5 The Third Decade 1980 - 90 – weathering a financial crisis in the 80s

The 80s opened with increasing inflation which affected all aspects of Australian life. One spectacular example was the rapid increase in land and house prices. Bank interest rates were also increasing, with many banks at this time charging 17% interest on home loans, some were even as high as 20%. Before the end of the decade, Australia, and the rest of the western world, would endure a severe recession in which redundancies rather than sackings would become commonplace. These redundancies affected all aspects of the workforce; professional, middle management and blue collar workers, as businesses struggled to survive economically.

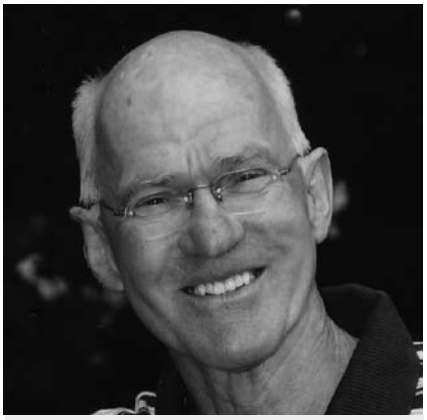
At the beginning of the decade, the Fraser Government allowed trade in Australian uranium subject to safeguards in accordance with the Non Proliferation Treaty. In contrast, the Labor Party had a moratorium policy, which in line with a decision taken at its 1977 Party Conference committed a future Labor government to declare a moratorium on uranium mining and treatment, and the repudiation of any commitments to mining, processing or export made by a non-Labor government. By 1984, Labor had been in office for a year, the Party agreed on a compromise that allowed for the continued operation of three named uranium mines, Nabarlek, Ranger and Roxby Downs. The machinations over the Labor Party uranium policies reflected anti-nuclear feelings within the Party, and the general population as a whole.

The generation of electricity from atomic energy was, by the 80s, not part of the Labor Party agenda. However, the AAEC was still investigating uranium enrichment by both centrifuge technology and laser enrichment. Both these projects would be cancelled during this decade. On the other hand, the AAEC had developed successful production methods for radiopharmaceuticals, one of which, ^{99m}Tc, had become a viable and valuable export commodity.

The AAEC itself was considered in some circles to have become ill equipped to deal with the changed socio/economic circumstances and the government implemented a Committee of Review of the AAEC under the Chairmanship of Professor Dick Collins.

The implementation of the review saw the winding up of the AAEC and its replacement by the Australian Nuclear Science and Technology Organisation (ANSTO) in 1987. Both the last Chairman of the AAEC, Professor Max Brennan, and the first Chairman of ANSTO, Professor Dick Collins, had previously served on the AINSE Council, reflecting the previous links of some of the first generation of Councillors, Watson-Munro and Baxter, to both the AAEC and a university.

The AAEC review noted that should the AAEC earn money by undertaking research for others under then current arrangements any funds earned would revert to the Government. This situation also applied to the new ANSTO. ANSTO's Chairman and new Executive Director, David Cook raised this issue with the Minister for Industry, Technology and Commerce, Senator John Button and argued that ANSTO should be allowed to retain any revenues earned from outside sources. The Minister accepted the arguments about revenue retention and went further, proposing that ANSTO, and CSIRO, have a target of 30% of funds coming from such research in order to encourage interaction with industry. These new arrangements were reflected in ANSTO's first five-year strategic plan published in 1988. At this time ANSTO requested three-year budget continuity and this was ultimately agreed by ANSTO's Minister and the Minister of Finance and the Department of Finance, and ANSTO entered into a triennial funding arrangement with a base year of 1988/89.



Emeritus Professor Richard (Dick) Collins

Generations of his students and colleagues know Richard (Dick) Collins as a passionate teacher and a successful scientist. (Extract from the promotion for Dick Collins' autobiography, 'Lots of Scars. The Life of a Scientist').

At ANSTO Dick Collins was known as the Chairman of the Committee of Review into the AAEC, the inaugural Chairman of ANSTO and, with his Board and Executive Director, was certainly the harbinger of momentous change for ANSTO and, by extension, AINSE.

The Collins Review into the AAEC was supportive of AINSE and he recalls that his Board continued this goodwill towards the Institute. He remains an enthusiast for AINSE to this day yet he was Chairman of a Board whose Executive Director precipitated a 'period of crisis' for the Institute in 1990. Is there a dichotomy here?

The answer must be a resounding 'no' from those who know this exceptional academic and teacher. Collins came to the new ANSTO with a brief to revolutionise the organisation and to ensure that it would become more relevant and focused. Dick Collins would not have allowed AINSE to avoid the scrutiny that he and his Board directed at ANSTO.

Dick Collins had served as Councillor representing the University of Sydney from 1981 to 1985 replacing Charles Watson-Munro.

Dick Collins' academic record is impressive. He was Professor of Applied Physics at the University of Sydney from 1980 until his retirement at the end of 2000. He was Head of the School of Physics from 1996 to 2000 and Director of the Science Foundation for Physics from 1996 to 2002.

Retirement means little for Dick Collins. One example of his continuing interest in science and education was his agreement to become patron in 2007 for 'MyScience', a primary school program that is about curiousity and science.

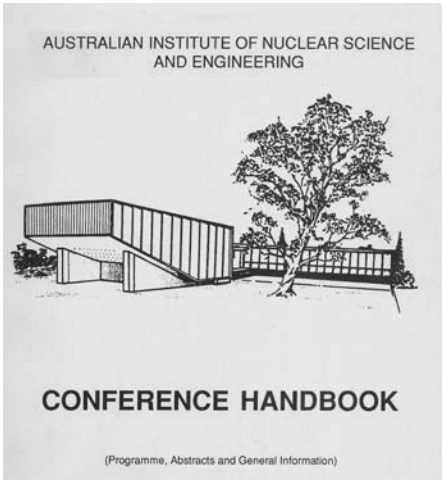
5.1 Membership

5.1.1 Institutes of Technology and a new university

During a Council meeting in February 1985 Professor Dick Collins raised the issue of Institutes of Technology becoming members of AINSE, almost twenty years after the issue had first been discussed. Dick Collins had in the early 70s been Head of the Applied Physics Department at the NSW Institute of Technology and knew very well that these Institutions were capable of applied scientific research. The Council requested the Executive Committee to consider the situation again. In April 1985 the Executive Committee advised that Institutes of Technology had been given assistance to access the facilities at Lucas Heights and this had cost AINSE in the vicinity of $2,000 per year.

Following the Dawkins Review into Higher Education and the associated Government higher education reform agenda[64] the Institutes of Technology were restructured as universities which allowed them now to confer degrees including higher degrees. Their names were changed in various ways to accommodate their new university status and they then became increasingly involved in research. The newly structured universities sought membership of AINSE in order to gain access to the research infrastructure at ANSTO. These new members joined as follows: Curtin University of Technology, previously the Western Australian Institute of Technology; Royal Melbourne Institute of Technology and the University of Technology, Sydney, in 1988.

Murdoch University, which had been the second university established in Perth, joined in 1985.



In this period AINSE often utilised this design for conference proceedings

5.1.2 Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Membership of AINSE was not restricted to universities. The CSIRO as a whole joined AINSE in 1982 but terminated its membership in 1992 in circumstances which are explained below.

In April 1981 the Minister for National Development and Energy, Senator John Carrick and the Minister for Science and Technology, David Thompson announced new arrangements for government-funded energy research. The new arrangements had direct impact on the AAEC and the CSIRO and were made in the light of a report by the National Energy Research Development and Demonstration Council (NERDDC) Review on the Activities of the AAEC Research Establishment.

The AAEC had by this time started to explore energy production using methods other than nuclear fission. The Government determined that these non-nuclear research areas would be transferred to the CSIRO into a new Division called the Institute of Energy and Earth Resources. Relevant AAEC resources would be transferred to the Institute which would be co-located with the AAEC at Lucas Heights. The AAEC and the Institute would be separate entities with separate research facilities. The Ministers announced that the streamlined program of nuclear-based research and development would include HIFAR reactor operations, uranium enrichment, radioisotope production, waste-management studies and support for regulatory and international obligations.

