



PM/84/59

PRIME MINISTER

Study Group of Incentives for Membership of the Non-Proliferation Treaty (NPT)

1. The Non-Proliferation Treaty, which came into force in 1970, has an initial life of 25 years and has a provision for regular review every fifth year. The first Review Conference in 1975 agreed a final declaration. The second, in 1980, failed to agree, largely because of the high level of criticism of the Nuclear Weapon States by the developing countries over failure to make progress regarding nuclear disarmament (Article VI), and apparent lack of commitment to share their nuclear expertise (Article IV). Supporters of the Treaty are now concerned lest the Review Conference in 1985 should continue the downward trend, thus making it unlikely that the Treaty would be renewed in 1995.

2. OD(D) at its meeting on 14 December requested the creation of a Study Group to identify options for increasing incentives for parties to the NPT to maintain their support and for non-parties to adhere. The Study Group was formed from experts provided by UKAEA, BNFL and CEGB as well as officials from both wings of FCO and from the Department of Energy. I attach their final report, together with a covering Note by Officials. The Group concluded that the best incentive would be provided by the establishment of a technical assistance fund, with monies provided by developed countries party to the NPT and spent for the benefit of developing country parties. They suggest that \$10 - 15 million a year could be real benefit in

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promoting the growth of nuclear energy in the third world, as well as valuable projects in areas such as the use of isotopes in medicine and agriculture. Their proposal is that the UK's contribution should be about £250,000 in 1986/87, rising to a maximum of about £500,000 per annum in 1987/88 and thereafter.

3. Through the administration of the fund we will press that to the extent possible our contribution would be spent in the UK. The Study Group reported that the UK is well placed to take advantage of the opportunities offered for exports and for providing training in the UK. We could therefore expect most of our contribution to be spent in the UK with some possibility of a net benefit to the balance of payments. Although the private sector will be among the beneficiaries we do not think that our objective could be satisfactorily attained by trying to persuade them to finance our contribution, as this would be too insecure and unstable a source of funds to permit the kind of project planning over several years which will be necessary if the fund is to be fully effective. Nor is it feasible to try to tap existing multilateral sources of aid funds, such as UNDP or the EC, as all the controlling bodies include non-parties to the NPT who would block the use of their money for assistance to NPT parties only. As the Note by Officials makes clear, discussions are still in progress to identify the most appropriate Vote on which to carry the UK contribution and an appropriate bid for money will need to be made in the current PES exercise. In the view of Treasury officials, the question of which Department would pay the UK contribution and how it would be financed should be settled before any decision in principle is taken to support the fund; they believe that it would be inappropriate to adjust existing public expenditure programmes for the comparatively small sum involved, which should therefore be accommodated within current provision. I hope, nevertheless, that as the



sums involved are indeed small you will be prepared to accept the principle of UK support for an NPT Technical Assistance Fund now. The possibility that any UK ideas might be pre-empted by more ambitious, and therefore more expensive, proposals by other developed countries is a strong argument for pressing forward with our informal deliberations with some speed. I should stress, however, that no soundings will be taken of other Governments until the question of UK finance has been satisfactorily resolved.

4. There are two additional points in the attached papers to which I would like to draw your attention in seeking your approval and that of colleagues. First, the proposal as developed by the Study Group will not result in any major new international bureaucracy, as it is intended that administration of the projects should be put in the hands of the IAEA. Second, the UK contribution would be made contingent upon an acceptable outcome to the Third NPT Review Conference, thus ensuring that we do not spend our money without first achieving our immediate political objective. In deciding what constitutes an acceptable outcome we shall, of course, also need to keep our long term political objectives in view.

5. I am copying this minute and enclosures to the Secretary of State for Defence (as the third member of OD(D)), the Secretary of State for Energy, the Chief Secretary to the Treasury and Sir Robert Armstrong.

GEOFFREY HOWE

Foreign and Commonwealth Secretary

3 April 1984

THE NON-PROLIFERATION TREATY

Note by Officials

1. At their Meeting on 14 December 1983 (OD(D)(83)1st Meeting) the Sub-Committee agreed that officials should identify options for increasing incentives to states parties to the Non-Proliferation Treaty (NPT) to maintain their support for the Treaty and for non-states parties to adhere to it, with particular reference to those provisions of the Treaty which enshrine the intention of the parties to co-operate in the application of nuclear energy for peaceful purposes with due consideration for the needs of the developing areas of the world (Article IV of the Treaty). This Note, which has been prepared by an interdepartmental group of officials, presents the results of this further work involving officials and representatives of the UK nuclear industry.

The Problem

2. At the last Review Conference in 1980, the developing countries criticised the Nuclear Weapon States for failing to make progress on nuclear disarmament (Article VI), and the nuclear supplier countries for their apparent lack of commitment under Article IV to make nuclear technology, particularly for power generation, available to developing countries. The Conference failed to agree a final declaration. The maintenance of support for the NPT regime is particularly important in the run-up to the 1985 Review Conference. The Review Conference is not a forum for disarmament negotiations and discussions, and the scope for making progress under Article VI has to be viewed in a wider context than the NPT per se. However, there is scope for making significant and positive progress elsewhere, especially under Article IV. In this regard it is important that nuclear suppliers coordinate and develop a strategy for increasing the real benefits to developing countries of being NPT parties in an effort to counter developing country criticism, as that criticism focuses on alleged restrictions to the supply of technology for electricity generation by nuclear power. A most important

component of such a strategy would be the establishment of a fund providing increased technical cooperation for nuclear power projects for NPT states parties.

3. The Study Group has identified those NPT states parties for which a case could be made for assistance from such a fund, and established that they are almost all countries who are influential in the Group of 77, or who have expressed concern about the fulfilment of Article IV. Officials do not consider that setting up a necessarily modest fund would of itself bring about a revolution in developing country attitudes to the NPT but targetting of assistance on these countries could in the short-term influence them politically to show greater support for the NPT, and in the longer term favourably influence the attitudes to the Treaty of non-NPT states parties.

Types of Assistance

4. Apart from the problem of finance, the strongest impediment to the development of nuclear power in many countries is the lack of adequate intellectual, industrial and regulatory bases. These must be established if nuclear power plants are to be constructed and operated efficiently and safely. Other types of assistance could include aid in planning for the introduction of nuclear power, training staff, developing new regulatory institutions and providing help in studies of the technical and economic feasibility of nuclear power plants.

5. The Study Group has considered the methods by which technical and other assistance could be provided to developing countries who are either signatories to the NPT, or who might be encouraged to become signatories. These states vary from those who have no nuclear facilities or intentions to acquire them in the near future, to those with advanced programmes and the capability to construct nuclear reactors with minimal help. Included in the latter case, are a number of problem non-NPT states parties who are unlikely to be persuaded to adhere to the NPT by increased technical assistance for NPT states parties; sustained diplomatic pressure is more likely to bear fruit. But the majority of

states are not at this advanced stage, and would benefit from, and appreciate, any assistance that was offered.

