

REPORT

**Regional Workshop on Leadership in Business
Management for Nuclear Institutions in the East
Asia and Pacific Region**

18-22 November 2002
Beijing
People's Republic of China

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1. Introduction

An IAEA Regional Project on Enhanced Sustainability and Self-reliance of Nuclear Institutions in the Asia and Pacific region (RAS/0/032) was initiated in 2001 to support regional efforts to ensure the sustainability of National Nuclear Institutes.

The project was established as a response to the conclusions and recommendations of a Regional Seminar held in Kuala Lumpur, Malaysia, attended by senior management personnel from National Atomic Energy Commissions, National Nuclear Institutes and policy agencies involved in science and technology and in national development.

The first meeting of Project Counterparts was held in Yangon, Myanmar, from 12-15 November 2001. A key strategy agreed at the meeting was to establish or strengthen Business Development Units (BDU) in the major nuclear institutions in all participating countries. BDUs will have different goals and operating environments in different countries that depend on government policies and local conditions. Their fundamental role, however, may be considered as acting as a “bridge” between the institutions, which have products and services that arise from successful R&D, and the potential users of the products and services as well as funding agencies.

BDUs in specific countries focus to varying degrees on technology transfer, marketing, commercial services or related activities. However, they share the aim of assisting technical divisions to increase the utilisation of nuclear applications and to ensure that the institutions obtain some form of financial benefit from the provision of the products and services.

The workshop brought together 21 participants identified by their institutions as being among the leaders of their BDUs from 11 countries, as well as two international experts and the IAEA project manager. A list of participants is provided in **Annex 1**. The workshop was the first regional event involving staff of nuclear institutions that share a common interest in how to manage activities aimed at increasing the utilisation of nuclear applications. Working sessions were held at the Beijing Institute of Nuclear Engineering (BINE), and there was a visit to the Nuclear Science Centre, Tsinghua University. Accommodation was provided nearby at the Xiyuan Hotel.

2. Opening

Mr Yang Dazhu of the China Atomic Energy Authority (CAEA), on behalf of the government of the People’s Republic of China and CAEA, warmly welcomed the representatives of the IAEA, the two experts from Korea and Australia and the participants from overseas institutes. He said that the Chinese Government attaches great importance to nuclear R&D in its national nuclear institutions and encourages the institutions to transfer nuclear technologies to end-users and to increase the utilization of the technologies in order to promote the development of economy. China is putting a place a socialist market economy, which is quite different from the planning economy. The national nuclear

institutions in China are also facing new opportunities for development and serious challenges.

RAS/0/032 was therefore beneficial to China in making some of the necessary changes, and he hoped that China would also be able to help other countries in the region. He wished all the participants a pleasant stay in Beijing.

Mr Yang Chuande, senior advisor to BINE and Workshop Co-ordinator, welcomed all participants on behalf of BINE. BINE, the most comprehensive engineering institute in China, was honoured to have the confidence of the IAEA to host the Workshop. Until 1984, BINE relied 100% on direct funding from government. This was a very comfortable situation for the staff, but more recently BINE has no longer received direct funding and must seek revenue in the open market via contracts.

In some years, the business associated with nuclear power plants was insufficient to sustain the institute. BINE had no choice other than to compete against other organisations in the non-nuclear field. Eventually, this has helped BINE not only to enlarge its technical capacity, but also its business management systems.

Mr Yang noted that two brother institutes were represented at the Workshop. The China Institute of Atomic Energy and the Nuclear Power Institute of China were basically in the R&D field but will face the same challenges as BINE in the future. He wished and deeply believed that the Workshop would be successful.

Mr Peter Roberts, IAEA Consultant and Project Manager for RAS/0/032 welcomed participants on behalf of the Director-General of the IAEA, and thanked the government of China through the China Atomic Energy Authority for hosting the workshop. He also thanked the China National Nuclear Corporation, the parent company of the three nuclear institutions represented at the Workshop, for its support of the workshop. The cooperation with the workshop by the Nuclear Power Institute of China and the China Institute of Atomic Energy was welcomed as a way in which the very large and diverse nuclear sector in China could be represented at the meeting.

He noted especially that this workshop was one of the first regional events for which the Agency had outsourced the overall organisation of an event to the host institution. Therefore, the Agency was grateful to the Beijing Institute of Nuclear Engineering for agreeing to be responsible not only for the local requirements for the workshop, but also for bringing the overseas participants to Beijing. The experience of outsourcing this workshop would be very valuable, and Mr Roberts thanked BINE, the Workshop Co-ordinator (Mr Yang) and his colleagues for their patience, hard work and the extra effort involved prior to the beginning of the workshop. Mr Bischoff, head of the IAEA Experts and Training section was present to assess the success of the outsourcing.

Finally, Mr Roberts said that nuclear institutions had been established in the region over several decades with considerable investment from national governments and from the Agency. It was important that this investment was not wasted and the long term self-reliance

and sustainability of the institutions was essential. Project RAS/0/032 was established to support national efforts to attain sustainability through better management skills and had the full support of the Agency.

Participants unanimously agreed that Mr Yang Chuande should be the workshop chairman. Staff of BINE would be recording the workshop and assisting in the preparation of its report.

