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## MULTILATERAL APPROACHES TO THE NUCLEAR FUEL CYCLE

### EXECUTIVE SUMMARY

*The 1968 Nuclear Non-Proliferation Treaty (NPT) is meant to be underpinned by a three-part bargain: states without weapons were to forswear them and the wherewithal to build them; states with such weapons were to get rid of them, gradually and as part of general nuclear disarmament; and all parties were to cooperate in the peaceful uses of nuclear energy.*

*The NPT has held up pretty well in limiting the spread of nuclear weapons despite some persistent anomalies. More recently, however, the system has come under challenge: from treaty benders and breakers, from leaky export controls and from illicit transactions through a well organised black market. Furthermore, the US seems set to breach its own hitherto strict export control standards in agreeing to supply civilian nuclear technology and cooperation to NPT hold out and de facto nuclear weapon state India.*

*The NPT has long been under fire from some of the treaty have-nots who complain that the aforesaid NPT bargain has grown one-sided, with them being asked to take on increasingly heavy burdens without corresponding implementation of obligations by the five recognised weapons states.*

*Some Non Nuclear Weapon States now represent their own adherence to the NPT as a "concession" — as if, in cooperating in limiting nuclear proliferation, they were sacrificing their own better interests. This argument can be refuted. But the very real sense of inequality and discrimination and complaints of Nuclear Weapon States hypocrisy dominated proceedings at the (failed) May NPT Review Conference (NPTRC) in New York.*

*Such review conference dogma obscures the now far greater risk to the non-proliferation objectives of the treaty: the dissemination of weapons-usable technologies to more of the states parties. As North Korea has shown and as is feared for Iran, a state party can exploit the cover of its treaty membership for ostensibly peaceful purposes to circumvent its NPT obligations, creep to the nuclear weapons threshold and start on a full-scale weapons program.*

*The Director General of the International Atomic Energy Agency has proposed that these proliferation concerns might be ameliorated by placing the most sensitive technologies of the nuclear fuel cycle under multilateral arrangements and control. Options include having the IAEA assume the role of ultimate guarantor of nuclear supply. Such arrangements would not necessarily head off the committed proliferator but, for a larger majority of states, could still be a satisfactory multilateral option for delivering reliable and adequate supplies of fuel and services without the attendant risks of an independent alternative.*

*To prosper, an initiative in this area would require support from a coalition of committed countries, and this paper canvasses the merits of an Australian role in that regard.*

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The global nuclear non-proliferation regime, anchored in the NPT, has been very successful in limiting the spread of nuclear weapons. Instead of the two dozen or so countries earlier thought likely to emerge as nuclear weapons states, the count as at 2005 of countries with known or suspected operational nuclear arsenals remains just eight. Still, challenges to the system have persisted: from regional arms races, from treaty benders and breakers, from leaky export controls, and, as the now uncovered exploits of Pakistan's former nuclear chief A Q Khan have revealed, from a burgeoning and alarmingly well organised black market. This was the context in which NPT parties met in New York last May to conduct their five-yearly review of the operation of the 1968 treaty.

In the event, this latest review conference ended in a bad-tempered procedural impasse — prompted, were most of the delegates to be believed, by the failure of the five designated Nuclear Weapons States to do enough to disarm. Those delegates pointed to the three-part deal said to underpin the 1968 treaty, namely that those not then possessing nuclear weapons, the Non Nuclear Weapons States (or simply NNWS), undertook not to acquire them; that those that did have them (the NWS) promised to eliminate them — eventually, and as part of general disarmament; and that all parties were assured of the right to develop and use nuclear energy for peaceful purposes. Continuing reluctance by the NWS to fulfil their disarmament obligations under this bargain — so the argument went — must inevitably breed reluctance in the NNWS to fulfil theirs; and that — it was further argued — should have been the principal focus of the review conference.

