientific Basis <http://www.ipcc.ch/ipccreports/tar/wg1/245.htm#fig66>

O’Nions in recent evidence to the Public Accounts committee⁶ about the Halley research station in Antarctica asserted that the “physics of the upper atmosphere there will be a very key part of climate change”. Scientists in the UK are at the forefront of improving our knowledge of sun-climate links in a number of areas, many of which are dependant upon our knowledge of STP and building on it.

12. Space weather. Solar variability has a very strong influence on the near-earth space environment, including large transient increases in the amount of radiation there. Such space weather events are frequent but intermittent and of varying severity, the prediction of which is an ultimate goal of STP research. They can lead to temporary loss of service from satellites, or even the complete loss of satellites worth about \$300 million each. More than half of all space insurance is done through London and is worth \$500 million per year. BAS has conducted research into the risk to satellites from space weather, commissioned by City of London satellite insurers. The radiation can also enter the upper reaches of the atmosphere and poses a risk to air crew, passengers and sensitive electronics. The monitoring of this radiation risk is now required by law; understanding its variability helps airlines manage this risk. These are two areas where the UK is leading but it is also involved in other applications concerning the effect of space weather on radio communications, navigation systems, electricity supply networks, and pipelines. A recent study⁷ commissioned by the European Space Agency (ESA) identified that the potential european market for space weather services exceeded a billion euros over 15 years. BAS has led recent space weather contracts for ESA.

13. UK security. The importance of STP to security is harder to assess by its very nature. We are aware of at least one university department that provides STP consultancy services to the Ministry of Defence, and of UK companies who use STP knowledge in defence contracts. In the U.S.A., where it is easier to know of the links between the military and research scientists, the military services support considerable STP research, including the impact of space weather on radio communications and satellites and also similar impacts resulting from nuclear detonation in space. Whilst some of this information may be shared through NATO, UK scientists have world-leading or unique expertise in some STP areas and also it would seem important that the UK maintain a national capability to provide independent advice to government.

14. Education and training. Space science, including STP, is known to excite and attract young people into physics and engineering, which is essential for sustaining a knowledge-based economy and reversing the decline of science teachers. Higher education and training is also essential for sustaining national capability and international leadership in STP.

Recommendation 2: Restore funding for fundamental and applied research, education and training in STP that is adequate to maintain national capability.

IMPACT OF STFC DELIVERY PLAN ON SOLAR-TERRESTRIAL PHYSICS

15. The STFC Delivery Plan⁸ states that

“We will cease all support for ground-based solar-terrestrial physics facilities.

We will target our investment in astronomy grants taking account of reduced facility availability.”

In our opinion, this will lead to the complete loss of national capability in STP by removing vital experimental infrastructure and the associated research and people.

16. Effective STP research combines measurements from the ground and from space—together these provide much more than the sum of the parts. Indeed, the recent ESA space weather study⁷ highlighted that ground-based measurements are extremely cost-effective as methods for monitoring space weather and therefore are a key element in stimulating the growth of this market. The 2005 International Review of International Perceptions of UK Research in Physics and Astronomy⁹ also stated that “The UK has a world-leading role in ground-based space research using ionospheric radars, auroral observations, and magnetometer networks” and that “The ground-based space research is highly cost-effective relative to space-based science, and increased support would likely yield great dividends as well as valuable hands-on experience for PhD students and PDRAs.”

17. The STFC delivery plan⁸ makes no mention of space-based STP or even the Sun. Given the current situation that STFC will target astronomy grants to existing facilities and that existing STP missions are coming to the end of their operational lives with no commitment yet by STFC to future missions, the delivery plan effectively removes STP from the UK’s research portfolio.

⁶ Big Science: Public investment in large scientific facilities, question 65, <http://www.publications.parliament.uk/pa/cm200607/cmselect/cmpubacc/521/521.pdf>

⁷ Space Weather Applications Pilot Project: Cost Benefit Analysis—Final Report, p. 67, ESA publication SEA/06/TN/5482.

⁸ Science and Technology Facilities Council Delivery Plan 2008–9—2011–12 http://www.scitech.ac.uk/resources/pdf/delplan_07.pdf

⁹ Second International Review of International Perceptions of UK Research in Physics and Astronomy 2005, p.18, http://www.ras.org.uk/images/stories/ras_pdfs/2005review/2005%20Review.pdf

Recommendation 3: Reverse the proposed closure of all ground-based STP facilities, recognising the need for combined space and ground-based STP research to maintain national capability.

RECOMMENDATIONS

18. Recommendation 1: Investigate whether STP should be funded wholly within another research council—EPSRC or NERC, recognising the distinction between STP and Astronomy and the lack of representation of STP in the STFC decision-making process.

19. Recommendation 2: Restore funding for fundamental and applied research, education and training in STP that is adequate to maintain national capability.

20. Recommendation 3: Reverse the proposed closure of all ground-based STP facilities, recognising the need for combined space and ground-based STP research to maintain national capability.

February 2008

Memorandum 4

Submission from the British Academy

BRITISH ACADEMY COMMENT ON CSR 07 ALLOCATIONS

The CSR settlement is a strong result for the research community, with an outcome in line with the ten-year policy framework for science and innovations, and at a level distinctly higher than the average CSR settlement for Government departments.

The British Academy is the national academy for the humanities and social sciences. Like the two other national academies, the British Academy receives a Grant-in-Aid through the science budget, which is used to support research in a way that complements the Research Councils.

This was the first time that the British Academy had been through a spending review process under the aegis of a science ministry (the Academy had previously been funded through Dfes). The process followed by OSI/DTI and thereafter DIUS was open and consultative: officials made clear at all stages that the spending review would be challenging, that it was necessary to prepare for a range of possible outcomes, including flat-cash, and that evidence of a thorough examination of priorities would be necessary.

The British Academy submitted a delivery plan that was the result of extensive reflection and reprioritisation, in the light of our own priorities and also the need to adjust to the “full economic costing” regime. It was targeted on building research capacity in the humanities and social sciences, with a clear priority of raising the number of postdoctoral fellowships awarded—this is our flagship scheme. We also outlined plans to sustain our other schemes, to extend our international leadership—including a focus on areas of strategic interest to the UK, like China, the middle east, Africa and Latin America—and to develop our work in communications and outreach. We were aware of the likely impact of FEC commitments on volume of research able to be supported. We had to address some difficult issues, recognising that we could not continue to do everything, and to restructure some of our programmes.

The settlement for the British Academy will allow us to deliver our identified priorities, and also to take part, alongside the other national academies and RCUK, in a new international visiting fellowship scheme. We will be able to expand our postdoctoral fellowship scheme to 45 awards a year (with a success rate still well below 10%, it should be noted) and to sustain our other activities. We will be able to meet our FEC obligations, although there is pressure on some of our ambitions in the international area and there will be tighter success rates in some schemes. Like other bodies in receipt of public funds we are required to make savings in operating costs, which is particularly challenging for a small organisation like the Academy. We would of course always welcome more funds, but overall we see it as a good settlement for our share of support for the humanities and social sciences.

We are aware that other research funding bodies with an interest in the humanities and social sciences have had to deal with challenges similar to those faced by the British Academy, thinking through their priorities and seeking to balance FEC and research volume. The Research Councils in our disciplines received their share of the settlement. We have recently seen announcements by AHRC of changes in the number of studentship places offered and success rates on grants. We would be concerned about a sustained reduction in the number of PhD studentships in the humanities, since this is the principal entree to those disciplines (we are particularly interested in levels of response-mode provision). We understand however that numbers can be expected to stabilise at close to traditional levels.

February 2008

Memorandum 5**Submission from the Radio and Space Plasma Physics Research Group, University of Leicester**

SCIENCE BUDGET ALLOCATION

1. We are aware that a number of written submissions have been made to the IUS Select Committee investigation of the Science Budget Allocation in response to the statement in the STFC Delivery Plan (11 December 2007) that “We will cease all support for ground-based solar-terrestrial physics facilities”. These submissions emphasise the UK-wide community view of the scientific and societal significance of these facilities, and the negative impacts that will result from the intended cessation of support. The purpose of this submission is to draw specific attention to the effect of this decision on the research programme of the Radio & Space Plasma Physics (RSPP) group in the Department of Physics & Astronomy at the University of Leicester, currently the largest university group undertaking research in this discipline, and its inappropriateness in relation to the STFC’s stated mission and remit.

2. During the past 20 years the RSPP group at Leicester has built a world-leading research programme in ground-based solar-terrestrial physics, based on applications of radar techniques to studies of the polar upper atmosphere. It has designed, built, and now operates radar facilities in Iceland, Finland, and on Svalbard within the Arctic Circle, the scientific discoveries from which have resulted in major national and international awards to Leicester staff, and the acquisition of a world-class reputation for both scientific and technical excellence. The announcement of the STFC decision promises to bring this programme to an end, with the loss of both scientific and technical capability, and the waste of major investments over recent years both personal and financial. The high-power Spear radar facility on Svalbard, in particular, was completed only two years ago at a cost to the former PPARC of over £2 million, with a planned scientific programme of at least 10 years. The STFC decision will thus disrupt and terminate productive careers at Leicester, resulting in the dismissal of both scientific and technical staff, waste substantial investments of public money, and damage the UK’s reputation and prestige through our withdrawal from international collaborations to which we are major contributors.

3. Withdrawal of support for ground-based solar-terrestrial physics will also have major negative impact on the training of young scientists, who through their work at Leicester gain hands-on experience of research using world-class experimental facilities. Such direct experience has now become a rarity within the STFC remit, where much of research training is conducted at considerable distance using data from large international facilities. The loss to economic benefit and knowledge transfer will also be considerable. Radar systems commissioned from us by other international institutes are currently operating in Alaska, Antarctica, and Japan, earning income to the UK that has exceeded the initial research council investment, and related negotiations are currently in progress with institutes in China and Russia. Such activities cannot be sustained in the absence of an on-going research programme at Leicester. The scientific knowledge gained from this research also has immediate applicability eg to defence radar systems, mitigation of the effect of “space weather” on technological systems, and in novel techniques for geological exploration.

4. The existing and future potential for world-class scientific research at Leicester, the contribution to the training of young scientists, and the immediate strong contribution to knowledge transfer, are all in direct line with the government’s vision for the mission of the new research council. Against this background the STFC’s own decision to withdraw all support from this area of work seems perverse, and to have been arrived at without rational basis. Three recommendations follow.

- (i) That a detailed independent pre-implementation review be undertaken of the STFC Delivery Plan, in particular of the intent to cease support for ground-based solar-terrestrial physics facilities.
- (ii) That there should be an enquiry into the transparency of decision-making within the research council, including the operation of peer-review, appropriate representation of the client community within the policy-forming structures, and the level of consultation and discussion with the community.
- (iii) Consideration should be given to transferring grant-awarding activities in this specific field (and possibly across the board) from STFC to another body eg EPSRC or NERC, with appropriate transfer of funds. As a consequence of recent events we have lost confidence in the ability and willingness of the present research council and its executive to provide appropriate future stewardship of university research in our discipline to the benefit of the nation.

Memorandum 6

Submission from the UK Solar Physics Community

SCIENCE BUDGET ALLOCATION

UK Solar Physics (UKSP) is the body representing UK scientists engaged in solar physics, the study of the basic physical workings of the Sun. Solar physics addresses all parts of the Sun, from the fusion power source in its deep interior to the origin and evolution of the surface disturbances and radiation that affect Earth's near-space environment (space weather). UKSP represents UK scientists at all career stages, in Universities and in Government laboratories. This submission reflects our very deep concern at the 2008–11 Comprehensive Spending Review and the STFC Delivery Plan. These will seriously affect the UK's national capacity and international leadership in Solar Physics, Space Physics and Solar Terrestrial Physics (STP).

1. Solar Physics is the study of the fundamental physical processes governing our star. Conditions on Earth, including climate conditions, are to varying degrees sensitive to the everyday radiation output of the Sun, and on its magnetic field (which shields the solar system from external influences). These vary on timescales of years, and are constantly monitored. Frequent but intermittent violent solar activity (solar flares and mass ejections) drives or moderates all aspects of space weather, known to cause serious damage to satellites, global communication systems and power grids. Solar physics is a necessary component of space weather prediction, without which manned exploration of the solar system is manifestly more dangerous. Therefore studying the basic physics of the Sun has obvious environmental, security and socio-economic implications.

2. The Sun provides a unique laboratory for studying the basic properties of plasmas, the “fourth state of matter”, under conditions not currently achievable on Earth. This plays an important part in our understanding of laboratory-based controlled fusion reactors, an environmentally friendly, realistic solution to our future energy requirements with paramount international interest.

3. Solar Physics is closely related to both Astronomy and Solar Terrestrial Physics (STP). The Sun is the only star in the Universe close enough to study in detail, therefore providing invaluable, and in many aspects the only insight into the working of other stars and astrophysical objects.

4. The Sun's proximity and its evident effect on human activities, means that solar physics and STP is a highly effective topic for scientific dialogue with the public.

5. The International Review of UK Physics and Astronomy Research 2005 stated,

“UK researchers have an exceptionally strong standing in solar physics as well as space-based and ground-based space physics. The UK has a world-leading role in helioseismology, dynamo theory, coronal activity, magnetic reconnection, and shock physics, thus covering many of the important aspects of the Sun-Earth connection.”

This strong standing exists in all disciplines of solar physics ranging from satellite and ground-based instrumentation design, data collection and analysis, to the development of fundamental theory. UKSP punches well above its weight in internationally leading research, and for a relatively modest investment.

6. Continued understanding of the Sun and its frequent dynamic energy releases will be essential for controlling the radiation hazard for future Lunar base and Mars Mission astronauts. Thus, maintaining a strong solar physics base in the UK is essential for the success of these future endeavours.

7. The diversity of research carried out in solar physics, ranging from instrument development and design to data stream communications, image processing and supercomputing techniques, provides a positive economic impact on UK high-tech industries. Many of our graduates go on to apply these skills in the Telecommunications, Space, Defence, Financial and Medical Imaging industries.

8. The funding settlement for the STFC has resulted in a shortfall of £80 million compared to the level required to fulfil its responsibilities over the next three years. By cutting this fundamental research the UK Solar Physics community, which currently has a strong and leading international standing, will be seriously disadvantaged. We will not be able to exploit the full benefits of our ESA membership.

9. Reductions of this magnitude will result in a serious cut in grants to universities and will undermine the effectiveness of UK research and the future recruitment of science students at all levels, including postgraduate students, for the foreseeable future. It will reduce the national capacity to innovate and generate commercially competitive technology that depends directly or indirectly, on advances in physics and astronomy. Such a loss of capacity in terms of laboratory facilities and personnel will damage not only our current research programmes but compromise future participation in space science.

10. Solar physics and solar-terrestrial physics are closely allied disciplines and both are necessary for developing a physical understanding of space physics and a predictive capacity for space weather. Therefore UKSP supports the request from our sister discipline to halt the withdrawal from their ground-based facilities.

11. We recommend that:

- (1) The Select Committee takes a long-term view of the importance of Solar Physics and Space Physics for continued recruitment, education and knowledge exchange within the UK. With this in mind adequate funding should be made available by Government so that the UK continues to meet its present commitments.
- (2) All proposed cuts within STFC be put on immediate hold until the findings of the Wakeham Review are published and a proper review of UK Space Physics reported. In fact, to retain our international leading position an increase of funding is required.
- (3) Proper engagement, engendering trust and understanding, must occur between the management of STFC and all areas of the scientific community that it represents.
- (4) Funding is restored for research, education and training that is adequate to maintain international leadership in solar, solar-terrestrial, and space physics.

February 2008

Memorandum 7

Submission from Professor Stephen Hill, Principal, Royal Holloway, University of London

STFC FUNDING CRISIS

I am writing to indicate my concern over the funding Crisis in STFC.

ISIS and Diamond are major national resources for national and international research programmes. They act as a magnet for the best international researchers, and underpin some of the best UK research in condensed matter physics.

At Royal Holloway we are extremely concerned about the impact of possible cuts to ISIS and Diamond, resulting from the STFC funding crisis. We are concerned not only by the consequent impact on this research agenda, but also that on Physics Departments in the region. The status of Physics as a strategically important and vulnerable subject is well recognised. Proposed cuts to STFC simply undermine the positive steps that are being taken elsewhere.

The following details give examples of important activities which are potentially under threat:

The Department of Physics at Royal Holloway has established as a key part of its research strategy the development of strong links with ISIS and DIAMOND.

We are involved in setting up a regional consortium (SEPNET), which is in the process of applying to HEFCE Strategic Development Fund, with the objective of ensuring the sustainability of Physics in the region.

This has as a key part of its proposal the establishment of a strategic partnership with ISIS and Diamond fuelled by a number of jointly funded posts. Office space at the RAL campus will foster this partnership. Together with other actions proposed by SEPNET, on student training, employer engagement and outreach, we intend to work together to promote the knowledge transfer agenda and the regional economy.

There has been substantial investment in equipment for materials discovery, both in universities and at RAL. It is vital that we are able to take advantage of this investment, since it will enable UK scientists to develop new materials and set the agenda in condensed matter research.

In addition Royal Holloway is partnering with ISIS and Diamond, to establish a Centre for the Theory of Condensed Matter, spearheaded by a Chair at RHUL. This addresses weaknesses highlighted in the International Review of Physics 2005. The Centre would promote the interaction of theorists and experimentalists in a subject that is unarguably key to new device technologies. It would link strongly and coordinate with other regional partners, including London Centre for Nanotechnology and the National Physical Laboratory, providing a unique resource.

These examples serve to illustrate that the major central facilities of ISIS and Diamond are not only jewels in the crown of UK science, but also serve to promote (through their international excellence) the wider health of scientific disciplines and the regional and national economy. The synergies between these central facilities and universities are likely to be of crucial future importance, and we urge that they are protected at all costs.

February 2008

Memorandum 8

Submission from the Institute of Physics and the Royal Astronomical Society

SCIENCE BUDGET ALLOCATIONS

The Institute of Physics is a scientific membership organisation devoted to increasing the understanding and application of physics. It has an extensive worldwide membership and is a leading communicator of physics with all audiences from specialists through government to the general public. Its publishing company, IOP Publishing, is a world leader in scientific publishing and the electronic dissemination of physics.

The Royal Astronomical Society (RAS) is the UK's leading professional body for astronomy & astrophysics, geophysics, solar and solar-terrestrial physics, and planetary sciences. Its members include the majority of scientific researchers in UK universities, observatories and laboratories. The RAS organises scientific meetings, publishes research journals, promotes public engagement in science and represents UK astronomy, nationally and internationally.

The attached annex highlights the key issues of concern relating to the Science and Technology Facilities Council's Science Budget allocation and its Delivery Plan for the 2008–09 to 2010–11 Comprehensive Spending Review period.

February 2008

Annex

SUMMARY

Impact on physics and astronomy

- STFC will have to cut £80 million from its planned programme of activity over the CSR period, which will have devastating consequences for many of its science areas. STFC's Delivery Plan announced a 25% cut to grants, which will lead to a loss of millions of pounds in research income (of up to £750,000) for many physics departments which will threaten their financial viability.
- The cut will result in research project cancellations and a significant cut to rolling grants, which will affect the projects of all STFC user communities (eg astronomy, particle physics, nuclear physics, etc.), and lead to redundancies at STFC operated facilities at the Daresbury Laboratory, the Rutherford Appleton Laboratory, and the Astronomy Technology Centre.
- Uncertainties raised about the long-term prospects for physics may lead to a reduction in the attractiveness of physics undergraduate, MSc and PhD programmes and of physics as a long-term career path. A reduction in the number of students choosing physics would have implications not only for the financial viability of physics departments, but also for the long-term competitiveness of the UK's economy.
- Reneging on existing commitments without prior consultation will damage the UK's reputation as a leading player in international collaborations.

Principal issues

- The Institute and the Society urge DIUS to allow STFC to postpone the implementation of its Delivery Plan until after the health of disciplines review of physics (the Wakeham review) has reported in mid-summer 2008. There needs to be a commitment that the Wakeham review will address the current STFC problem, and that it makes use of informed international opinion.
- STFC should be given time to produce a revised Delivery Plan in which its scientific priorities are developed in full consultation, and that the balance of capital investment and associated operations and exploitation costs are optimised. Important long-term decisions should not be made on such a short timescale as was the case with its current Delivery Plan.
- The 25% cut in grants will pose severe financial constraints to many physics departments. The Institute and the Society urge DIUS to provide the £80 million shortfall in STFC's budget, or at least £20 million to allow STFC's planned programme to continue until after the Wakeham review has reported.
- Increases in the running costs of major facilities should be allocated to the research councils who make the most use of facilities. In the case of the Diamond Light Source and ISIS, users are largely outside of the STFC funded community. It is not fair that core funding of physics grants should be affected by increased activity in, for example, the study of medical materials.

- The Institute and the Society are concerned that the arrangements for compensating for changes in international subscriptions have reverted to STFC. DIUS should revert to the practice of providing protection against changes in exchange rates and net national income from a departmental reserve.

BACKGROUND

The Comprehensive Spending Review (CSR) announced in 2007 led to an increase to the total science budget of 17.4%¹⁰ over a three year period. The Engineering and Physical Sciences Research Council (EPSRC) and the Science and Technology Facilities Council (STFC), the two major funders of physics research, were allocated 18.6% and 13.6% increases respectively. It is understood that the vast majority of these increases will be needed to cover the full economic costs (FEC) of research, whereby 80% overheads are paid on grants. Even though FEC is a positive development, with more money entering university science, its phased introduction does make it difficult to unravel the financial consequences of the CSR settlement. Essentially, its effect is not to fund more science but to ensure that the science that is supported is better funded.

For EPSRC, significant funds which would have been allocated to it were instead directed to the new Technology Strategy Board (TSB) and the Energy Technologies Institute (ETI); around 3% of its annual budget. Its actual budget will rise by an average of 6.2% a year from £711 million in 2007–08 to £843 million by 2010–11. But over time, with inflation and the need to pay 80% FEC the number of grants awarded via its responsive mode mechanism will be reduced. This is a situation that the Institute intends to monitor as a reduced number of funded grants will mean less research income for physics departments. Increased competition for a smaller pot of money will have an impact on the morale of academics and lead to financial pressures on departments.

According to STFC, due to the need to pay 80% FEC, redundancy costs associated with the forthcoming closure of the Synchrotron Radiation Source (SRS) at the Daresbury Laboratory, etc., the 13.6% increase to its budget basically amounts to a flat cash settlement, ie a reduction in real terms, even though the increase is above inflation. STFC's annual budget is proposed to increase from £573.5 million in 2007–08 to £651.6 million in 2010–11, an average increase of just 4.5% per annum.

Crucially, and unlike most of the other research councils, STFC has many fixed costs associated with running national facilities and paying the UK's increasing subscriptions to international facilities (of the order of £180 million per annum). STFC also has to cope with increased operational costs for a number of new facilities, especially the Diamond Light Source and the ISIS Second Target Station, which according to the Public Accounts Committee report, "Big Science, investment in large scientific facilities"¹¹, totals about £27 million per annum. It appears that the lion's share of the problem for this shortfall is a consequence of the structure of the system which provides capital funding to construct new facilities but not operational costs. Moreover, these increased costs were ring-fenced within STFC's allocation, which is a legacy that it inherited from CCLRC. This arrangement directly contradicts the reassurance that PPARC users were given by the government that STFC would not be burdened with the liabilities of CCLRC, following the merger on 1 April 2007.

Principal issue: Increases in the running costs of major facilities should be allocated to the research councils who make the most use of facilities. In the case of the Diamond Light Source and ISIS, users are largely outside of the STFC funded community. It is not fair that core funding of physics grants should be affected by increased activity in, for example, the study of medical materials.

In addition, STFC will also have a greater responsibility for dealing with the effects of fluctuations in international subscriptions (eg CERN) caused by changes in the value of the pound. In the event of a sustained decrease in the value of the pound against the Swiss Franc and/or the euro, such changes could lead to a decrease in the volume of research possible to make use of the international facilities provided by the subscription. This is a new development thrust upon PPARC and now STFC by the government. Such a vulnerability to currency fluctuations appears unique among major European nations. Making provision for possible fluctuations is another constraint on STFC's budget (and the budget of other research council's with international subscriptions).

As a consequence of these factors, STFC will have to cut £80 million from its planned programme over the CSR period. This will have devastating consequences for many of STFC's science areas, with the biggest impact due in year one of the CSR period.