AINSE had kept a close eye on events leading up to these significant changes and in May 1981 Professor Don George, Chairman AAEC, Professor Stuart Butler, Director AAEC, Research Establishment and Dr Terry Waler, Chief Scientist, Planning, AAEC briefed AINSE Councillors. The AINSE Council in May 1981, requested to AAEC to keep the Institute informed of developments, placed on record its *pleasure that a first class nuclear science and technology research organisation would continue at Lucas Heights under the AAEC* and that *future developments would also involve other research activities at Lucas Heights within the new CSIRO Institute.*

On 1 April 1982, 120 AAEC staff members were transferred to CSIRO. At this time there were four divisions of CSIRO located at Lucas Heights: the Divisions of Energy Chemistry; Energy Technology; and Mineral Physics - all part of the Institute of Energy and Earth Resources; and the Division of Chemical Physics that was part of the Institute of Physical Sciences.

Dr David Cook when he was CEO of ANSTO between 1988 and 1994

64 Green Paper, Higher Education: A Policy Discussion Paper (Dawkins 1987) and the White Paper, Higher Education: A Policy Statement (Dawkins 1988)

The CSIRO Institute of Energy and Earth Resources expressed interest in becoming a member of AINSE in 1982 and advised that it was prepared to pay $20,000 as a membership subscription for that year. The Executive Committee recommended to Council that the Institute of Energy and Earth Resources be made a member. However, by the time Council met in February 1982, the Secretary (Finance and Administration) CSIRO, H Crozier, stated in a letter to Council *upon consideration, it appears that it would be more appropriate for membership to be held in the name of CSIRO rather than in the name of the Institute of Energy and Earth Resources. I therefore ask that the Council admit CSIRO to membership.*

The Council agreed to this proposal and the CSIRO became a member on 19 February 1982. The membership subscription for the CSIRO in 1982 was to be $20,000 but the future annual subscription was still to be determined. The President and the Executive Officer met with the Chair of CSIRO, Paul Wild, in Canberra to discuss these annual subscription fees.

The AINSE Executive Committee in July 1982 suggested that the CSIRO membership subscription *could be fixed in relation to the annual membership subscription payable by the AAEC in the proportion 79 to 220, which we understand is used in connection with certain financial arrangements between CSIRO and the AAEC with respect to the Lucas Heights Research Laboratories.* If one used this formula the CSIRO membership subscriptions for 1983 would be $65,000 to the nearest $1,000. This proposal was rejected out of hand by the CSIRO Executive Committee which responded *that CSIRO's annual subscription to AINSE should be maintained at $20,000 and that CSIRO's continued membership of AINSE be reviewed in 1983.*

While CSIRO remained a member of AINSE, Peter Alfredson, who was the Councillor for CSIRO, usually made a short report at most Council Meetings. CSIRO underwent several restructures during this period and in 1987 the Institute of Energy and Earth Resources became the Institute of Mineral, Energy and Construction. The AINSE Council Meeting in August 1987 noted that CSIRO was also put under government pressure to *become 30% externally funded within three years.* The annual membership subscription CSIRO paid had increased to $31,450 in 1987 and $34,700 in 1988.

While CSIRO membership of AINSE was for the organisation as a whole, CSIRO involvement was directed through the Institute of Minerals, Energy and Construction. The continuance of that membership was dependent on the utilisation of facilities at Lucas Heights.

In 1991 the CSIRO Institute of Minerals, Energy and Construction made reference to the intention of AINSE to align activities more closely with the objectives of ANSTO. In a letter tabled at the Executive Committee in May 1991, Dr Reid, Director of the Institute of Minerals, Energy and Construction made their position clear.

> *It is understood that the Institute is considering refocusing its activities so that they align more closely with objectives of ANSTO. Unless there is scope to cater for the needs of the CSIRO in the Institute's revised terms of reference, it would be difficult to defend this organisation's continued association with AINSE and we would be giving notice of our intention not to renew our membership.*

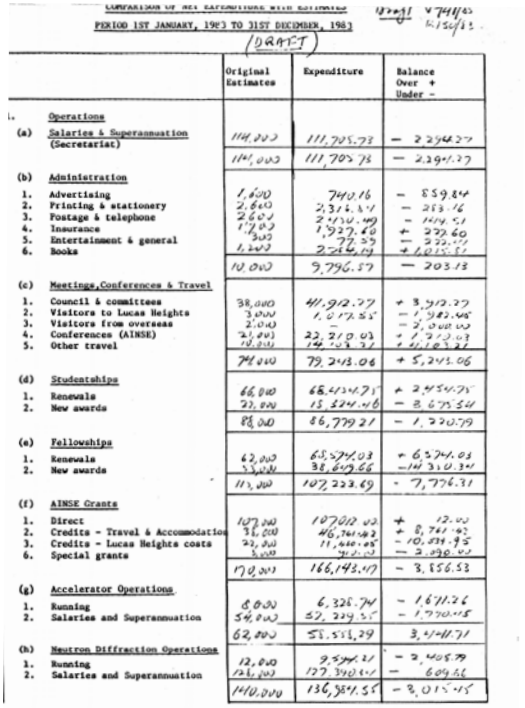
Dr Reid's conciliatory tone concluded with a sting in its tail.

> *It is hoped that CSIRO's requirements can be accommodated as we support the concept of AINSE as evidenced by our long association with the Institute. However, we see a close alignment of AINSE with ANSTO's research program structure as incompatible with our interests and those of the other AINSE partners.*

The Minutes of the Executive Committee do not display any cause for alarm at this ultimatum and the Executive Committee appeared to accept assurances from the Scientific Secretary that AINSE had provided assurances that *new mutually beneficial arrangements could be made for CSIRO's continued membership of AINSE*.

Assurances notwithstanding, the Council in July 1992 noted that CSIRO had advised that CSIRO would not renew its membership in 1993. The letter of intent received from Dr Reid alluded to a request from Dr David Cook, Executive Director ANSTO, for CSIRO to withdraw its membership. In response, Dr Reid advised AINSE that one of the major motives for CSIRO's membership of AINSE had been that it has provided a useful vehicle for undertaking collaborative work with universities using the specialist facilities at CSIRO and ANSTO available at Lucas Heights. The usefulness of this arrangement has been reducing in recent years

> *…. due to organisational changes at CSIRO.* Dr Reid continued that (CSIRO Divisions) *...have now established other mechanisms to ensure collaboration with*



COMPARISON OF NET EXPENDITURE WITH ESTIMATES
PERIOD 1ST JANUARY, 1983 TO 31ST DECEMBER, 1983
(DRAFT)