Critics of the Nuclear Five have a point. Although nowhere near as dire as some have suggested, the actual record of the NWS in ridding themselves of their nuclear weapons has not lived up to hopes — or expectations. The same applies to the foot-dragging, particularly by the US, in beginning negotiations for a fissile material cut-off treaty as well as the delay (again blamed on non-ratification by the US) in bringing into force the comprehensive test ban treaty. Furthermore, a new complaint can now be added to the charge sheet, with the US Administration now going perilously close to accepting non-NPT party, India, as a full nuclear power. The decision last July — still to be ratified by Congress — to provide India with previously withheld nuclear cooperation and civilian technology breaches what had hitherto been a fundamental tenet of US non-proliferation policy, namely that such support should only be available to fully complying treaty parties; indeed to be a specific reward for renouncing nuclear weapons. That the US is seemingly now winking at India having it both ways will doubtless further fuel complaints that the NPT has become a charade that allows the powerful to hang on to their own weapons while bending other treaty rules to suit their own geo-political agenda.

These concerns notwithstanding, what remains equally true is that a large majority of states, NNWS as well as NWS, share an interest in containing the spread of nuclear weapons. Indeed, what the earlier description of the NWS/NWWS bargain overlooks is that the treaty was also a bargain between the NNWS themselves; that is, that it was fundamental to the decision of each NNWS not to pursue a weapons program that other NNWS should maintain their commitment to do likewise. In

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other words, for many individual NNWS, the principal benefit from the NPT comes not from the NWS abiding by the treaty, but from seeing other NNWS do so. And where the critics in New York were dangerously wrong last May was in using attacks on the alleged shortfalls by the NWS for doing next to nothing about a far greater new threat to the NPT: the proliferation of weapons-usable technologies to nuclear wannabes bent on breaking or bending its rules, North Korea and Iran pre-eminently among them.

Indeed, what the activities of these two countries have revealed is a basic flaw in the NPT as it was negotiated thirty-five years ago, namely that any party should have the right to access the full technologies of civilian nuclear power in return for its promise not to turn those nuclear skills to military use. Back then, few countries had acquired the sophisticated and costly techniques of fuel cycle technology, and few were expected to try. But things have not turned out that way. Technologies for enriching uranium and producing plutonium, both fissile ingredients for a bomb, are now widely understood and can easily be abused. Furthermore, as North Korea has shown, it is possible for a state party simply to abandon the NPT and, with or without the requisite notice specified in the treaty, proceed with a weapons program.

To be sure, most countries with nuclear programs are not proliferators. For the large majority, they are concerned simply with reaping the benefits of peaceful nuclear energy. Energy security, including access to nuclear power on a timely, predictable and economically attractive basis is thus their principal objective. For the most part,

furthermore, they recognise the risks of widely dispersed weapons-usable material, and understand the need for restraint. But many of these same countries find it difficult to accept the notion that some states are more equal than others in the peaceful nuclear sector, and they consequently reject the establishment of principles that codify discrimination. Article IV of the NPT — providing for the “inalienable” right of all states “to develop research, production and use of nuclear energy for peaceful purposes without discrimination” — is often cited as essential in preserving the NNWS stake in the system. And there have been persistent complaints by some developing countries that denial of nuclear transfers or technology by the industrialised countries — exercised through the Nuclear Suppliers Group — is itself a breach of the NPT, specifically Article IV.2 wherein all parties undertook to “facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy”.

Iran has been able to play into this sentiment. It pleads its intention, and absolute entitlement, to acquire the full range of nuclear technologies for peaceful purposes. It accuses the US and others of deliberately distorting its motivation, and insists that all its nuclear activities will be undertaken under the inspection system of the IAEA, thus assuring their non-military use. Others, of course, are concerned that Iran might proceed thus, building up sizeable, even if strictly legitimate, stocks of enriched uranium and plutonium, but thereby providing the option for a quick breakout from the NPT at any time of Iran’s choosing. Iran’s record of lies, cover-ups and evasions about its past

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nuclear activities has not helped. Tehran has attempted to shrug off the failure to keep the IAEA informed as a mere “discrepancy”. But that is hardly a convincing explanation for its non-disclosure to IAEA inspectors of activities and experiments that took place over two decades and make little sense except in pursuit of a weapons program.