The Provisional Programme, circulated prior to the meeting, was adopted (**Annex 2**).

3. Purpose of Meeting and Expected Outcomes and Outputs

Mr Roberts summarised the purpose and expected outcomes of the meeting. The overall purpose was to bring together the leaders of units in nuclear institutes responsible for technology transfer or marketing or commercial services. For ease of communication at the Workshop, such units were collectively called Business Development Units (BDUs). It was expected that establishing a network of BDU leaders would –

- achieve a better understanding of different approaches to marketing nuclear applications across the region.
- assist the development of BDUs in institutes that do not have much experience in marketing nuclear applications.
- consider how to best integrate marketing skills in a BDU with the skills of the Technical Divisions.
- extend the use of nuclear applications to major regional development projects.

The planned outputs of the meeting were to report on:

- common features of successful BDUs.
- appropriate mechanisms for the future development of a network of BDUs.
- further training needs for the less experienced BDUs.
- how to integrate regional efforts to increase the utilisation of nuclear products and services in regional development.
- targets for achievement over the next 12 months.

4. Working Session 1: Overview of the Situation in Asia/Pacific

Each of the national participants presented their country status report. This outlined the situation with regard to the BDUs in their nuclear institutions. Hard copies and a CD version

were provided to all participants. A supplement to the workshop report is available that contains all the country presentations as well as the presentations of the international experts.

The meeting heard presentations from Dr K-J Jung of the Korea Atomic Energy Research Institute (KAERI) and Dr R Hutchings of the Australian Nuclear Science and Technology Organisation (ANSTO).

Dr Jung presented a brief overview of KAERI, its work and organisational structures. He continued by outlining examples of technology transfer within the public sector. These were related to diversification of nuclear institutes, regulatory changes, economic or political events or new market opportunities. Most were related to activities associated with the substantial nuclear power programme in Korea.

Dr Jung made several key points for the successes achieved in technology transfer within the public sector. These included:

- a flexible matrix system based on R & D projects and their needs.
- a sound basis focussed on R & D.
- the transfer of manpower from KAERI to the organisation responsible for the transferred technology.

The final point was especially important. It assured an on-going relationship between the new organisations and KAERI.

Dr Hutchings introduced the work of ANSTO and reviewed the external and internal factors that had led to the present role and structure of the organisation. ANSTO was directed to provide services through the provision of its specialist nuclear facilities for the benefit of industry and researchers, products for industrial and environmental use and solutions to problems that could be solved through its unique capabilities.

An important concept was the project planning cycle to ensure a focus on outcomes in 6 Core Business Areas. There was a small BDU that provided guidance to technical divisions on commercial issues and business opportunities. The BDU was closely involved in the project planning cycle and managed the diverse business mechanisms used by ANSTO to provide benefit to its users.

5. Working Session II: Situation Assessment

The status of BDUs in the participating countries had been provided in detail in the country presentations. After substantial discussion, the position of the BDUs of the institutions of the 11 countries represented at the meeting was categorised as follows:

BDUs established: China, India, Indonesia, Malaysia, Pakistan and Vietnam. For Indonesia, the BDU was only recently formalised and much remains to be done to

implement it fully. For Vietnam, a single BDU is very active in a commercial irradiation facility but plans exist to extend the BDU concept to other institutes of the VAEC. All these institutes agreed that their BDUs needed further enhancement.

BDUs in process of establishment: Bangladesh, Philippines, Sri Lanka and Thailand. In Bangladesh and Sri Lanka establishment is proceeding as planned. In the Philippines the BDU concept is agreed and started but has not yet been formalised. Thailand is in a similar position, but also needs completion of the separation of OAEP into a regulatory authority and an agency for research, development and applications.

BDU not yet appropriate: Myanmar, which has yet to develop many services and products and to completely enact its nuclear legislation.

The variation in the development stage of BDUs was noted as well as the great variation in the size of the institutions and the social and political constraints within which they operated.

From the experience of the more established BDUs and of KAERI and ANSTO, several common features were found after examination of case studies of successful technology transfer. These were:

- strong leadership for the technology transfer project.
- motivated staff.
- a supportive environment through institute and government policy.
- establishment of a close relationship between the institution and the organisation to which technology was transferred.
- an expansion rather than a contraction of R&D opportunities after transfer.

A clear difference was found between countries that had a strong nuclear power programme (NPP) and those that did not. A NPP provided a basic level of sustainability for the nuclear institutes in such countries. The size and stability of these institutes allowed technology transfer through the transfer or exchange of significant numbers of staff, which also led to increased sustainability through building an effective relationship between the R&D organisation and its users.

A number of other issues were discussed and referred to appropriate drafting groups. The outcomes are reported later in the report or in the conclusions and recommendations section.

Training needs were identified and a need for improved business management skills was common to all countries. These needs were to improve skills in marketing, client communication and technical writing, in project costing and pricing, and in project management, including human resource management, and in advanced management of technology transfer.

Dr Roberts informed participants that it was planned to produce two documents useful to BDU activities in the coming months. The first concerned project costing and pricing. The other was a document summarising some successful applications of nuclear methods across a broad spectrum of problems. It was intended that this document would include information on the economic value of cost benefit of the successful transfer of the different technologies.