	Original Estimates	Expenditure	Balance Over + Under −
Operations			
(a) Salaries & Superannuation (Secretariat)	114,000	111,705.73	− 2,294.27
	114,000	111,705.73	− 2,294.27
(b) **Administration**			
1. Advertising	1,600	740.16	− 859.84
2. Printing & stationery	2,600	2,376.36	− 223.64
3. Postage & telephone	2,600	2,414.40	− 185.60
4. Insurance	1,700	1,927.40	+ 227.40
5. Entertainment & general	300	77.35	− 222.65
6. Books	1,200	2,216.69	+ 1,016.69
	10,000	9,796.57	− 203.43
(c) **Meetings, Conferences & Travel**			
1. Council & committees	38,000	41,912.27	+ 3,912.27
2. Visitors to Lucas Heights	3,000	1,017.54	− 1,982.46
3. Visitors from overseas	2,000	−	− 2,000.00
4. Conferences (AINSE)	21,000	22,210.03	+ 1,210.03
5. Other travel	10,000	12,103.32	+ 2,103.32
	74,000	79,243.06	+ 5,243.06
(d) **Studentships**			
1. Renewals	66,000	68,434.71	+ 2,434.71
2. New awards	23,000	15,524.46	− 8,675.54
	89,000	86,779.21	− 1,220.79
(e) **Fellowships**			
1. Renewals	42,000	48,274.03	+ 6,274.03
2. New awards	33,000	38,689.66	+14,310.34
	113,000	107,223.69	− 7,776.31
(f) **AINSE Grants**			
1. Direct	107,000	107,012.00	+ 12.00
2. Credits - Travel & Accommodation	31,000	46,761.03	+ 8,761.03
3. Credits - Lucas Heights costs	22,000	11,440.05	− 10,559.95
6. Special grants	10,000	10,810.00	+ 2,810.00
	170,000	166,143.47	− 3,856.53
(g) **Accelerator Operations**			
1. Running	8,000	6,328.74	− 1,671.26
2. Salaries and Superannuation	54,000	52,229.55	− 1,770.45
	62,000	58,558.29	3,441.71
(h) **Neutron Diffraction Operations**			
1. Running	12,000	9,594.21	− 2,405.79
2. Salaries and Superannuation	126,000	127,390.41	− 609.59
	140,000	136,984.55	− 3,015.45

The financial crisis in this period is perhaps illustrated by the example of handwritten expenditure analysis submitted to the February 1984 Council. (Top line reads ' Comparison of Net Expenditure with Estimates')

universities and as we have little or no call on any specialised ANSTO facilities can see little advantage in CSIRO's continued membership of AINSE.

It is apparent that CSIRO's decision to leave AINSE was bound up in CSIRO's relationship with ANSTO. The notice of withdrawal was simply noted at the Council meeting and no discussion followed on the matter. This meagre acknowledgement was tempered by comments by Professor Len Lindoy, AINSE President, at the Council meeting in November 1992 when he paid

... tribute to the contribution to AINSE that had been gained through the membership of the CSIRO and thanked Dr Alfredson on behalf of Council for all his support.

As an act of good faith, in November 1992 the AINSE Executive Committee authorised the transfer to CSIRO of some AINSE equipment located at the CSIRO Applied Physics Division, Lindfield. CSIRO left AINSE on amicable terms.

5.2 Finances

The Executive Committee meeting in January 1979 noted that while the university members increased their contributions to a total of $123,000 and the AAEC subscription was increased to $125,000, the Commonwealth contribution to research and training had remained at $300,000. In the context of continuing inflationary pressures another subscription increase was agreed by Council at its July meeting in 1980. This increase was for 10% rounded to the nearest $50. The contribution for research and training remained at $300,000.

By now the AINSE Executive Committee had serious concerns about the level of future funding. In September 1980 it was suggested that the Commonwealth contribution for research and training be increased to $500,000 for 1981 and thereafter be indexed. The AAEC at this time was contributing a total of $145,000 in annual subscriptions and $300,000 for research and training. In July 1981 the Executive Committee suggested another subscription fee increase. AINSE finally, in 1982, received an increase in the research and training contribution to $400,000. Again it was not what had been requested but it at least it was an increase.

The Executive Committee in April 1982 noted that during the previous three-year period inflation has totalled 33.8% which had resulted in a reduction in purchasing power of the funds left in reserve. The Executive Committee now sought the assistance of the Commission in making arrangements for the President Syd Haydon and several other members of the committee to have discussions with the Minister for National Development and Energy Senator John Carrick concerning funding for AINSE for 1983.

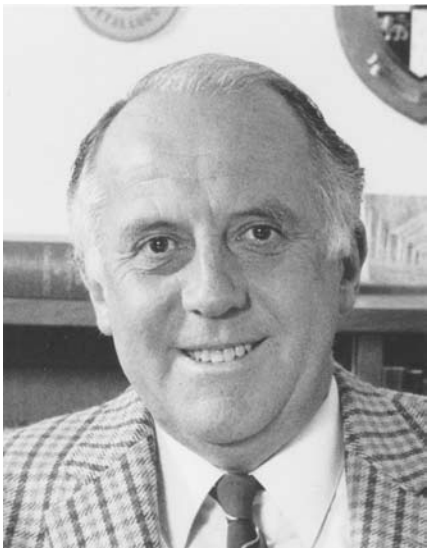
This request proved, in the end, to be fruitless. Another increase in subscriptions was decided, this time by a factor of 1.114. The situation worsened even further during that year when the Australian dollar slumped against the US dollar, leading to an even greater increase in the price of imported equipment and special materials. Council then again requested the AAEC subscription increase to $200,000 in 1984 and to increase the Commonwealth Contribution for Research and Training to $600,000.

In February 1983 Council placed on record that additional funds would be critical *in maintaining the Institute's capacity to fulfil its responsibilities*. The Council also authorised the President, Ian Polmear, and Executive Officer, Bill Palmer, to take action to improve the Institute's income.

The situation was proving to be so desperate that the President, Ian Polmear, even suggested inviting the Shadow Minister, Paul Keating, to visit AINSE and the Lucas Heights Facilities. This suggestion did not result in the desired meeting since the Shadow Minister was not allowed on the grounds of the Research Facility at Lucas Heights without the approval of the Minister for National Development and Energy, which was not secured.

When the Executive Committee met in January 1983, much of the discussion centred on the deteriorating financial position. By July another increase in subscriptions was agreed for 1984 this time by a factor of 1.113.

The advent of the Hawke Government in March 1983 did not ease the situation for AINSE, in fact, it became worse. Inflation was so great that the new government was attempting to take economic control by cutting Government spending. Instead of the $200,000 increase in the Commonwealth Contribution for Research and Training, the new Government agreed to an amount of $300,000, a drop of $100,000! The AAEC subscription, $198,000, was



Professor Ian Polmear in 1986
Photo courtesy of Monash University Archives IN213

Emeritus Professor Ian Polmear AO

Ian Polmear represented Monash University on the AINSE Council from 1974 to 1989, Vice President from 1979 to 1982 and served as President in 1983 and 1984. He was appointed an Honorary Fellow in 1996 in recognition of his valuable leadership as AINSE President and his contribution to the work of the Executive Committee over many years.

His qualifications are in metallurgical engineering and science from the University of Melbourne. After working briefly in industry, and then at the former Aeronautical Research Laboratories where he became a Principal Research Scientist, he was appointed to the Foundation Chair of Materials Engineering at Monash University in 1967. At Monash, he was responsible for establishing the Department of Materials Engineering in 1970 which he chaired until 1987 when he was appointed Deputy Vice-Chancellor.

Ian Polmear took early retirement in 1991 and has since served as a consultant with CSIRO, the former Comalco Research Centre, and in a private capacity. From 1996 to 1999 he chaired the Technical Reference Committee that managed a Probabilistic Safety Assessment, Remaining Life Study, and Seismic Analysis of the HIFAR Reactor. Since 1999, he has been a member of the Nuclear Safety Committee of the Australian Radiation Protection and Nuclear Safety Agency.

also less than requested. The Council at its earliest opportunity placed its disappointment on record and made arrangements for the President, Ian Polmear, and the Executive Officer, Bill Palmer, to meet with the new Minister for Resources and Energy, Senator Peter Walsh. At this meeting in Canberra, they requested an assurance that the Commonwealth contribution in 1985 would be $650,000. The Minister indicated that while he would hope to increase the contribution for 1985 it was unlikely that any increase would reach the level of $650,000 as requested.

The Executive Committee and Council of AINSE, at this time, made an analysis of their cash flow and by May 1984 AINSE expenditure went into survival mode.

> *The Executive Officer advised the Council, that in view of the catastrophic financial situation occasioned by the reduction of the (Commonwealth Government) 'Contribution for Research and Training' to only $300,000 for 1984 (compared to $400,000 for 1982 and 1983) all activities for 1984 were being reduced to a minimum survival level.*

The situation did not interfere with commitments to existing fellowships and studentships, and new fellowships and studentships being offered, as in the past. The Council did not, for example, seek to revise its earlier decision taken in February 1982 whereby the basic stipend for AINSE studentships were set at 25% above that offered for Commonwealth Postgraduate Research Awards. Expenditure for studentships was maintained at the same proportional level of expenditure as it had been in 1983.