Neither is it the case that Article IV of the NPT bestows an unqualified right to sensitive technologies. An important caveat in the treaty is that the exercise of this right is to be in conformity with the non-proliferation objectives codified in Articles I and II. In other words, whatever entitlements are conferred, these come only from the overriding obligation not to pursue a nuclear weapons program. After all, the NPT is a non-proliferation treaty, not a nuclear power generation treaty, still less a nuclear bomb maker’s treaty.

Beyond all this treaty-speak, however, what should be incontestable is that it is undesirable that every state with a nuclear research and/or nuclear energy program should develop the full nuclear cycle, including its own enrichment and reprocessing facilities. Neither should it be acceptable that a state party to the NPT, invoking its right to master the nuclear cycle, should be able to do so unfettered, and then give three months’ notice to quit the treaty and build a bomb. Is there then an alternative to the spread of sensitive technology to more and more states, and along with that the inherent risk of diversion? The question has added salience in light of the increased tempo of new nuclear power construction, particularly in parts of East Asia, plus the growing reality that the push to curb greenhouse emissions and marked improvements in the economics are

reviving interest in nuclear power as a means of meeting future global energy needs; and along with that more states with sensitive facilities, a greater number of such facilities and enhanced numbers of personnel involved.

The Director General of the IAEA, Dr Mohamed El Baradei, has posed the same question several times in the past couple of years. His tentative answer, first canvassed at the IAEA General Conference in September 2003, and later in op-ed pieces in the New York Times and elsewhere, has been to raise again earlier ideas for multilateral approaches to ownership and operation of fuel cycle facilities, along with multilateral assurances of supply. While generally avoiding prescription, in some of his statements Dr El Baradei seems to be hankering for a classic concept of a network of regionally located facilities with exclusive rights to undertake uranium enrichment and plutonium separation under multilateral control, as well as the future management and disposal of spent fuel and nuclear waste. In August last year, the Director General established an expert group of nuclear scientists and others with a close background in nuclear cycle matters to advise him on these matters.

**Earlier Studies**

Actually, most of the options for multilateral management had been considered a quarter century before, during the second half of the 1970s and the first half of the following decade. The impetus was India’s “peaceful nuclear explosion” of 1974 plus the 1970s oil crisis which led to expectations of an exponential lift in the number of nuclear

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facilities to be built to meet future global energy needs. At the time, the world was staring at the prospect of large scale equipment and nuclear material transfers, all bearing on the most sensitive aspects of the fuel cycle, combined with associated training and the widespread dissemination of knowledge of nuclear fission and its various uses — the “plutonium economy” as it was referred to in those days. The resulting concern to manage the process to ensure respect for non-proliferation norms led to a number of proposals for regional, multilateral and international arrangements that, on the one hand, might reinforce the NPT objective of discouraging horizontal proliferation and, on the other, not undermine the right of states to exploit nuclear energy for peaceful purposes.

Studies during this period were conducted both within the IAEA and outside, under the auspices of the INCFE (International Nuclear Fuel Cycle Evaluation) exercise then being actively promoted by the Carter Administration. The final pickings were thin, however, with none of the proposals/ initiatives leading anywhere. In part, this reflected Cold War tensions but also splits between those supporting an end to all plutonium separation — and thus an end to reprocessing — and those still planning to reprocess and recycle the extracted plutonium in fresh reactor fuel. At all events, by the mid eighties, much of the immediacy felt for doing something had dissipated with the initial shock of the oil crisis having been overcome, and with the accidents at Three Mile Island and Chernobyl plus fresh concerns about nuclear waste liabilities leading to a freeze on new civil nuclear construction in much of the developed world. Ideas for multilaterally-controlled fuel cycles never

entirely faded, and were in fact addressed anew within IAEA sponsored symposia in 1997 and 2001-2002, when, concomitantly, the focus also shifted from reprocessing of plutonium (a process undertaken at the “back end” of the cycle) to uranium enrichment (a “front end” activity).<sup>1</sup> Still, clearly, what has given the matter its current salience is its being raised afresh by Dr El Baradei and his appointment of the expert group to examine the options and to develop ideas for their possible realisation.