Prior to the announcement of its Delivery Plan, STFC made the decision to withdraw from the Gemini Observatory, which will save it about £4 million a year in running costs (this figure may not include withdrawal penalties). Other measures announced in the Delivery Plan include the withdrawal from major facility programmes (eg the ILC), the reprioritisation of investment in high priority science programmes,

¹⁰ The Allocations of the Science Budget 2008–09 to 2010–11; December 2007; DIUS; www.dius.gov.uk/publications/URN07114.pdf

¹¹ www.publications.parliament.uk/pa/cm200607/cmselect/cmpublic/521/52102.htm

and a cut of at least 25% in grants for all areas. The cut translates into various project cancellations and a significant cut to rolling grants, which will affect the projects of all STFC user communities (eg astronomy, particle physics, nuclear physics, etc.), and result in redundancies at STFC operated facilities at the Daresbury Laboratory, the Rutherford Appleton Laboratory (RAL), and the Astronomy Technology Centre (ATC). Indeed, STFC is planning to remove funding from its current programme in the region of £120 million rather than just £80 million, in order to create headroom in its budget to revive some cancelled projects and for investment in new projects.

The reductions represent a hammer blow to the morale and future prospects of the physics and astronomy communities funded by STFC, especially when considering the encouraging statements made by an independent panel of international physicists and astronomers, who benchmarked the quality of the UK's research efforts in physics and astronomy against its leading international competitor nations¹². The panel noted the considerable efforts that had been made to improve the status of physics and astronomy in the UK, since the preceding review in 2000, and was struck by the general improvement in the research environment and the positive outlook of those involved with the research effort at all levels. The panel also reported that the UK continues to enjoy a high international standing in the areas of astrophysics and solar system physics, particle physics, and nuclear physics; this world-leading position is now under considerable threat.

Following the announcement about the Gemini Observatory and concerns about further proposed cutbacks, the Institute and the Society consulted with their membership and made representations to the government, along with several other bodies, in order to discuss various options that could be used to support STFC and limit the damage that would fall upon the physics and astronomy community, and prevent redundancies at STFC operated facilities. It is understood that there was some flexibility offered in response, first, a loan in the region of £27 million for year one of the CSR period (which has to be paid back in years two and three) to aid STFC in reprofiling its structure (ie redundancy packages), and second, £5 million per annum has been released from STFC's capital funds which can be utilised immediately for recurrent costs. However, these limited measures are not going to prevent damage being done to the physics and astronomy research base, especially as they will not significantly alter the margin of cuts announced to grants.

While it is, of course, the government's right to prioritise whichever area of science it chooses, it is not sensible to implement such damaging cuts to physics and astronomy apparently by accident and before there is any opportunity for debate or planning. Indeed, the scale of the changes could cause irreversible damage to the UK's long-term ability to lead in a number of key areas of physics and astronomy research, which will have an impact on the UK's ambition to be leading knowledge-based economy.

IMPLICATIONS OF STFC'S DELIVERY PLAN

It is understood that STFC's Delivery Plan¹³ was formulated very quickly, and it did not have time to consult its user community effectively. STFC has publicly admitted that there are many issues within it that still need to be agreed and finalised. In addition, the creation of STFC occurred just a few months before the submissions for the Comprehensive Spending Review of 2007, which did not allow much time to prepare a robust case.

Principal issue: STFC should be given time to produce a revised Delivery Plan in which its scientific priorities are developed in full consultation, and that the balance of capital investment and associated operations and exploitation costs are optimised. Important long-term decisions should not be made on such a short timescale as was the case with its current Delivery Plan.

The following are the headline statements from STFC's Delivery Plan in response to which we have outlined the likely impacts on physics and astronomy as gleaned from our communications with physics departments and government-funded laboratories.

25% CUT IN RESEARCH GRANTS:

At the town meeting organised by STFC on 13 December 2007¹⁴, it was outlined by Professor Keith Mason, STFC's chief executive, that STFC's grant awarding capacity in all areas will have to be cut by around 25%, including grants that are currently being reviewed for funding. Current STFC grant funding in university physics departments across the UK is in the region of £80 million, so this could lead to a £20 million sector wide reduction over this period, which we calculate to be a loss of around £9 million in overheads under FEC.

¹² International Perceptions of UK Research in Physics and Astronomy 2005; January 2006; EPSRC, PPARC, IOP & RAS; www.iop.org/activity/policy/Projects/International_Review/index.html

¹³ www.stfc.ac.uk/About/Strat/Council/STFC_DelPLan.aspx

¹⁴ www.stfc.ac.uk/About/Strat/Council/TownMeeting07.aspx

Principal issue: The 25% cut in grants will pose severe financial constraints to many physics departments. The Institute and the Society urge DIUS to provide the £80 million shortfall in STFC's budget, or at least £20 million to allow STFC's planned programme to continue until after the health of disciplines review of physics (the Wakeham review) has reported.

The impact of this cut will be differential across physics departments and will be felt over a period of time, but all departments will suffer. STFC funding typically accounts for anything between 25 and 80% of departmental grant income in a range of subject areas such as physics, astronomy and applied mathematics. (One department, in particular, is entirely dependent on STFC for grant income; this also applies to many individual research groups within departments.) A cut of 25% could equate to a loss of millions of pounds in grant income including overheads, a result that would raise concerns over a department's financial viability within many university funding models. In addition to project and facilities funding, STFC grants also directly support academic staff, postdoctoral research assistants (PDRAs), technical and administrative staff, and PhD students.

For example, one particular research-intensive physics department, on average, secures over £17 million per annum in research income (based on spend), of which 40% is secured from STFC. This includes staff costs, non-staff spend (equipment, travel, consumables, etc.) and overheads but not the associated spend at facilities. A 25% cut would then equate to a loss of around one-tenth of its total grant income (£1.7 million). The loss in overheads resulting from a 25% cut (ie around £750,000) would have a severe effect on the department's finances, a situation that is in sharp contrast to the HEFCE funding introduced to protect the future of high cost scientific subjects deemed vulnerable but key to the economy¹⁵. It would be particularly difficult to re-adjust to this situation on the timescales that seem to have been proposed as there are additional costs in making staff redundant which would not be borne by STFC. At the level of a 25% cut, a reduction in research support staff of between 20 or 30 could be anticipated for a number of departments. There would also be significant detriment to the work of staff outside the former PPARC community, for example, condensed matter physicists who use central computing facilities and plasma physicists who use the Central Laser Facility (CLF) at Harwell. For one department, income based on the use of such facilities in the RAE period was over £3 million.

For another department whose STFC turnover is about £1.9 million, a 25% cut would represent a £475,000 reduction in funding, of which the overheads are around £200,000. The potential impact of the cuts in grants would be severe threatening the viability of STFC funded research programmes in the university. This scenario applies to several small- to medium-sized departments and will have damaging consequences. By their nature, these departments are in challenging financial positions, where their universities are investing heavily to maintain and develop world-class research effort.

Perhaps even more damaging is that STFC has stated that it will cancel some existing grants. This will damage the relationship of trust between universities and the research councils and make forward planning very difficult. It will leave departments having to make people redundant at very short notice when they have been awarded contracts with explicit long-term end dates. It will cause great damage to a wide variety of science programmes and a department's ability to recruit high-calibre staff.

In summary, the loss of grant income to a department will inevitably lead to:

- an increased risk of closure, exacerbated by the accompanying reduction in direct funding and overheads;
- an abrupt loss of posts funded on grants that are cut;
- a loss of leadership prospects for high profile international projects, coupled with a reduced international reputation and a loss of collaboration partners;
- a reduced ability to attract other grants (eg EU, industry, etc.) as a result of reduced leadership roles, reputation and matching funding;
- to a reduction in the attractiveness of physics undergraduate, MSc and PhD programmes and of physics as a long-term career path;
- a reduction in institutional support for staff and equipment, which could lead to lack of exploitation of the investment made to date and to facilities becoming run-down; and
- a reduced ability to attract and keep hold of high-calibre academic staff within an increasingly global job market.

PARTICLE PHYSICS:

STFC Delivery Plan: We will cease investment in the International Linear Collider.

The withdrawal from the International Linear Collider (ILC) will have a major impact on the UK's international credibility in future collaborations. It is damaging that a long-term, high-profile international programme which PPARC/STFC has actively encouraged over several years has been terminated without consultation.

¹⁵ www.hefce.ac.uk/News/HEFCE/2006/science.htm

A number of particle physics research groups have been working on the development of the ILC project, which is currently in its design phase, and have international leadership roles. Indeed, the international review panel reported that the UK's experimental particle physicists are taking a leading role in all aspects related to the ILC which is to become the next major project in particle physics.

In addition, the statement in the Delivery Plan that the increase in the CERN subscription will come out of the particle physics grants line is at variance with the treatment of other international subscriptions (eg ESA), which are top-sliced. This additional siphoning from an already shrinking particle physics domestic programme will greatly reduce the UK's ability to exploit the CERN subscription at a critical time when the first data are due from the Large Hadron Collider (LHC).

These decisions will have serious consequences for UK particle physics in the post LHC era, as the ability to attract good scientists to fellowships, or PhD students, etc. will be adversely affected.

NUCLEAR PHYSICS:

STFC Delivery Plan: We will focus our investment in nuclear physics on the highest priority programmes.

The nuclear physics community is already under pressure as a result of the transfer of responsibility from EPSRC to STFC and has been subject to planning problems for over a year. Nuclear physicists are very concerned by the vagueness of this statement, which is almost meaningless, as it hides the possibility of some serious pruning. A major concern is the possibility of a cut in grant funding. Because of the changeover, all funding for nuclear physics is through grant applications which are currently under consideration. Hence a cut of this nature would be a cut on the total nuclear physics programme and not just that part which comes up for renewal at this time.

In addition, at a time when the government has just announced its commitment to new nuclear build, it seems incomprehensible that a cut should be made on research groups which will provide a training ground for new, young staff with the skills required for the safe operation of a new generation of reactors.

Moreover, there are also serious longer-term implications, beyond short-term financial loss, if STFC is unable to collaborate in international nuclear physics ventures such as the Facility for Antiproton and Ion Research (FAIR) based in Germany, membership to which was recommended by the international review panel along the lines of the CERN subscription¹⁶.

The UK has no nuclear accelerator facility but physicists have adopted a realistic plan for optimising their capability to undertake forefront research on international facilities (eg GANIL, SPIRAL, etc.), by embedding themselves in an integral way by building a number of key instruments. Thus they play an enhanced role in the research, highly leveraging the relatively small funding. The facilities in Europe would not be able to carry out research of the same quality without UK contributions.

PARTICLE ASTROPHYSICS:

STFC Delivery Plan: We will revisit the on-going level of our investment in a number of projects, including the experiments for the direct detection of gravitational waves ie GEO600 and Advanced LIGO; experiments in the direct detection of dark matter ie Zeplin III using the Boulby mine; and the cosmic microwave background experiment, CLOVER. We will cease to invest in high-energy gamma ray astronomy experiments.

Not only is the immediate threat to CLOVER a concern, but the decision to cease investment in high-energy gamma ray astronomy experiments will lead to a loss of momentum and expansion for the research area, as UK research groups will cease to contribute to the interpretation of data. Moreover, a lack of involvement in the development of the next phase of instrumentation will have long-term consequences. World-leading experimental groups will be damaged by withdrawal from ground-based gravitational wave experiments and from underground searches for dark matter.

ASTRONOMY:

STFC Delivery Plan: We plan to withdraw from future investment in the twin 8-metre Gemini telescopes and we will work with our international partners to retain access to Gemini North.

The decision to withdraw from the Gemini Observatory will have a major impact on astronomy and astrophysics research groups. The withdrawal, particularly at short notice, will significantly reduce access to the research tools needed to undertake their research, and will substantially reduce the UK's capacity to lead world-class research in these areas over the next few years. This decision could also threaten the future of the ATC, based at the Royal Observatory Edinburgh, which plays a key role in delivering world-class instrumentation.

¹⁶ International Perceptions of UK Research in Physics and Astronomy 2005; January 2006; EPSRC, PPARC, IOP & RAS; www.iop.org/activity/policy/Projects/International_Review/index.html

However, we note that the Delivery Plan states that STFC are negotiating for continued access to Gemini North and welcome this. Access to optical and infrared telescopes in the northern hemisphere (eg Gemini North, UKIRT, WHT) is crucial for exploitation of SCUBA-2 surveys.

STFC Delivery Plan: We will cease all support for ground-based solar-terrestrial physics facilities.

STFC has all but done this already as it has closed or is closing the CUTLASS and SABRE radars, the ionosondes and the SAMNET magnetometer chain as a national facility. This decision will cause considerable problems with current facility grants and missed opportunities in future international collaborations for many research groups.

STFC Delivery Plan: We will target our investment in astronomy grants taking account of reduced facility availability.

This decision will reduce the grants of a number of astronomy research groups, particularly those in observational astrophysics, which will have impact in terms of reductions in staff (eg PDRAs), FEC and other infrastructure in renewed grants. The withdrawal of already awarded grants connected to cancelled facilities will be particularly traumatic for those involved.

STFC Delivery Plan: As part of the programmatic review we will consider the case and our financial capacity for further investment in the operation of the UK infrared telescope (UKIRT) in Hawaii, Merlin, the Liverpool Telescope, Astro-Grid and whether and at what level we should invest in the US-led Dark Energy Survey.

Any reductions in these areas will damage the UK's involvement in near infrared astronomy, where ground-breaking surveys are being carried out by UK astronomers with UKIRT, and in radio astronomy, where Merlin represents the main current UK facility, which would impact on many departments. Withdrawal from the Liverpool Telescope or the Dark Energy Survey would fall heavily on the departments involved.

STFC Delivery Plan: Subject to programmatic review, we will reduce our post-launch support for existing (space) missions by around 30%.

This may affect research groups that have post-launch support grants for current missions like Integral and Newton-XMM.

NEUTRON SCATTERING:

STFC Delivery Plan: ISIS is the world's most productive pulsed neutron spallation source. In the short-term, given financial constraints, we may have to consider reducing availability to UK users in universities.

Many physics departments are heavy users of ISIS, and any reduction in access would severely undermine their research efforts. This particularly applies to condensed matter physicists, who do not get grants from STFC, but rely on the facilities it provides. The experiments on highly topical problems are least able to accommodate delays. Thus it would be more difficult for UK users in universities to publish in the highest impact journals, and this is one of the key criteria upon which the success of facilities, and UK science itself, is judged.

If the operation of ISIS is not properly funded, it will have an impact on the research of not just physicists, but will also affect considerable parts of biology, chemistry, and engineering.

INTERNATIONAL SUBSCRIPTIONS:

STFC Delivery Plan: From 31 March 2008 onwards, any significant increases in international subscriptions resulting from adverse movements in exchange rates and/or NNI rates will be dealt with in the same way as uninsured risks ie STFC will be expected to absorb the increase up to £6 million . . .

The loss of protection from currency fluctuations and changes in net national income (NNI) is a significant issue, especially as it is something which the research councils fought for many years to secure. This protection is even more important for STFC, given that its remit requires that a large proportion of its allocation has to be invested in overseas facilities. This decision could have some serious long-term issues and many are concerned that the UK's future participation in the LHC could be threatened.

Principal issue: The Institute and the Society are concerned that the arrangements for compensating for changes in international subscriptions have reverted to STFC. DIUS should revert to the practice of providing protection against changes in exchange rates and net national income from a departmental reserve.

THE HARWELL AND DARESBUARY SCIENCE AND INNOVATION CAMPUSES:

STFC Delivery Plan: The Harwell and Daresbury Science and Innovation Campuses form the most innovative and ambitious aspect of our KE strategy and will be recognised as internationally leading centres of excellence for science and innovation.

Significant STFC resources will be absorbed by the creation of the new Harwell and Daresbury Science and Innovation Campuses, which will aim to improve the UK's performance in knowledge transfer amongst other things. The Institute is of the view that the prime beneficiaries of the campuses will be regional economies rather than STFC funded programmes. Hence, the regional development agencies should make a contribution to STFC.

LONG-TERM IMPACT ON PHYSICS AND ASTRONOMY

The proposed reduction in research grants will have a major impact on the viability of individual physics departments, which, for instance, will reduce their ability to attract and retain internationally leading research staff. The Institute's "Survey of Academic Appointments in Physics 1999–2004"¹⁷, showed that at the time over 1760 staff were engaged in physics research and teaching in the UK, of which the two most populated areas were "Astronomy, Astrophysics, Cosmology and Space Physics (19%), and "High Energy and Particle Physics" (11%). These two areas were also the most popular for arriving staff. In addition, the cuts will also disproportionately reduce the number of women engaged in physics research, especially in the areas of astronomy and particle physics.

It is well known that astronomy and particle physics are the main areas of physics that attract students to study physics. At a time when the decline in the number of students sitting A-level physics has been arrested, and the numbers applying and being accepted to study university physics have been increasing, these cuts could undermine the efforts of all the stakeholders that have led to this turning of the tide. We have already heard from schoolteachers that some students who were considering studying university physics are now reluctant to do so because of the STFC funding crisis.

The government, for example, in its *Next Steps* publication¹⁸, has continually stressed the importance of the UK being a world-leading, knowledge-based economy due to it excelling in curiosity-driven research and innovation and competing with the threat posed by the burgeoning economies of China and India. This is dependent on the UK continuing to produce high-quality physics graduates, academics being provided with the funds and facilities to undertake internationally-leading research, and the ability to transfer the knowledge generated to technologies and services that can increase the UK's economic productivity and the well-being and prosperity of its population.

Indeed, along with a number of other subjects, physics has been identified as a subject of strategic and national importance, and HEFCE has allocated the Institute £1.8 million to increase numbers studying A-level and undergraduate physics, through its Stimulating Physics programme¹⁹. Furthermore, HEFCE has allocated £75 million over three years to ensure that the funding shortfall in its teaching funding formula will not lead to any further departmental closures in high cost and vulnerable science subjects²⁰ (the most recent being the University of Reading physics department in 2007). It is of concern that while one branch of the government is making strenuous efforts to increase the number of physicists another is taking actions that will have the opposite effect. Moreover, the cessation of the allocation of additional funding from HEFCE (2009–10), will coincide with the time the impact of the RAE 2008 allocations will be fully realised; an occurrence which is usually a cause of uncertainty for physics departments, which will be exacerbated by the STFC funding crisis.

There is a special situation in Scotland where cuts will have a particularly damaging effect on the on the Scottish Universities Physics Alliance (SUPA). SUPA is an alliance, which aims to place Scotland at the forefront of research in physics. In a short space of time, SUPA has built up a reputation of excellence in world-class physics research and raised the prominence of physics in Scotland. A significant component of the next phase of SUPA was a bid was to collaborate with STFC to start development work on the ILC. If this funding collapses, SUPA could also lose out on an investment from the Scottish Funding Council (SFC) and future funding opportunities.

¹⁷ www.iop.org/activity/policy/Publications/file_4148.pdf

¹⁸ Science and innovation investment framework 2004–2014: next steps; March 2006; HM Treasury; www.hm-treasury.gov.uk/budget/budget_06/assoc_docs/bud_bud06_adscience.cfm

¹⁹ www.stimulatingphysics.org/

²⁰ www.hefce.ac.uk/News/HEFCE/2006/science.htm

HEALTH OF DISCIPLINES REVIEW—PHYSICS

The Secretary of State for DIUS has asked Professor Ian Diamond of Research Councils UK (RCUK) to organise a health of disciplines review of physics, which will be chaired by Professor Bill Wakeham, vice-chancellor of the University of Southampton. We understand that the review is scheduled to begin in mid-January and is expected to report in mid-summer 2008.

The Institute and the Society welcome the review which we hope will address the current STFC problem as well as the longer-term future of physics. The terms of reference of the review are not yet public but a crucial element will be the balance between capital spending and running costs, which is certainly at the heart of STFC's problems. Furthermore, it is imperative that the Institute and the Society are fully engaged in the review, in order to provide a broad professional oversight.

Both EPSRC and the former PPARC were joint sponsors, along with the Institute and the Society, of two International Reviews of UK Physics and Astronomy Research in 2000 and 2005. These reviews arose from the interest of the former Office of Science and Technology (OST) in receiving an international assessment of the standing of British physics and astronomy research and the research councils' wish to obtain a better understanding of the strategic position of both subjects. Both reviews recruited an independent panel of international leading physicists and astronomers, who reported on the quality, distribution of effort and future potential of research in physics and astronomy, providing detailed comments on the health on each of the major sub-areas of research. The panels also made recommendations on how the funding of such research could be optimised. It would seem sensible for the Wakeham review to take full cognisance of these reports and, perhaps, to use some of the panel members as consultants.

Principal issue: The Institute and the Society urge DIUS to allow STFC to postpone the implementation of its Delivery Plan until after the Wakeham review has reported. There needs to be a commitment that the Wakeham review will address the current STFC problem, and that it makes use of informed international opinion.

Memorandum 9
Submission from Prospect

SCIENCE BUDGET ALLOCATIONS

1. Prospect is the recognised trade union for scientific, engineering and other staff in the Science and Technology Facilities Research Council (STFC).

2. Prospect recognises that the STFC did not receive the Comprehensive Spending Review (CSR) allocation it had hoped and that hard choices needed to be made. However, we feel that decisions have been made secretly, without the involvement of stakeholders, especially the staff. We contrast this with the approach of other Councils (eg Natural Environment Research Council with the restructuring of the Centre for Ecology and Hydrology) where a dialogue was held on options before decisions were made.

3. As a result, staff do not understand the STFC vision for the future or support the decisions taken.

4. The STFC Council have announced that the CSR allocation was £80 million less than they had hoped for. However, the settlement represents an increase of over 13.5% over the CSR period. Staff can only conclude that the cuts in science programme and potential redundancies are a strategic decision of Council and not a result of funding cuts. They question the need for such a radical change of direction, which they believe, puts their science, jobs and sites at risk.

5. This is compounded by the aim of the STFC to create a further £40 million "headroom" to allow for flexibility. This means an objective of finding £120 million cuts which staff fear will be funded by job losses. In the absence of detailed plans, and a clear science strategy, staff remain unconvinced that redundancies and loss of programme can be reduced by efficiencies or other sources of funding.

6. Staff also fear for the future of the UK Astronomy Technology Centre (UKATC) in Edinburgh and the Daresbury Laboratory.

7. Staff believe that the STFC's intention to "explore alternative options for running the UKATC²¹ means removing it from the public sector with little time to adjust in order to compete. This is despite the fact that STFC's Chief Executive has described this site as the "jewel in the crown". They also fear that the aim of reducing "significantly the proportion of in-house staff funded through Direct Vote" and withdrawing from "major facility programmes which are not of the highest priority"²² will remove the critical mass from the Daresbury Laboratory site, putting it at risk.

²¹ STFC Delivery Plan 2008/9–2011/12 paragraph 1.2.

²² *Ibid.*

8. The proposals would also have a considerable impact on the Rutherford Appleton Centre (RAL). Although RAL is likely to survive, a substantial number of jobs could be lost and areas of science abandoned (ie the International Linear Collider, Solar-Terrestrial Physics and some e-Science).

9. Prospect sees a contradiction between the Department for Innovation, Universities and Skills statement that the Daresbury Campus “will be at the heart of STFC’s economic impact strategy”²³ and the withdrawal of STFC from science programmes key to the future of the site (ie the energy recovery Linac Prototype for a next generation light source and the EMMA project, with application to cancer therapy. Staff at Daresbury doubt that without these key programmes or equally important alternatives that the site can “act as a focal point for collaboration and knowledge exchange with industry and academic researchers”²⁴ or be a “genuine internationally-competitive critical mass”²⁵

10. In addition, staff note the different approaches envisaged for the Daresbury and Harwell Campuses. They believe that the “range of options”²⁶ being considered for the latter rather than the Joint Venture Company proposed for the former, (where the “major facilities ie Diamond, ISIS and the Central Laser Facility”²⁷ will be) shows a lesser commitment by the STFC to the future of Daresbury Laboratory. Staff feel let down, especially after the promises made about their future by the previous Minister Lord Sainsbury and the investment made by the North West Regional Development Agency.

11. At worst case, the STFC Delivery Plan could result in the loss of hundreds of skilled jobs representing a further drain on the scientific and engineering capability in the UK. Additionally, the future of the UKATC and the Daresbury Laboratory appear to be at risk. The STFC have said that they hope to reduce the need for job losses through efficiency savings and by attracting alternative funding.²⁸ Prospect hopes that they succeed. However, in the absence of any detail we remain concerned.

January 2008

Memorandum 10

Submission from the Royal Society

SCIENCE BUDGET ALLOCATIONS

The Royal Society is pleased to submit this statement on Research Council budgets to the House of Commons Select Committee on Innovation Universities and Skills, in advance of its evidence sessions on the same topic. This submission has been approved by the President on behalf of the Royal Society.

