

Comhairle na nDámhachtainí Ardoideachais agus Oiliúna

The Higher Education and Training Awards Council

Report of the findings of the evaluation panel engaged to consider the application by Cork Institute of Technology for accreditation to maintain postgraduate research degree registers at doctoral level in Science (Chemistry, Biological Sciences and Physics).

30 August 2004

Summary of findings

The Panel was of the opinion that Cork Institute of Technology will be able to meet with the criteria for institutional accreditation to maintain a register of postgraduate research degree students. However, it recommended that before accreditation is granted, the Institute would submit to the HETAC (and obtain HETAC's agreement for) its final draft research code of practice and other regulations.

The Panel was of the opinion that the Institute met the criteria for accreditation to maintain a register of postgraduate degrees at masters and doctoral level *in the areas in the school of science* (within physics, chemistry and biological sciences) *reflecting the expertise of the current research-active academic staff.*

The panel noted that there was a growing commitment to co-operation between the various research active groups, facilitated by the new School of Science structure.

It was evident to the Panel that a relatively small corps of research active staff was producing high quality research output commensurate with its size in each of the three areas appraised. The Panel identified an important question to be whether blanket accreditation should be given to each discipline area or just to the research active groups. There is no doubt that the research-active individuals are very capable of independently carrying out the full range of activities associated with the selection of projects, students and external examiners for Ph.D. level programmes. The panel was of the view that the same cannot be said of the members of the academic staff who are not research active and appear to be a high percentage of the total number of staff.

1 INTRODUCTION

Cork Institute of Technology submitted an application to HETAC for accreditation to maintain registers of postgraduate research degrees at doctoral level in the School of Science (incorporating Physics, Chemistry and Biological Sciences).

Accreditation to maintain a register allows an institution to register postgraduate research degree students without referring the details of the individual research degree programme to HETAC for validation decision on a case-by-case basis.

Such accreditation is a prerequisite for an Institute of Technology to receive delegated authority from HETAC to make its own research degree awards.

1.1 Submission

The application for accreditation was received by HETAC on 31 May 2004. It took the form of two bound volumes:

1. *Institute Submission*
2. *Submission for Accreditation to Maintain a register in a Discipline Area: Science and Computing*

The institute had wished to jointly apply for the areas in Science and Computing but following discussions with HETAC the Institute decided to submit areas in Science alone and submit computing with engineering for appraisal in the autumn.

1.2 Assessors and preliminary reports

The Institute was invited to nominate four recent postgraduate research degree graduates (in each of the three areas Physics, Chemistry and Biological Science) and, for each field, persons who are independent recognised experts and can make national and international comparisons.

HETAC selected one learner representative and two independent experts from the nominations received from the Institute and a further four independent expert assessors. Professor Fagan was invited to chair the Panel.

The constitution of the evaluation panel is as follows:

Professor Tony Fagan (chairman), *Department of Electronic & Electrical Engineering, University College Dublin.*

Professor Michael Redfern, *Associate Professor, Astronomy and Instrumentation Department of Physics National University of Ireland, Galway*

Professor Richard O'Kennedy (*Selected from list of Cork Institute of Technology Nominees*)
*Professor of Biological Sciences
School of Biotechnology Dublin City University*

Professor Peter Stockley *Astbury Centre for Structural Molecular Biology,
School of Biochemistry & Molecular Biology, University of Leeds*

Dr Robin Wait Senior *Lecturer in Proteomics Kennedy Institute of Rheumatology Medicine
Imperial College London*

Professor Frank Hegarty (*Selected from list of Cork Institute of Technology Nominees*) *Chemistry Department, University College Dublin,*

Dr Sean Kelly (*Learner representative: one of Two Cork Institute of Technology nominees*) *Merck, Sharpe and Dohme (Ireland) Ltd,*

with

Dr Peter Cullen Higher Education and Training Awards Council.

Each assessor received by e-mail a copy of the HETAC document “*Accreditation to Maintain A Register for a specified Postgraduate Research Degree in a Specified Discipline Area- Issues for Assessors*” prior to being engaged by HETAC. This communication highlighted, among other things, issues (such as conflict of interest) that assessors must consider before agreeing to act.