6. Generalisation as to the types of assistance which might be offered is difficult, as each case would require separate assessment. The Report sets out a number of options of which actual cases are likely to be variants.

Costs

7. Analysis suggests that a fund spending some \$10 - 15m per annum could have considerable political impact by virtue of its size. It would substantially increase the total technical co-operation funds available for nuclear energy development in developing countries (indeed it would add between 30 and 50% to the present technical co-operation fund of the IAEA). It would be possible at that level to mount sensible, continuing programmes in a variety of developing countries so that over a few years all the influential G77 countries would have received assistance in line with their development needs. On the basis of the United Kingdom's existing contributions to the International Atomic Energy Agency Technical Co-operation fund, it would be reasonable for the British contribution to such a fund to be limited to a maximum of £500,000 a year. It is anticipated that this sum, although relatively modest, will generate substantial consultancy and related business for British nuclear industry and educational establishments. Expenditure would start in 1986/87. Underspensing could be expected during the first year of the fund's operation, because of the time required to commit and spend money on new projects, and the actual United Kingdom contributions in that year could be reduced accordingly. If this scheme is approved then an appropriate budget provision will need to be made. This is being urgently discussed by interested Departments. A bid in the 1984 Public Expenditure Survey for additional provision (new money) of £250,000 in 1986/87 and £500,000 in 1987/88 will be required.

8. If Ministers agree that the establishment of such a fund

would be worthwhile given the likely benefits which would result for the NPT regime, the next steps will be:-

1) To discuss the proposal with other major nuclear suppliers with a view to obtaining maximum support for it. Discussions should begin with the US Government as potentially the most important donor and as the other Western nuclear weapons state party to the NPT - with preoccupations most nearly matching our own relative to the Treaty Review.

2) If adequate support is obtained, then potential donors will have to agree a plan for promoting and developing the initiative, as part of an overall strategy for the 1985 Review Conference.

Alternative Approach

9. An alternative way to address the problems outlined above is for the United Kingdom to increase its bilateral assistance to developing NPT states parties. It seems likely, however, that greater impact on the Group of 77's attitudes at the 1985 NPT Review Conference could be obtained by concerted action by the major nuclear suppliers. It should be noted that the United Kingdom pledged at the last Review Conference an additional \$1 million for funding over 5 years for "footnote A projects" (those approved by IAEA Board of Governors but for which there are no funds available from regular sources). All of this pledge has now been committed on a range of projects in a substantial number of developing NPT states parties. The money has been well spent and appreciated, by the Agency and recipient countries. The Department of Energy, from whose Vote this money has been provided, is proposing that this level of funding on a bilateral basis should continue. It is intended that the UK should obtain maximum political capital at the 1985 Review Conference, by reference to this bilateral assistance in the Ministerial keynote speech and elsewhere. We do not doubt that these funds have helped to demonstrate the UK's readiness to meet its commitments under the NPT and there would be value in its continuation, but we believe that a multilateral approach would

have added effectiveness in obtaining new adherents and maintaining cohesion of parties to the NPT.

10. The establishment of a multinational fund would not replace continued diplomatic efforts to persuade non-parties to adhere to the NPT. In this regard the most valuable targets are France and the PRC. Adherence by Spain would also be of great value if that could be accomplished, particularly given her influence in Latin America.

RECOMMENDATIONS

11. The Sub-Committee is invited to agree that:-

- 1) Officials should now discuss with other major nuclear suppliers, the proposal to establish a new technical cooperation fund discriminating in favour of NPT States parties.
- 2) If adequate support is obtained then a plan should be agreed with other potential donors for promoting and developing the initiative prior to the 1985 NPT Review Conference.
- 3) The establishment of such a fund should be made conditional on the developing NPT states parties agreeing to an acceptable Review Conference Final Declaration. If a Final Declaration is not agreed then there would be no fund.
- 4) Such a fund should be administered by the IAEA with the guidance of a small committee of NPT states parties.
- 5) The UK contribution to such a fund would start in 1986/87 and rise to a maximum of £500,000 perhaps in 1987/88.
- 6) If there is inadequate support for this proposal, then it should be dropped.

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A. CONCLUSIONS

Size of Fund

1. The Study Group has concluded that a technical cooperation fund with an annual allocation of the order of \$10-15 million, (of which UK share would not exceed \$750,000 (£500,000)) could finance a wide range of projects of real benefit in 20 or more NPT states at different levels of development in the nuclear energy field, over the first five years of its operation starting in 1986/7 at the earliest.

Political Impact

2. It is the Study Group's view that the establishment of such a fund, which will substantially increase the total technical assistance funds available for nuclear energy development in developing countries, could:

- a) have an immediate political impact on those NPT parties who are influential in the G77, and who have expressed concern over the supplier countries' commitment to transfer nuclear technology under Article IV of the Treaty; and
- b) in the longer term, influence politically a significant number of developing NPT non-parties.

3. While the fund should primarily focus on projects in the nuclear energy field, support for nuclear projects in the agricultural and medical fields should also be considered, especially in those NPT states parties (a relatively large group), for whom nuclear energy development is likely to be inappropriate for the foreseeable future. While these states may not be individually politically important, due consideration has also to be given to influencing an adequate number of states through the creation of the fund.

Administration of Fund

4. The fund should be administered by the IAEA, with the guidance of a small committee of NPT states parties, to ensure that it does not appear to be in competition with the Agency's own technical cooperation programme. The Agency's management fee would be such as to ensure that it would incur no extra expense to its regular budget. Details of the mechanism for management of the fund would have to be worked out in collaboration with other potential donors.

B. REPORT OF THE STUDY GROUP ON INCENTIVES FOR MEMBERSHIP OF THE NON-PROLIFERATION TREATY (NPT)

Summary

1. A major complaint of NPT and non-NPT developing countries is that nuclear supplier countries have not done enough to meet their commitments under Article IV of the NPT to make nuclear technology available to developing countries (paragraph 3).
2. Greater efforts to assist developing NPT parties with the transfer of non-sensitive nuclear power technology would influence the attitudes to the NPT of a significant number of G77 states (paragraph 4).
3. Consideration should also be given to funding projects in other fields in those countries for whom nuclear energy development is likely to be inappropriate in the foreseeable future (paragraph 5).
4. Development of efficient and safe nuclear power requires the creation first of an adequate intellectual, industrial and regulatory base (paragraphs 6 to 10).
5. Very few developing countries can make an economic case for needing to operate their own plants for uranium enrichment, or reprocessing of spent fuel to recover plutonium (paragraph 11).
6. Eight levels of nuclear development are defined and appropriate types of assistance identified. The cases range from "one" to "eight" where sufficient advancement has been made to enable consideration of the establishment of nuclear power stations. An additional case concerns assistance, appropriate to the prospecting and exploitation of uranium deposits (paragraphs 12 to 14).
7. For some developing countries nuclear power may be an attractive option, while in others the case may not be so apparent. Studies are required to assist countries in their assessment of this, and to ascertain whether there is scope for funding projects in the medical

/and

and agricultural fields (paragraph 15).