6. Working Session III: Working with the Private Sector

The meeting heard presentations from the invited experts on supporting joint ventures with the private sector (Dr Jung) and meeting customer needs and protecting intellectual property (Dr Hutchings).

Dr Jung described the successful system that KAERI had used to encourage entrepreneurs within KAERI to break away and become new small private companies. The system was based on strong marketing and a supportive environment for the venture. It was overseen by a Venture Committee. The key differences between the system for transfer into the private system compared with the public system were that the number of researchers transferred were generally lower, and if the venture failed the researcher could re-enter KAERI.

KAERI had initiated the concept of incubator systems for its nuclear R&D areas. A researcher was provided with an attractive range of supporting systems. The venture could be initiated by a researcher or by KAERI. Dr Jung described 19 ventures inaugurated by the researcher with incubation periods of three to four years, after which the researcher would graduate from the incubator as a successful private venture. The system has had a high success rate and he described the type of new work done within several new companies owned by staff previously employed by KAERI (such as KAITECH) and the industries set up around Deadeog Nuclear Valley.

Dr Hutchings described the concept of Intellectual Property. He stressed the need for professional advice and the need for researchers to be aware of the many difficulties that could be involved in trying to protect the Intellectual Property of a research institute when working with the private sector. He also outlined some useful alternate strategies to dependence on Royalties and Licensing agreements that institutes could consider.

Dr Hutchings also emphasised the different attitudes towards the research process between the institute researchers and the private sector client and had advice on some of the conventional wisdom of the day. In summary, he advised the need for keeping the focus on the customer and their needs, deciding upon a strategy to capture value and IP, seeking professional advice on patenting and thinking through the options carefully.

7. Working Session IV: Regional Issues

a) *Networking among BDUs*

Participants recognised that taking products and services to the market place provided potential for competition between institutes and countries. However, there were also opportunities for synergies through co-operation between institutes that could be advantageous. Overall, it was decided that establishment of a network of contacts between the various BDUs would have a benefit for all.

The exchange of information between BDUs should concentrate on continuing to share experiences in the systems of BDU administration and management. Mr Roberts informed the Workshop that he regularly provided a newsletter to Project Counterparts and participants suggested that this could be a useful starting point for the sharing of information. Electronic contacts directly between the participants would be used on an 'as needed' basis.

b) *Increasing the Utilisation of Nuclear Methods in Regional Development Projects*

A network of BDUs could also share information on attempts to raise funds from regional organisations, such as the ADB, ESCAP etc. The reasons for success or failure could be disseminated among member states.

Participants were informed that the RCA had established a regional office in Korea. Its tasks included increasing awareness of nuclear technologies and the skills available among RCA member states. It would also attempt to find further funding for RCA activities from international organisations that funded development projects in the region.

The RCA Regional Office was considered by participants to be fulfilling the role of a BDU for the RCA. It was, therefore, suggested that the human capacity being established within the BDUs in the project could act as an information resource for the RCA Regional Office, since both are involved in increasing awareness of nuclear methods and the identification of opportunities. However, care would be needed to ensure that potential funding agencies were not confused by separate approaches from different BDU or the Regional Office.

8. Working Session V: Future Activities

Future activities were discussed and those agreed are included within the recommendations and action plan. It was agreed that each country would attempt to provide an example of successful technology transfer with a robust evaluation of its economic value. Participants considered this would be a useful training exercise and a contribution to awareness campaigns designed to increase the profile of nuclear methods at a national and regional level.

9. Drafting Groups

The participants met as a series of drafting groups to discuss issues referred from earlier sessions.

9.1 The Role of BDUs

It was agreed that the mission of BDUs was to:

- Act as a ‘bridge’ between the R&D of an institute and potential users.
- Provide overall management and co-ordination of client relationships, particularly in the private sector, and the process of technology transfer and the provision of products and services for the institute.
- Provide assistance in the assessment of the technology transfer potential of research portfolios.

It was also agreed that effective management of technology transfer and/or the provision of services and products required many responsibilities and duties to be undertaken. Depending upon the organisation of the BDU within an institute and its designated responsibilities or duties, the role of the BDU would vary. However, the role would probably include:

- leadership (e.g., in managing contracts and private sector work, staff training in management skills).
- co-ordination (e.g., human resource management for projects).
- advisory (e.g., research portfolio planning).

To ensure effective technology transfer, client satisfaction, and self-reliance, institutions and their BDUs should ensure that the following activities are carried out within the organisation:

General strategic positioning

R&D remains the corner-stone of the institutes, and new research ideas must always be encouraged. However, it is important that, after a suitable period, an assessment is conducted to ensure that research activities are concentrated on projects that have potential for technology transfer and user uptake. The BDU has a role in advising on R&D portfolios in this regard. In addition, institutes should increase user awareness and the BDU should, therefore, be involved in –

- Strategic science and business planning.
- Assessment of opportunities for user uptake of developing R&D projects.
- Training science staff to communicate better with users and to build user confidence and relationships.
- Identifying potential users of R&D and their needs.
- Increasing user awareness.