1.3 Declarations relating to conflicts of interest

All assessors were required to consider whether or not there might be a conflict of interest involve in acting. Some did mention past and present interactions with the Institute that did not constitute conflict:

Richard O’Kennedy Declared that he was acting as both a course extern examiner and research extern examiner for Cork Institute of Technology.

Frank Hegarty Declared that two of the staff members completed their PhDs under his supervision in the 1970s (approx 74 and 77). There is no current/ recent research collaboration.

Sean Kelly (Learner representative) (Mentioned at preliminary meeting his employer Merck, Sharpe and Dobme (Ireland) Ltd occasionally uses Cork Institute of Technology facilities: SK has no collaboration.

Michael Redfern (Mentioned at preliminary meeting that Dr Niall Smith Cork Institute of Technology and he are on Life in the Universe National Steering Committee)

The submission material was dispatched to the assessors along with a covering letter and a copy of the document “*Validation process, policy and criteria for the accreditation of providers to maintain a register for a specified research degree in a specified discipline area*” which set out the criteria that must be met.

Each assessor was invited to submit an independent preliminary report to HETAC prior to the site visit.

1.4 Site visit 18 June 2004

The Panel met on the evening of 17 June to discuss the written submission and plan the site visit. The broad objectives for the site visit were to evaluate both the Institution and the proposed research areas against the criteria for accreditation.

The Panel sought to use the site visit to

- converse with the senior management of the institute;
- converse with the research active staff and heads of departments;
- converse with registered postgraduate students;
- survey the research facilities; and
- evaluate the research performance.

The site visit took place between 09:00 and approximately 15:30 on Friday 18 June at the Cork Institute of Technology. The outline schedule follows (the times are approximate)

Plenary session 9:30-10:15 : Meeting with the Director (Dr Kelleher), Director Designate (Dr Murphy) and other senior management staff.

Parallel sessions 10:30-11:30: Evaluation of research environment in each of the three areas within the school of science; the Panel split into sub-Panels for this purpose.

Meeting with physics research staff. (Professors Redfern and Fagan accompanied by Dr Cullen)

Meeting with chemistry research staff. (Professor Hegarty and Drs Wait and Kelly)

Meeting with biological sciences research staff. (Professors Stockley and O'Kennedy)

Plenary session 11:30-12:00:

Plenary meeting between the Panel and the science school research staff.

Parallel sessions: 12:15-13:00

Meeting with groups of research students in each of the three areas

Lunch followed by viewing of facilities in each area meeting with students in their laboratories.

Private meeting of the Panel

Final meeting with senior staff to thank them for their cooperation etc.

2 FINDINGS

2.1 General

2.1.1 Submission material

The Panel was of the opinion that the submission documentation was, in the main, well prepared. It covered many of the requirements of HETAC: it highlighted the research strengths of the Departments under review. However, the Institute submission document was poor on critical self-evaluation and did not identify, analyse and address areas for improvement.

2.1.2 Senior management staff

The Institute and its senior management staff demonstrated a commitment to supporting research. The Panel found the comments from the senior management staff to be helpful and reasonable.

The senior management did not reveal what percentage of the overall Institute budget was directed into research. Nevertheless, it was clear that the Institute had invested in modern facilities in most areas visited. Staff in Biological Science, for example, confirmed that there are 'challenge' funds of 50,000 Euro each year to allow staff to bid for pump priming funds. This appeared to be an excellent scheme and the Panel was of the view that it ought to be encouraged, and wherever possible expanded.

The Panel learned that there were some institutional incentives for staff to do research including reduced teaching hours, increased promotion prospects to senior lecturer grade positions and college scholarships for young researchers. The Panel was of the opinion that more needed to be done in this regard.

The stated recruitment policy (interest in research a prerequisite for new academic staff members) also appeared to support the building of a culture of research.

2.1.3 School of Science

The Panel found evidence of a resonant harmony in the interactions between the research groups in Physics, Chemistry & Biological Science and a clear community of interests between these differing groups in the School of Science.

The Panel observed during the plenary meeting with the (newly formed) School of Science that the researchers see (internal and external) collaboration as being very important and that such collaboration must arise 'organically' from the interests and expertise of individuals and should not be imposed. It was apparent that the School of Science has the potential to foster further cooperation and be of significant benefit to researchers.

2.1.4 Research activity of staff

The Panel observed that by no means are all of the staff were research active. In both Chemistry and Biological Sciences there appeared to be very research active groups surrounded by much less research-active colleagues. In the Department of Applied Physics and Instrumentation, of the seventeen academic staff, the Panel, considering the submission documentation, found three having a solid record of publication in recent years.