8. A fund of \$15 million per annum, equivalent to more than half the present IAEA technical cooperation fund, would have a significant impact merely by its size. It could fund a wide range of projects in over 20 countries over a five-year period (paragraphs 16 and 18).

9. UK contribution to such a fund is likely to be \$0.5 to 0.75 million (c. £0.5 million maximum) per annum (paragraph 17).

10. Flexible administration of the fund will be required to enable allocation of money for projects in the right target countries (paragraph 19).

11. IAEA should administer projects financed by the fund. An appropriate management fee for this service should be charged to the fund (paragraph 20).

12. UK has the technical resources to cope with any additional demands for training of foreign personnel, and for consultants, that may arise after the establishment of the fund (paragraph 21).

C. REPORT OF THE STUDY GROUP ON INCENTIVES FOR MEMBERSHIP OF THE
NON PROLIFERATION TREATY

1. This report is presented in response to the request from OD(D). The Terms of Reference of the Group and its membership are set out at Annex 1 and 2 respectively.
2. The report analyses the countries who could be the target of further initiatives, the types of initiative, the expected cost of different levels of aid and the overall size of fund required to be politically influential. A brief discussion of the availability of physical resources in the UK is presented.

TARGET

3. A major complaint, undermining adhesion to the Non Proliferation Treaty (NPT), is that not enough has been done by the main nuclear supplier countries to meet their commitment under Article IV of the NPT, to make nuclear technology available to developing countries. The grievance is expressed most strongly in relation to technology for power generation. Developing countries can in many cases more readily use nuclear technology in medicine, agriculture and industry, and the Technical Co-operation Programme of the IAEA goes a long way to meet these needs.
4. The Study Group categorised countries according to their membership or not of the NPT and whether or not they are already embarked on nuclear programmes (see annexes 3-11). There are a few developing countries which are parties to the NPT and are embarking on nuclear development programmes, and a greater number of developing countries which have realistic aspirations to acquiring nuclear power who could benefit from further assistance. There was in fact a notable similarity between this group and those NPT states parties who are influential in the G77, or who have expressed concern about the fulfilment of Article IV of the NPT. If assistance were initially targetted on these countries, there is a good prospect that they could be

influenced politically in the short term to show greater support for the NPT.

5. While such a fund should mainly focus on projects in the nuclear energy field, consideration should also be given to supporting nuclear programmes in the agricultural and medical fields, especially in the relatively large group of NPT states parties, for whom nuclear energy development is likely to be inappropriate in the foreseeable future. While individually these states may not be politically important, due consideration has to be given to influencing an adequate number of states through the creation of the fund.

TYPES OF ASSISTANCE

6. Apart from the problem of finance, the strongest impediment to the development of nuclear power in many countries is the lack of an adequate intellectual, industrial and regulatory base. This must be established, if nuclear power plants are to be constructed and operated efficiently and safely. Some developing countries have a significant number of nationals qualified in nuclear science, but almost invariably they lack people and organisations capable of:

- a) planning the introduction of nuclear power;
- b) assisting in construction, operation and maintenance;
- c) providing components, or the goods and services needed to support operations;
- d) providing quality assurance, licensing, and safety and environmental monitoring.

PLANNING

7. The successful introduction of nuclear power is a highly complex process involving many developments, other than the building of a nuclear reactor. Planning for it is therefore also highly complex. Many developing countries lack even the

expertise to assess whether or when they could realistically use nuclear power. Provision of assistance with energy planning might show that some countries' hopes to develop nuclear energy are unrealistic and hence remove their grounds for complaints over Article IV. In other countries such assistance would be a valued step along the development road.

TRAINING ESTABLISHMENT

8. There is a large requirement for training staff in nuclear technology, including training of reactor operators, technicians and engineers for industrial support, quality control, environmental and safety monitoring, and administrators and engineers for regulatory and planning functions. Assistance would be given in planning, staffing and equipping training establishments. There is frequently a desire by developing countries to acquire research reactors for such establishments, but there is rarely a real need for this. Often a much cheaper radiation source would suffice.

REGULATORY INSTITUTIONS

9. Even those developing countries which have already started nuclear power programmes have difficulty in setting up organisations to licence operations and assure high safety and environmental standards. The need for such bodies is generally recognised, and the developing countries seek advice on how to run these activities. Assistance could be given in planning the development of new institutions, reorienting inadequate ones already in place and in training staff. Again this is not a very costly business. Provision of such assistance would be beneficial to developed countries, for if developing countries embarked on nuclear programmes without being able to assure high standards of safety and environmental protection, there would be a serious risk of losing public acceptance of nuclear power in developed countries.

10. It is not envisaged that new funds would be large enough

sensibly to assist directly in the purchase of power plants. Funding for this will need to be provided by commercial banks, and aid agencies, with backing from export credit agencies. Backing from these bodies will not be forthcoming except for well presented proposals. A new fund could assist by providing studies of technical and economic feasibility and, if necessary, environmental impact statements.

PROLIFERATION SENSITIVE TECHNOLOGY

11. Some countries persistently complain that they are not allowed access to proliferation-sensitive technologies, such as that for uranium enrichment and reprocessing of spent fuel to recover plutonium. Very few developing countries can make an economic case for needing to operate their own plants for these purposes. Those countries whose state of development lends strongest support to their claims are not for the most part parties to the NPT (India, Argentina, Brazil and Pakistan). There is, however, no overall benefit to be gained from offering assistance in these sensitive technologies, as these countries have strong political objections to the NPT and their behaviour leads to suspicions that they would misuse assistance on sensitive technology.

ASSISTANCE PROGRAMMES

12. The Study Group considered the methods by which technological 'aid' in the areas covered in paragraphs 6 to 10 above, could be provided to non-weapon states which are either signatories to the NPT, or are to be encouraged to become signatories.

These states fall into a wide range of nuclear 'advancement' ranging from those which have no facilities or immediate intentions, to those with advanced programmes and the capability to order and manage the construction of a nuclear power plant as an informed customer, with the minimum of outside help. In the latter cases, and within the scope of funding presently proposed for incentives, there is little point in offering technical aid,

and political pressure is probably the best course. However, the majority of states are not at this advanced stage and would benefit from, and appreciate, assistance within the scale envisaged (see annexes 3-12).