The Society appreciates the Government’s general support for science and for the overall settlement announced with the Budget in March 2007 and again in the 2007 Comprehensive Spending Review (CSR) outcomes. However, this year there are three specific cases of decisions about research council funding that have had unintentional negative impacts, which are worthy of further investigation. We further believe that a sensible response to this recurring problem is to have a committee to advise the Director General for the Research Councils (DGRC) on the Science Budget.

MEDICAL RESEARCH COUNCIL’S (MRC) TRANSLATIONAL FUND CLAWBACK

It has been reported that £92 million is to be taken from the MRC’s commercial fund. We believe that such a clawback would be a breach of faith with the scientists whose enterprise built up this fund in the past—a fund intended to support future discoveries that will improve and save lives. If institutions receiving public funds are not able to keep the extra resources they have earned, a damaging precedent is set. Government should be encouraging entrepreneurial behaviour in publicly funded institutions as well as the private sector.

SCIENCE AND TECHNOLOGIES FACILITIES COUNCIL (STFC)

When the formation of the STFC was first proposed 18 or more months ago, the Royal Society identified a number of issues that had to be addressed for the new structure to succeed. One of these was the interplay between providing the capital costs of building a major facility and the recurrent costs involved in enabling researchers to use it to best advantage. The overall CSR allocation for STFC seemed not unfair, in the context of Government’s overall priorities. However, the internal distributions within STFC do not properly provide for the recurrent costs, and will impact severely on grants to university physics departments—a matter of special concern in view of the government’s recognition of the need to boost physics at all levels.

²³ The Allocation of the Science Budget 2008/9–2010/11, Department for Innovation, Universities and Skills, December 2007.

²⁴ STFC Delivery Plan 2008/9–2011/12 Section 3 introduction.

²⁵ STFC Delivery Plan 2008/9–2011/12 paragraph 3.1.

²⁶ STFC Delivery Plan 2008/9–2011/12 paragraph 3.1.

²⁷ *Ibid.*

²⁸ STFC Delivery Plan 2008/9–2011/12 paragraphs 1.1 and 5.1.

We also believe the cuts would reduce the UK's scientific return from existing world-class facilities, and risk jeopardising our reputation as reliable long-term collaborators. We do not believe a review of physics is an adequate solution, and instead suggest that money is used from the capital budget to cover the shortfall.

RESEARCH COUNCIL BUDGET RAID IN FEBRUARY 2007

In February 2007, it was announced that £68 million would be taken from the Research Councils' budgets, in order to cover deficits elsewhere in the (then) Department for Trade & Industry's budget. £68 million was a small percentage of the overall science budget, but such a cut sent a damaging signal to those whose commitment is needed for the UK to sustain its scientific competitiveness, and had a demoralising effect on the scientific community. We were also concerned that these cuts infringed the established principle that Science Budget funds are strictly ring-fenced within DTI, and set a dangerous precedent about the credibility of future assurances about ring-fencing.

SCIENCE BUDGET ADVISORY GROUP

The Society believes that a new structure is needed to ensure that Ministers and their officials know the likely effects of RC allocations or any funding rearrangements. We believe the DGRC should be advised by an independent group of experts from all disciplines and from a range of institutions, who can identify any potential negative consequences of decisions and ensure they are drawn to the attention of all concerned. This was proposed in the 1993 White Paper "Realising our Potential", although never implemented.

January 2008

Memorandum 11

Submission from the Russell Group of Universities

SCIENCE AND TECHNOLOGY FACILITIES COUNCIL PROJECTED FUNDING DEFICIT

The impact on The Russell Group of Universities

THE ECONOMIC IMPACT OF PHYSICS

The field of physics generates significant gains for the UK economy. Key contributions to the national economy include:

- High R&D spending: Spending on R&D in physics-based sectors amounted to £3.3 billion in 2004—almost a quarter (24%) of total R&D spending in the UK. Physics-based sectors are a significant contributor to Government's R&D spending target.
- Significant export volumes: Physics-based industries accounted for almost a third of the UK's exports in 2005. Physics-based sectors exported £92.9 billion and imported £109.8 billion worth of goods and services. This accounted for 29% of the total value of UK exports and 30% of imports.
- National output: Businesses using modern and advanced elements of physics in their business processes contribute £70 billion to national GDP, making up 6.4% of the UK's total output (this is comparable to the economic output produced by the finance, banking and insurance sector combined)
- High productivity: When productivity in physics-based industries is compared across all industries in the UK, the physics-based sector comes out as a high performer—being almost twice as productive as the average. In 2005, GVA per employee in physics-based sectors was approximately £69,000; about 70% higher than in the UK as a whole.
- Job creation: The physics-based sector has created one million jobs, concentrated in 32,000 businesses, and more than one million indirectly supported by these businesses.

A STRATEGIC AND VULNERABLE SUBJECT

Despite physics's valuable contribution to the UK economy, some worrying trends have led to it being defined as a "strategic and vulnerable subject":

- Significant closures of physics departments: Since 1994, the number of physics departments has declined by 30%. According to *Materials Today*, UK department closures have more to do with funding not matching the costs of lab-based subjects. Numbers of physics undergraduates have actually been rising, albeit not as fast as in other subjects. The University of Reading announced the closure of its (29 faculty-strong) physics department in 2010, due to the university's inability to "subsidise the loss-making department".

- Concern about the supply of graduates: The Confederation of British Industry has continually voiced concern over the lack of physics graduates available to UK science-based companies. In March 2007, the CBI warned that more students must study science (including physics), engineering, and technology or the UK will lose its world-leading position in industries such as aerospace. In August 2007, it noted that science and engineering companies are already struggling to fill posts. 80% of engineering or industrial companies and 67% of energy, water or utility companies expect a shortfall in overall graduate recruits this year.
- Increased competition from international competitors: Other countries have made firm commitments to increasing science (physics) funding. A reinforced commitment to maintain physics spending is a key step government could take in addressing these global challenges.
- Since 1999, China's spending on research and development has increased by more than 20 per cent each year. Spending by central government in 2006 reached £4.7 billion, compared with £3.2 billion by the UK.
- South Korea has increased its scientific research workforce by 70,000 and increased public funding on R&D from 2005 to 2006 by 15%. With its "U-Korea" programme, public and private funding will exceed £35 billion by 2010 and Korea aims to rank among the top ten countries for nanotechnology by 2010.
- In the US, President Bush signed into law "H.R. 4664", a five-year reauthorization bill for the National Science Foundation (NSF), which authorizes a doubling of the NSF budget over five years.
- On 30 November 2007, Vladimir Putin promised to boost Russia's public spending on science to more than 400 billion rubles (approx £8 billion) by 2010, which is twice this year's spending. Such international commitments to the funding of science will certainly impair the UK's ability to compete with other countries, economically and technologically.

POTENTIAL IMPACT OF STFC PROJECTED DEFICIT OF £80 MILLION OVER THREE YEARS

The Russell Group of Universities wishes to highlight the possible impact of a £80 million deficit for STFC in the following three areas:

- Increasing vulnerability of physics departments: physics is already recognised as a strategically important and vulnerable subject. One of the significant funding streams for physics departments is grants from STFC. Therefore, any reduction in grant funding from STFC would have a negative impact on the financial planning of departments and the robustness of their future financial stability.
- Impact of grant cuts: we understand that a number of factors have contributed to the STFC's projected funding deficit but funding of grants should not be seen by STFC as a soft target to resolve the problem. Amongst other consequences, this would lead to a greatly demoralised staff and risk the medium and long-term health of physics in the UK.
- Utilisation of investment in leading facilities: significant long-term funding has been invested in ensuring that the UK has internationally leading facilities in recognition of the strategic importance of doing so. STFC grants and funded activity are essential to ensure that the best use is made of these facilities and the significant investment already made by the UK government in this area.

PROJECTED IMPACT ON RUSSELL GROUP UNIVERSITIES

- In many Russell Group universities, STFC funding accounts for 30% and upwards of departmental budgets in a range of subject areas such as physics, astronomy and applied mathematics. In some highly-focussed research departments, STFC funding accounts for over 80% of grant income.
- At some of these universities, a cut in the range of 25–30% would equate to many millions of pounds. In addition to project and facilities funding, STFC funds supports hundreds of academic staff, postdoctoral researchers and PhD studentships. Universities need a period of adjustment where a future trajectory of existing programmes could be modified and future programmes re-worked.
- Russell Group universities have projected that departmental research income would be severely hit, projects would be halted and support staff would be disproportionately cut. PhD student recruitment would be hard hit due to lack of fellowships available and undergraduate admissions into physics would suffer. Our main concerns regarding impact lie in the following four areas:
- Project funding: as STFC has placed great emphasis on ensuring the viability of projects, a 25–40% cut would make these projects no longer feasible, requiring the same approximate 25–40% of the projects be cut completely.

- Returns to international commitments: there is a strong argument to be made for protecting existing commitments in this area as cuts would place at risk the UK global position that it has worked long to establish. In addition, as returns on international subscriptions, such as CERN, ESA & ESO, are materialising, the timing of these cuts are particularly problematic. The UK's ability to participate in and deliver on international commitments would also be called into question. In addition, these cuts will make it increasingly hard to recruit global talent.
- Undergraduates into physics: as Astronomy or Particle Physics are the two of the strongest attractors of undergraduates into the field, cuts from the STFC would drastically affect recruitment from the undergraduate level, further eroding the number of home-grown physicists.
- Knock-on effects: funding cuts from STFC will have knock-on effects of increasing the competition and demand for funding from other councils and funding sources. As an example of additional effects of these cuts, the Universities of Glasgow and Edinburgh have noted that any cuts will have a particularly damaging effect on their participation in Scottish Universities Physics Alliance II, part of Scottish research pooling. A large part of the SUPA-II bid was a collaborative bid with STFC was to begin development work on the International Linear Collider. If this funding collapses, it could lose both £3 million investment from STFC and very large future grants.

January 2008

Memorandum 12

Submission from the Australian Institute of Physics

RE: £80 MILLION BUDGET CUTS TO PHYSICS

I am the President of the Australian Institute of Physics.

I am writing to express the serious concern of the Australian Physics community at the abrupt set of decisions made by your government to reduce the funding of important major physics initiatives and physics research in general. The planned budget cut of 80 million over the next three years will lead to job losses at universities and three leading research laboratories; a 25 per cent cut in university grants; withdrawal from a number of high-profile programmes such as the International Linear Collider and lead to some university physics departments losing up to £750,000 in income.

The basis for our concerns is the following:

1. Such a sudden decision to cease involvement with long term multi-national research programs is damaging the stellar international reputation of UK science. UK researchers have been leaders in so many aspects of fundamental research which at the time did not have any clear path to impact but subsequently became the basis for modern civilization. The work of Maxwell and Faraday are two classic examples. The involvement in the multi-national research programs will have a similar impact on society when they reach fruition.
2. These decisions were made with a profound lack of consultation. Many physicists have committed significant effort to participate and contribute to these international and large research programs usually with high personal cost, and the commitment demonstrated is far beyond their financial rewards. Even researchers at university departments and government laboratories are committed and effective in their research usually driven by the desire to undertake work that will make a difference. Sudden decisions leading to the cutting these research programs is insulting and belittling of the vocation of a scientist. It is well known that the financial return for many scientists is not commensurate with their level of training and hours worked compared to other professions. Furthermore, the sudden removal of support for multinational research programs places the burden of funding on other nations and may put the whole research program which has had significant investment to date, under threat. Many of these programs are close to achieving important results that may change the way we understand the basis of existence and the potential for energy generation. Many other fundamental research programs may be lost with that investment wasted.
3. The long term consequences will be far greater than the relatively small savings in relation to the overall science research budget. Physics research contributes to 6.4% (Gross Value Added) of the UK economy which is equivalent to the financial, banking and insurance sector. 5% of jobs in the UK are in physics-based technology companies (Centre for Economics and Business Research Ltd, September 2007). Furthermore the UK is already beginning to fall behind in international competitiveness. The current plans to cut physics research will lead to further exacerbation of this decline and the potential reduction in the UK industry sectors reliant on physics-based innovation.

4. The lack of support and the demolition of careers for some physicists will have a ripple effect with young people not believing that a career in physics is sustainable or reliable and they will seek out other careers in professions that are not producing the innovation needed to drive a successful economy.

I urge your government to reconsider the very damaging decisions recently made and determine another way to achieve the reduction in the national budget that your government is seeking. The savings of 80 million over three years will be rapidly overshadowed by reduced international economic competitiveness, reduction in the development of innovative physics—based technologies that provide significant employment and economic activity in the UK, loss of innovation, reduction in young people aspiring to be the future generation of innovators and irreparable loss of the high level of international reputation.

February 2008

Memorandum 13

Submission from the Standing Conference of Astronomy Professors (SCAP)

SCIENCE BUDGET ALLOCATIONS

The SCAP is an independent body representing those UK Professors who research and teach in subjects relating to space physics and all of the Universe beyond the Earth's lower atmosphere. In the following, the meaning of the word "astronomy" should therefore be interpreted as including: space environment and exploration physics; solar and planetary science; astrophysics and cosmology; and related work in cutting-edge technology and instrumentation, e-science and high-performance computing.

I write to you as Chair of SCAP, to communicate outcomes of a special SCAP meeting held on January 16 in London. This meeting was attended by 40 professors from 18 universities. The present letter also incorporates the views expressed in writing by SCAP members who were not able to be present at the meeting. We endorse the main points made in a joint submission from the Institute of Physics and the Royal Astronomical Society, which accompanied their letter to you dated January 11.

The SCAP wishes to emphasise the following particular and additional crucial points.

1. Astronomy and space physics research groups and their university departments provide a superb and extensive training environment for future generations of scientists. We estimate that around half of all physics students are attracted into the subject by astronomy and space physics. This effectively provides billions of pounds' worth of training of a highly skilled science workforce for the UK economy.
2. Our subjects also make a substantial positive impact on the economy via knowledge transfer into high-technology and advanced computing and software. Furthermore they contribute enormously to the development of a science-literate culture, by enthusing society with the results of astronomical and space research.
3. The apparent STFC funding uplift within the CSRO7 allocations actually falls far short (to the extent of some £80 million) of covering the responsibilities assigned to the new Research Council following the merger of its predecessor Research Councils PPARC and CCLRC.
4. The £80 million shortfall will necessitate a considerable cut in research volume in key areas of astronomy and space physics which are recognized as world-leading. This will affect many universities and also STFC's developing science innovation campuses. In turn, this will surely have a crippling impact on the training programmes. Already, the current crisis appears to be having a very adverse effect on the morale of postgraduate and undergraduate students, and this will inevitably deter many potential future students, thus undermining some of the Government's laudable initiatives to generate a workforce trained in the sciences.
5. The precipitous nature of the cuts is forcing the UK to withdraw undiplomatically from high profile international facilities in our subjects, for example, the Gemini Telescopes. Such cuts may therefore reflect badly on the UK's reliability as an international partner across a much wider range of disciplines.
6. A significant contribution to the current problems has been the fact that the "near-cash" fraction of STFC's budget is much smaller than for the other research councils. The very exploitation of astronomy facilities which generates the attraction for students, training, etc, is thus dramatically squeezed by funding fluctuations. A fair way of mitigating these effects is for increased running costs of major facilities such as Diamond and ISIS to be allocated to the research councils who most use them.

7. Compensation for changes in international subscriptions should be borne at higher level by the Treasury. These subscriptions raise the UK's overall profile on the international stage, and generate significant revenues from contracts placed with UK industry.
8. Serious consideration should be given to establishing methods for including the more indirect and long-term benefits of world-class pure science research (points 1 and 2 above, and eg the creation of the World Wide Web in CERN) within all calculations of economic impact. Concentrating too much on near-market impacts seriously risks squeezing huge benefits out of the equation and thence out of the UK.

Some more detailed information on these points is included below in an appendix to this letter.

In conclusion, members of the Standing Conference of Astronomy Professors are deeply concerned both by the immediate impact of precipitous cuts in this basic research, and by the longer-term implications. We urge that steps be taken both in the short term to prevent irreversible unplanned decline, and in the longer term to place such fundamental research on a sustainable footing. Investments in STFC basic science will be repaid many times over.

January 2008

Appendix

The apparent funding uplift in the CSRO7 settlement for STFC actually falls well short of covering the responsibilities assigned to STFC following the merger of PPARC and CCLRC. This shortfall is only marginally offset by the increased expenditure on Full Economic Costing, which was itself introduced as a result of the Government's creditable recognition of the previous systematic underfunding of research.

In the very short term, the ensuing programme cuts might appear to benefit the UK, since we expect the well-trained physicists made redundant by these cuts will be snapped up within the broader economy, in all major areas from high technology to finance. However, such precipitous cuts will surely cripple the training environment for future generations of scientists. The threat of many staff redundancies is already causing widespread depression amongst students and this mood can be expected to infect the prospective student population, causing a reduction in the flow of trainee scientists. The combination of a sudden loss of research funding and the accompanying reduction in student numbers will then likely lead to the closure of physics departments. Such an outcome is particularly perverse at a time when other Government funding is providing uplift specifically to increase the ability of physics departments to recruit and train students. Indeed, it surely undermines some of the Government's laudable initiatives to generate a substantial science-trained workforce.

STFC funding of pure science benefits the economy through training scientists and more directly through knowledge transfer to high-technology areas. These range from advanced software and cutting-edge medical imaging to such practical technology as airport luggage scanners and number-plate recognition. A reduction in research volume will necessarily impact on these economic benefits.

The *Standing Conference of Astronomy Professors* requests that the following practical proposals be urgently considered by the Government to rectify this unfortunate situation, and that appropriate safeguards be put in place to avoid any recurrence.

1. *Balance between financing facilities and exploitation in STFC.* A significant contribution to the current situation has been the financial structure of STFC's responsibilities. In particular, the "near cash" element of STFC's budget is much smaller than for the other research councils. This imbalance means that relatively modest cost changes in the non-cash element of the budget have a disproportionate effect on the near-cash budget which provides the only flexibility for changing expenditure patterns. Since scientific exploitation for astronomy and particle physics dominates this element, it is this exploitation that will be lost through the funding fluctuations that we are now seeing. Such fluctuations are particularly problematic because they can arise from non-cash shortfalls in subjects that have nothing to do with the areas of exploitation research that STFC supports through grants. It therefore appears to be fundamentally impossible in practice to ensure an appropriate balance between facilities and exploitation within a particular field. To mitigate this problem, we propose that for accounting purposes the non-cash elements of STFC's budget be devolved to the research council that makes use of the facility: for Diamond, for example, appropriate costs should be included within the MRC budget. STFC would, of course, retain its overall management role for facilities, and thus achieve the primary benefits of a single facilities structure for which it was set up.

2. *International Subscriptions.* The risk that has now been placed on STFC to deal with changes in international subscriptions puts a further inappropriate squeeze on its ability to deliver science, since these risks must be met entirely from the small near-cash budget that funds exploitation. Since the subscriptions exist not only to deliver science but also to raise the country's profile on the international stage and to generate revenue from the contracts that are placed with UK industry, it is not appropriate for STFC to fund the entirety of any fluctuations. The situation is particularly perverse in the case of subscriptions that are linked to GDP, since an increase in the nation's wealth leads to a corresponding rise in subscription and a balancing cut in our ability to carry out scientific research with these facilities. The SCAP therefore suggests that this element of the STFC budget should be paid directly from the Treasury as a reflection of its geopolitical nature.

3. *Measurement of Economic Impact.* It is generally accepted that pure science areas can have a dramatic economic impact in the long term (one need look no further than the creation of the worldwide web in CERN), and that they have further less-tangible effects through inspiring future generations to engage with science, and through training of mathematically and scientifically literate, high-quality graduates. However, these hard-to-quantify benefits have not been generally factored into discussions of the importance of funding science. Rather, measurement of economic impact has tended to focus on more direct knowledge transfer and near-market impact. The SCAP recommends that serious consideration be given to establishing a methodology for including the wider effects in the calculation of the economic impact of science, before they are squeezed any further out of the equation and their benefits are lost to the country.

Memorandum 14

Submission from Dr Ian Corbett

Your Committee will have received many letters on this topic. However, the subject is so serious and so urgent that I hope that one more, from a slightly different perspective, may be justified.

Until I retired in 2001 I was Deputy Chief Executive of the Particle Physics and Astronomy Research Council. Prior to that I was Head of Astronomy and Particle Physics at the Science and Engineering Research Council. From 2001 to the end of 2006 I was Deputy Director General of the European Organisation for Astronomical Research in the Southern Hemisphere (ESO). I am therefore very familiar with the Comprehensive Spending Review process, and the preparation of research council business (or delivery) plans. Perhaps more importantly, having spent much of the last 20 years establishing international collaborations to the benefit of UK science, I know how vital the UK contribution is to astronomy and particle physics on the world scene, and how important it is to be perceived as a reliable and productive partner.

From the material in the public domain it is possible to deconstruct the CSR allocation to STFC. I can confirm that the statements made by the Council about its financial situation and the consequences of the actions set out in its Delivery Plan are correct. The shortfall of £80 million is a reality, and the consequential wasted investment through cuts in the science programme, closure of facilities, and redundancies are inevitable. Enormous damage to our scientific output and international credibility will follow. All this has been very well aired and is, for example, set out in the IOP/RAS submission to your committee.

I find it hard to believe that a government that has consistently given generous support to science should have knowingly adopted a policy with such dire consequences. Yet it is clear from material now in the public domain that officials at DIUS were properly briefed by STFC between March and July on the consequences of various hypothetical funding scenarios, including flat cash, and that the current situation was accurately predicted. It is not clear, given these inputs, how DIUS arrived at the actual CSR allocation.

This is a short term situation with enormous long term repercussions. The lasting national and international damage to UK physics that will result from the STFC Delivery Plan requires prompt action if the situation is to be retrieved. It would appear that STFC needs an immediate increase of “near cash” (not a loan, which just postpones the inevitable), to enable it to stabilise its programme before moving on to consult its principle stakeholders, reassure its overseas collaborators, and prepare a balanced input to the Wakeham review. Other measures which would help have been suggested by many different people: they all merit serious examination.

I believe that your Committee has the standing and authority to convince the government to recognise this as an extremely serious problem for UK science, nationally and internationally. I hope you will be able to make recommendations for its urgent resolution before irreparable damage is done to an area of science in which the UK excels. I very much look forward to reading your Committee’s report, and the government’s response.

January 2008

Memorandum 15

Submission from Group Leaders in Particle Physics²⁹

1. We very much welcome the initiative of your Select Committee to look into the circumstances surrounding the recent settlement for the STFC as a result of the Comprehensive Spending Review. What should have been a good news story for science in the UK was seriously undermined when the consequences of the STFC component of the settlement for physics as a discipline became apparent. We, as group leaders

²⁹ See Appendix.

in particle physics, are naturally concerned, but we note that our concerns are widely shared, by Universities UK, the Royal Society, the Institute of Physics, the Royal Astronomical Society, the British Association for the Advancement of Science and many organisations and individuals.³⁰

2. We cannot believe that the draconian cuts outlined in the STFC Delivery Plan published on December 11th 2007 are a result of a deliberate policy, but the effects are likely to be devastating for some physics departments. We first heard of this problem on 6th November, when STFC announced that there was an £80 million deficit in its budget over the CSR period 2008–2011. We were told that a draft delivery plan approved by STFC had been sent to the Minister (Dr Ian Pearson), and that it contained some radical options. In the end, we understand that this plan was not accepted—certainly an apparently hastily written plan was published on the 11 December. We are particularly concerned that the peer review system was marginalized prior to decisions by STFC Executive to withdraw from leading international programmes and to cut grants to universities by about 25%.

3. Given the seriousness of the situation, we wrote as concerned individuals to the Minister and local MPs, to advise them of the consequences for physics departments. At the same time, many other organisations became alarmed, particularly University Vice-Chancellors. We believe that, when serious unintended consequences of an action of a Government Department become apparent, it is essential that the appropriate Minister act quickly to mitigate the damage. This manifestly did not happen. All that did happen was a hastily conceived review into the Health of Physics, to be chaired by Professor Bill Wakeham, VC of Southampton. While this is very welcome, the time-scale for the review, its terms of reference and membership are unclear. However, all we hear makes us believe that the timescale currently envisaged for the review to report will be too late to avoid serious damage to physics departments, national centres of excellence (RAL, Daresbury, Astronomy Technology Centre . . .) and to individual careers, particularly those just starting out in research—a request for voluntary redundancies at RAL and Daresbury has already been issued, with a deadline of January for applications; by the summer, this invaluable expertise will be lost.