- Matching user needs with available products or services, or initiating R&D to meet user needs.

Specific projects: proposals and contracts

BDUs need to work with the technical team so that the institute has a standard method of working with its client organisations. BDUs have a leading role in ensuring that contracts benefit the institute. Overall, essential activities include -

- Identifying and promoting new, specific products and services that can be offered to users.
- Standardisation of costing factors and presentation of proposals.
- Costing project development.
- Planning and allocation of resources.
- Writing proposals and project pricing.
- Protection of Intellectual Property.
- Negotiation of contracts.

Specific projects: delivery

It is essential that projects meet the contract objectives of quality, delivery time and budget, and thus ensure client satisfaction. A key role for a BDU is -

- Monitoring project budgets and progress against targets.
- Evaluating QA of products, services and reports.
- Follow-up services, including warranty work.

Client relationship development

In the longer term, the most important factor in sustaining an R&D organisation is to build up an excellent relationship with the users. The institute must ensure there is -

- On-going contact with key clients.
- Monitoring trends in future user requirements.
- Identification of future opportunities for developments, such as identification of partners, partnership arrangements, Joint Ventures, market expansion etc.

The Workshop was informed that, with the help of Malaysia, a document on the Role and Criteria for BDUs had been circulated to Project Counterparts in the first quarter of 2002. This document is shown in **Annex 3**.

9.2 Problems and opportunities in dealing with the public sector

The comments made here are generic and may not apply to all countries or institutes.

The public sector organizations that could be potential users of nuclear technologies and the relevant areas of application will generally comprise:

Ministry	Areas of Application
Ministry of Science & Technology	development of new & sustainable technology
Ministry of Health	nuclear medicine, medical product sterilization
Ministry of Food & Agriculture	seed irradiation, bio-fertilizers, food sterilization; water resources
Ministry of Environment	radiation protection, air pollution monitoring
Ministry of Energy	development of alternate, sustainable, and environmentally safe energy
Ministry of Industry	enhancement of output & quality of industrial products & processes
Ministry of Education	human resource development

There may also be regional or local government organizations covering some of these areas.

The major **challenges** are:

1. Pricing – as many services to the public sector are regarded as being for the general welfare of the people (a “Public Good”), full market rates are not allowed. There may be no financial recognition for services provided and frequent requests for free services. An example is nuclear medicine.
2. Government policy not allowing retention of funds earned from services and products. This leads to no incentive or motivation for change among the staff of nuclear institutions.
3. Lack of public sector funds or budget.
4. Long decision-making process.
5. Difficulties in measuring value of benefits in the public sector.
6. Lack of awareness among both beneficiary organizations and nuclear institutes.
7. Delays in implementation of project.
8. Frequent change in decision and policies.
9. Negative image associated with the nuclear industry.
10. Lack of decisive leadership.

11. Policy constraints to pay in advance for service or product.
12. Institutions unwilling or unable to take risk.
13. Preference from users for imported services or expertise.

The major **opportunities** are:

1. Market is big and unexplored.
2. Wide opportunities due to multidisciplinary nature of nuclear technology.
3. Institutions can undertake research in areas in which the private sector is not interested or has difficulty in accessing.
4. Providing maximum benefit to people at large.
5. Providing a catalyst for technological change.
6. Helping economic/scientific/human resources development.
7. Generating alternative, sustainable & environment safe energy for the future.
8. Protecting the environment.
9. Developing spin off technology.

9.3 Barriers, Challenges, Opportunities and Issues when dealing with the Private Sector

Discussion focussed particularly on working with industry, but a number of points raised apply across the private sector generally.

The **barriers** are:

1. Some industry sectors are reluctant to change.
2. Industry may sell everything it produces and not all industries feel the need to be quality conscious.
3. Industry normally requires proven technology.
4. Industry often prefers to buy turnkey projects.
5. Institute financial mechanisms may not meet private sector requirements (offering credit etc).
6. Institute capabilities favor low volume/high tech opportunities.

The **challenges** are:

1. Succeeding in a competitive business environment.

2. Meeting industry needs for timeliness of service.
3. Introducing incentives for scientists (monetary or non-monetary).
4. Meeting needs for certification required in some sectors.
5. Mechanisms to share financial risks of prototyping, including leverage from government sources.
6. Breaking into a market, pricing strategies.
7. Need to generate early payments/financial return.
8. Achieving certification required to offer services in specific industries.

The **opportunities** are in:

2. Quality conscious industry sectors.
3. Technology demonstration, prototyping.
4. Premium products and services.

The response of BDU to the situation outlined above should be to help Institutes to:

- understand industry sectors and which are appropriate partners.
- understand business strategies and the way business thinks.
- assess markets and routes to enter the market.
- assess risks associated with entering into a contract.
- establish project planning cycle and project management disciplines.

In addition, active dialogue between the BDU and technical units is essential at all stages of developing project proposals, and complete agreement is required before signing any contract.

10 Conclusions

The workshop **conclusions** were:

Institutions

1. National nuclear institutions have been established to conduct R&D that delivers benefits to society. They are not in business to generate profit, nor even, primarily, revenue.
2. However, adequate revenue is necessary for them to operate satisfactorily, and all countries participating can no longer depend entirely on direct government

funding. Therefore, increasing self-reliance is essential and this involves seeking more diverse sources of funding in order to be sustainable.