TYPES OF AID OR ASSISTANCE

13. Generalisations are difficult, as each case would require individual assessment and agreement on a costed package. Nevertheless, the Study Group found it useful to consider a number of discrete cases of which actual cases were likely to be variants.

Case 1 Where no real progress has been made towards nuclear advancement or education. It is assumed however that institutions of higher education teaching science, engineering or related subjects exist. In this case the most advantageous aid would be education overseas and this could be provided by meeting the costs of graduates in a related subject studying for higher degrees in nuclear subjects.

Cost: Inclusive of all expenses could amount to £100K per student for complete PhD course. To make a noticeable impact 3 students studying in parallel would be a minimum.

Case 2 Where some progress has been made and a university department teaching nuclear subjects has already been set up or the nucleus of a research organisation exists, (eg Sri Lanka). Three alternatives are possible:-

(a) Provision of specialists together with very basic equipment to improve the teaching of nuclear subjects in a university, either as part of a science course, or ultimately as a specialisation or second degree. This activity could be strengthened by an interaction with a

UK university in carrying out collaborative programmes.

- (b) To provide specialist training for say 3 people over a period of one year. The training should be designed to encourage advances in the use of nuclear and allied scientific technology. Where specifically requested, and considered appropriate, training could be provided in the application of isotopes to medicine, agriculture, environment etc.
- (c) Where appropriate a specialist should be trained to be capable of carrying out energy assessments and needs, on a national basis, and of making first order estimates for future energy planning.

Cost: An expenditure of £500K/annum should establish a reasonable programme.

Case 3 Where the objectives of Case 2 have already been achieved and a nucleus of trained people exist (eg Nigeria) then, as a means of advancing the teaching, more sophisticated equipment with a specialist staff could be provided. In this category a small experimental assembly could be considered, either a graphite stack or a water moderated system. Such a facility would enable practical work to be carried out in basic nuclear physics. At this stage, (or in Case 4) training should also be provided in Engineering covering such topics as Systems Planning, Design, Quality Assurance etc.

Cost: £500K/annum over 2-3 years, with fuel, associated equipment, instruction and training.

Case 4 Where a nuclear research centre already exists, there

is often a desire to obtain a research reactor. This in terms of a reactor in the MW power range is to be discouraged, as it involves considerable numbers of staff and expertise to operate safely and efficiently. Many countries were encouraged in this direction in earlier years and there are numerous cases where reactors are now little more than prestige symbols. Where sufficient progress has been made and the aim is ultimately to develop a nuclear power programme, then most of the nuclear disciplines can be practised using a teaching or university type reactor, (eg Uruguay). This type of reactor is also capable of producing short-lived isotopes, impossible to import but of great advantage in medical diagnostics and therapy.

Cost: £5M over 3-4 years and inclusive of all buildings, services, tuition and initial operation.

Case 5 Where a small research reactor has already been purchased the attachment of experts in reactor utilisation would be worth considering (eg Malaysia). This would have the double effect of advancing the technology in the recipient country and enabling an oversight to be obtained of the safety procedures being practised. The aim would be to use the reactor as a focal point for the integration of a national nuclear programme, with particular emphasis on training.

Further aid could be provided by either supplying equipment to improve the reactor utilisation, eg isotope production. Where applicable, aid could be used to assist the local staff to manufacture equipment for themselves.

Cost: A reasonable programme for this support would amount to £1M/annum.

Case 6 In a case where sufficient progress has been made for a nuclear power programme to be contemplated, then the scope for aid is very large (eg Bangladesh). In the main this will consist of advanced training beyond university courses with a more practical, on the job focus. It can also be complemented by the attachment of experts to lead or advise local teams in setting up and carrying out the infrastructure tasks leading to a nuclear programme, eg safety and regulatory aspects, quality assurance, health physics, etc. In all of this the initial aim should be not to create particular pockets of specialisation, but rather to provide the background so that the recipients become "knowledgeable customers" capable of negotiating with reactor vendors.

Cost: £1M plus.

Case 7 As a follow up to Case 6 or where a good measure of technical competence is evident (eg Egypt or Mexico); there might be provision of sufficient experts to lead or assist in carrying out a feasibility study for a nuclear power station; alternatively, carrying out a complete survey and study. This would cover such aspects as site assessment, environmental impact, existing distribution network(s) evaluation, degree of national involvement, manpower planning, costs etc.

Cost: £1M plus/annum over 2 years.

Case 8 This case lies at the extreme of the spectrum. Sufficient advancement has been made to contemplate a nuclear power programme and to invite bids from international vendors (eg South Korea). However, even in this instance wide areas exist where training and the attachment of experts would be welcomed across the whole range of disciplines. Of

particular importance in this case is training and/or expert leadership in project management. This is a complex problem when applied to nuclear installations because of the multiplicity of disciplines and specialised requirements.

The attachment of experts also has the advantage of influencing thinking and ensuring that the necessary systems are set up and that acceptable standards are applied to safety and related aspects.

Cost: £500K would make an appreciable impact.

Case 9 This is a special case primarily intended for states which are unlikely to contemplate nuclear energy research or utilisation programmes in the foreseeable future, but which have known reserves of or are exploring for uranium and can therefore be regarded as subject to influence, (eg a number of African States).

'Aid' can be provided in a number of ways:-

- Overseas education in advanced mining techniques.
- Resource surveys. (Prospecting).
- Ore recovery feasibility studies.
- Economics of mining studies.
- Mining logistics (Transport).
- Ore dressing and processing.
- Establishment of an analytical laboratory.

The activities listed, other than education, can be undertaken either in total or in part. In the latter event national resources can be augmented by 'aid', personnel and/or equipment.

Cost: £250K/annum over 2-4 years would make a considerable impact.

Training figures largely in the cases considered and is the area in which most effort should be concentrated. Most nations have an understandable desire to achieve standards which ensure a large measure of independence, but there are obvious advantages in ensuring that such independence is based on acceptable standards and practices.

14. If the means could be found to launch several of the above schemes each year for the next decade it would scarcely be possible for the G77 to make supportable claims that Article IV was being ignored. Targetting of the initial schemes on moderate countries influential in the G77 and having serious concerns over Article IV would be feasible and particularly valuable. There would be no question of undermining non-proliferation policies.