4. We urge your committee to ask the Minister to delay implementation of the STFC delivery plan until the Wakeham review has reported by finding the relatively small sum of money to enable this to happen from elsewhere within the Science Vote, for example from the Large Facilities line.

5. When the STFC was formed last year by the merger of CCLRC and the Particle Physics and Astronomy Research Council (PPARC), assurances were given that the merger would be properly funded and would not adversely impact scientific research volumes and university physics department finances. In April 2007 the House of Commons Select Committee on Science and Technology (which covers part of the brief of your Select Committee) discussed the formation of STFC. There was discussion of the potential impact that a shortfall in the funding of the facilities could have on University Grants, and in general the “conflict of interest” that could arise between the grant-giving functions and the facilities operations of the new Council. The Committee noted that “[t]here were concerns that the STFC would be hampered by CCLRC liabilities, but we have been reassured by the Minister for Science that these will not be transferred to the STFC”. It should also be noted that the NAO report published in January 2007 noted the increased operating costs of Diamond and the ISIS 2nd target station. In the draft Delivery Plan of July 2007, STFC noted that they would have to “make provision for the inherited and unavoidable liabilities in relation to Diamond VAT, SRS restructuring and 08/09 operating costs (40 million over the CSR period)” and furthermore “absorb the shortfall in funding in the last Spending Review for the operating costs for Diamond and ISIS Target Station 2 (*circa* 35 million over the CSR period)”. This seems to indicate that STFC inherited a deficit of around £25 million per annum from the CCLRC side of the merger.

6. The STFC Delivery Plan following the CSR Allocations will lead to the cancellation of existing research programmes, many with international partners. We know of initiatives in several countries’ which have cited the UK as an innovative and imaginative research leader, for example in fostering strong collaborative programmes between national laboratories and university departments. The UK’s international reputation in science as a reliable partner will be severely damaged unless the STFC Delivery Plan is revised, just at the point when UK science had recovered after decades of indifference and neglect.

7. The impact of the 25% *average* reduction in grants on many university physics departments will be severe. Most leading departments rely on STFC-funded science for a large part (from a third to much more than two-thirds) of their research income. Some will be hit disproportionately harder. Particle physics and astronomy, which are wholly funded from within STFC and which are most affected by the proposals in the current STFC Delivery Plan, are well documented as the main reasons why young people choose physics at A-level and university. For example, a recent survey² of 900 first year undergraduates in November 2007 showed that 75% of them cited the study of fundamental particles and quantum phenomena at A-level as having a significant impact on their decision to study physics at university.

8. The impact on the national laboratories at Harwell and Daresbury will be no less dramatic. There are reports in the press of up to 600 redundancies among the scientific staff—more than a third of the total. It is difficult to believe that this can be achieved without lasting damage to world-leading facilities such as the ISIS Spallation Neutron Source, the Astra-Gemini Petawatt laser and the new Diamond Synchrotron Light Source, as well as threatening world-leading developments in technology and engineering. Expertise in

³⁰ See for example the more than 12,000 signatures to the Downing Street petition <http://petitions.pm.gov.uk/Physics-Funding/>

research teams that has been built-up over the years, once dispersed, will be impossible to re-assemble. Over the past decade, the UK has become a magnet to some of the best young researchers world-wide—a genuine “brain-gain”—and many UK scientists who have worked many years overseas have returned. The damage to our international reputation is incalculable; people have long memories.

9. The Government are well aware of the key role played by physics in the wider economy. In November 2007, the Minister for Science and Innovation, Dr Ian Pearson, speaking at the Institute of Physics, said: “Physics makes a key contribution to the UK economy through the one million jobs where the use of physics-based technologies or expertise is critical to the existence of the sector, concentrated in 32,000 businesses.” 5% of jobs in the UK are in sectors where the use of physics-based technologies or expertise is critical to the existence of the sector.

10. There are illustrations that some damage has already been done. Let us choose just one—the letter of 16th December 2007 to the Secretary of State that was signed by 559 early-stage researchers (graduate students and postdoctoral staff). They are “dismayed by the swingeing cuts” and concerned that these will “inevitably discourage the uptake of science at all levels; school, undergraduate and postgraduate”. It is also interesting to note that this impressive number of signatories was collected in less than three days. They were able to do this so quickly through the use of the Facebook website, a development that would not have been possible without the World Wide Web which was, as we are sure you know well, invented by Sir Tim Berners-Lee while he was working at CERN, described in a Guardian leader (“in praise of . . . CERN”, March 2006) as the laboratory “whose expertise is so wide-ranging that it invented the world wide web as a sideline and gave it away free”.

11. There are many questions that we believe your Committee should ask:

- Why was STFC set up without sufficient resources to carry out its core business?
- Why, when the situation became clear and the consequences obvious to all, was nothing done to alleviate it?
- Was the process for allocating the large increase in resources for science conducted properly? On what basis were the final allocations decided?
- Did DIUS officials discuss the implications with the Minister before making the final allocations?
- Why was the draft of 7th November Delivery Plan proposed by STFC rejected?
- There is evidence that the STFC science advisory structure was marginalised and their advice ignored—is this true? Why is the communication between STFC and the communities that it serves so poor?
- Since DIUS has acknowledged that the STFC Delivery Plan will cause major problems for physics departments, and has set up a review to investigate these, why does it not find the small amount of resource required to delay the implementation of the delivery plan, with all its disastrous consequences, until a proper review can be carried out?
- Why has DIUS decided that STFC will in future be responsible for changes in international subscriptions due to variations in exchange rates? What is the potential impact on science output of this decision?
- Was any assessment carried out within DIUS of the impact of the STFC Delivery Plan on the UK’s international reputation? If not, why not? If so, what was that assessment, and why were the consequences thought to be acceptable?
- What are the likely consequences for university physics departments if this plan is implemented?

January 2008

Appendix

Prof Roger Barlow—University of Manchester
 Prof Nick Brook—University of Bristol
 Prof. A.A. Carter—Queen Mary, University of London
 Prof. Janet Carter—Cavendish Laboratory, University of Cambridge
 Prof Christine Davies—University of Glasgow
 Prof Brian Foster—University of Oxford
 Prof Nigel Glover—Durham University
 Prof. Michael Green—Royal Holloway University of London
 Prof Philip Harris—University of Sussex
 Prof Paul Harrison—University of Warwick
 Dr. Mark Hindmarsh—University of Sussex
 Prof Peter R Hobson—Brunel University
 Prof Chris Hull—Imperial College

Prof Roger Jones—Lancaster University
 Prof Richard Kenway—University of Edinburgh
 Dr Mark Lancaster—University college London
 Dr. Jolm V Morris—RAL
 Prof Franz Muheim—University of Edinburgh
 Prof Ken Peach—John Adams Institute for Accelerator Science
 Prof D H Saxon—University of Glasgow
 Prof Graham Shore—University of Swansea
 Prof. WJ Spence—Queen Mary University of London
 Prof. Neil Spooner—University of Sheffield
 Prof David L. Wark—Imperial College London
 Prof. Peter Watkins—University of Birmingham
 Prof Bryan Webber—University of Cambridge

Memorandum 16

Submission from Professor Pat Roche, Astrophysics, Oxford University

I thought it would be helpful to summarise our estimates of the impact of the STFC funding cuts on the Physics Department at Oxford University. This is one of the largest Physics departments in the UK and has been rated 5* in the RAE exercises. The impact on us may not be completely representative of other departments, but is an indication of the effects of these cuts on a department that has programmes well aligned with the high priority areas identified by previous PPARC and STFC roadmaps.

We estimate that Oxford Physics will lose 30–40 STFC-funded positions over the next 3 years. This will result in a loss of 25% to 33% of our grant income from STFC, and a loss of overhead to the Physics Department of £1.0 million to £1.5 million p.a.

To put this into perspective, HEFCE has provided additional funds to Oxford Physics to support teaching of this 'high cost and vulnerable laboratory-based subject'. The amount allocated by HEFCE to Oxford for physics is £772,000 p.a. for the next 3 years. The net losses to Physics from the STFC funding crisis could be more than twice this welcome HEFCE support.

While the exact numbers will have to await the outcome of the STFC planning process, the financial impact on Oxford Physics is expected to be extremely serious. Coupled with the termination of whole research areas and the attendant loss of morale, this is indeed a disaster for Physics.

February 2008

Memorandum 17

Submission from the University College Union

SCIENCE BUDGET ALLOCATIONS

1. The University and College Union (UCU) represents more than 120,000 academics, lecturers, trainers, instructors, researchers, managers, administrators, computer staff, librarians and postgraduates in universities, colleges, prisons, adult education and training organisations across the UK. We welcome the decision of the Innovation, Universities and Skills select committee to investigate the science budget allocations.

2. We have two main concerns about the science budget allocations. Firstly, the shortfall in funding for the Science and Technology Facilities Council requires it to curtail support for some major research initiatives with threats of job losses. Secondly, the allocations for university research capital (distinct from the research capital allocated via the HE funding councils) are being reduced by 28% over the three years of the 2007 CSR period.

 THE STFC FUNDING SHORTFALL

3. During the period of CSR 2007, funding for the STFC will increase by 13.6%, from £573.5 million in 2007–8 to £651.6 million in 2010–11. By contrast, funding for the Medical Research Council will rise by 30.1%, and overall funding for UK research councils by 18.0%.

4. Although STFC funding is to go up by nearly £80 million, it will have an estimated shortfall of £80 million. After paying for items including:

- the increase in full economic costing of research grants to 80%
- investment in new facilities, including the Diamond synchrotron and ISIS Target Station 2; and
- subscription to international facilities, including the Large Hadron Collider at CERN

the STFC will not have enough to fund all the items it planned to support.

5. As a result, the STFC will cease investment in various initiatives, including:

- the International Linear Collider;
- high-energy gamma ray astronomy experiments;
- the twin 8-metre Gemini telescopes.

6. In addition, the STFC is considering whether to continue further investment in the operation of the UK infrared telescope in Hawaii, Merlin, the Liverpool Telescope, Astro-Grid and investment in the US-led Dark Energy Survey.

7. It has been estimated that the shortfall in STFC funding may lead to a 25% cut in its grants to university physics departments. While STFC grant funding only forms a small proportion of the annual income of some physics departments, for others the STFC contribution is up to 75% or more of annual income.

8. Reductions in research grant funding will lead to loss of jobs, particularly among postdoctoral research students, and technical and support staff. Such staff will be difficult, if not impossible, to replace should funding levels recover in the future. Reductions will also undermine the creation of new knowledge, as well as knowledge transfer into society and the economy. The reductions will undermine the government's 10-year plan for science in the UK.

9. There is at this early stage considerable confusion and uncertainty about the impact of the STFC shortfall. A UCU member has sent the following comment on the potential impact in their department of the STFC cuts:

I am afraid the situation is unclear at the moment. We have as yet received no official information as to what will happen with our Rolling Grant funding, for example, but the effects . . . are likely to be very serious if the cuts are implemented as proposed in the STFC Delivery Plan. We receive about 85% of our research funding from the STFC as we have large Nuclear and Particle Physics groups. One of the projects we are involved in . . . is associated with the International Linear Collider and has been cut in the STFC Delivery Plan. My first guess would be that . . . this will result in the loss of one Research Associate at my institute and probably in job losses at a further five institutes in the UK . . . (These numbers have to be treated as very approximate as, due to the lack of information from STFC, it is very unclear how they propose to implement the cuts—over what time scale etc. etc.) Cuts to Rolling Grants are also proposed at the 25% level. As you can see from this number and the 85% figure mentioned above, there is likely to be a significant number of further job losses . . . as a result of the cuts. At the moment, given the lack of information, I don't think I can give you much idea about possible numbers.

UNIVERSITY CAPITAL FUNDING

10. As noted above, the allocations for university science research capital (distinct from the research capital allocated via the HE funding councils) are being reduced by 28% over the 3 years of the 2007 CSR period, from £300 million in 2007–8 to £215 million in 2010–11.

11. Although the 2007 CSR period sees capital funding for university science research moving from the limited period funding under the Science Research Investment Fund to funding on a permanent basis under the New Capital Investment Fund, further investigation is required to see what impact this reduction is likely to have.

12. While there has been considerable improvement in funding for capital infrastructure in UK higher education since 2000, and further investment is planned to continue for the period of CSR2007 under the iterative amounts indicated via HEFCE in the DIUS press release of 11 December 2007, we are concerned to see this reduction in the capital funding provided via the science budget.

WHAT IS UCU DOING?

13. UCU is gathering information, from members and from physics departments in UK HEIs, about the specific impact of the underfunding of physics and astronomy through the shortfall in the STFC budget.

14. UCU is campaigning for the government to provide additional funding to make up the projected shortfall in STFC income. This includes making representations to government ministers about STFC funding.

15. UCU is also following up with the DIUS the future funding of university capital for science research allocated via the Science Budget, which is to fall by more than one quarter over the period of the 2007 CSR.

16. UCU has been actively campaigning for the protection of both science research and teaching at HEIs. The union has actively resisted department closures, although not always successfully—the closure of the physics department at Reading being the most recent case. Recent UCU research on STEM subjects shows a decline in the period 1998–2007 of 31% in the number of single honours chemistry courses offered in the UK, of 14% in single honours physics and of nearly 10% in single honours maths courses. In some regions of the UK, in 2007 there is only one provider of core science and maths subjects—a situation which could undermine widening participation aims.³¹

17. We believe that the 25% cut in STFC grant funding will threaten large numbers of research jobs and ultimately the viability of physics departments around the country.

18. UCU has long been concerned about the impact on research quality due to the lack of continuity of employment for many research staff in the UK. We have agreement from the DIUS that HEFCE should commission research on the impact of lack of job security as a deterrent to the brightest research students continuing in the HE sector.

19. To date more than 12,000 people have signed the petition on the 10 Downing St website to “reverse the decision to cut vital UK contributions to Particle Physics and Astronomy”.

20. At 15.01.08 the petition had 12,597 signatures.

21. “Due to cost overruns the UK’s funding agency for particle physics and astronomy, STFC, is recouping £80 million with deep cuts to UK physics operations in these areas. These include ending the UK’s involvement in the International Linear Collider—the next generation of particle physics experiment. This risks relegating the UK to second tier involvement in future research and critically damaging the country’s standing within the community. Furthermore UK Astronomy will be seriously hit with up to a 25% cut in grants. This is incompatible with the government’s stated aim of making Britain a world leader in science. A review of this decision has recently been announced and we urge the Prime Minister to press for another solution to this problem before UK physics is set back by decades.”

January 2008

Memorandum 18
Submission from the Space Plasma Environment and Radio Science Group at Lancaster University
SCIENCE BUDGET ALLOCATIONS
Executive Summary

1. Solar Terrestrial Physics (STP) addresses the Earth’s space environment and has important applications to space technology and the potential for significant economic benefits. The UK STP community is internationally recognised as world-leading in this field. Most of the research is currently funded through the Science and Technology Facilities Council (STFC) and will be harmed severely by the new strategy delivery plan. The cut to STP within the new delivery plan is inconsistent with the remit of STFC, which is focussed on maximising economic and societal return from the science that it funds. We make a series of recommendations for resolving the important issues outlined within this document.

Introduction

2. The Space Plasma Environment and Radio Science (SPEARS) group forms part of the Department of Communication Systems at Lancaster University. Much of our funding relies on a rolling grant from STFC and our research hinges upon combining ground- and space based instrumentation to study the near-Earth space environment. SPEARS’ expertise in ground-based instrumentation is demonstrated by the fact that it has been awarded contracts to build instruments for other UK research groups as well as India, Norway and China and its position as the principal investigator for a consortium of 14 countries

³¹ Degrees of decline? Core science funding and mathematics degree courses in the UK 1998–2007: http://www.ucu.org.uk/media/pdf/7/h/degreesofdecline_nov06_1.pdf

investigating charged particle dynamics in the Earth's plasma environment. SPEARS has a leading role in one of the identified International Polar Year programmes. Our outreach activities in promoting science include the popular AuroraWatch³² website and a leading role in the Sun Earth Plan website³³, a showcase for UK solar system science research.

Solar-Terrestrial Physics (STP): What it is and why it matters

3. *STP and Technology.* STP seeks to understand the influence of the Sun on the Earth's space environment. This environment is of great importance to modern civilisation which relies heavily on space-based technology such as communication and navigation satellites. The term *Space Weather* was coined to describe the large transient events that can cause major damage to satellites. Increased radiation hazards from such events pose risks to air crews and electronics. This is only a small, but important, part of the work that we do. UK STP scientists are also involved in applications concerning the effects on radio communications, and electricity and oil supply networks. A recent study for the European Space Agency (ESA) suggested that the potential market for space weather services was in excess of EUR 1 billion over 15 years³⁴.

4. *Climate Change.* According to the IPCC in 2007, "... uncertainties remain large because of the lack of direct observations and incomplete understanding of solar variability mechanisms over long time scales"³⁵. It is increasingly essential that we establish how important the solar effect on climate change is so that anthropogenic effects can be properly defined. As recently as May 2007 Sir Keith O'Nions asserted that "the physics of the upper atmosphere will be a very key part of climate change"³⁶. UK STP scientists are well placed to drive this area of research and ground-based instrumentation plays a vital role in supplying those long-term monitoring capabilities that the IPCC has identified as so important.

STP and its Position in the UK Research Portfolio

5. UK STP research has been recognised as world-leading by the 2005 review "International Perceptions of UK Research in Physics and Astronomy"³⁷. UK expertise lies in combining ground- and space-based observations. The multi-disciplinary nature of STP requires such a synergetic approach in order to see the complete picture. The international review panel explicitly recognised that strength: "UK researchers have an exceptionally strong standing in solar physics as well as space-based and ground-based space physics".

6. In many ways STP operates in a manner similar to the geosciences, eg the role of long-term monitoring and the growing importance of understanding complex systems. This is recognised internationally by the positioning of STP in international geophysical organisations (eg AGU, EGU, IUGG). A recent example is the decision of the EU COST programme to recognise the science of space weather as part of Earth System Science. In the UK, STP has long been considered as a subsidiary of Astronomy and consequently STP as a distinctive field in its own right has often attracted minority funding and has little or no representation within the research council.

7. Though there is much "blue-skies" research in the field, this is necessary to underpin the important technological and predictive applications achieved through long-term monitoring and modelling.

Impact of the STFC Delivery plan

8. A new science strategy delivery plan has been brought forward by STFC with a distinct lack of transparency and consultation within the wider science community. This new delivery plan states that:

"We will cease all support for ground-based solar-terrestrial physics facilities."

"We will target our investment in astronomy grants taking account of reduced facility availability."

9. There is no justification for this statement within the document and no further mention of space-based STP or solar physics. Existing space-based STP missions that monitor the Earth's space environment are approaching the end of their operational lifetimes and are likely to be ranked as low priority by STFC in their on-going programmatic review. As such the delivery plan effectively removes all capability in STP from the UK along with our international reputation. Indeed, suggesting that STP can be performed without a ground-based capability is disingenuous; this has been likened to attempting to describe the weather patterns for North America using just a handful of thermometers, without knowing exactly where they are³⁸. As mentioned earlier, STP provides an important contribution to understanding climate change;

³² aurorawatch.lancs.ac.uk

³³ sunearthplan.net

³⁴ by Systems Engineering and Assessment Ltd. (available from ESA, contact A. Glover: Alexi.glover@esa.int)

³⁵ IPCC Technical Summary. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

³⁶ in oral evidence given to the Commons Public Accounts Committee.

³⁷ http://www.ras.org.uk/images/stories/ras_pdfs/2005review/2005%20Review.pdf

³⁸ Dr. Reiner Friedel (Los Alamos National Laboratory), Space Weather Week Workshop, 2003.

STFC has highlighted the importance of climate change in its remit by including the question “How does our climate work?” in its own delivery plan. This makes their decision to cut such an important resource even more unfathomable.

10. The chief executive of STFC has suggested that the stated withdrawal of funding is a consolidation of decisions made under PPARC’s 2005 programmatic review. However, the decisions arrived at in that review pertained to a limited number of instruments, hardly “*all . . . ground-based solar-terrestrial physics facilities*”, and in fact institutes that operated some of those instruments were encouraged to seek additional funding through the grants line (including the current round of grants).

11. It is clear from the delivery plan and comments from the STFC executive that STFC is pursuing a policy of maximising economic impact from the science that it supports. It would seem that STFC has completely overlooked the fact that STP and solar science have large economic and societal impact. In fact the decision to remove funding for STP ground-based facilities was taken under the old PPARC remit rather than under the auspice of STFC. The ESA report referred to earlier also highlighted the cost-effective nature of ground-based measurements for space weather monitoring; the UK receives a large scientific return for very small investment. They are a key element in stimulating the growth in this market and if STFC invests to support innovation in the ground-based STP programme, significant benefits could be accrued. To operate the current levels of ground-based instrumentation in STP for a year costs less than £1 million (including an international subscription to the world-leading EISCAT radars). Since STFC is attempting to cut £120 million over three years this equates to a saving of less than 2.5% whilst removing a complete area of scientific expertise from the UK.

RECOMMENDATIONS

12. Recommendation 1: Investigate whether STP is appropriately placed within the STFC. Given the nature of STP it might be better positioned within another research council, such as EPSRC or NERC, or even within a new funding organisation dedicated to Space Science representing solar, planetary and solar-terrestrial physics and associated technology.

13. Recommendation 2: To recognise that the new delivery plan does not have the backing of the scientific community since no peer review or consultation has been carried out in its production. To request STFC place implementation of the delivery plan on hold, or dismiss it with a view to producing a proper delivery plan.

14. Recommendation 3: The Royal Society has stated that the announced review of physics is not a solution to the crisis and suggests that money be used from the capital budget to cover the shortfall. We endorse the RS statement and request Government to respond to this request.

15. Recommendation 4: We request that funding for research in STP be restored in order to maintain our national capability in this important area of science, recognising STP’s contribution to knowledge exchange and economic and societal impact.

January 2008

Memorandum 19

Submission from Universities UK

FUNDING OF THE SCIENCE AND TECHNOLOGY FACILITIES COUNCIL

Prior to the Innovation, Universities and Skills Committee’s session on the science budget allocations on 21st January I am writing to inform you of Universities UK’s ongoing concern over the funding of the Science and Technology Facilities Council (STFC).

UUK have welcomed the headline investment for science announced in the recent Comprehensive Spending Review (CSR). Indeed, we are encouraged by the government’s strong commitment to science and innovation and the strategic approach taken within the 10-year science and innovation framework. Much of the additional funding provided in this and previous spending reviews has been provided to meet more of the full economic costs of projects undertaken in universities. UUK are strong supporters of this agenda and believe that this commitment will help secure a strong and sustainable research base in universities.

The headline investment for STFC in the 2007 CSR was 14%. UUK understand, however, that in reality this will represent a significant reduction in funding over this spending period due to a number of factors. Notably for universities, as part of the STFC delivery plan this will lead to a 25% reduction in research grant funding.

We do, of course, appreciate that the circumstances that have led to this situation are complex, and compounded by the fact that the STFC was only created in April this year. However, the impact of the proposed cuts will be significant, particularly in university physics departments. We have taken informal

soundings of UUK members on the potential impact of scaling back of STFC funding over the current CSR period. We will be undertaking further analysis of the information provided, and would be happy to share this with the committee, but the headline messages on the impact of a 25% cut in grant funding are:

- There would be a significant loss of staff at all levels, impacting on the health of physics departments and research environment.
- Cuts would place at risk the successful outcome of work where the UK already has an established lead. UK institutions would therefore lose leadership in world-leading projects and lose international collaborative partners.
- Recruitment and retention of high-calibre researchers of international standing will be much harder.
- Collaboration at regional and national levels (for example, research pooling in Scotland) would be damaged. Collaboration provides a solution to many of the concerns over future capacity in physics. Collaborative initiatives designed to sustain physics provision following a number of high profile closures, supported by the funding councils and others, have the potential to be undermined by the STFC cuts.
- Institutional investment in staff and equipment would not be fully exploited and facilities would become run-down.
- Any negative publicity about the viability of Physics departments would also have knock on effect on student recruitment into degree programmes.
- Any reduction could also have potentially negative effects on the regional economy, for example impacting on the supply chain for instrumentation.
- There will also be a considerable impact in parts of Chemistry, Biology, and Engineering.

It is clear that this situation was not intended, but given its seriousness it is crucial that it can be resolved in a way that does not damage the viability of physics departments in UK universities, many of which are already in a fragile financial position.