3. R&D relevant to a wider range of users remains the corner-stone of a good institution. However, there is an increasing need for new business management skills within institutes in order to increase uptake and better delivery of the knowledge, products and services produced by this R&D.
4. To increasing funding sources, achieving client satisfaction is essential. Technology transfer, or services and products, must add value to the user's business, and be well-delivered.
5. Projects should be managed by a matrix approach in which the appropriate skills are drawn from all parts of the institute rather than from a single division or discipline.
6. There are more constraints on nuclear institutions in developing countries that do not have a Nuclear Power Programme in terms of retaining direct government funding and in becoming self-reliant through technology transfer.
7. All institutions that are not permitted to retain a significant proportion of any revenue earned through products and services have difficulty in motivating staff to change their attitudes towards a greater emphasis on taking their R&D to the market place.

BDUs

8. BDUs are an essential part of a self-reliant, sustainable institution. Their role includes to:
 - i. act as a 'bridge' between the R&D capability of an institute and potential users.
 - ii. provide overall management and co-ordination of client relationships, particularly the private sector, and the process of technology transfer and the provision of products and services for the institute.
 - iii. provide assistance in the assessment of the technology transfer potential of research portfolios.
9. Each institution participating in the project is at a different stage of development, and the establishment and operating mechanisms of their BDUs vary. Therefore, there can be no single model for a BDU that fits all institutions.
10. Generally, institutions expected to staff their BDUs with scientists and engineers that have been given training in business management skills. Each institution expected to be able to provide sufficient training in business management from local resources. However, the Agency could provide invaluable assistance through the provision of experts with experience of business management within a nuclear environment.

11. Further training and enhancement of business management skills was required even within institutions that had well established BDUs, because they face a funding environment that is increasingly challenging.
12. The document (**Annex 3**) on the Role and Criteria for BDUs and section 9.1 of this report were endorsed as a good starting point for any institution considering the establishment or enhancement of a BDU.
13. The marketing and project management skills of the BDU staff would be useful in attempts to increase funding through major regional funding Agencies. It was noted that the RCA had recently established a Regional Office with tasks that included raising the awareness of nuclear technologies within the region and seeking funding through participation in major development projects such as those run by the World Bank, ADB, etc. The work of BDUs in individual institutes could be synergistic with the work of the small RCA Regional Office, which could consider using BDUs as an information resource.
14. Recent Agency statements on TC strategy and the need for sustainability of projects were noted, and the capabilities of BDUs should be of value in assisting the development of national TC programmes.
15. A credible assessment of the economic benefit of successful applications of nuclear methods for problem-solving would be a useful addition to the information that could be used by all BDUs to increase interest and awareness among user groups. It was noted that an activity was planned during 2003 to provide this information in a useful format.

General

Participants also stressed several further conclusions. Success in increasing the utilisation of nuclear technologies also depended on factors outside the basic scope of a BDU, such as:

1. **Leadership.** Strong, decisive leadership on the path to more business-oriented institutions was essential.
2. **Motivation.** Success would be difficult without the support of the scientists and engineers within the institutions. This would require some incentives in terms of improved salary and equipment.
3. **Government policies.** Unless overall policy facilitated the transfer of technology, and included the opportunity for the institution to benefit from successful transfer, then there would be no motivation for staff. For example, several institutions represented at the Workshop were unable to retain any funds gained through the provision of products or services.

The BDUs could act as a catalyst for improvements in leadership, motivation and policy that would favour improved self-reliance and sustainability.

Participants considered that the Workshop had been successful in promoting the importance of self-reliance and sustainability. It had given participants a broad view of the very different approaches being taken in different institutions and many new ideas had been brought forward.

It was concluded that a useful network had been established in the region that would ultimately lead to increased awareness and use of nuclear technologies. This network should be continued so that lessons could be learned and shared as the BDUs started to have an impact on the operation and viability of their institutions.

11. Recommendations

The workshop **recommendations** were that:

1. Institutions should include goals and objectives to achieve sustainability in their Strategic Plans.
2. Institutions that already had existing BDUs should review their functions and operating mechanisms with a view to enhancing their effectiveness. This should be completed by October 2003.
3. Institutions that were in the process of establishing a BDU should have an operating BDU in place by October 2003, subject only to the requirements of any national government authority.
4. The BDU should be appropriately involved in the strategic and project planning of the institution. The BDU must work jointly with the leaders of the technical divisions, each respecting the skills and responsibilities of the other. The closer to the market an institute project or activity, then the more the BDU should have a controlling influence.
5. The mechanism favoured for operating a BDU is as a small separate unit within the institute led by a manager with direct reporting responsibility to the head of the institution. This is due to the requirement for involvement of the BDU in strategic and project planning and for co-ordination between BDUs and technical divisions.
6. BDU staff should assist in reviewing all significant project proposals in order to standardise and improve their quality, thus leading to greater success with client organisations. The project proposals should include:
 - i. Proposals for IAEA TC funding.
 - ii. RCA project proposals.
 - iii. Proposals for work with external clients.
7. Institutions should regard the government as a client, and note that there are opportunities to increase funding through working for, or in partnership with, a

range of central and local government organisations, as well as the private sector.