### Expert Group

The expert group met in four separate sessions beginning in August 2004 and concluding in February 2005, with much inter-sessional dialogue. The group’s report<sup>2</sup> was released late February in Vienna where it was received — it must be said — with no particular enthusiasm. That’s perhaps unsurprising — fat documents, crafted by committees, rarely make for racy reading, and this 190-page effort was no exception. Nor should literary merit be the sole or even the main measure of the document’s worth. Still, this report was, and is, a disappointment, and must have been so to Dr El Baradei. In setting up the group, the Director General had been following a long-tested path for launching new initiatives on to the international agenda. What he had clearly been

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<sup>1</sup> See diagram on page 14 presenting a schematic drawing of the nuclear fuel cycle. The “front end” functions include milling, conversion, enrichment, fuel fabrication and power generation; “back end” functions include spent fuel storage, reprocessing and disposal of waste

<sup>2</sup> Multilateral Approaches to the Nuclear Fuel Cycle: Expert group Report to the Director General of the International Atomic Energy Agency, Vienna, February 22, 2005

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looking for was a hard-hitting, attention-grabbing outcome, something that might visibly rescue the debate on non-proliferation from its decades long wilderness — something, in short, other than the usual UN report. What he received instead was yet another vapid document, full of everything — and nothing — and, in its recommendations, positively groaning with caution. These things matter since getting policy changes through the international system is never easy, particularly for something as complicated as management of the nuclear fuel cycle.

Neither did it help that the work of the group was informed by so much NPT review conference dogma. The group was intended to be one of “independent” experts. But in practice individual members found it difficult to put aside the political baggage that each, through background and nationality, brought to the table. For some at least, it remained that it was not the proliferation of dangerous technologies but still the nuclear weapons in the arsenal of the five NWS that were the issue. No matter that collectively the numbers of such weapons in the inventories of the Five are at their lowest in decades, and set to drop further. Nor that only one of the five, China, is actually building up its stockpile, with the others freezing or rapidly building down from what they have. At times, furthermore, in its insistence on the inviolability of Article IV, the group might have been in the business of burnishing the right to enrich/reprocess rather than to looking for ways to discourage such activity. Certainly, for an Australian attending the meetings, there could have been much less banging on about Article IV and “inalienable rights”, and a much greater focus on the real problem identified by the Director General:

that too many states now have the capacity and — pace Article IV — the right to access the mysteries of the fuel cycle, and that ways simply had to be found to dissuade them from proceeding.

That said, and without resiling one bit from the criticism of dodgy construction and tortured syntax, buried within the report are some more thoughtful messages struggling to get through. There is, for example, good recognition of the proliferation risk attendant to the production of low enriched uranium (LEU), a fuel otherwise intended for civilian power generation. This is not only because of the wider access now available to earlier centrifuge technology but also due to the ease of building small or even large-scale centrifuge facilities dedicated to production of highly enriched uranium (HEU), that is, weapons-grade material. In fact, production of a critical quantity of HEU does not actually require a large plant: a good-sized office conference room would accommodate the required number of centrifuges. The task is even simpler if LEU is at hand: at the enrichment level typically used in power reactors — 3.5 per cent uranium 235 — already six-tenths of the separative work has been done; at the 20 per cent U-235 level used in fuel for many research reactors, nine-tenths. No surprise then that the world should find itself to be between the hound and the hydrant in trying to limit the proliferation risk posed by the increasing accessibility of enrichment technology.