We welcome the government's announcement of a review of physics, to be chaired by Professor Bill Wakeham. UUK would be supportive of suspending the STFC delivery plan until Professor Wakeham has reported. In the interim it will be important that there is a flexibility of approach and continued and open dialogue between STFC and DIUS to avoid any irreversible damage before recommendations arising from the Wakeham review can be taken forward. At the very least, funding should be found to provide a sensible period for adjustment before any abrupt decisions have to be taken.

January 2008

Memorandum 20

Submission from Professor Alan Rodger, Head of Science Programmes, British Antarctic Survey

SCIENCE BUDGET ALLOCATIONS

The STFC Delivery Plan Contains two critical statements that Combined, I believe, will lead to the rapid demise of STP. These are:

- (a) All ground based STP facilities are to close.
- (b) Grants will only be used to exploit facilities being operated by STFC.

The consequence will be that the *UK will lose a critical national capability that has direct and indirect economic value*. Hence the proposed cuts at STFC are fundamentally different from the others proposed in the recent delivery STFC plan.

STP provides the basic knowledge of the space environment—an environment upon which we rely to an ever-greater extent in the 21st century. Changes in the space environment, known as space weather events, pose natural hazards for satellite operations. One space weather event can cause the complete loss of satellites at -300 million each and there are now 300 satellites in space, the majority of which are used for commerce in some form or other. Many are also insured through the City of London insurance market.

The accuracy of global positioning systems including the European Galileo depends upon space weather. STP provides the expertise to design, protect and exploit the system.

Even aircraft and their passengers are affected by additional radiation dose during space weather events, and for which STP provides the underpinning knowledge.

Space weather events are frequent and occur with varying severity, their prediction is the ultimate goal of STP research.

There is a second and completely different dimension to STP research—namely Sun-climate links. It is critical that we quantify now the solar induced effects on climate change so we can predict more accurately the anthropogenic ones. Even IPCC 2007 and Sir Keith O’Nions³⁹ in recent evidence to the Public Accounts committee agree this is important.

STP research is essentially an environmental science. It needs measurements distributed in space and time, including long-term measurements of the secular changes of the Earth and the Sun. To be highly effective, one needs to combine measurements from the ground and from space—together; these provide much more than the sum of the parts. This is why the proposed closure of all ground-based STP facilities effectively leads to a loss of national capability in SIP as a whole. Essentially the approach is akin to that of the UK Met Office -just a few hundred kilometres higher up in the atmosphere.

The independent report for the Institute of Physics report concluded in 2005 that the UK is a world leader both in Sun-climate science and space weather.

As we take to space and the skies even more, where is the knowledge base and the supply of bright young minds going to come from to maintain this critical national capability in SIP if the current plans of STFC are carried through? I see another nuclear industry situation arising—we will have to import all the skills in the future if we cut off the supply now.

In conclusion I urge you to examine the potential loss of UK National Capability in solar terrestrial physics (SIP) with particular care during the forthcoming review Science Budget Allocations. SIP directly underpins commercial interests and Government policy.

January 2008

Memorandum 21

Submission from Danny Steeghs, Department of Physics, University of Warwick

I write to you in response to the recent developments concerning the Science and Technology Facilities Council and its alarming delivery plan for the next three years. I recently had the privilege to take part in the Royal Society MP pairing scheme and attended several committee activities during my week in Westminster. I was impressed with the crucial and active roles of the various select committees. I would like to thank the IUS committee members for their efforts in general and very much appreciate your attention to my letter.

I am a young astrophysicist that returned to the UK earlier this year, moving from a research position in the USA at Harvard to a staff position at the University of Warwick, with support from a STFC advanced research fellowship. My return was partly motivated by the strong tradition for fundamental research in the UK and the political support behind science and education. However, in the last few weeks a rather disturbing picture has emerged concerning funding for astronomy and related fields within the STFC remit.

The move of the PPARC portfolio wholly within the new STFC council did raise considerable concern and uncertainty within the community from the very beginning because of the likelihood of both planned and unplanned disruptions to the UK research roadmap given the focus on facilities in both name and central aims of the new council. Indeed, the House of Commons Science & Technology committee in its 2005–06 Office of Science and Innovation scrutiny report raised some very pertinent points. Quoting from that report; *“There were concerns that the STFC would be hampered by CCLRC liabilities, but we have been assured by the Minister of Science that these will not be transferred to the STFC”*. The report also mentions *the risk that “... funding may be diverted from grants to support facilities management and that Universities could also be disadvantaged . . . and that “ . . . there could be tension within the STFC between funding for large facilities and funding for basic science..”*. At the time assurances were given by the government and STFC executives that this would not happen. *Finally, the report mentioned that “ . . . we were concerned at the lack of consultation within the research community . . . even with key players.. “and the committee recommended that “the funding for the STFC from the CSR round be an increase over the combined existing budgets in order that it can achieve its potential.”*

I believe that the outcome of the recent CSR and the delivery plan released by STFC in response to it imply dire consequences that are in conflict with the various assurances that were given to the POST committee when STFC was formed. Indeed, the picture that has emerged can only be described as bleak, with outright withdrawals from key facilities and a substantial cut in the grants line. While some sub-disciplines seem to have suffered more than others, and it does appear to be that the PPARC science is particularly hit, the delivery plan has detrimental effects across the board. I believe that the delivery plan will have disastrous consequences for a large variety of research groups and university departments across the UK, with the international reputation to follow shortly thereafter. While the plan itself does not present hard figures, STFC has indicated that the cut to the grants line will be at least 25%.

³⁹ Sir Keith said “physics of the upper atmosphere there will be a very key part of climate change”—Big Science: Public Investment in Large Scientific Facilities, Question 65, 9 May 2007, HC 153-i.

Many physics departments obtain a substantial fraction of their funds through STFC grants, and this is even more crucial with the move of the full economic cost contribution to the RCs. The substantial and disruptive changes in the grants line as laid out in the delivery plan will not only affect the research undertaken at these departments but also undercuts the funding of subjects that have been very important in boosting undergraduate recruitment numbers for the physical sciences. While it is important to pursue research with a direct economic impact, we cannot ignore the fact that such economic impact is only possible with a viable infrastructure for basic research and an attractive research portfolio at university department to ensure that we can attract teenagers to cornerstone disciplines such as physics. The current situation is clearly inconsistent with the government's pledge to boost education and science nor should the detrimental economic impact of drastic changes to basic research grant support be overlooked.

It is clear that STFC's budget is not sufficient for it to pursue its planned and expected activities. Secondly, the delivery plan that was released as an attempt to meet the significant holes in its budget proposes disruptive and detrimental measures that could set back the UK community by decades and involved little to no community consultation.

I would like to urge the committee to scrutinize these issues in detail and hope that some of the information in this letter will be useful to you. I believe I speak on behalf of a large community and have yet to find a single colleague who is not dismayed by these recent developments.

December 2007

Memorandum 22

Submission from Heads of relevant UK Research Groups⁴⁰

THE IMPACT OF UK WITHDRAWAL FROM GROUND-BASED SOLAR-TERRESTRIAL PHYSICS

1. We are writing in connection with the recent announcement by the Science and Technology Facilities Council to cease support for ground-based Solar-Terrestrial Physics.

2. At present, the UK has an unrivalled and highly cost-effective Solar-Terrestrial Physics research programme, which underpins a number of key areas for UK science, technology and society. This is an outstanding example of marrying top-quality, world-leading scientific research⁴¹ with knowledge exchange. Over the past five years, prize-winning UK research using ground-based STP data has revealed century-scale changes in the Sun and Earth's "space climate". Allied to change in Earth's intrinsic magnetic field, which is now faster than at any time since observations began, these studies show that we must expect, and plan for, change in many phenomena and effects relevant to modern life including:

- the fluxes of solar and cosmic energetic particles hazardous to satellites and humans operating in space or in high-altitude aircraft
- the performance of positioning and navigation systems such as Galileo and GPS
- disruption to oil and mineral exploration schedules, power distribution networks, broadcast and communications systems
- electronics malfunction rates on board aircraft, satellites and ground-based systems.

3. We now know that the cost-effective design, safe operation and financial insurance of all these systems cannot depend on out-dated knowledge, because our space environment is too variable on the timescales of decades to centuries. It is absolutely essential that we should not lose the national capability in STP/Space Weather and involvement in key growth areas such as satellite situational awareness and integrated space applications which, through highly effective Knowledge Exchange, underpins this wide range of commercial, security and military activities (of which several are classified).

4. Because satellite observations are only made from a rapidly-moving vantage point, ground-based monitoring of space weather is a key complement to data from space. Such observations also make major contributions to a wide range of other scientific studies including:

- coupling between the upper atmosphere, the middle atmosphere and the troposphere (an inadequately addressed interface with NERC science and climate change studies)
- detection of intrinsic magnetic fields on extrasolar planets and understanding of their role in preventing atmospheric erosion and allowing habitability
- development of ground-penetrating exploration radars for the Earth and the Moon
- fundamental mechanisms in plasma physics

⁴⁰ See Appendix.

⁴¹ As rated, for example, by the 2005 International Review supported by PPARC, RAS, IoP and EPSRC: http://www.ras.org.uk/images/stories/ras_pdfs/2005review/2005%20Review.pdf

- solar system formation (using an unique ability to discriminate between extra-solar and solar-system micrometeorites)
- design and operations for the AURORA programme
- error correction and calibration for low frequency radio astronomy satellite orbital decay predictions
- monitoring of potentially lethal space debris down to 1 cm dimensions.

5. The savings made by cutting ground-based STP facilities are relatively small, but wholly disproportionate damage will be done to our national infrastructure. We urge those of you who are responsible for overseeing the implementation of the seemingly inevitable reductions in spending on the physical sciences to safeguard this small but vital area in which the UK plays a world-leading role.

January 2005

Appendix

Professor Mike Lockwood FRS
Space Environment Physics
University of Southampton

Professor Paul Cannon FEng
Chief Scientist, Communications Division
QinetiQ

Professor Sandra C Chapman
Director, Centre for Fusion, Space and Astrophysics
University of Warwick

Professor S.W.H. Cowley
Head, Radio and Space Plasma Physics
University of Leicester

Dr Andrew Fazakerley
Mullard Space Science Laboratory
University College London

Dr Mervyn Freeman
Natural Complexity Programme
British Antarctic Survey

Professor Manuel Grande
Head, Solar System Physics
University of Wales, Aberystwyth

Professor Farideh Honary
Head, Department of Communication Systems
Lancaster University

Professor Steven J Schwartz
Professor of Space Physics
Imperial College London

Professor N. Mitchell
Head, Telecommunications, Space & Radio
Department of Electronic & Electrical Engineering
University of Bath

Professor Alan Hood
School of Mathematics and Statistics
St Andrews University

Professor Michael Hapgood
Chair, UK RAS Magnetosphere Ionosphere
Solar and Terrestrial (MIST) Council
Rutherford Appleton Laboratory

Professor Alan Aylward
Head, Atmospheric Physics Laboratory
University College London

Professor E.M. Warrington
Head, Radio Systems Research Group
Department of Engineering
University of Leicester and
Chair, Ofcom Ionospheric Effects on
Radio Systems Task Group

Dr. Lyndsay Fletcher
Chair, UK Solar Physics
University of Glasgow

Dr David Kerridge,
Head, Earth Hazards and Systems
British Geological Survey

Professor Steve Rawlings
Astrophysics
Oxford University

Will Whitehorn
President, Virgin Galactic

Professor Mike Thompson,
Head, School of Mathematics & Statistics
University of Sheffield

Dr Clive Dyer
Centre for Radiation Environments, Effects & Hardening
QinetiQ

James Briggs
Systems Engineer
VT Communications

Professor Alan Dodson
Pro-Vice-Chancellor & Professor of Geodesy
Institute of Engineering Surveying and Space
Geodesy, University of Nottingham

Nick Negus
Spectrum Manager
GCHQ Cheltenham

Memorandum 23

Submission from the Department of Physics, Durham University

Having recently attended a meeting at University of Durham, where our local MP (one of your members, Dr Roberta Blackman-Woods) discussed the funding situation with STFC, I was moved to write a brief account of the personal impact this funding cut will have on my own research and employment.

My name is Dr. Sam Nolan and I am currently employed by the University of Durham as an Associate Fellow in Astronomy. For several years before this I was employed by PPARC on various research grants in the field of gamma-ray astronomy. The success of these grants (more of which later) being such that in November last year the department of Physics at the University took me on as full time staff.

When I started my PhD, 10 years ago, my field of astronomy was in its infancy. But thanks to the hard work of my collaborators and I in Durham and within the European and African collaboration in which I work, we have brought this field to maturity in recent years and produced many *Nature* and *Science* articles. Although our grant from STFC has been a modest £150,000/annum, our collaboration (HESS) has recently been awarded with the 2{million Euro Descartes prize for European collaborative science. With the recent decisions from STFC, not only will the UK's involvement in this rapidly evolving area of astronomy cease, but there will also be significant problems for our European partners as a result. This is due to the fact that the UK provides key calibration data, without which the telescopes are unable to take high-quality data.

Although the field of ground-based gamma-ray astronomy had modest beginnings at Harwell in the early 1950s it is fair to say that all the key breakthroughs that have created its recent successes are due to either science carried out in the UK or by UK scientists using international facilities. I therefore find it difficult to see why, for such a small investment and large return, our funding has been withdrawn without consultation.

After finishing my PhD in Durham for example I went to work in the States on a NASA fellowship, but it was the continuing commitment to this evolving field and the significant expertise available within the UK that made me return to Durham.

Currently I am involved in a large amount of teaching within not only Durham University but the Open University as well. In addition I believe that science cannot afford to exist within a vacuum and so I give regular talks to local schools and societies, attempting to explain and enthuse the next generation of students. In addition our research has appeared in several news articles as well as being the topic of a recent BBC Radio 4 documentary in the Frontiers series. None of this would be possible without the current STFC funding. Having grown up myself in rural Cumbria, I know how vital these outreach events are, as without them I would never have been encouraged to learn physics or become an astronomer.

In addition, for the small investment we require to operate, we are developing two spinout technology companies. One that seeks to design high performance mirrors -for not only astronomy but also solar light collection for heating and light. The second project (in collaboration with AGI Ltd) is developing an atmospheric quality monitor for use by the military on aircraft carriers. The nature of this is directly related to the calibration systems we currently use for our telescopes. Therefore in effect this current STFC decision will cease these industrial collaborations as well.

Now that I have reached a point in my career where I am able to become an independent researcher, and working within such a developing field which is truly the newest form of astronomy, and can shed light on many of the big questions, such as the origin of cosmic-radiation and the nature of dark matter, I find it truly unimaginable that STFC has chosen its current path. Without review or consultation with any academic in the field, STFC has informed us that the UK “will cease to invest in high-energy gamma ray astronomy experiments”. Not only does this raise questions about the future of my own career at the University but that of at least a dozen of my colleagues, some students and some postdoctoral researchers.

I therefore would urge the parliamentary committee to question at the highest levels the threat that is befalling this small but rapidly evolving area of Physics. Without at the very least a review of the subject, STFC have written off one of the most successful experiments in recent years and removed the ability for UK scientists to become involved in future projects within this field.

January 2008

Memorandum 24

Submission from the Magnetosphere, Ionosphere and Solar-Terrestrial (MIST) Council on behalf of the MIST Science Community

SCIENCE BUDGET ALLOCATIONS

Executive Summary

1. Prof. Keith Mason, chief-executive of STFC and Prof. Ian Diamond, chair of RCUK gave oral evidence to the Committee on 21 January 2008. This memorandum highlights a number of inaccurate or puzzling statements made by those witnesses which we feel merit further consideration by the Committee. The major point of contention is that contrary to the evidence given by Prof. Keith Mason the decision to withdraw support for all ground-based STP facilities was not made by PPARC. The PPARC programmatic review applied only to certain STP national facilities and stated that it would “maintain a capacity in ground-based STP”.

2. The quotations used below are taken from the uncorrected transcript of the 21 January meeting and the appropriate question is indicated at the start of each relevant paragraph. Relevant portions of testimony are appended at the end of the document. The manner in which STFC does business under the current management (and PPARC before) prompted the MIST community to take the unprecedented step of passing a vote of no-confidence in the “financial, administrative, decision-making and communication arrangements within the STFC as presently implemented”. We enclose a copy of these resolutions and the recent statement from the Royal Astronomical Society, which expresses a lack of confidence in STFC’s handling of the funding crisis. The latter has been fully supported in an email to the CEO of STFC from the Particle Physics action group.

Who is MIST?

MIST is an informal community of UK-based scientists with interests in physical processes within the Sun-Earth system and other planets. This includes studies of the mesosphere, ionosphere, thermosphere and magnetosphere of Earth and of other planets and the solar wind. The role of MIST is to help promote these interests to the public, wider scientific community and other stakeholders as well as provide a platform for scientists to present their work to the rest of the UK community. MIST is currently represented by a council formed of five elected members.

Commentary on answers to questions

3. **Q141:** Prof. Mason replied that “that decision [to cut ground-based solar-terrestrial facilities] was actually made by PPARC”. **This is not true.** PPARC did not decide to close down all ground-based solar-terrestrial physics facilities. As a result of the 2005 Programmatic Review, PPARC announced⁴² that they would: “withdraw earlier from . . . a number of Solar Terrestrial physics facilities (SAMNET, CUTLASS, IONOSONDES, SPEAR)” but that they would: “maintain a capacity in ground-based solar terrestrial physics.”

4. In particular it did not include the international EISCAT facility from which STFC is now seeking to withdraw. Indeed, in PPARC’s Delivery Plan (updated after the Programmatic Review) it says: “The current EISCAT agreement ends in December 2006 and the UK has recently agreed to continue participation until 2011”. In addition the UK STP community operates a number of smaller facilities through the grants line and is concerned that misleading statements from STFC will (and in some cases already has) influence the assessment procedure.

5. Prof. Mason also demonstrates the very opacity of decision-making within STFC (and PPARC, under his leadership) about which the scientific community are complaining when he says that he “will not go into” the reasons why STP facilities “came low down on the list”. When the research council will not reveal the criteria on which projects are judged, how can scientists make the case for funding? MIST council has made a freedom of information request to obtain any and all documents related to the STFC decision to cut STP since we have little in the way of explanation over this devastating decision.

6. **Q143:** Prof. Mason’s response to this question highlights two issues: He says that “communications and climate change were not part of PPARC’s remit”. This may be true, but this simply demonstrates that STP was inappropriately positioned within PPARC and would be better off funded by a research council which recognises the value of its applications. Ironically, such applications *are* in STFC’s remit making the decision to withdraw from ground-based STP all the more puzzling. (see also Prof. Mason’s answer to Q124).

7. Prof. Mason says that “we are talking about . . . international subscriptions in many of these cases”. **This is not true.** The only ground-based STP facility which involves an international subscription is EISCAT. As noted above, PPARC did not decide to withdraw from it. Whereas other facilities (eg CUTLASS) were part of international partnerships (eg SuperDARN) this did not involve extra monetary commitment from STFC as implied by Prof. Mason. Instead these agreements are added-value bonuses to the operation of these instruments that facilitate international collaboration and buy-in to suites of instruments that bolster UK science, with no additional cash input from STFC beyond the operation of the UK facility. Consequently, withdrawal from the named facilities only saves the small operating costs (~750,000 per year) but brings considerable damage to our international reputation.

8. **Q80:** Prof. Mason describes the £10 or £20 million as a “minor variance”. Compared to the £80 million hole in STFC’s budget and the effect this will have on grants, this is hardly minor. £10 million could support ground-based solar terrestrial physics at current levels for about five years.

9. **Q78:** Prof. Mason remarked that “I think we do consultation extremely well in STFC; . . . it does involve the community”. STFC simply does not have the advisory structure in place to consult its community. There is no input from below the levels of PPAN and PALS. Those committees are small and therefore cannot adequately represent the breadth of science that STFC supports. As chief executive, it is Prof. Mason who is responsible for ensuring that an adequate structure is in place.

10. It would also be interesting to know to what extent DIUS required discussion to be kept “under wraps”. Would this really have prevented consultation? The recent statement from the RAS says “The requirement of confidentiality for members of Council, the Science Board, and PPAN and PALS, goes far beyond any legal requirements”. Surely once the allocations were decided, they could have been made public immediately, allowing the research councils to discuss with the community how to prioritize spending.

11. **Q121:** It seems strange that Prof. Mason says that STFC is withdrawing from international commitments which are “minor in monetary terms”. Surely it would make more sense to withdraw from those which are minor in *science* terms? Otherwise one saves little money whilst impacting a lot of research.

⁴² “News from Council”, March 2006: <http://www.pparc.ac.uk/Nw/Council0306.asp>

12. **Q132:** Prof. Diamond remarked that “there are a number of research councils, for example EPSRC, who have things called discipline hopping grants which enable people to retrain”. This is certainly true in the case of EPSRC (“Postdoctoral Mobility” grants), but this particular scheme is only available to post-doctoral researchers already funded by EPSRC. It is therefore of no comfort to those who will be made redundant from STFC-funded projects. The only somewhat similar scheme that the STFC has is the aurora fellowship, which allows STFC scientists to move into planetary science (still within STFC); only three places were available in the current round.

13. **Recommendation:** if RCUK is serious about “discipline hopping”, it should ensure that all research councils have schemes in place to allow discipline hopping to take place between all research councils.

MIST resolutions

14. These resolutions were voted on and passed at the MIST business meeting on 21 January 2008. Copies of these resolutions were sent by hard copy to Secretary of State John Denham MP, Prof. Ian Diamond, Prof. Keith Mason, Prof. Sir Keith O’Nions, Ian Pearson MP, Prof. Richard Wade and Peter Warry. There has been no response so far.

15. **Resolution 1 Statement:** Contrary to prior reassurances, the structure and operation of the newly-formed STFC has resulted in grant funding for research being subject to the vagaries of variations in major international subscriptions and in the operating budgets of large facilities, largely unrelated to the STFC grant-supported research programme. The MIST community believes that these arrangements are disastrous for all the grant-supported research communities that the STFC serves, in particular having substantial negative impact on HEI Physics Departments throughout the UK both immediately and in the long-term. While participation in international programmes and the provision of cutting-edge facilities are essential, it is equally important to ensure the health of the grant-supported research communities, including young scientists, who scientifically exploit these investments.

16. **Action Requested:** Rapid steps must be taken to implement new administrative arrangements that ensure stable ring-fenced grant funding, preferably by transferring grant-awarding activities to another body.

17. **Resolution 2 Statement:** The MIST community is deeply concerned about the lack of transparency in recent decision-making within the STFC, the lack of appropriate domain knowledge within its policy-forming structures, and the lack of consultation and discussion with the community. We are particularly exercised about the process, basis, and rationale through which the decision was taken to “cease all support for ground-based solar-terrestrial physics facilities”. This decision appears perverse in view of the existing, and future potential for, high-impact world class research in this area, the contribution to the motivation and training of young scientists, and the immediate connection to knowledge exchange and economic impact, all of which are directly aligned with the government’s vision for the mission of the STFC.

18. **Actions Requested:** As a first step we request publication of all procedures, criteria, metrics, performance indicators and rankings that were developed in the steps leading up to and during the key research council reviews that led to the decisions announced in the December 2007 Delivery Plan. This request includes reviews of predecessor bodies cited as pertinent by STFC, notably the last PPARC programmatic review. Furthermore, we request the timely publication of the STFC science strategy and evaluation criteria and metrics for future grant application rounds, including the forthcoming round in June 2008. We also support the calls by the Institute of Physics, the Royal Astronomical Society, and the Particle Physics community for a moratorium on implementation of the STFC Delivery Plan until the Wakeham Review of Physics has been conducted and its conclusions reported, and we call on DIUS to find the modest funding needed to allow this to happen.

19. **Resolution 3 Statement:** In view of the above considerations the MIST community wishes to express no confidence in the financial, administrative, decision-making, and communication arrangements within the STFC as presently implemented. These are inadequate to provide appropriate future stewardship of our research discipline to the scientific, cultural, and economic benefit of the UK, and inadequate for the training of young scientists, which is of clear benefit to physics in the UK.

20. **Actions Requested:** We request a change of the structures, and individuals in the STFC council, responsible for the current failure.

RAS statement

21. Mindful of very strong feelings in the entire astronomical community, RAS Council expresses a lack of confidence in STFC’s handling of the current funding crisis:

22. In its actions since it was formed, STFC has failed to pay sufficient attention to the part of its mission associated with the delivery of first class science in astronomy, particle physics and nuclear physics.