8. The development of BDUs, and the marketing and project management skills within them, should be drawn to the attention of the RCA Co-ordinator and the new RCA Regional Office.
9. The development of BDUs should also be drawn to the attention of persons responsible for national TC programme development, such as national TC Liaison Officers and Agency Country Officers and area officers.
10. The network of contacts established at the meeting should be continued. Electronic media provide excellent opportunities for participants to maintain contact with each other on a regular basis.
11. An independent review of the progress of RAS/0/032 should be conducted during the second half of 2003.
12. A further meeting of leaders of BDUs should be held in the second quarter of 2003. The purpose of the meeting could include:
 - i. Review progress towards the targets set in recommendations 1-3 above.
 - ii. Share experiences in successful and unsuccessful operating mechanisms for BDUs, recognising the guidelines and recommendations of this Workshop.
 - iii. Establish a mechanism for greater business co-operation within the region; this could include contacts with the RCA Regional Office.
 - iv. Consider how to measure the success of a BDU.
 - v. Examine the examples of Technical and Economic Success Stories in Technology Transfer provided by participants and other relevant information, and use them as case studies for development of mechanisms for measuring the net economic benefit of successful technology transfer. However in the case of Myanmar this study would be limited to a study of the basis of the costs charged for services for licensing and personal dose monitoring.
13. Some other recommendations were:
 - i. Staff secondments between the private sector and institutes (in both directions) should be considered as a mechanism to increase understanding and awareness in both the private sector and the institutes.
 - ii. Institutes should seek ways in which advanced development work can be funded by a mix of government and industry funding, thus reducing risks and costs to both the institute and the client.
 - iii. Opportunities should be sought to increase technology transfer between countries.

14. Finally, the Workshop requested that the IAEA continue its support for the establishment or enhancement of BDU. It was requested that:
 - i. the IAEA work with the senior management of the institutions to discuss with their governments the implementation of policies that would facilitate self-reliance and sustainability, for example through retention of revenue for products and services and through increased technology transfer, including between institutes. This could involve integration of the work of the project manager and Project Counterparts of RAS/0/032 with the work of Country Officers and National TC Liaison Officers.
 - ii. assist the training of BDU staff to improve skills in marketing, client communication and technical writing, project costing and pricing, and project management, including human resource management.
 - iii. Continue the provision of experts, as required.

12. Action List

Participants

- To provide to the project manager one example of a Technical and Economic Success Story in Technology Transfer (by 15 March 2003). However, in the case of Myanmar the example would be to examine the basis of the costs charged for services related to licensing and personal dose monitoring.
- To discuss the findings and implications of the Workshop for their institution with the Project Counterpart for RAS/0/032, the National RCA Co-ordinator and National TC Liaison Officer. In particular, discussions must be held to determine the path to be taken to establish or enhance the BDU (as soon as feasible). This should lead to a review of the National Workplan for RAS/0/032.
- To review with the Project Counterpart the most appropriate means to ensure that the project manager is provided with regular information on national activities or other events relevant to the project (on-going).

Project manager

- To inform the RCA Co-ordinator of the findings of the Workshop with regard to linking the work of BDUs with the work of the RCA Regional Office and expanding funding for nuclear institutes from major regional funding agencies (within 1 month).
- To request the Department of Technical Co-operation to consider how to integrate the capabilities of the BDU with general upstream programming of TC programmes (within 1 month).

- To request the Department of Technical Co-operation to consider the advantages of an International Agreement on Peaceful Nuclear Technology Transfer and the role that the Department could play in implementing such an Agreement (within 1 month).
- To forward to all participants a standard format for submission of Technical and Economic Success Stories in Technology Transfer (within 1 month).
- To forward to all participants the reports of the expert meetings on Project Costing and Pricing and on the Economic Value of Nuclear Applications (when available during 2003).
- To continue to produce Newsletters at about quarterly intervals and to forward these not only to Project Counterparts but also to Workshop participants (on-going).

13. Achievements against Planned Expected Outcomes

The planned outcomes of the Workshop were presented in Section 3. Participants considered that expected all outcomes were satisfactorily achieved.

14. Adoption of the Meeting Report

The chairman and Mr Roberts presented the draft Workshop report. It was extensively discussed and revised. The Workshop **adopted** the report subject to the agreed revisions and consideration of any comments sent to the project manager by email within 1 week.

15. Close of Meeting

On behalf of the IAEA, Mr Bischoff thanked BINE for the excellent job in bringing, receiving and hosting all the overseas participants. He thanked them for organising one of the first Workshops to be use outsourcing for all arrangements. Mr Bischoff said that the Workshop appeared to have had a good outcome, but the real outcome depended upon the implementation that happened when participants returned to their institutes. He wished them good luck and success, and hoped that they would have good progress to report if another meeting was held next year.

Mr Roberts thanked all the participants for their hard and constructive work. The workshop had confirmed the importance of the BDU concept. It was important that a common understanding had been achieved of the role of BDUs and that clear targets and actions for the future had been identified. The Agency would carefully consider the report of the workshop and, at their request, adjust the project activities accordingly.

