

SCIENCE RESEARCH COUNCIL
RESEARCH REACTOR COMMITTEE

A G E N D A

For the First meeting of the Joint SRC/AEA
Research Reactor Committee to be held on
Wednesday, 24th November, 1965 at 2.30p.m.
at SRC, State House, High Holborn, W.C.1.
(Room 1516, Fifteenth Floor)

1. Minutes of Last Meeting of the NIRNS
Research Reactor Committee
2. Terms of Reference and Future Role of the
Committee with respect to the S.R.C. *To follow.*
(Paper RR 1(65/66))
3. Report of the Working Party set up to
examine the proposal to extend the
Scottish Reactor Centre (Paper RR 2(65/66)) ✓
4. Report of Panel on Neutron Beam Facilities
for Universities (Paper RR 3/65/66) ✓
5. Use of Petten Reactor by Universities
(Paper RR 4(65/66)) ✓
6. University Utilisation of Herald *Circulated separately.*
(Paper RR 5(65/66))
7. Applications for Research Grants
See DR/3/S17(J+) (for information only)
8. Any other business.

G. L. Cooper
Joint Secretary.

DR/3/517

IN CONFIDENCE

RR 6 (65/66)

S C I E N C E R E S E A R C H C O U N C I L

RESEARCH REACTOR COMMITTEE

Minutes of the First Meeting of the Joint SRC/AEA Research Reactor Committee held at State House, London, on 24th November, 1965.

Present: Sir John Cockcroft - Chairman
 Dr. V.S. Crocker
 Dr. S.C. Curran
 Dr. P.E. Egelstaff
 Mr. C. Jolliffe
 Dr. W.M. Lomer
 Mr. J.J. McEnhill
 Professor E.W.J. Mitchell
 Mr. G.L. Cooper - Joint Secretary, S.R.C.
 Mr. L. May - Acting Joint Secretary, A.E.A.

Apologies for absence were received from Professor Diamond, and Mr. R.M. Fishenden, the Joint Secretary, AEA; Mr. L. May deputised for Mr. Fishenden. Professor W.B. Hall and Dr. H. Wilson were in attendance for Item 3.

1. Minutes of the previous meeting

The Committee approved the minutes of the last meeting, i.e. their final meeting as a Committee of the ex-NIRNS.

2. Terms of Reference and Future Role of the Committee with respect to the S.R.C.

Mr. Cooper introducing Paper RR1 (65/66) said its main purpose was to explain the changes SRC proposed to introduce in the arrangements for dealing with research grant applications from universities involving experiments on reactors. Such applications, irrespective of whether the reactor it was proposed to use was owned by a university or the AEA, would be considered by the appropriate subject Committees of the SRC University Science and Technology Board, rather than the Research Reactor Committee, and if approved, financed from the yearly allocations of funds delegated to the Committee from the UST Board. The main reason why SRC wished to proceed in this way is that experiments on reactors, although involving a common technique, nevertheless are essentially experiments in solid state physics, etc., and therefore should be considered on the criteria of timeliness and promise by the appropriate Committees in competition with other proposals in the same fields but which do not involve reactor techniques. Although no longer responsible for financing the individual experiments on reactors, members of the Research Reactor Committee would still be given an opportunity of commenting on new proposals, and advising SRC on such matters as the most appropriate reactor facilities, in each case. Major proposals for new university reactor centres or modifications to existing centres would of course be considered by the Committee as before and their recommendations passed direct to the UST Board.

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All matters relating to University use of AEA reactors would likewise be considered by the Committee who in turn would advise SRC on what funds should be provided for this purpose.

In the discussion the Committee gave their general approval to these proposals although some members expressed their concern over the fact that the Committee would become purely advisory in nature, having no funds which could be allocated on their own authority as in the past. In reply it was stated that if in the light of experience it appeared that the work of the Committee was being seriously hindered for this reason, the SRC would be willing to reconsider the question of a financial allocation as foreshadowed in paragraph 6 of the paper. Professor Mitchell urged that in view of the increasing scale and cost of university research involving reactors, particularly neutron beam work, the Committee should report direct to the Council in parallel with the Nuclear Physics Board, rather than to the UST Board of Council. The Chairman said he would write to the Chairman of SRC on this matter.