To deal with the situation, a plan was developed to reduce the costs of operation by 8% from $803,000 to $738,000 as estimated in July 1984. Savings were obtained through a fortuitous relinquishment of two AINSE Fellowships ($35,000), limitations on grants ($10,000), a deferment in the replacement of a staff member ($7,000) and reduced expenditure on equipment ($6,000). In addition, $9,000 was generated by the reinvestment of uncommitted funds. Table 8 shows changes that actually occurred.

Notwithstanding these savings, Council accepted that AINSE had to work hard to survive what had become a catastrophic situation.

AUSTRALIAN INSTITUTE OF NUCLEAR SCIENCE AND ENGINEERING

Stevens Hall Manager: 543-3006
Residents: 543-3390

16th July, 1984.

The Registrar,

Dear Sir,

AINSE GRANTS 1985 SERIES - CLOSING DATE 6/9/84

The Institute will be pleased to receive proposals from your university for the award of AINSE Grants in the 1985 Series. A number of sets of the following documents concerning these awards is enclosed:-

Announcement
Forms for 'Summary of Proposal' (Form 'A'-2 copies,yellow)
Instructions for 'Detailed Proposal' (Form 'B'-3 blue)
Facilities Lists - AAEC/ANSTO-HIFAR-ADMF
Conditions of Awards

It would be appreciated if you would arrange for this invitation to submit proposals to be brought to the attention of all those departments and individuals in your university who may wish to request an AINSE Grant in this series.

The sequence of actions involved is as follows:-

(i) Distribution of Announcement within the university - to be arranged by the Registrar:

(ii) Preliminary Discussion with the Representative of the university on the AINSE Council - to be arranged by the individual originating a proposal, before the proposal is submitted;

(iii) Preliminary Visits to Lucas Heights for exploratory discussions- the person wishing to make such a visit should write directly to the Institute, if possible before 22/8/84;

(iv) Submission of Requests - for each project, the Registrar is asked to arrange that both of the following are forwarded to reach the Institute by 6th September, 1984:-

Summary of Proposal (Form 'A')
Detailed Proposal (ref. Form 'B' for instructions).

The Institute hopes to receive a number of proposals from your university. It would be appreciated if you would arrange for all of these to be collected and forwarded together, to reach the Institute by the closing date - 6th September, 1984.

Yours faithfully,

(E.A.Palmer)
Executive Officer

Enc.

Notwithstanding the ongoing financial crisis, life goes on and in July 1984 AINSE called for proposals for the 1985 awards series.

Table 8. Analysis of Income/Costs and Disbursements 1982-1987

Year	Income ($)					Costs ($)			
	Total	Member	R&T Cont	Other	%	Total	Fellows	Students	Grants
1982	811,700	346,750	400,000	64,950	.	733,985	91,125	59,586	129,952
1983	845,260	382,000	400,000	62,960	4	818,081	107,224	86,779	166,143
1984*	789,206	423,150	300,000	66,056	-7	680,504	54,148	71,912	93,327
1985	957,102	465,400	400,000	91,702	21	855,975	79,223	85,699	162,530
1986	1,022,272	884,450	—	137,822	7	955,559	101,357	90,527	170,221
1987	1,100,024	953,850	—	146,174	8	965,453	104,018	100,839	178,332

% = increase/decrease from year before

(*1984 was the year of crisis)

By September a welcoming light came on in the gloomy financial tunnel when it was announced that the AAEC subscription would increase to $218,000 and that Commonwealth Contribution was increased to the 1982 level of $400,000. A somewhat relieved Council thanked the AAEC and the AINSE representatives who had met with Senator Walsh, *for their efforts*.

The AAEC was not the only scientific organisation affected by the government cut backs. It was reported at the November 1984 Council meeting that CSIRO was trying to cope with a 4% cut to its budget for 1984-85. Consequently this increase in income could be regarded as a victory for AINSE.

The AAEC on the other hand was receiving better attention from the Government than CSIRO in that the former received an 8% increase in Government appropriation for 1984/85 over 1983/84.

By November the AINSE Secretariat was able to report that it had reduced costs further to $680,000. This was obtained through deferment on commencement of two grants, savings generated by a HIFAR long-term shut-down, extra savings generated by deferring the

replacement of another staff member and delays in equipment delivery. These extra savings amounted to a 15% reduction in expenditure for 1984.

Armed with the welcome adjustment in the Government's contribution, the Council now was in a position to plan for increases in expenditure. For example in November 1984, it was projecting expenditures on studentships in 1985 of $85,000 and in 1986 of $100,000, up from $72,000 in 1984. In the event, it would achieve the the planned 1985 Figure but an expenditure of $100,000 would have to wait until 1987.

AINSE was, however, to face another blow in early 1985. Up to this time the AAEC would pass on funding requests from AINSE, as part of its overall budget and make representations to the Commonwealth Government on behalf of AINSE. The AINSE contributions would come out of the AAEC overall budget, but now in January 1985, Max Brennan, the Chair of the AAEC sent a letter to Bill Palmer, Executive Officer of AINSE, in part stating:

> *... the Commission has concluded that, given demands upon its resources, it is not able to propose to Government that its contribution to AINSE be further increased in 1985-86. In reaching this conclusion the Commission has assumed that it will be able to maintain its contribution for research and training at $400,000.*

Given that the AAEC had received an increase of 7.7% in Government appropriation for 1985/86 over 1984/85, the AAEC position must be seen as disingenuous and possibly reflected a lowering of its current thinking about its commitment to AINSE.

The issue was taken up at the Executive Committee meeting in January 1985. In the discussion that followed

> *...The Committee noted that requests to have the 'Contribution' adjusted annually by means of some acceptable 'indexation' mechanism had been put forward many times in the Institute's annual submissions to the AAEC. The reasons offered informally to AINSE for failure of these requests for 'indexation' included reference to the requirement that every AAEC proposal for increasing the 'Contribution' had to be submitted by the Commission as a 'new policy proposal' which appears to exclude the possibility of 'indexation'.*

Following the Federal budget, the AINSE Executive Committee meeting noted that the AAEC subscription for 1986 would be $225,000 but the training contribution would remain at $400,000. The universities, however, had agreed in August to a subscription increase of 1.049 for 1986. In the absence of meaningful upward adjustments to the AAEC contribution, AINSE was facing a new financial squeeze.

An analysis of the distribution of AINSE expenses is shown in Table 9.

Table 9. Analysis of AINSE expenses 1982 - 1986

Year	1982	1983	1984	1985	1986
Salaries (staff, students, fellows)	55%	57%	59%	52%	52%
Travel and accommodation	14%	17%	17%	18%	18%
Lucas Heights costs	5%	4%	5%	5%	5%
Equipment and special materials	25%	21%	17%	23%	23%
Administration	1%	1%	2%	2%	2%

Some success in relation to increasing the AAEC Contribution for Research and Training was gained in early 1986 when W Ratcliff, Secretary of AAEC, wrote to Bill Palmer stating:

> *... the Commission determined that, commencing the financial year 1986-87, it would adjust the research and training contribution by the same percentage increase as the AAEC received for its discretionary budget items. Further, it determined that the base year for calculations would be 1984-85, that is, the 1985 calendar year for AINSE.*

The traumas of 1984 were now past and an analysis of income/expenditure figures for the period show that AINSE by now had weathered the storm surprisingly well. AINSE had proved to be tenacious in the face of attempts to cut back its income. By 1986 AINSE had recovered from the fright of 1984. A combination of toughness in the face of adversity and a willingness and capability to cut expenditure ensured that AINSE's commitment to grants, fellowships and studentships was protected.