23. In making its bid to CSR2007, little emphasis was placed on the importance of these areas for UK science and for UK physics in particular. The DIUS does not seem to have been made sufficiently aware of the potential damage to the UK’s international science reputation and to UK Physics departments, despite

the fact that the Government has made Physics a high-priority in its long-term economic policy. Astronomy and space science play a key role in attracting school-children to science and in drawing university students into physics and there is immense benefit to the UK economy of our skilled Physics graduates. There is now a real danger that the recent improvement in Physics enrolment will be reversed

24. The STFC's Delivery Plan pays lip-service to the need to foster the UK academic community, who play the key role in delivery of all of STFC's outputs—first class science, facility design and usage, and knowledge exchange, but has shown no evidence in its public statements or actions that it recognizes this duty. The 25% decline in grants across the CSR period, with no sign of any intention or even desire to level this out in later years, has filled the community with deep pessimism and anger.

STFC has failed miserably to communicate with the community. The experience of the community prior to the formation of STFC has been good communication and a sense of engagement in decisions.

25. STFC claims that its Delivery Plan has been and is being arrived at through a process of Peer Review. Unfortunately, despite no doubt very hard work of those involved in this process on PPAN, PALS and Science Board, the community has no confidence in this process and is unlikely to accept the outcome as fair. It was a catastrophic error not to set up an advisory structure below PPAN. The requirement of confidentiality for members of Council, the Science Board, and PPAN and PALS, goes far beyond any legal requirements.

26. STFC needs to develop with the community a clear science strategy, so that both the community and those on STFC panels can make operational decisions with precision and clarity.

27. In dealings with international partners, STFC needs to take advantage of the contacts and diplomatic skills of members of the community. A take-it-or-leave-it approach to an international partnership will never succeed.

Relevant Questions from the uncorrected transcript of oral evidence

28. **Q78 Chairman:** You have two committees set up with your new organisation at STFC and you are saying to the members of those committees that you cannot even speak to your community. That is not consultation, that is something we would find in Russia.

29. Professor Mason: I disagree. Firstly I think we do consultation extremely well in STFC; I am very proud of the peer review system that we have set up, it is very effective, it does involve the community, it involves people who are able to look across the whole programme and I think it is a very good system. However, the period of time we are talking about is essentially a period where all the research councils are making bids to DIUS for funding and one of the reasons for so-called secrecy—or at least keeping this under wraps—is that it was a negotiating situation and I think to ensure a level playing field DIUS quite rightly insisted that these negotiations be taken under wraps because otherwise one would have had lobbying from all sorts of corners of the scientific community which would not have been necessarily helpful to a proper outcome.

30. **Q80 Chairman:** To stop you there, two years ago you had a £10 million overrun on Diamond; last year it was a £20 million overrun on it; you have suddenly been presented with a £10.5 million bill for VAT on it. Are you saying that all those were planned deficits?

31. Professor Mason: Forgive me for not having these numbers immediately to mind, but in terms of the capital phase of Diamond it was essentially on budget and on time with a minor variance.

32. **Q121 Mr Boswell:** My next question is something I asked our earlier witnesses about reputation more generally, but specifically about international subscriptions. If we are pulling out of international subscriptions is this going to be damaging to our reputation internationally in a way which will make us difficult to be partners in the future?

33. Professor Mason: It is part of our strategy to protect the major international subscriptions and we do that because we have a long term commitment to them and they are extremely valuable to the country, not only in terms of science but also in other ways and we are protecting them. We are withdrawing from a couple of relatively minor commitments—minor in monetary terms—but what I look for in international partners for is me is people who tell it as it is. We are being straight with our international partners. We have notified them of our intention to try to negotiate a withdrawal from the Gemini programme. We have told them that we do not believe that the current strategy for the ILC is the correct one and we cannot participate in that. We are being very upfront and very direct. What would be unfortunate in terms of international reputation is if we try and pull the wool over people's eyes and not tell it as it is. Quite the contrary, we are telling it exactly as it is.

34. **Q124 Dr Blackman-Woods:** You are more or less not agreeing with them is, I think, what you are saying. Can you tell us a bit more about how the decisions were made regarding which programmes to cut? I am totally confused about whether there was consultation or whether there was not consultation because we have had different answers today. I think you need to say something more about that.

35. Professor Mason: I will be very happy to. If you analyse our Delivery Plan in terms of decisions, we made two and a half decisions, to put it very bluntly. Those were strategic decisions. We made a strategic decision to withdraw from Gemini; we made a strategic decision to withdraw from ILC. These were not ill-considered decisions made overnight; these were based on advice that we got from our science community over the last year in terms of relative priorities and the fact that we cannot do everything. The half decision was in relation to STP ground-based facilities which was actually a decision that we made at the last spending review but we are confirming this time because clearly within a shrinking budget we could not restore the cuts that we needed to make at the last review. All the other decisions, as I said, are being handled through this £40 million headroom process where we have peer review committees sitting down, as we speak, drawing up a priority list for using that money, so they are fully involved.

36. **Q132 Dr Harris:** On this question of the health of physics before we leave it, you said there would be plenty of jobs for physicists because physics is funded by other means, but do you understand what the implications are for people who progress down a career in a certain area of physics? It is not something—as I understand it and this probably applies in other disciplines as well—that you can switch out of, from astrophysics into biophysics. Can I suggest to you that if you accept that, if you were going to make a strategic change in the way you wanted to put your investment—as you might be entitled to do based on good science and evidence—you would want to have a lead-in time so that you did not lure people into PhDs when there were no post-doc jobs available after that in that field and have specialists stuck in a post-doctoral area with nowhere to go. Do you accept that that would be a good way of doing strategic re-prioritisation?

37. Professor Mason: I do not accept your statement. I think there are many instances—one was quoted by a previous witness—of people who have very successfully changed fields. I think that is one of the beauties and one of the strengths of inter-disciplinary research, that we need to encourage people to branch out and think beyond their own narrow disciplines and how they can apply their skills more widely.

38. Professor Diamond: There are a number of research councils, for example EPSRC, who have things called discipline hopping grants which enable people to retrain. It happens an awful lot. One of the things also is that many particle physicists have found careers in the city, not doing particle physics but using their skills to be able to apply them in particular areas. People are prepared to re-train in those arenas. I think it is the case that re-training is part of a career in some instances.

39. **Q141 Dr Harris:** Let us take solar terrestrial physics because that is quite a wide field with a lot of things in that and you are going to cease all funding for ground-based work. That is one way of saying that you are taking one subject and you are not going to fund of it. An alternative way might be to fund just the best science here. Is it consistent with a philosophy of funding the best science to say that you are going to cease all funding for a particular area?

40. Professor Mason: As I said that decision was actually made by PPARC at the last spending review based on a programmatic review that ranked all the activities that PPARC funded. For reasons which I will not go into that particular area came low down on the list.

41. **Q143 Dr Harris:** So it is either lower quality or lower priority. I accept you can set your priorities in quality areas, but it begs the question why something like solar terrestrial physics—which is relevant to subjects like satellite communications and climate change—is seen as a lower priority than the formation of galaxies. I do not dismiss the formation of galaxies as being fascinating but one could say, in terms of what you are asked to do, surely communication systems and climate change should be a priority and therefore it must be a quality issue.

42. Professor Mason: To be fair communications and climate change were not part of PPARC's remit. The priority of these facilities—we are talking about funding again with international subscriptions in many of these cases—was judged to be down the priority of what PPARC needed to do.

February 2008

Memorandum 25

Submission from Johannes Knapp, Head of High-Energy Astrophysics, School of Physics and Astronomy, University of Leeds

We in Leeds, and colleagues from other UK universities, are directly suffering from the recent decision at STFC to "... cease to invest in high-energy gamma ray astronomy experiments". Seemingly, this decision has been taken by the CEO of STFC without consultation with any of the STFC panels or the wider community. Even the Head of Strategy of STFC, John Womersley, was taken by surprise.

As Gamma Ray Astronomy is a comparatively small (and cheap) part of Astro- and Particle Physics you may not have heard yet about this aspect of the funding crisis. With this letter I just wish to add one more facet to the picture, a facet with very serious consequences for some of us and for the UK.

High-energy gamma ray astronomy was pioneered in the UK, and key techniques have been developed here. The UK was involved in most major gamma ray experiments since the first successful detection of a gamma ray source in 1989. The amounts of UK funding available were never generous (order £0.3 million per year), but sufficient to stay a full collaboration member, alongside our American and European colleagues.

With the most recent generation of telescopes (HESS, VERITAS) the field experienced a boom. The source count went from about 10 in 2000 to over 100 now, and there is no end in sight. Gamma Ray astronomy has become one of the hottest topics in physics and a well-established discipline, similar to optical or X-ray astronomy. Exciting results are regularly published in high-ranked journals such as *Science* and *Nature*, prestigious prizes are given out for results in this area (eg the Descartes Prize of the European Union), and our students and young scientists find this field very attractive.

As a consequence of the boom a large European gamma ray observatory (CTA) is now proposed. It is one of the top-ranked projects in the “European Strategy Forum on Research Infrastructures” (ESFRI), the “Astroparticle Physics European Coordination” (APPEC) roadmap and the “ASTroParticle ERANet” (ASPERA) roadmap.

The latter is an initiative to co-ordinate funding of Astroparticle Physics across European funding agencies and it was set up with significant effort of PPARC (the predecessor of STFC). There is no doubt that CTA will be built (with generous funding from Germany, France and other European countries), that it will detect of the order of a thousand new sources, that it will yield an exceptional scientific return and that it will push this and related fields to new heights.

As it stands, however, this will happen without UK involvement. If we cannot participate in the design and construction we cannot be members of the collaboration and harvest the scientific results. Even worse, without funding we will have to leave the current experiments (HESS and VERITAS) which we have helped to design, for which we have built equipment and which are now in a very productive (and comparatively cheap) exploitation phase. Who would invest in an experiment and then leave when finally data start to come in? Especially if the cost savings are so modest as in our case. Gamma Ray Astronomy is extremely good value for money, compared to other projects funded by STFC. The withdrawal from running experiments will severely damage our reputation as collaboration partners and impede future UK involvement in large European or American projects for many years to come.

The UK community is of the order of 50 physicists (this was the number of participants at a gamma ray workshop in Leeds in December 2007), and many peers do have very positive views on this area of research. I think it would be only fair to have our field properly reviewed, and reasons given, before making the decision to kill it. I am sure the outcome of a peer review would be favourable for us.

February 2008

Memorandum 26

Submission from Dr Sam Nolan, University of Durham

Having recently attended a meeting at University of Durham, where our local MP (one of your members, Dr Roberta Blackman-Woods) discussed the funding situation with STFC, I was moved to write a brief account of the personal impact this funding cut will have on my own research and employment.

My name is Dr. Sam Nolan and I am currently employed by the University of Durham as a Associate Fellow in Astronomy. For several years before this I was employed by PPARC on various research grants in the field of gamma-ray astronomy. The success of these grants (more of which later) being such that in November last year the department of Physics at the University took me on as full time staff.

When I started my PhD, 10 years ago, my field of astronomy was in its infancy. But thanks to the hard work of my collaborators and I in Durham and within the European and African collaboration in which I work, we have brought this field to maturity in recent years and produced many *Nature* and *Science* articles. Although our grant from STFC has been a modest £150,000/annum, our collaboration (HESS) has recently been awarded with the 2 million Euro Descartes prize for European collaborative science. With the recent decisions from STFC, not only will the UK’s involvement in this rapidly evolving area of astronomy cease, but there will also be significant problems for our European partners as a result. This is due to the fact that the UK provides key calibration data, without which the telescopes are unable to take high-quality data.

Although the field of ground-based gamma-ray astronomy had modest beginnings at Harwell in the early 1950s it is fair to say that all the key breakthroughs that have created its recent successes are due to either science carried out in the UK or by UK scientists using international facilities. I therefore find it difficult to see why, for such a small investment and large return, our funding has been withdrawn without consultation.

After finishing my PhD in Durham for example I went to work in the States on a NASA fellowship, but it was the continuing commitment to this evolving field and the significant expertise available within the UK that made me return to Durham.

Currently I am involved in a large amount of teaching within not only Durham University but the Open University as well. In addition I believe that science cannot afford to exist within a vacuum and so I give regular talks to local schools and societies, attempting to explain and enthuse the next generation of students. In addition our research has appeared in several news articles as well as being the topic of a recent BBC Radio 4 documentary in the Frontiers series. None of this would be possible without the current STFC funding. Having grown up myself in rural Cumbria, I know how vital these outreach events are, as without them I would never have been encouraged to learn physics or become an astronomer.

In addition, for the small investment we require to operate, we are developing two spinout technology companies. One that seeks to design high performance mirrors -for not only astronomy but also solar light collection for heating and light. The second project (in collaboration with AGI Ltd) is developing an atmospheric quality monitor for use by the military on aircraft carriers. The nature of this is directly related to the calibration systems we currently use for our telescopes. Therefore in effect this current STFC decision will cease these industrial collaborations as well.

Now that I have reached a point in my career where I am able to become an independent researcher, and working within such a developing field which is truly the newest form of astronomy, and can shed light on many of the big questions, such as the origin of cosmic-radiation and the nature of dark matter, I find it truly unimaginable that STFC has chosen its current path. Without review or consultation with any academic in the field, STFC has informed us that the UK "will cease to invest in high-energy gamma ray astronomy experiments". Not only does this raise questions about the future of my own career at the University but that of at least a dozen of my colleagues, some students and some postdoctoral researchers.

I therefore would urge the parliamentary committee to question at the highest levels the threat that is befalling this small but rapidly evolving area of Physics. Without at the very least a review of the subject, STFC have written off one of the most successful experiments in recent years and removed the ability for UK scientists to become involved in future projects within this field.

February 2008

Memorandum 27

Submission from Jim Hinton, STFC Advanced Fellow, School of Physics and Astronomy, University of Leeds

I am writing to you as someone heavily affected by the STFC funding crisis, in particular the statement in the Delivery Plan 2008/9–2011/12 that the STFC will "cease to invest in high energy gamma-ray astronomy experiments", in the hope that this issue could be brought up at the Science Budget Allocations meeting this Wednesday. I realize that the decision to axe gamma-ray astronomy was made in the context of a general crisis in astronomy funding, but I would like to try to persuade you that this particular decision is unnecessarily damaging to UK science.

Gamma-rays lie at the extreme high energy end of the electromagnetic spectrum and as such represent a frontier in astronomy. The first source of TeV photons (12 orders of magnitude more energetic than visible light) photons was discovered in 1989 and within the last few years rapid progress has been made using an instrument called HESS <http://www.mpi-hd.mpg.de/hfm/HESS>. More than 70 sources are now known and new classes of TeV emitters have been announced in a string of papers in the journals Nature and Science. HESS recently won the European Union Descartes prize for Science Research <http://ec.europa.eu/research/index.cfm?pg=newsalert&lg=en&year=2007&na=na-070307-2>.

The Cherenkov Telescope Array <http://www.cta-observatory.org/> (CTA) project is a next generation instrument, planned to be ten times more sensitive than HESS, which is highly ranked in several European science roadmaps (eg ASPERA <http://www.aspera-eu.org/images/stories/files/Roadmap.pdf>) and involves 11 European countries.

The UK is well represented in these projects despite a very small share in the total costs. Of the seven science working groups in HESS, two are led by UK scientists (myself and Paula Chadwick at Durham). In CTA, three UK groups are involved and I am the coordinator of the working group designing the array through performance simulations (arguably the most important aspect of the design study). It is a bitter irony that ground-based gamma-ray astronomy has been supported in the UK through two decades of difficult pioneering activity, but now that the field has emerged as major astronomical discipline, the UK is planning to withdraw. Now is really a time to reap the benefits of these years of low level investment.

The impact of this decision on me personally is very negative. I received my PhD from the University of Leeds in 1998 working on cosmic rays with Prof. Alan Watson FRS. I then spent 6 years abroad, working in the field of very high energy gamma-ray astronomy, firstly at the University of Chicago and later at the Max Planck Institute for Nuclear Physics in Heidelberg. After being awarded an international prize (the Duggal Award <http://www.iupap.org/commissions/c4/website.html#duggal>), I returned to the UK in September 2006, to take up a 5 year STFC Advanced Fellowship, to continue my research in the gamma-ray field. For this work, I was recently awarded the UK Institute of Physics (IOP) Nuclear and Particle Physics Division Prize http://www.iop.org/activity/groups/division/npp/Division_Prize/page_6752.html for

2007. In the light of these achievements, I had hoped to secure a permanent post working in the UK in gamma-ray astronomy in the near future. Having just bought a house in Leeds, I am now faced with the choice of moving back to Germany (or France, Italy, Spain, Ireland . . .) or the USA to continue my work, or giving up my prominent place in an exciting and rapidly moving field, for an uncertain future in a different area of astrophysics.

My colleagues in the department are similarly affected and my PhD student Joanna Skilton, who started in 2007, has also been placed in a very unfortunate position. This decision sends the wrong message both to young scientists in the UK and to the international community: that the UK is not the right place to do cutting-edge research. I consider gamma-ray astronomy to be excellent science and good value for money.

Less than 1 million pounds is needed in total over three years to exploit current instruments and prepare for the future. This is also an area of research that is inspiring to many non-scientists (this is the high energy frontier of astronomy and we deal with very exotic objects such as supermassive black holes and supernova explosions). To leave this field now would in my view be a huge wasted opportunity for UK science.

February 2008

Memorandum 28

Submission from Dr Brian WJ McNeil, Department of Physics, SUPA, University of Strathclyde

I write to express my deep concern at the damage the £80 million shortfall in STFC funding will cause to UK science and economic competitiveness.

There has been little or no consultation within the scientific community on how to deal with these cuts and STFC senior management appear to have made hasty decisions that will adversely affect science strategy in the long-term. While there appears to be a positive bias towards space science, other economically important areas of science research look increasingly likely to suffer.

In particular, I am very concerned that research towards building the next generation of light sources will be compromised.

Currently, sources such as Diamond in Oxfordshire enable determination of the structure of atoms, molecules and biological systems. The next generation of sources, such as the UK's 4GLS project (now abandoned) will be able to follow their motion in time so that we will be able to "see" how such systems function and interact. This would generate great economic benefit from across the whole of science. Other nations (eg USA, Japan, Germany, Italy, France, South Korea) are all investing significantly in this field and will reap the rewards.

Staff at STFC Daresbury laboratory have been informed that they will probably suffer significant and disproportionate redundancies. These are the highly skilled people who designed the Diamond light source and who have been designing the UK's next generation light source. If redundancies are made on the scales anticipated (leaving only approximately 150 staff at Daresbury) great damage will be done to the UK science base from which it will take at least a generation to recover.

I strongly urge you not to allow Daresbury labs to be decimated in this way and to take immediate action to remedy the situation at your forthcoming meeting of the Innovation, Universities and Skills Committee.

Memorandum 29

Supplementary evidence from the Science and Technology Facilities Council following the oral evidence session on 21 January 2008

STFC REVISED DELIVERY PLAN AND UNIVERSITY PARTICLE PHYSICS AND ASTRONOMY POSTS

Research grants make up the bulk of the funding that STFC gives to universities and with such a large amount it is inevitable that, within a programme of cutbacks, the grants budget would come under pressure. It is difficult to quantify, in exact terms, the current size of the grants "budget" as a result of ongoing work associated with the merger and other factors but it is unlikely to differ significantly from the expenditure on grants by PPARC in 2006–07, which was £139.2 million (CCLRC spend was less than 1/10th of this figure).

Awards are made for a period of 1–5 years, usually with a review point approximately 3 years into the award to assess the health of the work programme.

Awards are planned for on three year cycles, but the timetable is different for Astronomy and Particle Physics.

Astronomy

Astronomy awards for exploitation (responsive mode) are decided upon annually within a three year cycle.

Over the last three years, the numbers of Post Doctoral Research Assistants (PDRAs) on grants has been:

2005/2006: 278

2006/2007: 329

2007/2008: 323 (the original plan figure was 356, but this was pegged back once the CSR allocation was known)

(NB: These figures equate to a 3 year cumulative total number of awards, approximately 100, or one third, of which are made within each given year.)

The 25% reduction in funding is cutting into the originally projected aspirational programme of growth, year on year. The revised Delivery Plan results in a reduction in the cumulative number of new awards being made by the end of 2010–11 to 247.

Whilst this is a significant adjustment, in comparison with 2005 it is a reduction of 31 posts, equating to roughly 11%. The reason for making this point is that the cutback should not, in STFC's opinion, be seen as a threat to the critical mass of researchers within Departments or their overall viability.

Particle Physics

In contrast to the rolling year on year Astronomy awards cycle, Particle Physics awards are made every three years. The next awards decision date will take effect in the year 2009–10, or one year into the revised STFC Delivery Plan. The 25% reduction in funding required by the Delivery Plan directly impacts on this decision date. Awards for the next two years are, in effect, protected because of the decision making cycle, with the exception of support provided within these grants for projects (such as the International Linear Collider) in which there will be a reduction as indicated in the Delivery Plan. In these instances, it is expected that current grants will be withdrawn and the relevant support removed.

It is envisaged that this delay should allow University Departments to plan effectively for the reduction in funding. It should also be noted that the Physics Review will have been completed in advance of this date and its recommendations should take into account this timetable.

CLARIFICATION REGARDING CASH, NON CASH AND CAPITAL ALLOCATIONS

Our accruals based allocation (in common with all government funding) comes in three flavours: near-cash, non-cash and capital. Before explaining what these are I should point out that, in the main, capital allocation can only be used on capital spend and non-cash can only be spent on non-cash items. Near-cash on the other hand can be spent on near-cash, non-cash or capital. In addition, and separately, the council is provided with cash to pay its accruals based budgetary commitments.

Near-cash is available to spend on running costs, salaries, certain subscriptions etc. It is similar to what we used to call resource or recurrent expenditure. This is the biggest element of our allocation.

Capital is the money we spend on investment in items that will become assets. Buildings, facilities and large pieces of equipment will class as capital. They have a value on our fixed asset register. In addition we are able to use some of our capital spend as something called capital grants to the private sector (CGPS) and we do this for a portion of our CERN subscription and on some University Grants.

Non-cash is an allocation we get to enable us to make provision in our accounts to cover future obligations and things like depreciation. This makes our accounts look more like normal business accounts. If we were a real business this would be money we would set aside for future replacement of assets and would be very real. The reason it is called non-cash is that no money actually moves around. We don't actually get the money, we just get an allocation and we use it to make provision in our accounts. One little twist in this story is that if we don't have enough non-cash to make provisions in our accounts then we need to use some of our near-cash instead and that is very real.

MANCHESTER INDEPENDENT ECONOMIC REVIEW TERMS OF REFERENCE

In addition the Government have asked the MIER to undertake a further piece of work on their behalf that will be undertaken alongside the existing Review programme of work on the potential contribution of the Daresbury campus to science and innovation in the UK economy as a whole, the North West science base and the Manchester City Region.

This will include an assessment of:

- the role of partnerships with universities, public sector bodies and the private sector;
- the potential for increased commercial investment;
- the contribution of training and the development of an appropriate skills base; and
- the complementarities with Harwell and other major science and innovation campuses.

February 2008

Memorandum 30

Submission from Dr Mark Thompson, Centre for Astrophysics Research, University of Hertfordshire

I was fortunate enough to hear your comments on last weeks Today programme and very glad to hear that your Select Committee would be looking into the issue of the catastrophic settlement for Physics & Astronomy from DIUS.

I am writing to bring your attention to a number of issues resulting from the funding cuts to Physics and Astronomy and to urge the Select Committee to consider these issues in the New Year. I am a recently appointed lecturer in Astrophysics at the University of Hertfordshire, a practising research scientist and also the Admissions Tutor for Physics for the University.

Firstly, as I understand it, the settlements in the Spending Review for scientific research seem to have been made on a very short-term economic potential basis. This basis will cause significant damage to UK Science all for the short-term good of UK plc. The cuts of 25% to the grants line at the Science & Technologies Facility Council (STFC) will result in the loss of many of our youngest and best scientific minds at the precise time when our country is becoming the best place in Europe to perform scientific research.

I would draw your attention to the recent funding announcement by the European Research Council for their Starting Grant Scheme. Along with many other European researchers I took part in this competition this year, which is designed to reward scientific excellence by giving young researchers the funds to set up their own research teams.

Unfortunately I was not successful, but UK-based researchers were the clear winners in this very competitive process: the UK has both the largest fraction of awarded grants and is the country of residence of the largest fraction of successful applicants. In monetary terms the strong success of the UK's researchers has resulted in somewhere in the region of €120 million being brought into the country. Whilst not all of this benefit is due to researchers working within the purview of STFC, it is clear that this success is entirely due to the strong research culture of the UK and the support given to postdoctoral researchers through the grants line. These postdoctoral researchers (of whom I was one just three years ago) contain the next generation of scientific leaders. With a 25% cut to the astronomy and particle physics grants line many of our best researchers will be lost, the research environment will be weakened and it is very unlikely that the UK will be able to compete as significantly as it has in the European (or worldwide) funding arena.