It was evident to the Panel that a relatively small corps of research active staff was producing high quality research output commensurate with its size in each of the three areas appraised. The Panel identified an important question to be whether blanket accreditation should be given to each area or just to the research active groups. There is no doubt that the research-active individuals are very capable of independently carrying out the full range of activities associated with the selection of projects, students and external examiners for Ph.D. level programmes. The panel was of the view that the same cannot be said of the remainder of the staff who are in a majority.

The Panel found some evidence of succession planning for replacement of supervisors and learned of the collaborative links that had been maintained with one senior member of staff who had recently relocated.

Overall, the Panel was in no doubt that there is a small, enthusiastic and effective core of researchers at the Institute who are now within an integrated School of Science.

2.1.5 Research students

The School of Science research students are drawn both from within Ireland and from without but overall mainly from Cork Institute of Technology graduates (particularly in Physics and Biological Sciences).

The meetings with research students from the three areas revealed that they were being properly supervised and appropriately challenged by the rigours of the research process. The Panel found the students to be broadly satisfied with the quality of supervision and with the resources that were available to them.

The Panel was of the view that there is a critical mass (for peer support etc.) of research students in the School of Science. The Postgraduate Association appears to be functioning very effectively as a support for the Science students.

2.1.6 Facilities

Tours of the laboratories revealed modern purpose-build facilities for both undergraduate and postgraduate use. Information resources were also considered to be satisfactory. Indeed, the Science School facilities compared well with more established research institutions.

2.1.7 Balance between academic research and development work

The Panel observed that both the senior management and the academic staff stressed the importance of the role of the Institute within the local community. Research was presented as an important activity for the Institute, other activities such as joint development projects (as distinct from research projects) with local industry appeared to be considered equally important. The Panel was of the view that the School of Science had struck a reasonable balance between academic research and development work.

2.1.8 Areas for improvement

The Panel observed that the small size of all the research groups makes them vulnerable. This is an issue that needs to be kept in mind and one that is faced by very many Irish higher education institutions.

The submission document did not present a critical self-evaluation and did not identify, analyse and address areas for improvement. This should be addressed in any future submissions or reviews.

The Institute might consider how to provide greater incentives to staff to encourage and reward high quality research performance.

Not all of the necessary research administration structures were found to be in place.

The Panel considered that a detailed central database of all research students and their completion dates etc needs to be established and monitored at both central and school level.

2.2 Code of practice for research

In broad terms the college appears to be in line with the *spirit* of the HETAC guidelines. There is a mentoring system for supervisors; there is a complaints procedure in place; there is an active Postgraduate Association; there are training workshops/modules in place for research students in the science field.

2.2.1 Areas for improvement

The Institute has not demonstrated to the Panel that it is in full compliance with the HETAC criteria.

The new Cork Institute of Technology postgraduate regulations were not finalised and had not been agreed with HETAC.

2.3 Chemistry

2.3.1 Submission material

In both Chemistry and Biological Sciences there appeared to be very research active groups surrounded by much less active colleagues. In one case, this seemed to be restricted primarily to one individual. This raised issues of meeting the Criteria concerning training continuity should that individual leave. Research grant funding and the numbers of PhD students also appeared to have fallen in the last few years following a peak. Output appeared to be restricted to the very research active groups and so the overall average output in these two areas appeared to be less than 2 papers/year. This would be considered research inactive in the United Kingdom where the assumption is that each research active member of staff will publish one refereed paper per year.

Mass Spectrometry Centre for Proteomics and Biotoxin Research (PROTEOBIO).

PROTEOBIO constitutes one of the major centres of research activity within the Department of Chemistry, and is principally concerned with the development of methods for the detection, quantitation and structural characterization of natural toxins, particularly those derived from cyanobacteria and shellfish.

It is well equipped with appropriate analytical instrumentation, including three tandem mass spectrometers (triple quadrupole, ion trap and hybrid quadrupole / time of flight), together with a range of chromatographic instrumentation.