On 27 April 1987, the Australian Atomic Energy Commission ceased to exist and a new

Photo courtesy of The University of New South Wales Archives

Professor Ken Taylor

Ken Taylor was a Member of the AINSE Council in 1976 and from 1979 to 1989, Vice President from 1981 to 1984 and President in 1985 and 1986.

As a researcher Ken Taylor received 20 AINSE Research Awards between 1975 and 1994, mostly related to his research on magnetic materials although in the 90s he received AINSE support for work in the area of high-temperature superconductors.

Ken Taylor's early interest was magnetic materials. This remained his interest for some time when he joined the School of Physics at the University of New South Wales. After this he was involved in a major research program with Dr George Paul on laser driven chemistry and processes. When funding for this ceased, he teamed up with Graeme Russell on the high-temperature superconductor research. Graeme Russell was an experimentalist working on the 'hot' area at that time of high-temperature superconductors. Both areas of research were undertaken at the University of New South Wales.

After retirement Ken Taylor moved to Tasmania. There he did some part-time university teaching but spent more of his time persuing his hobby of woodturning at which he was extraordinarily skilful.

He was involved in a fatal car accident in 2007.

organisation, the Australian Nuclear Science and Technology Organisation (ANSTO) was formed. ANSTO formally joined AINSE on that date. AINSE had every expectation that its relationship with the new organisation would remain the same. This, unfortunately, was not to be the case – see Section 6.1.

At its November 1989 meeting Council reviewed subscriptions and it was agreed that

> *... membership subscription levels be reviewed every 3 years based on an analysis of benefits received over the preceding 10 years.*

By this stage it had already been accepted that the ANSTO subscription would be at least equal to the total contribution from the universities.

5.3 Governance and process

5.3.1 Governance

In August 1980 the Executive Committee considered a letter and associated documentation from Terry Walker, the Chief Scientist Planning, AAEC, advising that a submission had been sent to the AAEC seeking to upgrade the neutron beam facilities on HIFAR - including installation of a cold source for long wavelength neutrons. In requesting AINSE input, the letter acknowledged the importance of AINSE involvement in the process.

AINSE input at this stage was fundamental and in November 1980 Terry Walker advised the Council that the AINSE submission to the AAEC on neutron beam upgrading, *including a 'cold source' had been accepted by the Commission as a basis for future action*.

AINSE's pivotal involvement in the neutron beam upgrading proposal is illustrated by the representation at a high-level meeting convened at Lucas Heights to discuss the issue: representing the Australian Science and Technology Council (ASTEC) - Chairman, Member and Secretary; representing the AAEC – General Manager, Director Research Establishment, Chief Scientist Planning, Chief Applied Physics Division, Controller, Reactors Department, Leader, and Member, Neutron Scattering Group; and representing AINSE – President, two Vice Presidents, Immediate Past President, Executive Officer, Leader and Member of the Neutron Diffraction Group.

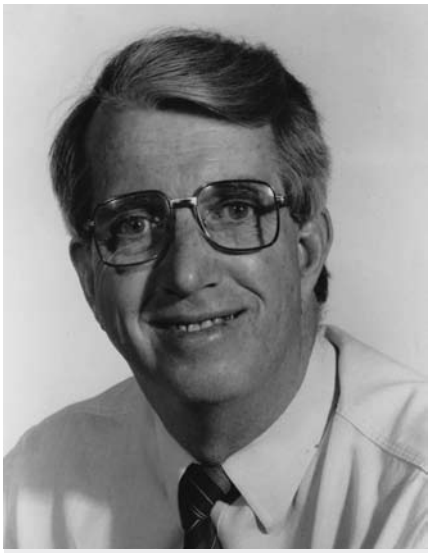
At this time the Government was reviewing the Atomic Energy Act through the Interdepartmental Committee on the Review of the Atomic Energy Act, 1953 and Related Matters. The AINSE submission to this Review conveyed a number of views, including the view that any legislation modifying or replacing the present Act should continue to provide for a formal association between the appropriate government authorities and the universities.

The ASTEC Report on Nuclear Science and Technology in Australia (November 1985) recognised the continuing role of AINSE in these cooperative activities since 1958, with particular reference to the mechanism for making available the reactors, accelerators and other facilities within the Lucas Heights Research Laboratories for use in research and training projects undertaken by staff and students from Australian universities and institutes of technology.

In 1984 both Ernest Titterton and David Allen-Williams, both founding Councillors who had each served 25 years, retired from Council. One of Titterton's last duties was to deliver one of the AINSE public lectures, entitled 'Risks, Safety, Costs and Commonsense'. These public lectures which were organised in conjunction with the roving Council meetings continued throughout the 80s.

AINSE had a representative on the Australian School of Nuclear Technology (ASNT) Board and continued supporting academic staff from member universities at courses given at Lucas Heights by this ANSTO owned and operated school until it was wound up in 1988, following a cost/benefit analysis undertaken by ANSTO. The school had run for over 20 years and some of its training functions such as nuclear safety courses were transferred to ANSTO.

Over the decade, the number of staff at the Institute remained stable. Bill Palmer generally had three administrative staff, three research scientists and three technical staff.



Professor Len Lindoy FAA

Len Lindoy received his first AINSE research award in the late 70s while working at James Cook University of North Queensland in Townsville. At that time he was investigating the design of new organic reagents for metal ion discrimination - an area of potential interest to the mineral processing industry. Reflecting the limited research facilities in Townsville, he travelled to Lucas Heights to use equipment both under the control of CSIRO (FAB mass spectrometer) and AINSE/ANSTO (the single-crystal diffractometer 2TanA). Initial research using the diffractometer was carried out in collaboration with Lindsay Davis, an outstanding scientist, who unfortunately died in mid-career. As a result of these studies, Len grew close to industry, becoming a consultant to ICI PLC/Zeneca/Avecia (UK) for 12 years on the design of reagents for use in mineral processing. From 1985 to 1996 he served as James Cook University's representative on AINSE Council. In 1992 he became AINSE Vice-President then President in 1993 taking over from Professor Jim O'Donnell, also a chemist, from the University of Queensland. This was a period of considerable turmoil for AINSE when its relationship with ANSTO and indeed its ultimate future was being questioned.

In 1995 Len received the AINSE Gold Medal for excellence in research at a Council visit to the University of Melbourne. In 1997 Len moved to the University of Sydney, where his AINSE research has involved the design of new reagents for use in radiomedicine, with emphasis on employing ^{64}Cu for cancer therapy. This project was carried with his student Ms Martalina Ramli and Dr Suzanne Smith from ANSTO.

5.4 Research achievements

5.4.1 Neutron scattering

The 80s saw continuing AINSE involvement in the provision of equipment for neutron-scattering studies and scientific and technical staff to develop, operate and maintain the equipment. AINSE also contributed to travel costs associated with attendance by researchers at overseas conferences. Demands on the resources of the AINSE Neutron Scattering Group were maintained at a high level over the decade.

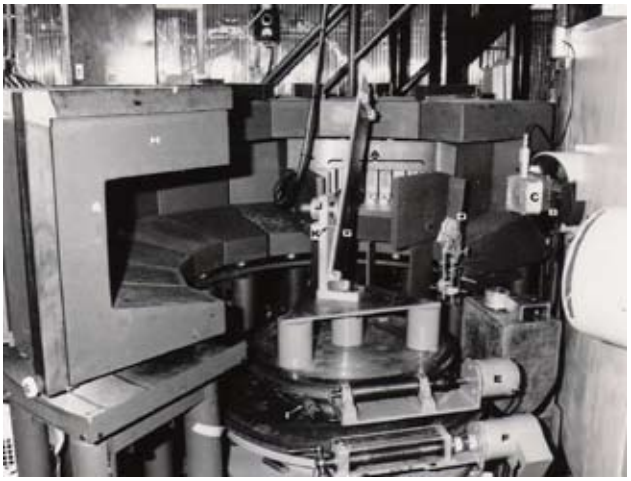
By 1986-87 AINSE was actively involved in the preparation of submissions to the AAEC/ANSTO for upgrading the neutron-scattering facilities in HIFAR including the early provision of a small-angle neutron-scattering (SANS) instrument. The need for such an instrument was evident from the progress in polymer and surface chemistry as well as structures of biological samples at ILL in France. A lecture on these developments was presented to ANZAAS by Professor John White in 1988. A key study by the Australian Academy of Science chaired by Professor Freeman advocated the Construction of an Australian Small Angle Scattering Facility on the HIFAR reactor in addition to increased Australian access to international synchrotron facilities. In 1988 ANSTO decided to build such an instrument at a cost of $1.3M and AINSE was invited to be a partner by contributing $400,000 over three years towards the capital cost.[65] The construction was to be carried out by ANSTO staff with the assistance of Lindsay Davis. This major allocation of AINSE funds was one of the final events of the first 30 years of AINSE's operations. At the end of the decade the cumulative total value-at-cost of AINSE neutron-scattering equipment[66] which had been installed at ANSTO was approximately $800,000.