Secondly, the UK has long enjoyed a very strong astronomy and astrophysics research base. Indeed we are the preeminent astronomy research country within Europe and second only to the US. In a number of fields, my own of sub-mm astronomy included, we are the clear world-leaders. This is in no small part due to the researchers supported by the grants line, who compete in one of the most darwinian research cultures in the world. These researchers put their personal lives and careers on the line to answer some of the most fundamental questions in the Universe and have truly given the UK its preeminent position. This position makes the UK a very attractive place for the researchers of all nationalities to come and work in.

My own university department has recently recruited astronomical researchers from Germany, the US, Spain, France, Mexico, all of whom were keen to come to the UK to take part in its strong research base.

For the UK to withdraw in large part from astronomy and particle physics will not only mean the loss of top foreign researchers wanting to come here, but will also give rise to the most savage brain drain yet experienced in astronomy or particle physics.

Finally, I must stress the effect of this terrible announcement upon undergraduate applications to study Physics. The nation's sixth form and college students are currently choosing their subjects and universities for UCAS applications. These students do not choose to study Physics because of an innovation-driven culture, nor to study applied science, nor because of immediate economic benefit to themselves or the nation. They are attracted to study Physics because of the headline fundamental research that goes on in our Universities - particle physics, the Higgs boson, astrophysics, astronomy and cosmology. Indeed, many University Physics departments have been recruiting astrophysics lecturers because of the perceived attraction that astrophysics has in encouraging students to study Physics. In my own experience, I am receiving increasing numbers of applications to study astrophysics and moreover these applications are not just from the UK, but coming from across Europe and the rest of the world.

Physics, as I'm sure that you know, is one of the strategically important and vulnerable subjects identified by HEFCE for priority support of £75 million over the 2007–2010 period. The Government has identified STEM subjects as critical to the success of the UK's economy and has pledged to increase the number of scientists and engineers in the UK's workforce. So for DIUS to carry out a raid on the very research funding that keeps Physics departments in existence and that crucially inspires the next generation of physicists to study Physics is both criminally irresponsible and in direct counter to the national strategy as pursued by HEFCE. Physics departments will close as a result of this funding decision by DIUS and the competitiveness of the UK will be decreased yet further.

I hope that the committee will be able to take my points on board and I earnestly hope that this terrible decision by DIUS can be reversed or mitigated before the UK's strong science leadership is irretrievably damaged. At the moment I am very despondent about the future of my own research career, which I have fought hard to achieve over the last ten years, and which our nation's leaders have recently seen fit to inform me how little it is valued.

February 2008

Memorandum 31

Submission from Herbert Carlson, Chief Scientist Emeritus, Air Force Office of Scientific Research

This is a short note to register my considered judgement that the UK has for decades played a leading role in the International ground based Space Sciences community, and that the direction I'm led to understand current funding is going for this field of science in the UK comes as a shock, despite having followed the increasingly distressing news that has emerged over the past year. Given the growing importance of that field as judged by leading scientists and funding agencies in so many other nations, I had been lulled into a false sense of security that the threat would be resolved with a favorable outcome.

Given the intensity of surprise and alarm for this field, which I anticipate to be felt by many abroad, if the presently considered budget cuts start to become implemented, this note is to ask what might colleagues and funding agencies in other nations say, or to whom might they write, to urge a meaningful reconsideration by the UK Research Councils, of the value of the research field now under threat, and a reconsideration of how it fits into the overall UK national science picture.

February 2008

Memorandum 32

Submission from A P Van Eyken, Director, EISCAT Scientific Association

I presently have the honour to be the Director of the EISCAT International Scientific Association, the World's leading upper atmosphere research radar institution, and an international partnership in which the United Kingdom plays a major role. In spite of my name, I am also a born and raised UK citizen. While the contents of the recently published Science and Technology Facilities Council (STFC) Delivery Plan distress me greatly in both capacities, I understand that the Chairman of the international EISCAT Council will express the Association's views and I write here primarily as a concerned, and saddened, UK citizen.

The United Kingdom's scientific community are world leaders in the development and exploitation of radar for atmospheric research. In particular, the UK has led the way in the exploitation of the EISCAT radars and together we have achieved a great deal of excellent science that is also of direct benefit to humankind.

I would like to emphasise the implications of the UK withdrawal from all ground-based Solar Terrestrial Physics (STP) which was announced—seemingly with no warning or consultation whatsoever—in the first Delivery Plan to be issued by STFC last week.

EISCAT is an international consortium of the UK, China, Norway, Sweden, Finland, Japan, and Germany and provides a number of radars and other facilities in northern Scandinavia and on the Svalbard archipelago in the Arctic. The research we carry out in the STP area is applicable to many areas but is of direct and immediate benefit to the forecasting of the geo-effectiveness of Earth-bound disturbances generated by the Sun (which can effect, and damage, a huge range of technological systems from cell-phones to the electrical supply grid), the design and operation of satellites in the hostile environment of space, the efficient operation of communication and navigation systems (including both one- and two-frequency GPS/Galileo positioning systems), satellite debris and space environment monitoring, satellite orbit prediction, the development of oil and mineral exploration radar, not to mention a variety of military applications.

In the UK, EISCAT participation had been funded through "blue skies" research councils starting in the days of the Science Research Council (SRC) and progressing through the Science and Engineering Research Council (SERC) to the Particle Physics and Astronomy Research Council (PPARC), where the direct

economic, military and wealth-creation benefits of the research were not major factors in the decision making. Nevertheless, two years ago the UK EISCAT community submitted an excellent science case supporting their continued involvement. This case dealt with, inter-alia, fundamental plasma physics, upper atmosphere cooling (caused by global warming), solar control of near-Earth space, upper-middle-lower atmosphere coupling and studies of the solar system condensation using EISCAT's unique capabilities for micrometeorite studies. Indeed, PPARC's Science Committee agreed and signed up to the rolling 5-year membership commitment, a decision reinforced by STFC's early actions in steering UK groundbased STP interests towards specific exploitation of UK's access to the EISCAT facilities which are, as noted above, the finest such resources in the World.

Given that the research carried out with EISCAT has so many immediate applications, we very much welcomed STFC as a new research Council with a broader remit to cover the economic benefits of our research. However, instead of supporting solar-terrestrial physics as an outstanding example of marrying world-leading research with technical benefits to society as a whole, STFC has singled out this field of research to be cut. The impression given is that this delivery plan is very poorly thought out, hurriedly written and that it targets ground-based STP just to pad out the list of savings. However, it is a tiny saving compared to that required and yet, by completely abandoning this entire field, does incalculable damage to the nation's support for its space industry. The Chief Executive is on record as saying that the cut was decided upon two years ago, in the programmatic review, but that they only decided to implement it now. Firstly, EISCAT-related STP was specifically not deprecated in that programmatic review, and, secondly, that was a review conducted under quite different circumstances by PPARC. Surely it has not been forgotten that the new research council has a different remit? It is not at all clear that any changes have been made to the STFC interpretation of the programmatic review to ensure that the economic impact of projects like EISCAT are genuinely given more weight than they were in the PPARC regime; indeed, the whole procedure seems to have been rather opaque.

Finally, I would like to make some comment on the reputation of the UK, its scientific community, and their trustworthiness in international collaborations. The prospect of the UK belonging, for several more years, to an international association, namely EISCAT, which it does not then exploit, is very damaging to its credibility as a competent research nation. That the UK would not honour its commitment, thus also destroying its reputation as a trustworthy partner for international collaboration, is presumably quite unthinkable. Driven by the requirements to address currently identified major science issues, and with strong backing from the EU, EISCAT is moving forward towards a new generation of radars which will be invaluable not just in space weather activities but also in studies of solar system formation and it painful for me, as a UK scientist, to imagine that all this could take place without our participation and without benefiting UK society in any way.

When STFC first cut back resources for UK ground-based STP, the Chairman of the EISCAT Council wrote to the STFC Chief Executive deploring the situation, but never received any response. I am therefore distributing this letter more widely, and by email in the interests of speed, in the hope that it may at least be read in some quarters before being consigned to the rubbish bin along with the fine and unrivalled reputation of UK atmospheric physics research.

December 2007

Memorandum 33

Supplementary evidence from the Science and Technology Facilities Council following the oral evidence session on 21 January

GRANTS

We have two types of grants:

Rolling five year ones for combined programmes seeking support for groups of PDRAs

Standard three year ones for distinct projects usually requiring support for single PDRAs.

The AGP ranked all of them. The cut was imposed by reducing the value of the award for the rolling grants (primarily by removing some PDRAs), so this did not result in any awards being cancelled, only the value reduced.

For the standard grants ranking a number of non-core rolling grant posts, which were assessed against the standard grants, were removed in the cut such that the final list of awarded standard grants was no different to if we had not made the required saving.

In simple terms we made the saving by cutting posts and associated costs rather than number of awards.

 CRITERIA USED TO ASSESS PROJECTS IN THE PROGRAMMATIC REVIEW

The criteria consisted of an assessment of:

- strategic importance
- impact
- competitiveness
- level of UK involvement
- scientific user base
- science output
- outreach
- training
- industrial impact

March 2008

Memorandum 34

Submission from Professor Swapan Chattopadhyay, Inaugural Director, Cockcroft Institute of Accelerator Science and Technology

SELECT COMMITTEE EVIDENCE SESSION, FEBRUARY 27, 2008

Preamble:

I would like to put on record the following statements:

- (i) Everything you hear from me are observations and comments from the perspective of a newly inducted scientist/scientific leader in the UK, barely ten months on the job, after a successful and matured career spanning 33 years working in various leadership and executive capacities with the Department of Energy-supported major US national labs (e.g. Lawrence Berkeley and Thomas Jefferson National Labs) and at top-rank US universities (e.g. University of California at Berkeley and most recently Harvard U.).
- (ii) When I speak of the Cockcroft Institute, I am using it as an “iconic” symbol for what appears to the rest of the world as the rising UK pre-eminence for accelerator science and technology, representing not only the Cockcroft Institute but also our sister institutions elsewhere such as the John Adams Institute at Oxford University and Royal Holloway as well as accelerator scientists and particle physicists at Imperial college and universities throughout UK.

1. On the issue of “Due Process” in communication, consultation, transparency and peer review: HM Government vs. STFC.

There appears to be a fundamental inconsistency between HIM Govt. /DIUS and STFC/RCUK/DIUS which brings into question STFC’s comprehension of its own business. I do not believe that the STFC Delivery Plan in its current form and its consequences—were intended by design by the HIM Government. I believe that the “Haldane Principle” of allowing the Research Councils determine their own priorities should hold unless there are reasons to question the integrity of the “due process” employed by the Research Councils in its decision making which might point to abuse of such privilege. I believe that it is this lack of demonstrable implementation of the “due process” in communication, consultation, transparency, and peer review that is under question at the moment, leading to the total lack of confidence in STFC’s management capacity and competence. I was glad however to note the DG RCUK, Sir Keith O’Nions, state at the end of the evidence session on Feb. 21, 2008, “. . . and the STFC CEO is quickly getting a good grip of the situation as evidenced by the recent re-structuring of STFC, etc . . .”, an admission that the necessary grip and understanding of the business needs were probably missing, at the formation of STFC, from its CEO and his management team. Note that the community got a hint of the impending Delivery Plan only in November, 2007, without any prior engagement.

2. On the question of “Much Ado about Nothing!”—Crisis or not?

I want the committee to know that the community is simply “re-acting” to the “actions” by “actors”, which is STFC. Sir Keith’s surprise at the out-of-proportion response to a “claimed” modest reduction in Physics support and the damage it has done to the agency’s reputation, and his admission of “hearing some reasonable and sensible voices amongst all the shrill . . .” as he put it, is a mere acknowledgement and

reflection of the lack of appreciation on STFC's part of the intricate global network of the physics whose organic understanding must be fundamental to the STFC management. The shrill voices came from no others than IoP, Royal Society, RAS, VC's of the Russell Group of Universities, RAS, the international community...etc.

Despite the Minister of Science, Ian Pearson's statement of "No Crisis", no real short-fall of £80 million and no reduction in support for the universities, and despite Sir Keith O'Nions statement, "...this is a problem that other nations would rather have than a crisis", STFC has, through Town Meetings and All-hands Meetings at RAL and DL, admitted to the situation calling it a "crisis" and admitted to an £80 million short-fall. Despite assurances of commitment to the science and staff at Daresbury and Rutherford sites, universities, including Cockcroft Institute, John Adams Institute and elsewhere, we are seriously looking into employment rules, regulations and policies about the actual redundancies and "terminations to contract" to be implemented on a scale of a few hundreds. This is not a potential or exaggerated situation, but is happening in real time.

Is it a CRISIS? No ILC, no GEMINI, 25% reduction in Particle Physics and Astronomy Grants, possible claw-back on existing grants, planning for 100's of staff redundancies, call it by whatever name one wants, but STFC management made it look like we cannot do anything about it to recover from this grave situation.

If STFC management is correct, then they are contradicting Sir Keith and Ian Pearson. If they are wrong, then they did bring about the damage themselves.

3. On the issue of Peer Review/Consultation before PAPAN and PALS considerations

It is my observation that the STFC decisions were not based upon intelligence-based, informed "reviews". See my letter to PM Gordon Brown (Annex 1). Sir Keith O'Nions in his evidence to the committee on February 21, 2008 said: "From where I sit, it appears that proper peer reviews have taken place, based on which PAPAN, PALS, etc. make their highest recommendations to the DG, RCUK. But probably there is reason to look into it further the rest of the question, of course, should be directed at STFC itself". In this regard, one should look critically at the review process or the lack thereof, at levels below the PAPAN and PALS. There have been three so-called programmatic peer reviews in STFC that I have personally witnessed: Future Light Sources Review, Particle Physics Review and Accelerator Science R&D Review. It has been my experience in the past three plus decades on all such reviews that:

- (i) Reviewed community knows that the review is taking place;
- (b) There is inclusive discussion and feedback on the selection of the members of the review committee team;
- (c) There are opportunities given to the community to comment upon an initial "draft" of any review for courtesy, ensuring factual accuracy and eliminating technical or parochial biases.

In all of the above STFC reviews, there were no consultations with the community, for the sake of full ownership, about the nature and selection of the reviewers and no sharing of the resulting deliberations before the review recommendations were declared final. In many cases there were fundamental scientific conflicts between the reviewers and the reviewed, thus compromising the integrity of the review. The qualifications and stature of the reviewers often did not match the qualification and stature of the reviewed, with visible gaps in expertise. These were pointed out at least in connection with two reviews: the Light Source Review (see my letter to the review organisers in STFC dated 30 April, 2007 with regards to the Selection of Review Panel members exposing gaps in expertise critical to the review (Annex 2)) and the accelerator science and technology review body, ASTAB, on which we have forced a dialogue with the director of strategy more recently. Conclusion: all this surely will lead to "flawed" recommendations.

4. On the issue of "redundancies", diminished capacity and erosion of national core competency in accelerator science:

- Unilateral STFC redundancies, and decision on grants without consultancy with the community and global partners ahead of time, erode severely the unique skills base as a resource to the entire nation.
- No Technical "core competency" leads to no skills, no innovation, no "knowledge exchange" (a DIUS Deliverable),
- Accelerator science and technology is a resource to the entire nation. The redundancies", if needed, must be aimed at preserving national "core competencies" and be system-wide in consultation with all stakeholders. The Universities and local economic sectors maintain strong support for accelerator science in their respective territories of education, research and industrial development. STFC, supposed to bring operational scientific facilities and technical experts as labour via grants, is an unstable stakeholder. ASTeC is already losing skills base of the very best via volunteers!

Nation's ability to attract top global recruitment compromised by the Delivery Plan.

5. On the issue of Communication and Management:

Judging by the way the current situation developed, the lateness in staff communication of the impending crisis, the secrecy behind any communication efforts, decisions taken without intelligent communication to the community and eventually the manner of communication to staff leave us with the following conclusions:

- (i) The management of the newly merged STFC (CCLRC + PPARC), which still does not exist as an integrated organisation but as a set of independent units, had either an inadequate understanding of its Business needs or a pre-determined set of priorities to start with, not shared with the community,'
- (ii) STFC management did not believe in communication with its staff and community in developing, in partnership, an appropriate and credible plan in response to the challenge faced by the CSR allocations. Decisions were taken without appropriate inclusiveness, peer review and consultation within UK and abroad; severe consequences of the DP for the nation are highly incommensurate with the alleged funding shortfall;
- (iii) The STFC management has lost the trust of the community in having the wisdom in (and respect for) the field they serve and in their intellectual and managerial capacity to administer the portfolio under their remit,'
- (iv) All this points to severe mismanagement of science at the highest levels of STFC and possibly DIUS. The Select Committee is requested to scrutinise the STFC and DIUS "competency" at the highest levels of its management in managing its scientific portfolio.

Major Concern for Cockcroft Institute at DSIC

Is the DIUS commitment to make Daresbury a Science and Innovation Campus viable in the light of inconsistency with the STFC vision of Daresbury site?

We fear the answer is "NO"—Lack of support of the STFC leadership for scientific "flagship" facilities on the DL campus by design coupled with the planned reduction-in-force following the Delivery Plan, will render such a plan lacking credibility!! The Cockcroft Institute, by itself, without a thriving Daresbury Laboratory, will have no reason to be on site and will retreat to the universities, failing the lofty DIUS goals.

Example:

Ambivalent messages on future support for ERLP/ALICE, a flag-ship accelerator test facility not yet properly exploited following its £1 SM investment This is crucial resource for future accelerator science and technology, both to STFC and the CI.

February 2008

Annex 1

January 14, 2008

The Rt. Hon. Gordon Brown, PC, MP Prime Minister
10 Downing Street
London, SW1A 2AA
United Kingdom

REF: STFC'S DELIVERY PLAN, ITS IMPACT ON UK'S PRE-EMINENCE IN SCIENCE AND EDUCATION AND IMPLICATIONS FOR THE INTEGRITY OF ITS SCIENCE ADMINISTRATION

Dear Prime Minister

I write to you expressing my grave concern over long-term irreparable damage to UK's premier international position in fundamental science, potentially resulting from the Delivery Plan of STFC as it is currently conceived and planned for implementation. This plan, in my considered opinion, has not been subject to the necessary critical scrutiny and review that is due. It has the consequence of significantly eroding the foundation of higher education in UK, its unique advanced skills base and its credibility as an international partner. As a scientist, professor and scientific leader who recently migrated to the UK after more than three decades of a productive career in the world-class university and national laboratory system in the USA, I was attracted by the rising eminence, scientific prowess and credibility of the science and its administration in the UK. Today, in self-introspection, I refuse to negate all the positive forces that brought me to the UK, but cannot help but seriously begin to question the integrity in UK science administration in one particular sector that I am close to.

The STFC's discretion in the decision making process and determining its own priorities can only be left unchallenged within boundaries of reasonable and proportional deviations in response to expected modest financial hardships. As the editorial, "A policy of drift, British Physics faces an unnecessary squeeze" in the 20–27 December 2007 issue of the international journal *Nature* points out on page 1127,

Researchers in most countries in most parts of the world, have to tighten their belts from time to time. But these reductions are more drastic and sudden than any arm of a competently managed research agency should have to bear!"

The *competency* or lack thereof can be considered in various ways: understanding, articulating and advocating one's business needs to the government, to peers and to the workforce; establishment and practice of a due process of communication to, and of participation by, the community; and finally a properly informed and intelligent decision making process following a critical analysis and scrutiny by peers. I will analyse these factors in turn below.

The present STFC Delivery Plan calls for: up to 500 job losses in the short span of a year or two at best in the skilled science and engineering sector at the two national laboratories of unparalleled international reputation—Daresbury and Rutherford Appleton; a 25% reduction in the university grants in areas of particle physics and astronomy where UK occupies the front row seat globally among nations; elimination of certain national and international projects without peer review or with severely defective and questionable ones at best; and reduction of university programs in higher education in physical sciences and associated knowledge-based economy. The current situation is supposedly a result of implementation of Full Economic Cost (FEC) practice and bearing the operating costs of large scientific facilities. These allegedly add up to a £80 million deficit in expenses over a three year period relative to the STFC allocated near-cash budget by the government, increasing by only 8% over three years at the level of inflation only, by far the lowest of any other research councils, including Arts and Humanities (at 12%), according to information gathered by the community via the Freedom of Information Act.

Observation: the FEC process was known for some time to be properly accounted for and applied to all government funded programs. The operating costs of large facilities are high but expectedly so and not a surprise—they have been anticipated at the required levels and noted as such for several years.

Implication: The management of the newly merged STFC had inadequate understanding of its Business needs. If this is false, then either STFC was not capable of articulating these needs to the government or deliberately did not consider it essential to advocate its needs to the government, peers and community.

On the face of this financial mismatch of the business needs and the allocated funds, STFC faced a challenge. Nobody in the community and even in the upper echelons of management was aware of this challenge until very late in calendar year 2007, when it was rumoured to be discussed in a confidential meeting of the STFC Science Council, which supposedly was about to review a Delivery Plan developed to meet this challenge.

Observation: STFC management did not communicate with the community or the government the resulting challenges they faced and developed its own priorities and plans to address the financial shortfall confidentially amongst its selective top management with information embargo in place.

Implication: STFC management did not believe in communication with its staff and community. STFC management did not trust the community in developing, in partnership an appropriate plan in response to the challenge.

The resulting Delivery Plan—as developed by STFC senior management in a totally “opaque” fashion without application of due process in taking intelligence-based informed decisions and lack of subsequent communication to and ownership by the community—has resulted in what, by all measures, is a grossly disproportionate balance of priorities, calling for devastating loss of skills and human resources which are the foundation of UK's scientific and technological pre-eminence and economy. Such dire consequences as above, incommensurate with the alleged shortfall over three years, can not be considered or accepted as part of any reasonable and respectful review process and can only point to fundamental deficiencies in responsible science administration. There have been three so-called programmatic review processes to my knowledge in STFC: one in connection with the future Light Sources in UK; one in connection with Particle Physics; and one in connection with Accelerator Science R&D. In all cases, there were no consultations, for the sake of full ownership, with the community about the nature and selection of the reviewers and no sharing of the resulting deliberations before the review recommendations were declared final. In many cases, there was fundamental scientific conflict between the reviewers and the reviewed, thus compromising the integrity of the review. The qualifications and stature of the reviewers often did not match the qualifications and stature of the reviewed. The association of the term international peer review' to any one of these reviews is a serious caricature of this honourable practice that has withstood the tests of time worldwide in assuring the very best in generating scientifically honest judgments with integrity. These are serious enough to call the entire enterprise into question as far as its integrity in scientific honesty and leadership is concerned.

Observation: STFC management does not have a grasp of its own portfolio to the point that either it cannot judge for itself when it needs to seek counsel from peers and community or has fundamental disrespect for the process of peer reviews and pays only lip service to it.

Implication: The STFC management has lost the trust of the community in having the wisdom in and respect for the field they serve and in their intellectual and managerial capacity to administer the portfolio under STFC remit.

The consequences of implementing such grossly ill-considered Delivery Plan are so significant and devastating for all UK science that they cannot possibly have been subject to any meaningful and well-advised peer review. UK scientists now have lost their confidence to a large measure in the current STFC management's ability to administer UK physical sciences under its remit, given their inability to constructively engage and appreciate the consequential damage to the field. The STFC is no longer able to determine their priorities, based on their best assessment of the science. If STFC has been merely following the instructions of DIUS all along, on the other hand, then the community needs to hear urgently that this was the original intention and design of the government.

I, as a newly inducted scientist and scientific leader in the UK, am grossly disappointed at this state of severe mismanagement of science. I however refuse to believe this to be typical of what I have come to know and respect over years in the UK as the science enterprise of the highest calibre and integrity in the world. I request that, despite your other busy engagements, you give this matter the highest consideration it deserves and bring back the dignity, integrity and fairness that the situation deserves for the sake of UK's pre-eminence in the field and preservation of its foundational base that brought me to the UK in the first place.