DEVELOPMENTAL ASPECTS

15. Nuclear power, compared to coal, gas and oil, has lower fuel costs, but requires large volumes of capital for the construction of power plants, together with extensive and sophisticated technical and managerial support. There are some developing countries which are consuming, or will later this century consume, large volumes of relatively expensive hydrocarbon generated power and are capable of developing the necessary technical and managerial support. They may therefore find nuclear power an economically attractive option. In other countries it would not be economically appropriate to embark upon a nuclear power programme. Nevertheless a decision to do so might be taken for other reasons. If a country does go forward with nuclear plans it could reasonably do so on the basis of a very small cadre of people trained to become intelligent buyers of turn-key equipment. Many countries may prefer however to develop a greater involvement in the management and support of a nuclear programme. In these cases there could be spin off in terms of indigenous scientific and technical manpower, although this is unlikely to compensate for any basically incorrect economic choice. Assessment studies financed from the fund could be useful in demonstrating which countries would benefit from nuclear energy development. Such studies could also ascertain

whether there was scope for funding nuclear projects in the medical and agricultural fields.

SIZE OF THE FUND

16. The Technical Co-operation fund of the IAEA has a target for contributions of \$22.5 m in 1984. In addition some member states provide bilateral aid which is administered on their behalf by the IAEA totalling about \$6 m. It appears likely, therefore, that a new fund disposing of some \$10m-15m a year would create a significant impact merely by its size, and would be able to support a sizeable number of programmes of the types discussed in paragraphs 12-15 above.

UK CONTRIBUTION

17. It is our intention to obtain the full support of other major nuclear supplier countries for the fund. If we can do this then our contribution to the fund, based on the present formula for contributions to the IAEA Technical Cooperation Fund, would amount to about 5% of the total, say \$0.5 million to \$0.75 million per annum.

ALLOCATION OF THE FUND

18. The Study Group has looked at ways in which the fund might be allocated, and has concluded that over 20 countries could be effectively assisted over the first five years of its operation starting in 1986/87 without overspending the total allocation. For example, an expenditure of \$1.4 million plus per annum over two years on a survey and feasibility study for a nuclear power station, would have a significant political impact on the Egyptian Government. Expenditure of \$0.7 million per annum over two or three years on assisting the development of a nuclear research centre, could have a comparable impact on the Nigerian Government. There will be an underspending during the first year or so of the fund's operation, because of the time required to commit and spend money on new projects.

POTENTIAL PROBLEMS

19. Two groups of NPT parties present special political problems. The first group, namely Iran, Iraq and Libya, covers those parties whose long term nuclear intentions are suspect. The second group, eg Afghanistan and Vietnam, covers those parties which the UK does not aid bilaterally for political reasons. We shall need to bear this in mind, when we come to consider mechanisms for the administration of the fund with other nuclear suppliers, so that adequate flexibility is built into the system.

MANAGEMENT OF FUND

20. It is important that the fund should not appear to be in competition with the IAEA or in any way reduce the importance of that organisation. A complete new structure to operate the fund would not be justified, and it would seem sensible to ask the IAEA to administer it as a service to the members under Article 111, A1 of the IAEA Statute, perhaps with the guidance of a small committee elected by the NPT parties. The administrative expenses of the IAEA could be reimbursed by means of a management fee on each project, and this money could be handled in accordance with Article XIV, B2. Details of the mechanism for managing the fund will have to be worked out in collaboration with other potential donors.

USE OF UK RESOURCES

21. An alternative to participation in an international exercise would be for the UK to increase its bilateral contribution to assistance for NPT parties. It seems likely, however, that greater impact on G77 behaviour at the NPTRC could be obtained if there is a concerted effort by industrialised countries. This could dilute any political or commercial benefits arising for the UK and it would be important to try to obtain some commercial benefit by ensuring that a reasonable share of the fund was spent on British services. In the short term there might be difficulties in providing certain types of

assistance eg in setting up analogies to the NII. In general, however, the UK disposes of manpower whose skills in nuclear engineering could be turned to good account in assisting developing countries. There is not a great surplus of places for training in nuclear matters in the UK but the UKAEA, the CEGB, the universities and polytechnics could between them accommodate a significant number of trainees. There is no shortage of UK consultants competent to assist with planning and feasibility studies.

TERMS OF REFERENCE OF THE STUDY GROUP ON INCENTIVES FOR
MEMBERSHIP OF THE NON-PROLIFERATION TREATY

'To identify options for increasing incentives for parties to the NPT to maintain their support and for non-parties to adhere, with particular regard to Article IV of the Treaty, (which enshrines the intention of the parties to cooperation in application of nuclear energy for peaceful purposes, 'with due consideration for the needs of the developing areas of the world').

Such options should be examined for:

- diplomatic impact;
- scientific and technical soundness;
- developmental value; and
- cost, including source of finance.

The Group should report to Ministers by mid-February 1984.'

MEMBERSHIP OF THE STUDY GROUP

The following participated in the three meetings of the Study Group:-

Dr R D Marsh	Head of Security and Safeguards, British Nuclear Fuels Plc
Mr O Plail	Consultant, Central Electricity Generating Board
Mr A Weaving	Commercial Advisor, Central Electricity Generating Board
Mr F Chadwick	Principal Officer, Commercial Policy and External Relations, United Kingdom Atomic Energy Authority
Mr T G Smith	Head of Overseas Projects Branch, United Kingdom Atomic Energy Authority
Mr G Stevens	Head, AE2 Division, Department of Energy
Dr R Horscroft	Head, DI52, Ministry of Defence
Mr G Armstrong	Aid Policy Department, Overseas Development Administration
Mr I R Kenyon	Head, Nuclear Energy Department, Foreign and Commonwealth Office
Mr P Gregory-Hood	Nuclear Energy Department, Foreign and Commonwealth Office
Mr D Gordon-Macleod	Nuclear Energy Department, Foreign and Commonwealth Office

DEVELOPING NPT COUNTRIES ALREADY ENGAGED IN
NUCLEAR POWER PROGRAMMES

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984 ^X		EXISTING REACTOR(S)	FORM OF AID ^Z
			FUNDED (\$)	FOOTNOTE (a) ^Y (\$)		
Egypt	/	/	709,800	388,400	RR	7
Mexico	/	/	172,900	108,800	PR	7
Philippines	/	/	136,000	71,400	PR	7
Romania	/	/	/	/	PR	8
South Korea	/	/	304,600	82,000	PR	8 & 9
Yugoslavia	/	/	274,400	446,600	PR	7

X Figures in columns 4 and 5 indicate the amount of aid provided and/or required for nuclear energy projects; ticks indicate that aid has been offered in other fields.

Y A footnote 'a' project is one that has been approved by the Agency's Board of Governors for implementation by the Agency for which assistance is provided only in substitution for other assistance which it is planned to provide to the Member State in question or if additional contributions from Member States of funds or services become available.

Z See paragraphs 12 and 13 of paper.