3. Scottish Universities' Reactor

Professor W.B. Hall and Dr. Wilson joined the meeting for this item. Professor Hall presented the report of the Panel (Paper RR2 (65/66)) which had been appointed to consider the proposal from the Scottish Reactor Consortium for a major extension to the Scottish Reactor Centre comprising £100,000 for further laboratory and office accommodation, £17,000 for modification of the Reactor, £33,500 for equipment and £23,800 per annum for recurrent costs to the end of the quinquennium. The need for additional staff and accommodation partly derives from the appreciable teaching undertaken by the Centre staff and the Panel wished to draw the Committee's attention to this policy as it appeared to represent a departure from the original concept of the Centre. Subject to the Committee's endorsement of this policy the Panel recommended provision of the following: additional equipment for the existing building to the value of £18,800; all the extra staff requested (4 academic, 7 technicians) at a cost of £16,300 per annum (including travel and subsistence); and finally the additional laboratory and office accommodation requested - with the exception of the lecture theatre, mechanical engineering laboratory and demonstration area - together with associated maintenance, insurance and essential services for new buildings at £3,000 per annum, and in addition £13,300 to equip the new laboratories on the accepted scale. The Panel considered that further work will be required before a sufficient case can be made for the proposed reactor modifications. It did not appear that the problem of Wigner energy storage would prevent satisfactory continuous operation at 100 kW and the increase of flux level which might be obtained as a result of the modification appeared marginal. A very recent proposal to construct a low power assembly, which had been added to the application at a late stage requires a design study before it can be properly assessed. The Panel had also agreed that expensive items of equipment needed for specific research programmes should be the subject of separate applications to SRC for research grants rather than included with the general equipment. Examples of such items are the 14 MeV pulsed neutron generator for neutron and reactor physics studies, and the 14 MeV continuous neutron generator for neutron activation analysis. Although not part of the application under consideration, the Panel had noted a proposal to establish a mass spectrometry group at the Centre to give a service to Geology Departments in Scottish Universities. It was agreed that providing the scientific case for the group was accepted, there was no objection to siting it at the Centre, although such developments, taken together with the proposed increase in academic staff point towards the growth of a research centre with greater independence than was perhaps intended in its original conception.

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In the discussion, particular attention was directed to the policy issue raised concerning teaching activities at the Centre. Comparisons were drawn with the situations at the other two university reactor centres (Manchester/Liverpool and London) where the main teaching load is borne by the university departmental staff. Dr. Curran argued however that special considerations applied in the Scottish case, where the large number of institutions served and their geographical separation provided strong reasons for concentrating teaching activities at the Centre. He also claimed that the teaching duties of the Centre staff were foreseen in the original conception. It was finally agreed that teaching must of necessity play a more prominent role than at the other two reactor centres. Accordingly the recommendations of the Panel concerning staff, equipment and accommodation were endorsed. The Committee were reminded that according to the recent agreement between the University Grants Committee and the SRC concerning division of responsibility for providing extensions to university reactor centres, only the additional equipment and running costs to the end of the quinquennium (July 1967) would fall to the SRC, the remainder, i.e. new buildings and their equipping, and recurrent costs after July 1967, being the responsibility of the UGC.

With regard to the proposals concerning the reactor itself, Dr. Croker said that Harwell were cooperating in the design study of the proposed core modifications. Professor Hall also offered the assistance of his group who were already engaged in a design study of a similar low power assembly to the one proposed for the Scottish Centre. Finally, the Chairman thanked Professor Hall and his Panel for their work on behalf of the Committee.

4. Neutron Beam Facilities for Universities (Paper RR3 (65/66))

Professor Mitchell introduced the report of the Panel which had been formed by the Committee under his chairmanship to examine the current and future university requirements for neutron beam facilities and to advise how they could best be met. The need for the survey arose from the growing university interest in the use of neutron beams and the desirability of accommodating the total university requirement within the limited reactor facilities available in the most efficient and economical way. The Panel had been in touch with all known active or potential users of neutron beams and an analysis of their requirements had indicated the broad nature and scale of facilities which were needed. The first conclusion to be drawn was that the three low power university reactors were not suitable for this class of work because of their low neutron fluxes. It is therefore necessary for universities to have access to the more powerful reactors operated by the AEA and in particular DIDO and PLUTO at Harwell and HERALD at Aldermaston. The Committee had already sponsored arrangements to hire a share of HERALD at an annual cost of approximately £100,000. The present capacity of HERALD was not sufficient however to accommodate all university users who wished to have access and the Panel therefore recommended that the utilisation of HERALD should be increased by providing further beam holes and instrumentation. Similar arrangements should be negotiated with AERE to guarantee university access to a share of their extensive range of facilities. If all the beam holes required were provided the total block grant to AEA for rental of reactor facilities might amount to £300,000 per annum. An AEA/Universities Users Panel should be set up to control allocation of time on the various facilities. The full recommendations of the Panel are set out in an Appendix.

The Committee accepted the report and fully endorsed its recommendations. Several members stressed the rapidly increasing interest in neutron techniques amongst university workers and Dr. Egelstaff believed the estimated number of potential users quoted in the report was probably conservative.