The construction of AUSANS provided an opportunity for the first major application to the ARC for infrastructure funds, notably $250K for the area detector.

The rapid growth in the use of HIFAR neutrons in the second decade was followed by a more modest increase in neutron-scattering publications during this decade. Approximately 120 papers were published with an AINSE acknowledgement which represented a 10% increase over the 70s output. In 1980 Lindsay Davis joined the AINSE neutron-scattering team led by Frank Moore, which further enhanced AINSE's capacity to develop both the neutron-scattering infrastructure and collaborative initiatives with universities. AAEC resources devoted to neutron-scattering staffing continued at a modest level. Terry Sabine departed AAEC/ANSTO in 1972 having made a substantial contribution to neutron difraction science, notably towards the theory of extinction effects. Chris Howard and Margaret Elcombe joined AAEC/ANSTO and provided further support to university researchers. The generous mentoring provided by Margaret over the next 25 years is fondly remembered by many former students.

The dominant research focus during the decade continued to be magnetism, with researchers in this field at Monash (ca. 60 publications) and the University of Western Australia (ca. 30 publications) accounting for some 75% of the journal papers for the decade. The driving force behind the Monash Physics phenomenon was Trevor Hicks who was an author on approximately 40 AINSE publications during the decade. He was strongly supported by Stewart Campbell who, like Trevor, would later receive an AINSE Gold medal for the excellence of his research. Jack Smith continued to be an important contributor to the Monash research. As in the 70s, the emphasis of the Monash magnetism work was on the mapping of magnetic moment distributions in metals and metal compounds using powder diffraction, single-crystal diffraction and neutron spectroscopy.

The AINSE-supported magnetism research at the University of Western Australia was led by Brian Figgis, the eminent physical inorganic chemist, who was the senior author on all of the UWA magnetism papers. These single-crystal studies with polarised neutrons focused on the magnetism of transition metal complexes, and made important contributions to the development of ligand field theory.



A specially designed specimen rig in place on the HRPD at HIFAR. Note also the approximately 120 degree detector bank on the HRPD.

It was during this period that Trevor Finlayson, together with Monash research and honours students and with the help of ANSTO staff, investigated the

65 AINSE Annual Report 1987-88, p6
66 ibid

influence of residual stresses on the physical and mechanical properties of alloys using the recently commissioned high-resolution powder diffractometer, see the picture on page 53. Trevor Finlayson also used the triple-axis spectrometer to investigate the lattice dynamics of superconducting $PdTe_2$ and its isomorphs. Some years later, the triple-axis spectrometer at HIFAR was refurbished by ANSTO, thus enabling research in neutron strain scanning to be undertaken by a number of Australian research groups with the benefit of AINSE support.

AINSE supported research by university neutron-scattering researchers who had been prominent in the 70s continued in the 80s; prominent research included

- determination of charge density distributions led by Ted Maslen and students at the University of Western Australia
- mineralogy studies at James Cook University led by John Parise and Chris Cuff
- projects at the University of Queensland led by Brian Lucas and Colin Kennard
- high-temperature neutron powder studies led by Zwi Barnea from the University of Melbourne
- neutron scattering from fine cobalt particles led by George Paul from the University of New South Wales

The decade also saw the emergence of many new AINSE-supported researchers including

- Tony Klein and Geoff Opat from the University of Melbourne on neutron optics research which resulted in the much cited paper 'Imaging and focusing of neutrons by a zone plate' P Kearney, A G Klein, G I Opat and R Gahler. Nature **287** 313 1980
- Veronica James from the University of New South Wales on her application of neutron scattering to various aspects of the biosciences including for example: neutron diffraction studies of biological membranes and a low-angle diffraction study of the alterations in the ductel stroma in breast cancer.
- Evan Gray from Griffith University on interstitial site occupation in metal hydrides
- Harry Bloom from the University of Tasmania on the crystal structures of polyhalides
- Fred Smith from Monash University on lattice dynamics of the alkali thiocyanates
- Richard Welberry from the Australian National University, on disorder in substituted anthracenes and molecular crystals.

Conferencing! Bill Palmer, Ian Polmear and Mick Carter in 1983

5.4.2 Neutron irradiations

In 1979 the Standard Neutron Irradiation Facility (SNIF) was developed on the 3 MV Van de Graaff accelerator, in collaboration with the University of Queensland. The 3 MV accelerator was ideal for producing well characterised neutron beams with relatively low gamma-ray contamination.

From mid 1979 to the early 90s the SNIF facility was extensively used by researchers in Martin Lavin's team from the University of Queensland and Queensland Institute of Medical Research, and contributed to several doctoral and masters theses as well as journal publications related to DNA damage mechanisms in cells by MeV neutrons.

5.4.3 Environmental science

In 1982 one of the longest running AINSE projects started. Professor Don Bradshaw a zoologist from the University of Western Australia started a study of metabolic rates of small animals in the Pilbara region, using the $^{18}O(p,\alpha)^{15}N$ reaction at 846 keV on the Van de Graaff accelerator. This work continued until his retirement in 2007. He has been one of the most regular and prolific publishers – with over 20 refereed papers, 13 conference presentations and four students' doctoral theses; see Section 6.6.3.

5.4.4 Materials science

In 1985 Dr Ian Brown of Lawrence Berkeley Laboratory (USA), inventor of the metal vapour vacuum arc (MEVVA) ion source visited ANSTO. This visit opened up the possibility of using a variant of the MEVVA source for isotope separation and for ion implantations. In

response, a new generation MEVVA source was constructed by ANSTO in 1997. Later that year Associate Professor Frank Paoloni, from the University of Wollongong, commenced collaboration on the Vacuum Arc Project. This was closely followed in 1986 by the first AINSE grant for vacuum arc research to Paoloni. Representative research in this area over the next ten years includes

- Armenang Nassibian at the University of Western Australia fabricated silicon devices
- Jack Kelly at the University of New South Wales investigated the modification of surface properties of metal alloys following ion implantation
- Ron MacDonald at the University of Newcastle modified surfaces by ion implantation
- Jagdish Mathur at the University of Wollongong used ion implantation for the production of photovoltaic cells
- J Unsworth at Macquarie University investigated ion implantation and electron irradiation of conducting polypyrrole
- Jim Williams at RMIT studied the interaction of MeV heavy ions with semiconductor multilayers

5.4.5 Radiation chemistry

The Polymer Materials and Radiation Group at the University of Queensland studied highly radiation-resistant polymers as well as polymers that exhibited low radiation resistance. In the 80s, the National Aeronautics and Space Administration (NASA) approached the Group with a view to collaborating on studies of the radiation chemistry of the wide range of radiation-resistant materials being considered for space applications. The collaboration subsequently also involved studies of materials irradiated in space on the Long Duration Exposure Facility, LDEF, launched by NASA in 1984. Over time, this research included studies of many aromatic polymers, such as the polyimide Kapton which is widely used in space, and others, including polymers that show oxygen atom resistance as well as radiation resistance, such as polyimides containing phosphene oxides. The collaboration with NASA is continuing through Professor Andrew Whittaker, and so has now extended over almost 30 years.