DEVELOPING NPT COUNTRIES CONSIDERING
NUCLEAR POWER PROGRAMME

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984		EXISTING REACTOR(S)	FORM OF AID ^Z
			FUNDED (\$)	FOOTNOTE (a)		
Bangladesh	/		10,000	81,000		6 & 9
Indonesia	/		229,000	0	RR	5 & 9
Iran	/		59,400	0	RR	5
Iraq	/	/	45,000	0	RR	5
Libya	/		172,600	0	RR	5 & 9
Peru	/	/	138,600	/	RR	4
Sri Lanka			96,200	0		2
Syria			196,600	0	RR	2 & 9
Turkey			42,800	0	RR	6 & 9
Venezuela			150,000		/	3

TABLE 1

DEVELOPING NPT COUNTRIES WITH LONGER TERM
PROSPECTS OR DECLARED INTENTION OF NUCLEAR POWER DEVELOPMENT

ANNEX 5

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984		FORM OF AID
			FUNDED	FOOTNOTE A \$	
Malaysia		/	19,800	21,600	5 & 9
Morocco			58,600		2 & 9
Nigeria	/	/	39,600		2
Panama	/		19,800		2 & 9
Thailand			16,000	64,400	5 & 9
Tunisia			/	/	2
Uganda					
Uruguay			19,800		4
Vietnam			/	/	4
Zaire		/	/	/	4

TABLE 2

DEVELOPING NPT COUNTRIES WITH EXPLOITABLE OR SPECULATIVE
URANIUM DEPOSITS

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984		FORM OF AID
			FUNDED \$	FOOTNOTE A \$	
Bolivia			6,600	/	4 & 9
Botswana					9
Burundi					9
Central African Republic					9
Chad					9
Ecuador			52,800		9
Gabon					9
Ghana			/	/	9
Jordan			19,800		2 & 9
Madagascar			25,000		9
Rwanda					9
Somalia					9
Suriname					9
United Rep of Cameroon					9
Zaire			/	/	9

DEVELOPING NPT COUNTRIES WITH NO DECLARED
 NUCLEAR POLICY

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984		FORM OF AID
			FUNDED \$	FOOTNOTE A \$	
AFGHANISTAN			/		1
ANTIGUA & BARBUDA					1
BAHAMAS					1
BARBADOS					1
BENIN					1
CAPE VERDE					1
CONGO					1
COSTA RICA					1
DEMOCRATIC KAMPUCHEA					1
DEMOCRATIC YEMEN					1
DOMINICAN REPUBLIC			/		1
EL SALVADOR			/		1
ETHIOPIA					1
FIJI					1
GAMBIA					1
GRENADA					1
GUATEMALA			99,600	/	1
GUINEA BISSAU					1
HAITI					1
HONDURAS					1
IVORY COAST			/		1
JAMAICA			93,200		4
KAMPUCHEA DR					2
KENYA			/	/	1
LAO PEOPLES' DR					1

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984		FORM OF AID
			FUNDED \$	FOOTNOTE A \$	
LEBANON			/		1
LESOTHO					1
LIBERIA					1
MALDIVES					1
MALI			/	/	1
MAURITIUS					1
MONGOLIA					1
NAURU					1
NEPAL					1
NICARAGUA			/		
PAPUA NEW GUINEA					
PARAGUAY			/		1
SAMOA					1
SENEGAL			/	/	1
SIERRA LEONE			/		1
SINGAPORE			/		1
SOLOMON ISLANDS					1
ST LUCIA					1
SUDAN			/	/	1
SWAZILAND					1
TRINIDAD & TOBAGO					1
TOGO					1
TONGA					1
TUVALU					
YEMEN PDR					

DEVELOPING NON-NPT PARTIES ALREADY ENGAGED IN NUCLEAR
POWER PROGRAMMES

Country	Serious Concern Over Article IV	Influential in G77	IAEA Technical Assistance* 1984		Existing Reactor(s)
			Funded \$	Footnote A \$	
Argentina	✓	✓	0	0	PR
Brazil	✓	✓	175,600	46,000	PR
India	✓	✓	0	0	PR
Pakistan	✓	✓	167,800	✓	PR

TABLE 1 DEVELOPING NON-NPT COUNTRIES CONSIDERING NUCLEAR POWER PROGRAMME

			IAEA Technical Assistance 1984		
Country	Serious concern over Article IV	Influential in G77	Funded \$	Footnote A \$	Form of Aid
Chile		✓	41,800	115,200	7

TABLE 2 DEVELOPING NON-NPT COUNTRIES WITH LONGER TERM PROSPECTS OR DECLARED INTENTION OF NUCLEAR POWER DEVELOPMENT

			IAEA Technical Assistance 1984		
Country	Serious concern over Article IV	Influential in G77	Funded \$	Footnote A \$	Form of Aid
Algeria		✓	✓		3
Kuwait					2
Oman					1
Saudi Arabia	✓	✓	✓		3 - 9
UAE					1

TABLE 3 DEVELOPING NON-NPT PARTIES WITH EXPLOITABLE URANIUM DEPOSITS

			IAEA Technical Assistance 1984		
Country	Serious concern over Article IV	Influential in G77	Funded \$	Footnote A \$	Form of Aid
Angola					9
Colombia*			✓		9
Malawi					9
Mozambique					9
Niger			38,200		9
Zambia					9
Zimbabwe		✓	39,600		9

* Signed but not ratified NPT

DEVELOPING NON-NPT PARTIES WITH NO DECLARED NUCLEAR POLICY

COUNTRY	SERIOUS CONCERN OVER ARTICLE IV	INFLUENTIAL IN G77	IAEA TECHNICAL ASSISTANCE 1984		FORM OF AID
			FUNDED \$	FOOTNOTE A \$	
ALBANIA					1
BAHRAIN					1
BELIZE					1
BHUTAN					1
BURMA					
COMOROS					1
DEMOCRATIC PR OF KOREA					1
DJIBOUTI					1
DOMINICA					1
EQUATORIA GUINEA					1
GUINEA					1
GUYANA					1
KIRIBATI					1
KOREA DEM PR					1
MAURITANIA					1
MONTSERRAT					1
QATAR					1
SAO TOME & PRINCIPE					1
ST CHRISTOPHER NEVIS					1
ST VINCENT & GRENADINES					1
SEYCHELLES					1
TANZANIA					1
VANUATU					1
WESTERN SAMOA					1
YEMEN ARAB REPUBLIC					1

COUNTRIES INFLUENTIAL IN G77

NPT PARTIES

Colombia
Egypt
Iraq
Malaysia
Mexico
Nigeria
Peru
Philippines
Yugoslavia
Zaire

NPT NON-PARTIES

Algeria
Argentina
Brazil
Chile
India
Pakistan
Saudi Arabia
Zimbabwe

SUMMARY OF CURRENT POSITIONS OF DEVELOPMENT OF NUCLEAR ENERGY
PROGRAMME IN G77

BANGLADESH

Bangladesh has opted for a plan involving construction of a 300MWe nuclear plant at RUPA for operation by 1990 and for which NNC made a representation on MAGNOX to the Bangladeshis in 1981. Competitors include West German and French organisations. Reports indicate that Bangladesh manufacturers have capability to produce 30% of plant. A safeguards agreement between IAEA and People's Republic of Bangladesh has received approval from Board of Governors. Unconfirmed reports in 1983 stated that Bangladesh intended to propose to Islamic conference that there should be set up an Islamic Nuclear Bank as a first step towards formulating an energy policy for all Islamic countries.