The group has published extensively in this area in mainstream journals including *Toxicon*, *Nat Toxins*, *J. Mass Spectrum*, *Rapid Communications in Mass Spectrometry*, and *J. Chromatogr.* As is often the case with specialist areas of research, the journals serving the analytical toxinology community do not have especially high impact factors compared to more general publications, but nevertheless the published output of the group to be is judged to be internationally competitive. Their extensive network of collaborations, and the presence of several of the leaders in the field as co-authors on their publications provide further evidence of the international standing of this work.

The number of students registered for research degrees appears stable, with around 12 currently active, of whom at least half are pursuing PhDs, which should ensure adequate critical mass and a reasonable level of peer support. The combination of state-of-the-art instrumentation and the expertise of the senior staff of the centre should ensure that these students receive an excellent grounding in analytical mass spectrometry, which will render them highly employable; so much so indeed that it may be difficult to induce them to take up post-doctoral fellowships on completion of their studies. A further indication of the solidity of the training offered is the good number of students achieving peer-reviewed publications or presentations at meetings.

In spite of the name of the PROTEOBIO centre it was not clear *from the submission* what proteomic studies were currently in progress, since there appears to be little published output in this area, and the facilities listed seemed to be more geared towards small molecule and cyclic peptide toxins. There does not appear, either, to be much evidence of the bioinformatics infrastructure normally associated with proteomics. However, this subject of published output was raised in discussions with the staff of PROTEOBIO, from which it emerged that a number of proteomic projects had been initiated (at least one in collaboration with the department of biological sciences). Rather than pursuing a gel electrophoresis based approach, the leader was leveraging the expertise of his group in chromatographic methods and was proposing to utilise high-resolution HPLC methods. It was also understood that the group had set up/ were in process of setting up the isotope coded affinity tagging (ICAT) strategy for quantitative protein expression profiling.

2.3.2 Site visit

Three of the twelve staff of the Chemistry Department were put forward by the Institute as research active. It was noted that the three research-active staff are required to do four, ten and twelve hours teaching per week during term. It was learned that, if further appointments were

made in the Department the Head of Department would give priority to further strengthening the marine toxicology area.

In the discussions with the research supervisors, it was clear that they valued the entry system where only 21-honours students entered the system and that a meaningful test (with external monitoring) takes place at the end of the first year.

The work in mass spectrometry (see 2.3.1) was considered to be outstanding from an institution that is chiefly concerned with undergraduate teaching. That Dr James chairs Gordon conferences in his area is a testament to his international reputation.

The sub-Panel met with six research students in their second or third year of PhD studies and (separately) two postdoctoral students from the PROTEOBIO group and had open discussions in which views of the researchers on their experience at the Institute were sought. The students were international (three from the Institute, three from Spain), highly articulate and clearly were very content with the training environment provided by the group. The sub-Panel was impressed by the international contacts, the opportunities presented to spend time in some of the best international laboratories and to present their work at international conferences. The way in which the write-up of the students work was planned was most impressive— all mentioned the drafting of research papers beginning in their second year, long before the work was completed. Each student is paid from a research grant and has had an opportunity to teach (generally to a maximum of three hours per week).

When the students offered the opportunity to suggest how their experience might be enhanced, they mentioned more write-up space; they also mentioned that some students were on higher (industrially sponsored) grants. They indicated that they had access to good library and information facilities and good access electronically to all of the research publications that they required. It was very evident that the postgraduate association, which links the postgraduates in the various research groups, was active and a useful vehicle for dealing with generic issues facing the postgraduates. The students indicated that all of the Institute workshops listed in the submission, apart from that on research ethics, had taken place.

The research students

- are linked with a post-doctoral researcher;
- have regular daily interaction with supervisors and post-doctoral researchers;
- are trained in the operation of state-of-the-art analytical instrumentation;
- are generally involved in the active Postgraduate Association;
- have research grants and earn extra income through teaching/supervision of undergraduates;
- are supervised by recognized international experts in their area and
- are required to write papers and participate in internal/external research forums. The Panel heard that all PhD students are required to submit 3-5 international peer-reviewed journal publications prior to thesis submission.

Overall, while a relatively small proportion of the staff in the department are research active, the three put forward are productive and provide an excellent environment for the training of PhD students as judged by Panel during the detailed site visit, review of the material presented and, most importantly, its interviews with the students themselves.

2.3.3 Areas for improvement

There seemed to be little published evidence of collaboration with the department of Biological Sciences, which would seem to be an obvious route to developing an active program of proteomic research.