In 1978 Don Napper and Bob Gilbert from the University of Sydney faced a dilemma. Brian Hawkett, their PhD student, had shown by careful experimentation and interpretation of his results that, in an emulsion polymerisation system, the radical species disappeared by a first-order reaction. This was not only counter-intuitive but at variance with a published result using gamma irradiation which showed a second-order reaction. Since they could fault neither Brian Hawkett's results nor reasoning, they decided to repeat the published experiment accessing the gamma source at Lucas Heights by means of an AINSE research award.

Stephen Lansdown modified the dilatometer to enable it to be inserted into and removed from the radiation field. His very first experiment gave publishable data. He showed that, had the previous irradiation experiments been allowed to run for somewhat longer, they would have shown that radical disappearance did in fact fit first order kinetics and that there was a thermally initiated polymerisation. This had also been found by Brian Hawkett. These observations not only led to a better interpretation of the complexities of emulsion polymerisation events but also opened up new vistas. Each new investigation suggested new ways in which radiation could be used. Over the next several years these were explored for different conditions and different monomers by many research students from other Australian universities and from overseas. The same gamma facility as used in 1978 is still being used.

When an emulsion of a monomer is inserted into the radiation field, polymerisation is initiated and later settles down to a steady state. The rate can be followed by the contraction in volume. When it is then removed from the radiation field, there is no new initiation so the rate of polymerisation decreases as the reactive radicals mutually annihilate. Thus information on this decay process can be separated from other reactions in the system. The simplification leads to a system free of dependent variables whose variables cannot be evaluated separately. This enables authentic modelling of the polymerisation to be performed.

These relaxation measurements have been one of the most extensive applications of AINSE radiation facilities in the polymer field but there have been other uses. These make use of the ability of gamma radiation to penetrate an emulsion which is opaque to visible or ultra-violet

light and deposit a minute dose over a reasonably large volume. This in turn means an even distribution of initiating radicals. Furthermore, the dose can be readily controlled and reproduced and is sensibly independent of temperature, composition and other variables. Chemical initiation does not have these attributes.

The investigations outlined above could not have been carried out without help from AINSE.

The group at the University of Melbourne was examining emissions from electron beam irradiated gases using the Febetron facilities at the University of Melbourne as well as at AINSE. The experiments measured specific yields of light from irradiated rare-gas halogen mixtures such as are used in Excimer lasers. The studies also demonstrated that both excited atom as well as ion recombination reactions were separately responsible for light production. The studies also measured the rate constants for ion-ion recombination in gases at pressures inaccessible for conventional plasma physics studies. The results were used by theoretical physicists to devise new models for pressure-assisted ion recombination.

AINSE technical staff members David Cohen and Alex Katsaros working on the PIXE/PIGE beamline and chamber, SR2, on the 3 MV Van de Graaff in the early 80s. This instrument was used extensively by AINSE for all PIXE work including all obsidian and archaeometry studies. At the time David Cohen was also an AINSE postgraduate student.

5.4.6 Heavy ion physics

The unique contributions of accelerators to the characterisation of thin films, surfaces and interfaces have been appreciated internationally and nationally for decades. This aspect has been well documented in the International Conference on Ion-Beam Analysis series held every two years since 1973. The 5th Ion-beam Analysis Conference was held in Sydney at the University of New South Wales in March 1981 with assistance from ANSTO and AINSE officers. AINSE continued to provide support for heavy ion physics through the AINSE Nuclear Techniques of Analysis conferences.

5.4.7 Archaeology and anthropology

In the 80s AINSE supported research by archaeologists by providing three main techniques.

- irradiation for $^{40}Ar/^{39}Ar$ age determination of rocks
- Neutron Activation Analysis (NAA) for elemental analysis
- Proton Induced X-ray Emission (PIXE) for elemental analysis

The $^{40}Ar/^{39}Ar$ dating was done exclusively for the McDougall group at the Australian National University to support both geological and anthropological studies. See Section 6.6.7.

NAA trace element analysis of heavy mineral fractions was done for John Prescott at the University of Adelaide who used low-level uranium and thorium determinations for archaeometry. Pottery samples were anaysed for J P White's study of prehistoric ceramics from Buka and Sohano Islands, PNG.

PIXE analysis of Admiralty Island pottery and prehistoric Melanesian pottery was undertaken for researchers at the Australian National University.

AINSE's continuing support for this research and its general support for conferences helped to raise interest in archaeological studies within the university sector.

5.4.8 Plasma/fusion

In the early part of the 80s, Ieuan Jones and his experimental group at Flinders University drew on the work of Harry Blevin and Peter Thoneman to develop the rotamak - a spherical device in which large currents were driven by rotating magnetic fields. This created a plasma with a compact toroidal field structure. Theoretical support was provided by Robin Storer, Peter Watterson, Waheed Hugrass, Shuyan Xu and others. AINSE supported extensive studies to determine the possibility of scaling the device so that it may become a possible source of fusion power, since there was a possibility of overcoming the pulsed nature of tokamak operation. Extensions of these experiments were set up at ANSTO under the leadership of George Collins, incorporating an applied toroidal magnetic field, thus leading to a spherical tokamak configuration. In addition, ANSTO appointed one of the world's leading computational plasma physicists, Ray Grimm from the Princeton Plasma Physics Laboratory (a Flinders graduate), to strengthen the organisation's understanding of the importance of thermonuclear fusion. This appointment was strongly supported by AINSE. Unfortunately, Ray died shortly after his appointment and was not replaced.

During this decade, the University of Sydney set up a small tokamak, with emphasis on the propagation of Alfven waves in hot plasmas, and became, under the leadership of Rod Cross, one of the leading centres of expertise on Alfven waves in plasma devices.

The Australian National University moved towards helical-toroidal experiments with the construction of SHEILA - a stellarator-like device which gave the foundation knowledge for the later construction of the much larger H-1 Heliac.

5.5 Specialist committees

At the beginning of the decade four specialist committees operated: Nuclear Physics, Radiation, Physics and Neutron Diffraction. The specialist committees considered grant applications; these were reviewed by the Executive Committee which presented a consolidated list of recommendations to the Council. In addition, the specialist committees provided advice to the Executive Committee and Council, primarily in relation to the organisation of conferences. The reporting process tended to be formal and limited – a list of recommendations for grants to be supported and there is no evidence of feedback from the Council to the specialist committees.

At the end of the decade there were five specialist committees: Engineering and Materials, Neutron Diffraction, Nuclear Physics, Plasma Physics and Radiation. The process of approval by Council had been further refined and the Council now only received a consolidated list of recommendations from the Executive Committee.

5.6 Research Awards

Over the decade the number of research awards was usually 90 to 100 each year. In this period AINSE did not highlight the successes associated with this research and simply listed the projects and associated publications in its annual reports. Early in the decade AINSE referred to the projects in terms of equipment and facilities used, but the description changed over the decade to embrace the research fields covered by the grants awarded.

The grants awarded continued to be modest, ranging from a few hundred to a few thousand dollars, however, some larger amounts were awarded.

In 1982 two of the largest grants were to

- Professor Max Brennan, University of Sydney, for a project on wave propagation and heating in high-temperature plasmas. $9,500
- Dr A Hilary Morton, Australian National University, for a project on fast monitoring of transient signals from LT-4 plasma. $11,109.

At the end of the decade in 1989 the two largest grants were awarded to Dr Trevor Hicks, Monash University

- for a project on the distribution of magnetic moments in superparamagnets, spin glasses and Kondo systems. $27,450; and
- for a project on the distribution of magnetic moments in alloys with magnetic long range order. $19,450.