/Dr. Lomer

Dr. Lomer while affirming Harwell's willingness to go as far as they could in making their facilities available to the universities nevertheless pointed out that all their beam holes were currently in use so that implementing the Panel's recommendations would inevitably cause difficulties by restricting the Harwell programme. Mr. Jolliffe, commenting on the financial recommendations said that the tentative sum of £300,000 per annum if confirmed, would represent a major undertaking for the SRC and it would be for the UST Board to decide if they could afford a commitment of this magnitude in competition with the other calls on their funds. The Committee asked that SRC and AEA officials in consultation with Professor Mitchell and other members of his Panel as appropriate should form a Working Party to discuss the recommendations in more detail, particularly the financial implications, with a view to preparing a fully costed scheme for financial approval. The Chairman thanked Professor Mitchell and his Panel for their report.

5. Use of Petten Reactor by Universities

Dr. Egelstaff introducing Paper RR4 (65/66) said that a visit made to the Reactor Centrum Nederland establishment at Petten in connection with a proposed Reading University experiment on diamond using the RCN triple axis spectrometer, had revealed that the experiment would not be feasible at the present time.

6. University Utilisation of HERALD

Mr. McEnhill presented Paper RR5 (65/66) summarising recent developments at the HERALD reactor, and university experiments in progress. Completion and hand-over of the cold neutron source which was scheduled to take place in August had been delayed owing to a faulty compressor in the refrigerator plant. The defects had subsequently been rectified and the final acceptance test carried out in early October. Following the installation of the transfer lines by AWRE, the refrigerator has been connected to an electrically heated dummy load suspended on the outside of the biological shield of the reactor and was about to be tested in this configuration.

The Committee noted the progress report. They furthermore approved the proposal to continue the Sub-Committee originally set up to supervise the cold neutron source project, but more recently used as a convenient forum for the discussion of problems relating to university utilisation of HERALD in general, before bringing them to the attention of the main Committee. Professor Mitchell agreed to act as Chairman of the Sub-Committee in succession to Dr. Valentine; Dr. Egelstaff also agreed to serve. Professor Walker of Birmingham would also be invited to become a member.

7. Any Other Business

With regard to the membership of the Committee, it was suggested that a chemist should be invited to join and the name of Professor Anderson (University of Oxford) was put forward. This was agreed and Dr. Egelstaff offered to approach Professor Anderson.

G.L. COOPER

NEUTRON BEAM FACILITIES FOR UNIVERSITIES
RECOMMENDATIONS TO THE RESEARCH REACTOR COMMITTEE

We recommend that:

- A. The S.R.C. should negotiate with A.E.A. to provide:
- (i) On the HERALD reactor at Aldermaston, guaranteed full time access to one beam hole, and part-time access to two neutron beam facilities, in addition to the full time access to three beam holes covered by the present contract.
 - (ii) On Harwell reactors a guaranteed 50% access to ten neutron beam facilities.

When all holes are available the total block grant to A.E.A. for rental of reactor facilities would be about £290,000 on current rates.

- B. The four beam holes allocated to S.R.C. on HERALD should be adequately instrumented to meet University requirements in the most efficient way. A detailed estimate of the necessary instrumentation and its cost should therefore be made. Preliminary estimates suggest that this might cost approximately:

£50,000 for diffractometers to cover major and some "service" users;

£30,000 for improved and extended instrumentation on the defect scattering and inelastic scattering holes.

- C. For each neutron beam facility covered by S.R.C./A.E.A. agreement, there should be a scientist responsible for its operation - he may be A.E.A., University, or S.R.C., but he should be someone whose research interests involve a substantial use of the facility.

To ensure an efficient and up-to-date crystallographic service at Aldermaston one scientist with suitable research interests should be appointed by S.R.C.

To ensure full and safe utilization of the equipment a few suitably qualified A/Sc. or A.E.O. staff should be available who will be capable of assuming full-time control of the apparatus. It is estimated that 2-3 will be required at Aldermaston. Some staff at Harwell are required to help the University programme.

- D. The allocation of time on the various facilities should be made by a joint A.E.A./Universities Users Panel who would be responsible to the Research Reactor Committee and who would be expected also to report to the Directors of the Establishments involved.

/E.

- E. The Research Reactor Committee should, from its funds, provide for the improvements which will be needed from time to time in the general instrumentation of the equipment used primarily by University Scientists.

Proposals concerning these improvements should be brought forward to the Research Reactor Committee by the A.E.A./ University Users Panel. Apart from these general items, individual users may need special items in order to perform a particular experiment. The latter items (special samples; special sample holders; travel) should be covered by a normal special grant application to the appropriate Physics, Chemistry etc. Committee.

- F. The University Reactor Centres be encouraged in the fields where their facilities are most suited, but that applications to the S.R.C. for equipment for beam work at the Centres should not be allowed to consume appreciable sums of money since these reactors do not provide adequate fluxes for most work in the beam field.
- G. The Research Reactor Committee should explore with A.E.A. the need for the development of new techniques for the more efficient use of neutron beams. In this context we draw attention to the need for work on co-ordinate neutron detectors.