He expressed his thanks to Dr Jung and Dr Hutchings for their valuable presentations and assistance in the discussions. The staff of the Nuclear Science Centre Tsinghua University

had spent time to create a useful and informative visit. Mr Roberts requested the Workshop Director to convey the thanks of the participants to the visit organisers.

In conclusion, Mr Roberts said that the success of the workshop was a credit to the excellent work done by the Workshop Director and his staff. The Agency was very grateful to BINE and particularly to the Workshop Director and his staff for their excellent organising of a successful workshop.

Mr Yang said two important points had been learned. First, China had learned how to conduct a successful Workshop under outsourcing arrangements. Second, BINE had learned that its experience over recent years had been shared by some other countries, while other countries were just starting to have the same experience in dealing with the marketplace.

Mr Yang said that the Workshop had been helpful for China. He hoped that the contacts made would be continued through to another meeting. He thanked the IAEA representatives and the international experts for their work and guidance.

He wished participants a good time in the remainder of their stay in Beijing and a safe trip home.

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ANNEX 2

WORKSHOP PROGRAMME

Date/Time	Activity	Speaker
Monday 18th		
0900	Registration	
0930	Opening Session	
	Opening remark of CAEA Welcome on behalf of the Beijing Institute of Nuclear Engineering	Mr. Yang Dazhu Mr. Yang Chuande, Workshop Coordinator
	Welcome on behalf of the IAEA	Mr Roberts
	Election of Chairperson & Rapporteur	
	Adoption of Workshop Programme	
1015	Break	
	Opening Session (Continued)	
1045	Purpose of the Workshop Workshop Mechanisms	Mr Roberts
1100	Introduction of Participants	Participants
	Overview of the Situation in Asia/Pacific	
1115	An Overview of Nuclear Technology Transfer Status and the Marketing System of KAERI	Dr Ki-Jung Jung, KAERI
1200	Country Report	BGD
1230	Lunch	
1400	Country Reports	CPR IND INS MAL
1530	Break	
1550	Business Development: The ANSTO Experience	Dr Ron Hutchings, ANSTO
1645	Country Reports	MYA PAK PHI
1730	End of Working Session	
1800	Reception	
Tuesday 19th		
0900	Country Reports	THA SRL VIE
1030	Break	
	Situation Assessment	

1100	Discussion of Country reports	
1115	Identification of common themes & problems	All participants
1200	Training needs in the region	All participants
1230	Lunch	
	Working with the Private Sector	
1400	Partnerships and ventures and some successful examples in KAERI	Dr K-J Jung, KAERI
1445	Meeting Customer Needs and Protecting Your Intellectual Property	Dr Ron Hutchings, ANSTO
1530	Break	
1550	Discussion on working with the private sector	All participants
	Regional Issues	
1615	Networking Among BDUs in the Region	All participants
1645	Role of BDUs in Increasing the Utilisation of Nuclear Methods in Regional Development Projects	All participants
1730	End of Working Session	
Wednesday 20th		
	Future Activities	
0900	Identification of Targets for the Project	Mr Roberts & all participants
	Drafting of Report	
1000	Drafting Groups Assigned to Section of Report	All participants in Drafting Groups
10.30	Break	
1100	Drafting Groups Continue	
1230	Lunch	
1400	Drafting Groups report back	
1500	Discussion	
1530	Break	
1600	Draft Conclusions and Recommendations	All participants
1500	End of Working Sessions	
Thursday 21st		
0900	Site visit to TsingHua University	
1800	Banquet	
Friday 22nd	Finalisation of Report	
0900	Presentation of report	Chairperson, Rapporteur and Mr Roberts
	Discussion	

1030	<i>Break</i>	
1100	Re-drafting report	
1230	Lunch	
1400	Adoption of report	Chairperson
	Close of Meeting	

THE ROLE AND CRITERIA FOR BDU

A Working Paper for RAS/0/032

March 2001

1. INTRODUCTION

This Working Paper has been produced as a result of an action requested at a Regional Meeting on the Role of Improved Management Practices in Increasing the Utilisation and Sustainability of Nuclear Applications in the East Asia and Pacific Region held in Yangon, Myanmar, 15-18 November 2001.

The Meeting heard that some countries had established Units to assist in the development of links with the private sector and other government agencies. The role of these Units differed between countries. Most countries had not established any specialist Unit but were considering the establishment of one. There are many possible names for such Units. Examples are Customer Service Units or Technology Transfer Units. The Meeting and this report refer to them as Business Development Units (BDUs).

One of three regional strategies for greater sustainability agreed by the Meeting was to identify and overcome barriers, and to facilitate the greater utilisation of nuclear technologies. It was agreed that by the end of December 2003, most participating countries would have a team of staff trained in technology transfer or, possibly, a dedicated Business Development Unit (BDU) to assist in the proper evaluation, development and marketing of new products and services. The Meeting recommended utilising the professional skills of the BDU in tandem with technical advice for project evaluation.

A follow-up action agreed at the meeting was that the experience of countries with BDU already in operation should be used to provide standard criteria for the role, responsibilities and structure of BDU. Malaysia generously agreed to produce these criteria. This Working Paper is the result.