By 1988 AINSE had commenced the inclusion of a fairly detailed listing of facilities and services at Lucas Heights in its annual reports. This followed the insertion of a listing of technical reports in 1984. These embryonic attempts to provide information on grant-related activities, and on the facilities available for use by university academics would be followed, two decades later, by regular reports on highlights from the research activities, extensive publications lists as well as lists of research awards, studentships and fellowships in the annual reports.

5.7 Research fellowships

With the exception of 1984 and 1985, AINSE managed to maintain the integrity of its fellowship program over the decade. The future careers of a number of research fellows from this decade are worthy of note.

Commenced Fellowship	Name	Comment
1980	Evan Gray	Griffith University, has supervised four PGRAs, 22 research awards since 1989, chief investigator in the ARC LIEF Grants for access to ISIS
1982	Tim White	Head of the Division of Materials Science at Nanyang Technological University
1983	Trevor Hambley	Head of the School of Chemistry at the University of Sydney
1984	Keith Nugent	Federation Fellow, School of Physics at the University of Melbourne
1989	Michael Antolovich	Charles Sturt University

The practice of awarding research fellowships to candidates at an early stage of an independent post-doctoral career was continued with tenure of two years.

The financial situation in 1984 resulted in the commencement of only one new fellowship during the year though the situation had improved by 1985 when six fellows held tenure.

During this decade, competition for places was constantly reported as intense and AINSE did what it could to promote the fellowships at all universities. By the end of the decade AINSE had awarded a total of 63 fellowships since the scheme commenced in 1960.

5.8 Studentships

The Executive Committee in April 1982 recommended a change to the 'location' Section of the guidelines for studentships:

> *Studentships will be held at the nominating university, but the student will be required to spend a significant proportion (normally not less than one quarter) of the total period of tenure of the award, attached to the Institute at Lucas Heights, NSW, for the purpose of using the facilities at Lucas Heights in connection with the approved research project.*

In May the Executive Committee further recommended that

> *... from 1 January 1983, the basic stipend for AINSE Postgraduate Research Studentships be increased to and thereafter maintained at a level 25% above the basic stipend for Commonwealth Postgraduate Awards (CPRA) while maintaining the CPRA allowances for dependent spouse and children.*

When the postgraduate scholarships had been introduced, almost all undergraduate students were Australian citizens or British subjects. By the mid 80s more undergraduate students were coming from overseas and Australia also attracted more postgraduate students from overseas. There was no compulsion for these students either to have permanent residency or hold Australian citizenship. The implementation of the Nuclear Non-Proliferation Treaty and Australia's increasing numbers of students from countries who were not signatories to the Treaty placed certain impediments on access to facilities at Lucas Heights.

The issue was discussed by the Executive Committee meeting in January 1986 where AINSE President Professor Ken Taylor commented

> *... that it may be appropriate for attention to be drawn to the existence of Commonwealth Government policies which can prevent the AAEC from permitting citizens of certain nations to have access to nuclear facilities at Lucas Heights. … Commonwealth Government will not permit the use of its nuclear facilities by citizens of nations which are not signatories to the Nuclear Non-Proliferation Treaty or, in the case of nuclear weapon states, have not given certain formal assurances.*

Professor Tim White

Tim White commenced his AINSE research fellowship in 1982 while at Griffith University. His research involved a study of the microstructure of Synroc. Tim White became a scientist at the AAEC in 1984 where he led the electron microscopy group.

This was followed by a variety of posts where he pursued the research fashions of the day in superconductivity and environmental remediation. He moved to the University of Melbourne in 1987, the University of Queensland in 1988, and the University of Western Australia in 1992, before taking up a research professorship at the University of South Australia in 1993. He began visiting Asia at this time and became a founding member of the Environmental Technology Institute in Singapore in 1996.

Tim White has remained in Singapore where he has occupied a number of posts. He was appointed Head of the Division of Materials Science at Nanyang Technological University in 2005.

Consequently, scholarships were restricted to those students who were Australian citizens. Gradually the criteria have been relaxed and as long as visiting foreign researchers or students do not have access to nuclear fuel cycle technology and they gain a clearance from ASIO, they are permitted access to facilities at ANSTO and are eligible for AINSE support.

Over the decade the number of concurrent studentships increased from about ten to about twelve.

A complete list of AINSE postgraduate students is given in Appendix 6. Some of the postgraduate students in this decade include:

- Vanessa Guthrie who is now Vice President - Environment and Sustainable Development, Woodside Energy Ltd;
- David Cohen who is now leader of the Accelerator Group at ANSTO;
- David Cookson who is facility manager at the Australian Synchrotron. Prior to this he was employed by ANSTO, for the Australian Synchrotron Research Program as an instrument scientist at the Advanced Photon Source in Chicago until 2007; and
- Erich Kisi and Bernd Lottermoser who have tenured positions at the University of Newcastle and James Cook University, respectively.

Bill Palmer with the NSW Governor, Sir James Rowland, at the presentation of Bill's OBE in 1982

5.9 A second scientific secretary

Bill Palmer, who had been with AINSE for nearly 30 years, retired on 1 August 1988.

In the 1982 Queen's Birthday Honours he was appointed an Officer of the Order of the British Empire for his services to science and technology. Bill, always a modest man, claims that his OBE was a way of recognising the contribution to Australian society that AINSE had accomplished. Bill had many qualities but his adroitness during the financial crisis of 1984 is worthy of mention.

An advertisement for his replacement specified the requirements for a Scientific Secretary, which included a degree in the physical sciences or engineering, and administration and/or business experience. The salary would not be less than $45,000.

The successful candidate was Dr Roger Gammon. He was well qualified to take up the position. He had a PhD in Physics from Brunel University and his work experience included: Physicist in the Reactor Group, United Kingdom Atomic Energy Authority (UKAEA), Harwell and Winfrith, 1969-1972, Lecturer, School of Physics and Materials, NSW Institute of Technology, 1972-1979, Director, Energy Centres, Energy Authority of NSW, including secondments to UKAERE – Harwell and the Jet Propulsion Laboratories, Caltech, Pasadena, 1979-1987 and Manager-Projects, Telecommunications Aerospace and Defence Desk, NSW Department of Industrial Development and Decentralisation, 1987-1988.

Roger Gammon was introduced to the Council on 6 May 1988 and commenced on 28 June of the same year. Since he was employed as the Scientific Secretary, the President of AINSE fulfilled the position of Executive Officer, as had been the case in the early days of Bill Palmer's employment. Gammon was promoted to the position of Executive Officer on 1 January 1992.

At ANSTO, its new Executive Director, Dr David Cook attended his first Board meeting on 8 June 1988. At this Board Meeting, Cook outlined a comprehensive plan of action, including a new corporate structure for ANSTO, devolution of administrative and financial responsibilities to program areas, a new visiting fellowship scheme and arrangements for program areas to retain earnings. Two weeks later Cook, in a detailed Information Circular dated 30 June 1988 outlined a comprehensive plan for significant change at ANSTO.

Roger Gammon

While the new direction and the often frenetic change process at ANSTO would by necessity impact on the operations of AINSE, the winding up of the AAEC and its replacement by ANSTO carried with it little hint of any future clashes between ANSTO and AINSE. Indeed the seminal 1986 Review of the Australian Atomic Energy Commission (the Collins Review) had acknowledged the contributions of AINSE.

> *The interim objectives proposed by the Committee [of Review] include statements relative to the training of scientific technical and research workers in areas of nuclear science and technology, and the provision of access from outside the Organisation to ANSTO's unique facilities. In this regard, the Committee notes with approval the*

very successful way in which the AAEC has carried out its responsibilities in this area through …ASNT and AINSE.

…The Committee recognises … that AINSE provides a particularly efficient method by which Australian researchers can gain access to the unique facilities of the AAEC, and regards this arrangement as a most cost effective alternative to the proliferation of facilities[67].

Dick Collins recalls that his Committee was supportive of AINSE's continuation; support that continued with the new Board of Directors of ANSTO of which he was the first Chairman.

67 Review of the Australian Atomic Energy Commission, 1986 p31