Bangladesh has entered into nuclear co-operation agreements with Canada, Pakistan, France, Italy and Germany. It is anticipated that the Iriga MK II now under construction will become operational 1984/85.

EGYPT

Eight nuclear plants are envisaged by the year 2000. Various bilateral co-operation agreements have been signed with the USA, UK, France, West Germany, Canada, Belgium and Sweden. Financial agreements to aid energy projects have been signed with Canada. The Nuclear Power Plant Authority (NPPA) under the Ministry of Electricity and Energy is responsible for the establishment and management of power plants and the Egyptian Atomic Energy Authority currently has licensing responsibilities. Tenders, including proposed financial arrangements, for the first two of the proposed units at El-Dabaa have been received from Framatom/Nira, KWU, Westinghouse/Mitsubishi and also Overseas Bechtel. Motor Columbus are retained as consultants by NPPA and are assisting with the assessment of the tenders and the result will probably be announced

in April/May 1984. Following the issue of the invitations to tender the Egyptians agreed that tenderers could quote for only one unit should they be unable to arrange financing for two. The UKAEA together with BEI, Mouchel and ANS has submitted consultancy services proposals to both NPPA and EAEA. British Council has training agreement with the Electricity Authority which is responsible for conventional plant. A member of the UKAEA is shortly to visit Egypt on behalf of IAEA to provide quality assurance advice.

INDONESIA

Official commissioning by the Indonesian President of the Atomic Energy Research and Irradiator Unit Operation Complex took place in December 1983. The IU was obtained with UNDP assistance and is intended for utilisation in development programmes in agriculture, preservation processes, hydrology, health. Research agreements for its use have been made with other members of SE Asia including India and Sri Lanka. In the first half of the 1960s the Centre for Nuclear Materials Exploration and Processing of the National Atomic Energy Agency, Jakarta, embarked upon a programme of uranium exploration surveys. Assistance has been given by the IAEA and work on ore processing has been undertaken in NMEP's laboratory. This work is particularly significant in view of the National Atomic Energy Agency's intention to set up a 25MW reactor which has nuclear fuel production facility. Another area in which the National Atomic Energy Agency has been concentrating effort is the Research Centre for Nuclear Materials and Instrumentation. With co-operation of Interatom a 30MW reactor is under construction at PUSPITEK Centre, Serpong. NIRA (Italy) is involved in this project. Harwell has submitted bids for experimental equipment (rigs) for the reactor. A report from Post in November 1983 said that the Director-General of BATAN had stated long-term plans include a 600MWe station for construction 1990s. Various reports indicate that assistance may be sought by the Indonesians in areas concerned with safety, training, waste management.

IRAN

Reports on current situation of nuclear energy programme are confused; in 1979 the Atomic Energy Organisation of Iran said the programme would be confined to a 30MWe research reactor and that all work on the incomplete Bushehr plant would cease. Recently the AEOI senior management was reported to have said that the Bushehr plant would not be completed, although its suppliers KWU have not commented upon this. The AEOI programme of uranium exploration is reported to be continuing.

IRAQ

Iraq's nuclear research programme is centred at Tuwaitha Research Centre, set up under the terms of the French/Iraqi collaboration agreement of 1975. Separate storage facilities for natural and depleted uranium exist at this Centre under IAEA safeguards. Although there have been various reports that the French will rebuild the TAMMUZ I reactor destroyed by Israeli bombs in 1981 this seems unlikely until the Iran/Iraq war and the problems in the Lebanon are resolved. During a visit to the UK in December 1981, Dr Al Kital of the Iraqi Atomic Energy Commission showed considerable interest in consultancy services which might be available from the UK but subsequently he has informed the UK that the inhibitions of the current political situation prevent the development of nuclear energy plans in Iraq. Future proposals include: hydro power together with irrigation plant and pump storage. State Organisation for Electricity (the State Electricity Authority) is reported to have long-term plans for 3 x 1200MW thermal power stations but these will probably depend upon financial arrangements. The existing 320MW diesel station at Daura will be doubled. Iraq has an agreement with Brazil on peaceful uses of nuclear energy.

LIBYA

Libya relies heavily upon gas turbine plant. Development of combined power/desalination complexes are being considered. Plans for a 440MW nuclear reactor (Soviet built) have been postponed. In August 1978 it was reported that Libya was interested in discussions

about possible nuclear energy programme. Libya has an agreement with Brazil on peaceful uses of nuclear energy.

MEXICO

Continual deterioration of Mexican economy inevitably affected their proposed nuclear programme of 22,000MWe nuclear capacity by the year 2000. The current situation is that fuel-loading for the first two BWR units, total capacity 1300MW, scheduled originally for start-up mid 1977 at Laguna Verde, is now due in 1988. In 1982 bids were received for their second station but these plans were subsequently postponed and the bids unopened. Mexico is a founder member of Treaty of Tlatelolco. Recently a Mexican official announced priorities will be concentrated on development of oil and gas-fired plant and on hydro schemes. There are also reports that a revised energy plan soon to be announced will allow for 5000MWe nuclear capacity. A senior member of CFE recently was reported to have said that construction of a second nuclear station may commence in 1987. Confirmation of this is awaited.

PERU

The IAEA has sponsored Peru's nuclear energy programme with a grant of \$2M (1977) and Argentina agreed in 1977 to build Peru's first reactor - a 10MW experimental reactor capable of producing radioisotopes for medical and agricultural use. In 1977 there was also an agreement with the French for the provision of nuclear technology, laboratories and training. A report from Post states this reactor should become operational in 1984. Co-operation agreements also exist with Argentina and the US, whilst with India there is agreement for co-operation in uses of nuclear materials in agriculture. Discussions have taken place with the FRG about possible co-operation and it is known that Peru would like some sort of co-operation with the UK, including training. Other areas in which the Peruvian authorities seek assistance are nuclear safety and analytical techniques.

PHILIPPINES

In 1968 - entered agreement with the US for the purchase of 2 nuclear plants and long term supply of uranium. In 1979 agreement was reached for the purchase of 2 x 620MW PR units from Westinghouse for the Bataan nuclear scheme. The scheme has suffered from considerable delays relating to pricing and safety questions. Completion is now expected in 1985 with financial assistance from the US Export Import Bank and other (mainly Japanese) sources. The station will provide approximately 9% of the Philippines' total generating capacity.