The bi-annual report by students needs to be reviewed (box-ticking according to the staff) it was resented somewhat by the students largely as extra non-productive work - in some cases there might be little to report over six months.

The students appear to need more space to write up.

Arrange workshops on research ethics.

2.4 Physics

2.4.1 Submission material

The submission documents gave rise to the following areas of concern that needed to be explored during the site visit:

- The number of research-active staff, and the number of research students is small raising the concern about whether there is ‘critical mass’. Of the seventeen academic staff in the Department of Applied Physics and Instrumentation, the Panel, considering the submission documentation, found three having a solid record of publication in recent years.
- It was not obvious how specialised training could be given with very small numbers.
- The periods of time for some students to complete— particularly some MSc students, appeared inordinately long
- The Department appeared very vulnerable were critical staff to leave.
- There did not appear to be a formal mentoring scheme in place for students.

These issues were explored during the site visit.

2.4.2 Site visit

The staff of the Department, as a whole, were enthusiastic and committed to research, although there did not seem to be any very great personal benefit other than personal satisfaction. The staff did not seem to think that promotion prospects would be enhanced by active research. None of the staff cited excessive teaching load as a disincentive to research. It became clear from the submission document the selected CVs had been selected (by the Registrar's office) to include only research-active staff— and this appeared to be a sore point to some members of the department.

The academic staff felt that the Institute was supportive of research in so far as it could be, and were of the view that they had adequate space and other facilities.

The academic staff pointed out that some research student training could involve undergraduate courses, external courses run by collaborators in European research projects and informal arrangements.

Quite a few MSc and (earlier) PhD candidates were part-time; this was put forward as an explanation for the long completion times noted earlier.

The sub-Panel met with (eight) full-time research students of the department. The Panel found the students to be very impressive, on account of their enthusiasm and willingness to talk about their work. All of the students expressed satisfaction with the level and quality of supervision, and the accessibility of their supervisors. All stated that they had good facilities and very good equipment. With one exception - who had a clear view that he wanted to work in science outreach - the students saw their futures in research.

With one exception, all of the students were Cork Institute of Technology graduates and in most cases were attracted to research by their undergraduate projects— which must be seen as an endorsement of the quality of the undergraduate experience.

The students felt that they had achieved a critical mass, particularly because the Postgraduate Association seems very important and effective.

The students, when asked, were aware of formal procedures for complaints, and so on.

Three strong research areas were observed on display in the laboratories — optical communications optical instrumentation & astrophysics and scanning microscopy — in that environment the students talked enthusiastically about their work. The quality of the work was on a par with what might be expected of graduate students working on in other laboratories in Ireland.

The research space seemed very small, but, apparently, extra space is becoming available as the Institute expands.

The present students seem to be getting good value. Their research is of a good standard. It is probable that future students would also receive high quality training in research which is competitive within Ireland, and probably internationally.

2.4.3 Areas for improvement

The Department might consider trying to enhance diversity by expanding the base of student intake, and to send some of its graduates elsewhere.

Concerns about the relatively small number of research-active staff remain, and the activities are very vulnerable to those staff leaving.

The Department needs to address the apparent backlog of student registrations.

MSc... 6 years (1) , 4 years (2), 3 years (2)

PhD...8 years (1), 6 years (2), 5 years (2)

2.5 Biological Sciences

2.5.1 Submission material

The submission from the Department of Biological Science seemed rather lacking in focus and specificity about current research programmes. The CVs of the senior staff demonstrated that there is substantial expertise in environmental and food microbiology, and in the application of molecular biology methods in these areas. On the other hand the submission document gave the impression that the research effort was spread over a range of disparate projects without much overall coherence, and published outputs were not always closely related to current or recently funded projects. Whereas it might have been expected that efforts would be concentrated to develop a critical mass in certain key areas of research in order to optimise inputs and outputs and build on the specific expertise of the research-active staff. Most recent and current students appear to have pursued MSc rather than PhD programmes, and only two are currently registered for PhDs.

Given the potential synergies between the interests of the researchers it was surprising to find little published evidence of collaboration with the Department of Chemistry, though much of the expertise in the two departments would seem to be complementary.

2.5.2 Site visit

Meetings with the Biological Science department staff included 6 of the declared 8 research active members of department. One of these gave an impressive (and impassioned) summary of departmental activities during which the enthusiasm for research and the supportive environment for these activities became very clear.