Respectfully and sincerely yours,

Swapn Chattopadhyay

Copies to:

The Rt Hon John Denham, PC, MP, Secretary of State for Innovation, Universities and Skills Dr. Ian Pearson MP, Minister of State, Science and Innovation

Mr. Mike Hall MP, Weaver Vale

Mrs. Louise Ellman MP, Liverpool Riverside

Mr. Phil Willis MP, Chair, House of Commons Select Committee for Innovation, Universities and Skills

Professor Drummond Bone, Vice-Chancellor, The University of Liverpool

Professor Alan Gilbert, President and Vice-Chancellor, The University of Manchester Professor Paul Welling, Vice-Chancellor, Lancaster University

Dr. Mike Dexter FRS, Chair of the Board, Cockcroft Institute

Prof. John B. Dainton FRS, Sir James Chadwick Chair of Physics, The University of Liverpool Sir Martin Rees FRS, President of the Royal Society

Annex 2

30th April 2007

Dr. John Womersley, Director of Strategy, STFC

Prof. Robert J. Donovan, Univ. of Edinburgh
(Coordinators of UK Light Source Review)

REF: SELECTION OF REVIEW PANEL MEMBERS

Dear John and Bob:

I was grateful for the invitation last Friday, April 27, 2007 that allowed me a glimpse at the initial strategy for the Review of UK Light Sources being planned this summer by STFC, and in particular, the Review Panel as it stands now. As a newcomer to the UK science enterprise, I would like to comment on it, if I may, and not in the capacity as part of any light source project in the UK, which I am not. But I would like to deposit my thoughts rather as someone who has been associated with and steeped for the past two and a half decades in light source developments and the associated science around the world. This has included both conventional storage ring-based SR facilities as well as contributions to the progress on the conception and subsequent developments on ultra-fast techniques at Berkeley and then subsequently worldwide, then on to FELs at Jefferson Lab, and to the underlying emerging technologies of SCRF and ERLs. I have been embedded in the US/global light sources community starting with the conception, design, construction and operation of the ALS at Berkeley, later on contributing to the SPEAR 3 and LCLS developments, development of the Jefferson lab ERL/FEL and Cornell ERL-based facilities, advising the APS ERL-Upgrade team and counselling the NLS-II team at BNL spanning nearly 25 years. All these in my case, were synergistic with the other half of my professional canvas which deals with the accelerators and colliders for high energy and nuclear physics, where development of intense and bright beams of electrons and positrons provided unparalleled synergy between the two fields.

It is my perception that the chosen panel represents the hard X-ray community extremely ably, with notable members known for their judgment and wisdom in the community. I however feel that that this panel could be made more complete by adding one or two extra members who can offer wisdom and counsel to the UK community on the longer wavelength IR, VUV and soft X-ray regimes towards which 4GLS is targeted by design. 4GLS is not a facility directed towards research of complex structures via X-rays *per se*, but is rather aimed towards spectroscopy and functional time-domain analysis of complex processes including collective dynamics on surfaces, ultrafast phenomena, biological function and high field physics. This community complements rather than competes with the conventional hard X-ray facilities. It should be stressed that it is also very different from the high energy X-FELs being contemplated at DESY and being built at SLAC (LCLS) based upon SASE. In fact 4GLS is a mezzo-scale, longer wavelength, coherent and bright source of controllable light, made robust, predictive, reproducible, brilliant and flexible in its time structure by the now-established technology of SCRF in combination with the emerging Energy Recovery and various laser seeding techniques. Facilities similar to this are under early stages of consideration at various sites world-wide, 4GLS being the first of its kind. It thereby promises to be pioneering in the field at its cutting edge, potentially placing the UK in the premier seat globally with discovery-calibre science and all the rewards which this brings. However, the chosen panel will find it difficult to appreciate these aspects, given the absence of 4GLS's projection on the "hard X-ray axis".

With this preamble, I take the liberty of suggesting to you a few names who may complete the panel in terms of its knowledge/experience base and who would bring wisdom to the whole scientific scope of 4GLS in advising the UK research and funding agencies. I speak solely on the basis of their scientific and technological merit. Eventually the composition of this panel has to be acceptable to the community as well as to the agency.

The names of Profs. Roger Falcone and/or Ron Shen from Berkeley come to mind. Roger is currently the Director of the Advanced Light Source at Berkeley. He was also the Chair of the Scientific Policy Committee of the LCLS at SLAC. As a professor in the Physics department of Univ. of California at Berkeley, including his tenure as its Head, as well as via his involvement at the ALS beam lines and Lawrence Livermore National Laboratory's large laser facilities, Roger is a world renowned expert on Higher Harmonic Generation, High-field Atomic Physics, Femto- and Atto-second Physics etc., all in the soft X-ray and VUV regions. He is an esteemed reviewer in many international reviews, is courteous and gracious, and would be highly desirable as an international reviewer with integrity and scientific stature for this review.

Prof. Ron Shen, is an expert on IR physics, including IR lasers, ALS beam lines and IRFELs and general non-linear multi-photon processes. He is highly esteemed in the US and international community and would add significant value to the review as well.

The names of Steve Leone and Graham Fleming crossed my mind, but past interactions with SLAC will shadow their effectiveness in this committee from a socio-political perspective, and I would not recommend them as panel members for this review.

Finally, there are other international names to bear in mind: Joe Bisognano from Univ. of Wisconsin at Madison and Executive Director of SRRC, Prof. Chuck Fadley from UC Davis, and Prof. Robert Austin from Princeton (member of US National Academy of Sciences).

I am sure one can carefully add a name or two to balance out the portfolio of this panel, allowing it the proper experience base necessary to evaluate the diverse facilities which it has to consider, particularly the novel, but unfortunately still somewhat misunderstood, facilities of the future like 4GLS.

I thank you for your attention to my remarks and wish you success in this important yet non-trivial light source review for the UK.

Sincerely yours,

Swapan

Prof. Swapan Chattopadhyay, Ph. D. (Berkeley)
Director, Cockcroft Institute and
First Chair of Accelerator Physics, UK

Memorandum 35

Submission from Professor A D Aylward, Head, Atmospheric Physics Laboratory, University College London

I have been hearing some strange statements to the Committee that effectively try to pretend there was very little effect this grant round.

Coming from a group that had 50% cuts between original grant committee allocation and post CSR cuts —and knowing at least two other universities where that was also the case, I find these statements difficult to reconcile with experience.

The grants committee—the AGP in STFC—had a list prior to the cuts of the grants that were going to be awarded in December 2007 (we know because when we were sent our grant announcement they sent both the pre-CSR award and the post-CSR award figures—we were cut 75% and we know others who were cut worse).

It would be interesting reading to find out overall what the REAL result of the CSR cuts was on grant announcements.

Mike Cruise from Birmingham was the Chair of the AGP during this process. Could he be asked to release both lists?

It might be interesting to see STFC explain the lists in light of the comments they have previously made to your Select Committee—and indeed statements that have been made on the floor of the House.

February 2008

Memorandum 36

Submission from Professor Stan Cowley, Head, Radio and Space Plasma Physics Group, Professor Mark Lester, Dr Steve Milan, Professor Terry Robinson, Dr Darren Wright and Professor Tim Yeoman, University of Leicester

RE: IUS SELECT COMMITTEE EVIDENCE 27 FEBRUARY 2008

After listening to the evidence presented by Professor Keith Mason to the above committee under your chairmanship on 27 February, we feel obliged to write to you concerning some statements that may have been misleading. These concern the treatment of ground-based solar-terrestrial physics (GB-STP) facilities in the UK both by the STFC and its predecessor body the PPARC. Our first-hand knowledge of this matter arises from the fact that the Radio & Space Plasma Physics group at the University of Leicester, of which we are members, is the largest university group in the UK involved in these studies, such that we have been centrally involved throughout.

Contrary to a statement given in evidence by Professor Mason, the attack on our field began almost immediately after his appointment as Chief Executive of the PPARC in summer 2005. Without representation of our broad community within the PPARC senior policy-making structures, the outcome of the 2005–06 Programmatic Review announced in March 2006 was the closure of some GB-STP facilities, including the CUTLASS & SPEAR radars operated from Leicester, as well as facilities operated by the Lancaster University and the RAL. We at Leicester were astonished by these decisions given the continuing high scientific productivity of CUTLASS, and the fact that the £2 million SPEAR system had only just been commissioned after ten years of planning. In fact we received PPARC’s “notice to quit” the same week that SPEAR’s first results were published.

This still left a substantial UK GB-STP programme centred around the international EISCAT facility, however, such that Professor Mason’s oft-repeated statement that the decision to pull out of GB-STP “was made two years ago” is significantly misleading, unless he was perhaps talking about a decision he had formed in his own mind. However, the restricted decisions that were made two years ago have now been parlayed up within the December 2007 STFC Delivery Plan to a withdrawal from all GB-STP, without recourse to acceptable peer review and without consultation with the relevant community. Indeed, since that time follow-on grant applications made in good faith in summer 2007 by GB-STP research groups at Lancaster, University College London, and Southampton were all announced as unfunded in February 2008. While the plan outlined to the committee by Prof Holdaway to form a broader funding consortium for UK STP is to be welcomed, we are very much concerned lest his view that this would occur “just about” in time to effect a rescue before terminal damage has been inflicted proves to be over-optimistic. In any case, given his track record over the past two and a half years, we are less than trustful of Professor Mason’s assurance of a “sympathetic hearing” for such a proposal once he is released from public scrutiny.

March 2008

Memorandum 37

Supplementary submission from the Arts and Humanities Research Council following the oral evidence session on 20 February 2008

AHRC RESPONSE TO ENQUIRIES FROM THE HOUSE OF COMMONS SELECT COMMITTEE ON INNOVATION, UNIVERSITIES AND SKILLS

Further to the oral evidence session on the 20 of February, the AHRC welcomes this opportunity to provide further information and clarification to the committee on some of the issues raised.

1. *The Minister and DG expressed surprise that AHRC was making significant cuts in the first year of CSR07. When did you brief DIUS about the cuts?*

A representative of DIUS was present at the meeting of Council on 21st November 2007. On that occasion Council considered how to deal with low success rates in responsive mode funding necessitated by the CSR result and decided to cancel a Research Leave round. Council also decided to cut postgraduate numbers and reallocate the moneys generated (for details, see response to question 3 below). On 4th December 2007 in an email to a DIUS officer the AHRC Chief Executive confirmed that in 2008–09 there would be 1000 new postgraduate awards in place of the 1,500 new awards in 2007–08.

2. *What alternatives were discussed with the department?*

As noted, a DIUS representative was present at the strategic considerations of the Council at its meeting on 21st November 2007.

3. *What discussion have you had and at what level with DIUS since 20 February?*

We have assumed that the intent was to ask us about discussions that have taken place after the oral evidence session on the 21st, not the 20th. Since 21st February 2008 we have received several emails from senior officers of DIUS requesting factual information in relation to issues raised at the hearing of the Select Committee on 21st February and we have made replies thereto. During a meeting on Tuesday 4th March 2008, which had been pre-arranged as part of the regular cycle of meetings between the Minister of Science and Research Council Chief Executive and which was attended by a senior DIUS officer, there was discussion about the AHRC budget.

4. *Why was the 15 January 2008 press release necessary?*

The release on 15 January 2008 was a statement and not a press release, in that it was only posted on our website and not circulated to the media. It was placed there with a link from our home page as a courtesy to our community so that they could be made aware of the impact of CSR on our spending plans over the next three years. We saw the statement as reflecting our responsibility to be transparent to our academic community, especially to allow them to plan research and postgraduate activities in an effective manner.

By 15th January 2008 decisions had been made on how best to manage our budget over the next three years and it seemed only fair to inform the community of those decisions so that people could plan ahead for their future award applications. The submission of applications to the AHRC—particularly in the case of research leave—is sometimes planned years in advance and involves complex preparation for both individual applicants and host institutions.

5. *Why did this information not appear in the Delivery Plan?*

The Delivery Plan is a document focusing on opportunities for a three year spending period and was aimed at a variety of stakeholder audiences. It would not have been appropriate to include in this high-level, aspirational document details of reductions in individual schemes.

6. *Why are such severe cuts to PhD places in the first year necessary?*

To understand our broad position in relation to the reduction in new postgraduate awards over the CSR period, it is necessary to set out the historical context, which has seen a reduction in our new postgraduate awards driven by our decision made five years ago to give greater priority to doctoral awards.

A paper presented to the AHRB Funding Group in June 2003 clearly indicated how the AHRB saw its priorities in respect of the development of the Postgraduate programmes. It said *inter alia*, that:

‘The budget priorities for the postgraduate programme are derived from 2 sources:

- (i) the Board’s own review of the programme, which recommended changes not only to the configuration of schemes, but also that the balance of awards be shifted to give greater priority to doctoral provision, and
- (ii) the recommendations of the Robert’s reports SET for Success, which called for an increase in doctoral stipends and greater support for research training.

The effect of responding positively to these two sets of priorities was to increase the proposed expenditure on the postgraduate programme by c. £17 million in total over the four years 2003–04 to 2006–07. This was a direct result of increasing stipends, providing funds for research and other training and shifting the balance of awards from Masters to Doctoral.

It was recommended and subsequently agreed by our funders that we should effect a shift in the balance of awards commencing with the October 2003 competition. The intention was that over the next five years, the shift would be completed and we would reach steady state with our new configuration by 2007–08.

It was clear that there would be cost implications of making these changes since a doctoral award typically costs three times as much as a Master’s award. The intention was to effect a more or less cost neutral shift in the balance of awards. As far back as June 2003, it was acknowledged that it would be necessary to reduce the total number of new awards to 1500 (previously 1600) to bring the 2 clusters in balance.

At the same time, the Roberts Review recommended that doctoral stipends should be increased from £9,000 in academic year 2003–04 to £12,000 in 2005–06. Holders of awards in London receive an additional £2,000 p.a. The average stipend was expected to rise to £13,000 p.a. A further recommendation was that we should increase our funding for research training support and as a result we now provide an allocation of £500 per doctoral award holder p.a. Unlike the other Research Councils, the AHRC did not receive specific funding in SR02 to meet the costs of these increases, but found the funds from within existing resources.

As can be seen by the table below, the AHRC has acted consistently with this policy.

	2003	2004	2005	2006	2007
Research Prep Masters	554	572	534	466	409
Professional Prep Masters	463	348	324	351	328
Doctoral	576	612	632	673	719
1,532	1,593	1,532	1,490	1,490	1,456

By 2007, the balance between Doctoral and Master’s awards had reached the required balance and was deemed to be in steady state from there on.

The length of a PhD was also extended from 3 years to 3.5 years to 4 years during this period, with associated increases in costs.

The indicative allocations letter from Keith O’Nions to Geoffrey Crossick in February 2005 provided details of the sums to be made available to support the cost of implementing the Roberts recommendations. This amounted to £1.137 million in 2006–07 and £6.56 million in 2007–08.

Regarding levels of funding, the split between Doctoral and Master’s awards between 2005–06 and 2008–09 is as follows:

	Doctoral	Masters	CDA ⁴³	Total <i>exc</i> CDA
2005–06	17.3M	5.1M	0	22.4M
2006–07	20.1M	5.1M	.73M	25.2M
2007–08	22.7M	5.2M	1.7M	27.9M
2008–09	25.5M	5.4M	2.5M	30.9M

⁴³ CDA stands for Collaborative Doctoral Award—please note that these awards are funded out of the AHRC’s research budget—not the post-graduate budget.

The increase in committed expenditure for Doctoral and Master's awards between 2005–06 and 2007–08 was £5.5 million—less than the sum that was provided to meet the requirements of the Roberts report, as we had been directed to do by government.

The decision to increase the part-time stipend was not merely an AHRC policy change, but reflected a requirement across the Research Councils to harmonise our funding in this respect, and address potential equal opportunities issues.

The immediate reason for the cuts in new postgraduate awards in 2008–2009 and thereafter was the need to rebalance our budget in the light of the CSR result. At a meeting with DIUS on 20th November 2007 concern was expressed by DIUS that the proportion of funding in this area was high relative to other research councils, and that we were directing insufficient funds into strategic programmes. The Council considered this question at its 21/11/07 meeting and resolved to reduce post-graduate awards and redirect the sum of approximately £11 million to cross-council and strategic programmes over the CSR period. Achieving this result meant reducing the number of new postgraduate awards to 1,000 in 2008–2009 (compared with approximately 1,500 new awards in 2007–2008) and thereafter making 1,325 new awards in 2009–2010 and 2010–2011. Because spending on a particular cohort of new postgraduates extends across two of our financial years, to secure a reasonable amount of resource for cross-council and strategic programmes in 2008–2009 a large reduction (ie from approximately 1,500 to 1,000) was required. As with all Council meetings, a representative from DIUS was present at the meeting on the 21st November 2007.

7. *Was AHRC expecting a substantially different settlement?*

DIUS had asked all Research to prepare expenditure forecasts based on four possible scenarios ranging from –5% to +10% on current baseline.

8. *In hindsight, did AHRC overstretch itself in terms of commitments made during the last CSR period?*

No.

9. *If so, what changes have been made to ensure that this will not happen in the next spending round?*

(Not applicable re. above).

March 2008

Memorandum 38

Supplementary evidence from the Department for Innovation, Universities and Skills following oral evidence session on 20 February 2008

SCIENCE BUDGET ALLOCATIONS INQUIRY

Answers to follow-up questions provided by the Department of Innovation, Universities and Skills

1. *Please provide the Committee with details of the success rates (including n-values and percentages) for research grants at their prospective quality grades for each Research Council.*

RESEARCH COUNCILS SUCCESS RATES

The application success rates for all Research Councils for 2005–06 and 2006–07 are in the public domain and will continue to be monitored and reviewed by RCUK.

The Research Councils publish annual figures on the funding rates of individual universities and research organisations.

All Research Councils receive substantially more high quality proposals for research funding than they are able to support. The funding rates published reflect the level of demand balanced against the available resources during the year. The Research Councils seek to maintain an active dialogue with their research

communities concerning levels of demand and funding rates and in disseminating best practice. Some Councils have received significantly more proposals in recent years, and/or applications for increased resources per grant, and both of these are relevant to success rates.

The latest data can be found at:
<http://www.rcuk.ac.uk/aboutrcuk/efficiency/demand/successrates/default.htm>

2. *Please provide the figures referred to in Q 211–212 and Q 216–217 on exchange rate fluctuations.*

For a number of years the Department had an arrangement with STFC (and prior to STFC's creation, CCLRC and PPARC) and NERC under which some of the increase in their subscriptions to five international organisations (CERN, ESO, ESA, ILL and ESRF) was met centrally from the Science Budget. The arrangement covered increases due to exchange rate movements and, for CERN, ESO and ESA, changes to national net income (NNI) rates (a common feature of international subscriptions whereby contributions vary according to a country's relative wealth).

The way the arrangement worked was that in each spending review period a part of the Science Budget was not allocated in advance but held by the Department to cover claims by STFC and NERC under the arrangement. These were made towards the end of the financial year, once the impact of exchange rate movements (and any NNI changes) were known. The sum initially set aside for this purpose from within the Science Budget was an estimate of what the increases might be.

For CSR07 and subsequent spending review periods this arrangement has been modified to recognise that the STFC and NERC, with their fuller knowledge of the amounts and timings of these subscriptions, are in a better position to manage this financial risk. Under this change, the 2007–08 baselines for STFC and NERC were adjusted to include anticipated international subscriptions claims for that year and STFC and NERC took on the responsibility for meeting the full cost of international subscriptions. Following the guidance in the Treasury publication *Managing Public Money* the Research Councils are permitted to take out forward contracts for currency, which enables them to fix the costs of their annual subscriptions at an early stage in the year.

It continues to be recognised that the volatility of exchange rates could be such that the increase faced by STFC and NERC in any one year might be excessively large compared to the size of their overall budget. Accordingly beyond a trigger limit (£6 million for STFC and £2 million for NERC), the two Councils can seek additional funding from the Science Budget. This is similar to the process that already exists for all Research Councils in respect of any unexpected major losses. If such a request were to be made in future, there would need to be discussions across all the Research Councils, amongst whom the Science Budget has been allocated, to establish how such a shortfall could be funded.

3. *When was the Minister first told of the nature of the cuts that AHRC has announced? What discussions has he or DIUS officials had with the AHRC on this issue?*

AHRC's Delivery Plan shows that in the period 2008 to 2011 the Council will fund a range of responsive mode and strategic programmes, including the research leave scheme, and a postgraduate programme. In order to respond to the national strategic cross-Council programmes which are being given priority in this period, the Council developed a 2008–09 budget which breaks down as follows:

<i>Mechanism</i>	<i>£ million</i>
Responsive mode research	43.52
Strategic/CSR07	16.26
Postgraduate	38.57
Knowledge transfer	5.93
Non-programme	7.39
Total expenditure	111.67

It is important to recognise that for some years the Council's expenditure on postgraduate training has been increasing. The total number of postgraduates being supported has increased as follows:

	<i>2005</i>	<i>2006</i>	<i>2007</i>
New commitments	1,490	1,490	1,456
Continuing students	2,631	2,803	2,928
TOTAL	4,121	4,293	4,384

A key feature of AHRC's policy has been to increase their proportion of doctoral awards being given in recognition of the Council's role in supporting high quality research. Accordingly the number of new PhD grants it has awarded has increased by 16% in the last two years and 27% in the last four years. The result of this move to more awards lasting three to four years, instead of Masters awards mainly lasting one year, has been that at the end of each year there has been an increasing amount of financial commitment carried forward:

2005-6	£22.4m
2006-7	£26.0m
2007-8	£29.6m
2008-9	£33.4m

In common with the other Councils, in June 2006 AHRC was required to make commitments across its budget as a whole based on a flat cash trajectory (FEC apart, and that is not relevant in relation to postgraduate training) for 2008-2011. The consequence of AHRC's decisions early in 2006 and 2007 in relation to their postgraduate training competitions is that a high level of committed money is projected to be carried forward at the end of 2007-08; a level which was always going to be challenging to manage against that commitment planning requirement.

AHRC's Council has made its decisions on funding for 2008 shown above against that background. It is understood that the Council is continuing to examine the scope for flexible use of its budget in the CSR period to maximise its effectiveness.

At the AHRC Council meeting last November there was some discussion of the level of new commitments to postgraduate training awards which could be afforded within their settlement, but as the reasons for the scale of decline in postgraduate training were unclear we sought further clarification of the position. Accordingly Ministers were advised of the revisions to AHRC's Delivery Plan which involved more emphasis on contributing to strategic issues, and they agreed in early December to a Delivery Plan being published which did not contain any specific numbers of postgraduate training awards. AHRC told officials on 4 December that they planned to reduce the number of new postgraduate awards to 1000 in 2008-9, but as we had already confirmed this was not part of AHRC's Delivery Plan announcement, officials intended to consider this issue further with AHRC in the New Year, to understand more fully why this reduction was necessary. This communication was not drawn to the attention of Ministers. Before this happened, on 15 January the AHRC published a statement on their web site without giving the Department any prior notice of its publication. More recently there have been helpful discussions between DIUS and AHRC officials about a number of aspects of the Council's programme.

4. Please provide a timescale with precise dates, where possible, of the discussion that DIUS has had with the Treasury on the rules regarding profits made through intellectual property.

There were various discussions with Treasury during May and June on this subject, leading up to the DTI's CSR settlement in June. A subsequent letter from the Treasury dated 12 July 2007 confirmed the arrangements for regularising the budgetary position of the MRC Commercial Fund. Since then there have been continuing exchanges with the Treasury over the precise implementation arrangements.

5. Please provide figures on how much each Research Council received for FEC and on the relationship between flat cash and FEC (see Q 193).

The allocations to Research Councils did not include any separately identifiable sum in respect of the estimated costs of 80% FEC in CSR07. The allocations took account of the collective advice from Research Councils that the additional FEC costs in CSR07 were estimated to be as follows:

FEC Additions				
	2008-09	2009-10	2010-11	CSR07 Total
AHRC	6,350	10,053	11,796	28,199
BBSRC	30,135	43,523	49,824	123,482
ESRC	15,236	22,005	25,190	62,431
EPSRC	73,479	106,124	121,486	301,089
MRC	29,079	41,998	48,077	119,154
NERC	14,154	21,810	25,413	61,377
STFC	12,139	18,487	21,474	52,100
Total	180,572	264,000	303,260	747,832

It is expected that the move by Research Councils to funding at 80% FEC will be completed by the end of CSR07.

The 2007–08 baselines for the Research Councils would be the flat cash sums for CSR07, which are shown in Table 2.1 of “The Allocations of the Science Budget 2008–09 to 2010–11” published in December 2007 and are as follows:

Table 2.1: Science Budget Allocations

	<i>£ million</i>
<i>Research Councils</i>	<i>2007–08</i>
Arts & Humanities Research Council	96,792
Biotechnology & Biosciences Research Council	386,854
Economics & Social Research Council	149,881
Engineering & Physical Sciences Research Council	711,112
Medical Research Council	543,399
Natural Environment Research Council	372,398
Science & Technology Facilities Council	573,464
Total	2,833,900

Department for Innovation, Universities and Skills.

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