Although there is a cleared site for a second 620MW plant, an official has claimed that no more plants will be built for at least ten years. Several disadvantages in nuclear development have come to light: electricity demand growth is less than was predicted in 1974, and more geothermal and hydro resources have been discovered, thus reducing the need for nuclear power; it is also thought that a 620MW unit will put strain on the underdeveloped national grid. It is understood that PAEC (Philippine Atomic Energy Commission) intends to set up a national system of accounting and control for nuclear materials and also to study systems for risk analysis.

ROMANIA

Reports were received in March 1982 that new plans concerning construction of nuclear power plants were included in the 1981-1990 energy programme. This stated that 5 x 600MW units would be constructed at Cernavoda, 3 x 1000MW units at Moldavia (one for commissioning in 1990) and one (?) in Transylvania.

The Canadians were supplying CANDUs at Cernavoda but severe Romanian financial restrictions led to the Canadians suspending drawings from the \$1 billion credit facilities until the Canadian suppliers were paid for services already provided. However in September 1983 it was announced that credit was again available and in November 1983 Romania was reported to have almost completed the exterior construction for the two Cernavoda CANDUs with site preparation for the third under way. In September 1982 agreement was reached with

the Soviet Union for the supply of 3 x 1000PWRs. Economic problems were reported to be the reasons for this turn to Moscow. The USSR is to provide enriched uranium to Romania (under the IAEA agreement) for use in a TRIGA Research Reactor - experimental fuel elements in a CANDU type reactor. Romania's nuclear programme forecasts 4500MW by 1990 to be doubled by 1995.

Under construction at August 1983:

Romania 1 (Olt) PWR 440MW construction commenced 1976

Romania 2 (Cernavoda) PHWR 679MW construction commenced 1980

Romania 3 (Cernavoda) PHWR 679MW construction commenced 1982.

SOUTH KOREA

South Korea's first nuclear plant, KORI I, a PWR (Westinghouse/GEC) has been operational since 1978. Since then KORI II and the third plant at Wolsung, a CANDU, have also been commissioned in record time. Six other PWRs are under construction and a contract for the two most recently ordered was awarded to Framatom/Alsthom Atlantique. However, recent reports indicate that the construction schedule for these six will be delayed for some nine months and that plans to commence construction of the tenth and eleventh will be delayed until April 1986. This decision stems from the slowing down in South Korea's economic growth and consequent decrease in power demand. Nonetheless South Korea still plans a total of 12 units to supply 41.5% of estimated 27,000MW peak load in 1991. Problems which will be encountered may be lack of funding and also the need to resolve waste disposal situation.

SRI LANKA

Sri Lanka has entered into a safeguards agreement with IAEA - awaiting entry to come into force. Sri Lanka relies heavily on hydro plant with back-up from gas turbines. Because of the uncertainty of hydro power Sri Lanka is considering nuclear energy. The installation of a research reactor with plans for commercial nuclear plant by 1995 have been proposed. During visit the head of Sri Lankan Atomic Energy Authority asked for training assistance and

that visit also resulted in a UK company agreed to counter submitting a proposal for a research reactor. The Sri Lankan authorities appear to recognise that an increasing application of nuclear techniques in sectors such as agriculture, medicine, industry, etc requires the development of a local core of trained nuclear scientists. Sri Lanka has research agreement with Indonesia.

SYRIA

In May 1983 Syria announced that they had agreed with the USSR that there would be a joint feasibility study for Syria's first nuclear power station, probably a 600MW plant to come on line by 1995. This followed the cancellation of another agreement with Sofratom. Previously assistance had also been sought from the Belgians and from India. (Reports of officials at the 1983 New Delhi Conference claimed that several international bids for nuclear plants were receiving consideration.) During discussions both in the UK and Syria, consideration was given to provision of assistance with training and regulatory and safety procedures.

TURKEY

Two sites for two nuclear stations have been selected at Akkuyu and Sinop and the country's fifth five-year plan (1984-1989) allows for construction of the first station to commence during that time. KWU of West Germany is regarded as the strongest contender in the bids received from international companies for the construction of this first plant.

The President (Mr Kenan Evren) has committed the country to \$2.6bn spending on a nuclear energy programme. It is said that US, Canadian and West German companies will participate and that negotiations will commence during this year.

VENEZUELA

Whilst Venezuela has vast oil reserves and enormous hydro-electricity potential she would like to reduce reliance on oil

as primary fuel. In July 1979 an agreement was reached whereby oil exports to Brazil would be doubled in return for nuclear technology and assistance. There is also a five-year accord with Argentina for co-operation to include research, planning, technology, construction, development and use of experimental reactors. An agreement in 1974 with Italian and Swiss organisations also provides for consultancy on nuclear engineering.

There appears to be no immediate intention by Venezuela to embark upon a nuclear energy programme. However, there was considerable interest shown by them in using a system based upon Magnox design for extraction of heavy crude.

It is also known that the Venezuelan Government is establishing a Nuclear Research Centre, mainly for improving agricultural productivity.

COMADIN (Venezuelan National Council for the Development of the Nuclear Industry) is assessing the advantages of setting up a uranium exploration.

YUGOSLAVIA

Although Yugoslavia's plans for 6000MWe nuclear capacity by the year 2000 are unlikely to be achieved, very severe power shortages emphasise the urgency of meeting these shortages by increasing nuclear generating capacity. The first 600MWe station, a W two-loop PWR, was built at Krsko and it is believed that final handover has now taken place following resolution of steam generator vibration problems. Plans were made to commence construction of a second plant at Prevlaka in 1985 but these have slipped and now initial tenders are scheduled for issue in April 1984 with a closing date for bids in December 1984. The choice of vendor will be made known mid-1986 and construction will commence in 1987. Available information suggests that tender documents may require long-term technology transfer, involvement and development of Yugoslav nuclear industry, guarantee of fuel supplies, although initial documents for Prevlaka will relate only to supply of nuclear island, fuel supply and turbine generator. No decision on type of fuel cycle will be

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DOMINICAN REPUBLIC	6	LIBERIA	6
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MAURITIUS	6	SUDAN	6
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MONGOLIA	6	SWAZILAND	6
MONTSERRAT	9	SYRIA	4,11
MOROCCO	5 (TABLE 1)	TANZANIA	9
MOZAMBIQUE	8 (TABLE 3)	THAILAND	5 (TABLE 1)
NAURU	6	TOGO	6
NEPAL	6	TONGA	6
(PAPUA NEW GUINEA)		TRINIDAD & TOBAGO	6
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SAUDI ARABIA	8 (TABLE 2)10		
SENEGAL	6		
SEYCHELLES	9		