The department has recently suffered from the predation of one of its senior staff to UCD. This has left a fairly junior group of staff whose members have yet to establish themselves as truly independent researchers with international reputations. However, their enthusiasm and sensible plans suggest that they are well placed to overcome this loss. The Institute might consider prioritising Biological Science for future high-level appointments— whenever funds permit— to correct this problem.

Research plans were sensible and well thought out, especially in terms of collaborations with both other Irish and International institutions.

Internationally competitive work in environmental monitoring is clearly going on, and appears to be important for the Irish economy. There is at least one spin-off company based on this work.

The work with Physics on AFM imaging of cells and viruses was considered to be excellent and can be expected to yield many further publications and help to integrate the differing areas within the new School structure. Physics-Life Sciences interface is a point where major research growth and discovery is expected to occur over the next 20 years.

The recent publication record of the Biological Sciences group was found to be good and included several in 2004 that were not listed in the submission documentation. The publications demonstrated some of the fruit of the aforementioned collaborations and were in good international peer-reviewed journals.

The Department had good collaborative links with UCC, the University Hospital, Teagasc and UCD. As mentioned earlier, recently a senior staff member had taken a post at UCD however, very active collaboration continues with this researcher.

It was observed that some staff are very involved with industry in a number of capacities, though this may be more related to development than research but is commendable and certainly beneficial to the region. It also cements industrial relationships with the Institute and enhances its reputation.

Evidence was found that the Institute management is highly supportive of this research. This support is manifest in reduced loads for active researchers, studentships, excellent labs for teaching and research that have been recently re-furbished, and the purchase of high-grade

equipment that can be used for both teaching and research. More space is likely to be allocated to the Department when other activities move out to the new Marine Training Institute.

The sub-panel visited all of the facilities, including those in Chemistry. It was of the view that excellent research facilities exist in some areas, particularly those related to Bioanalysis /Cell Biology, Atomic Force Microscopy and Analysis/Mass Spec. In the *latter area (Chemistry Department)* it was considered that the *facilities* were world class and in all the others were nationally and internationally competitive.

The sub-panel had extensive discussions with the current post-graduate students and found them to be very enthusiastic and highly articulate. The students were eloquent in their support of the Institute and in particular the friendly and accessible nature of the academic staff. They welcomed the chances they got to contribute to teaching programmes and appear well paid to do so. There appeared to be very few issues that restricted their research activities. Library facilities were not extensive, although well appointed, but were backed up with extensive electronic access to journals etc. All the students contributed to the discussions and appeared enthusiastic and mutually supporting. It was clearly evident that there is a research student community there. The students were clear about what they would do if problems arose in the conduct of their research or if there were problems with their supervision. Most of the students were also very clear about why they had chosen to do a higher degree at the Institute and how this would help them achieve their career goals. It was clear that they had access to funding, adequate space and equipment and formed an integrated and collaborative unit. Many had attended meetings and courses or had visited other laboratories to learn relevant techniques. The students were aware of all the key elements in relation to transfer from the Master's to the Doctoral register and particular emphasis was given to getting publications and presenting talks and posters. A journal club, seminar series, regular meetings with supervisors and an excellent postgraduate association are present. The latter is very active and arranges a major colloquium each year. The students felt that there is an excellent scientific and social environment that is both highly supportive and enjoyable. Most of the students were Cork Institute of Technology graduates: one was a UCC graduate.

A detailed examination of the draft Postgraduate regulations and the other documentation showed that many (but not all) of the formal requirements of the HETAC Validation process are clearly met.

The novelty and standard of the research was clearly demonstrated by the research described, the posters/papers presented and the impressive selection of publications, reports and posters that were shown to us during the visit. It was felt by the staff that research students should certainly have papers published or in press before submission of the Ph.D.

2.5.3 Areas for improvement

It was suggested that HETAC should seek further clarification in relation to the precise procedures for recruiting research students, that there is sign-off on Health and Safety (i.e. that the students have read the rules, have followed all the necessary procedures in relation to the safe use of chemicals) and that there is a clear process for ensuring that this has occurred.

Information was lacking in relation to several individuals and their CV's and this was examined during the assessment. In many cases it was felt that there was considerable additional information and outputs that greatly strengthened the application and these were demonstrated during the course of the visit.

END.