2. PURPOSE

This Working Paper considers the possible role, responsibilities and structure of a BDU. However, the environment in which nuclear institutions must operate in different countries in the region is highly varied. Therefore, this Working Paper does not make recommendations on how a BDU should be established. It is offered only as guidance on the issues that must be considered before a BDU is established (or in any review of an existing BDU).

3. DEFINITION AND ROLE OF A BDU

The role of a BDU is to facilitate the uptake of the products and services resulting from R&D, and to promote the development of long-term relationships with users that benefit the scientific and financial viability of the institution.

A BDU can be defined as any person, team or organisational unit that has been given the above role.

4. PRIOR CONDITIONS FOR ESTABLISHMENT OF A BDU

A BDU should not be established unless justified by the stage of development of the parent institution. Generally, this will require –

- The institution to have developed significant numbers of a wide range of products or services.
- Legislation and regulations in place for the safe use of nuclear techniques outside the nuclear institution.
- The demonstration of a net financial benefit to the institution.

5. RESPONSIBILITIES

Responsibilities that may be given to a BDU could include:

- a. Identifying potential users of R&D and their needs.
- b. Increasing user awareness.
- c. Matching user needs with available products or services, or initiating R&D to meet user needs.
- d. Identifying and promoting new, specific products and services that can be offered to users.
- e. Participating in strategic science and business planning.
- f. Costing project development; Resource planning and allocation.
- g. Writing proposals and project pricing.
- h. Contract negotiation.
- i. Protection of Intellectual Property.
- j. Monitoring project budgets and progress against targets.
- k. QA of products, services and reports.
- l. Identification of future opportunities for developments, such as identification of partners, partnership arrangements, Joint Ventures, market expansion etc.
- m. Development of long-term relationships with users.
- n. Technology forecasting; Monitoring trends in future user requirements.
- o. Assessment of opportunities for user uptake of R&D projects.
- p. Training science staff to communicate better with users and to build user confidence and relationships.

6. ACCOUNTABILITIES AND PERFORMANCE INDICATORS

It is probable that the BDU (or at least its manager) should be placed within the corporate (administrative) branch of the institution. The BDU should report to a senior manager with direct access to the head of the institution. This will ensure that all products and services of the institution are promoted in a co-ordinated and unbiased way.

An alternative is to have the manager of the BDU in a corporate branch, but with staff placed within the science divisions or within a group of science divisions. This can have the advantage that overall BDU policy is under corporate control, but there is also a very direct day-to-day link between the BDU staff members and the scientists whose products and services they promote. This system can be appropriate for some larger organisation with many operational centres that may be scattered among several locations.

A further alternative is to completely merge the BDU with the general financial administration of the institution. A justification for this is that a major function of the BDU is to ensure that projects remain financially viable. A merger of functions can provide a complete service to both internal and external users.

7. SKILLS REQUIRED

The staff of a BDU will need strong skills in business management. This is the predominant skill required. The team leader in particular should have had formal training in business management and development. Of course, it would also be ideal if staff also had a strong nuclear science background.

The situation in different institutions will dictate how they achieve the right skills within the BDU. The options include:

- a. Recruit staff with specialist business management skills.
- b. Identify science staff wishing to change career directions and provide them with extensive business management training.
- c. Recruit a business specialist, or train one existing staff member extensively, and then employ a “train-the-trainers” approach to filling the other BDU positions.

A “train-the-trainers” approach may also be a good way to introduce some basic business skills to staff that intend to remain senior science project leaders. This will increase the level of business management skills within the institution generally and promote understanding between science and BDU staff.

8. RELATIONSHIP WITH SCIENCE DIVISIONS

Staff of a BDU and staff in a science division tend to have different priorities and to measure success in different ways. This can create unhelpful tensions between the BDU and the science divisions.

Science staff can rightly expect a BDU to reduce the amount of time needed on promotion of their work. However, a BDU cannot promote an R&D product without some support and involvement from the science staff. Science staff are interested in having their work used; BDU staff are interested in making sure that the use is of financial advantage to the institution. The balance required between these issues and managing the resulting tensions can be difficult to achieve. It can take several years before BDU and science staff fully understand and appreciate each other's value to a symbiotic relationship.

Actions that can be taken to increase the constructive working relationship between the BDU and the science divisions can include:

- a. A regular demonstration of support for the BDU from the head of the institution.
- b. Regular meetings between senior managers of science divisions with the BDU manager.
- c. Placing BDU staff within science divisions, where appropriate.
- d. Internal seminars given by BDU staff on their role and examples of successes in their work.

9. FINANCE

A BDU will be an overhead cost to the institution and will reduce the amount of money available for science unless its activities generate extra, profitable revenue. This is why the opportunities for generating extra revenue through extra promotional activities (or through permitting science staff to spend more time on research) must be carefully evaluated before a decision is made to establish a BDU.

A BDU should have a sufficient number of staff to be effective, but the number must also be justified by a financial return to the institution. Its operational costs must be clearly identified. Meeting targets set for the extra revenue that must be generated through BDU activities should also be one of the performance indicators of the BDU.