The same applies to reprocessing, again a right theoretically permitted under Article IV of the NPT but so far exercised by very few. On the one hand, it might be held to be a reasonable requirement that a state should have its own



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capability to reprocess its spent fuel and to use the separated plutonium and/or uranium as a base for fresh MOX (mixed oxides of plutonium and uranium) fuel. On the other, obvious proliferation risks attach to any stepped up dissemination of reprocessing activity, especially if the separated plutonium is of the low burn-up variety, which is weapons-grade material pure and simple.

So would placing these sensitive technologies under multilateral control reduce the risks? And would the multilateral option be feasible in any event? Actually, the case for the multilateral approach is not self-evident. The main perceived benefit is that the number of facilities would be less than if individual states constructed their own, while the attendant problem of safeguarding the facilities is reduced both in scope and expense. Non-proliferation benefits could also be expected to derive from the multinational oversight inherent in a multilateral arrangement, with the presence of multinational staff putting all participants under a greater degree of peer scrutiny, making it more difficult for any individual partner to effect a breakout, and providing less opportunity for diversion, theft or loss. More generally, establishing multilateral facilities could be tantamount to denationalising fuel cycle activities by placing decisions on operation, as well as the distribution of product, in the hands of a collectivity rather than those of individual states.

Yet downsides, existing and potential, are also evident. In particular, multilateral options could well have the counterproductive effect of stimulating, or increasing, an unnecessary early deployment of high-risk technology, and promoting its unwarranted transfer. And it

would contribute little or nothing to non-proliferation were participants free to remove, say, separated plutonium or enriched uranium from the multilateral facility to use unchecked as they see fit. Indeed, to be effective in non-proliferation terms, any multilateral arrangement would have to ensure not only that the facility and its technology could not be abused, but also that its product would be subject to appropriate international controls over its storage, release, use and ultimate disposition. But even were such safeguards in place, the multilateral approach probably means wider dissemination of knowledge and broader access to sensitive know-how.

Of even more concern, given the prevalent view (reflected also in the expert group) that any new arrangements would need to be voluntary, a multilateral arrangement might well have the paradoxical effect of tying down the arrangement-abiding participant while non-participating rogue states could still roam free. True, with the existence of a multilateral alternative, the justification for a national program becomes less persuasive, and the degree of ambiguity surrounding a national decision to proceed less clouded, with the result that the international community becomes more alert to the possible nuclear intentions of the state in question. This may not be unimportant given the contemporary example of Iran, and the large constituency, such as reflected in the recent review conference, for giving Iran a free pass. The hope would also have to be that a satisfactory experience in a multilateral venture in securing reliable and adequate supplies of fuel and services would lead most states to conclude that this way of meeting their nuclear requirements was preferable to a more independent, but



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problematic, alternative. However, that is not going to deter the committed proliferator (DPRK or Iran?) or any state (Brazil?) determined to acquire the full nuclear cycle for reasons of national independence or prestige. That will be so no matter how compelling any new multilateral arrangement, however financially attractive, and whatever additional incentives were built in. One might conclude, therefore, that the multilateral approach could remove a pretext for a country to move ahead independently but not provide a cast iron guarantee that it will not do so.

That's not all. Dig a little deeper into its report and one soon finds that a threshold question the group would ask about any new facility, whether it be multilateral or otherwise, is whether such new capacity is actually physically needed. For enrichment, the true answer is probably no, since present capacity comfortably outstrips demand for all projections out to 2020, and probably beyond. To be factored into the arithmetic is the importance or otherwise of releases from the joint US/Russian warhead dismantlement program in supplying the LEU fuel market, with some maintaining that, when this arrangement terminates, supply constraints will begin to pinch, thus providing scope for new production through a multilateral arrangement. Additionally, costly technologies that can benefit from economies of scale should theoretically be attractive possibilities for multilateral collaboration. Against that, however, a full-blown multilateral facility would require the development of new organisational arrangements of a potentially complex political, economic and managerial nature that, even allowing for economies of scale, could add measurably to the costs,

detracting from the general viability of the enterprise. Moreover, commercial logic suggests that an industrial size enrichment plant only becomes viable when designed to service a large fleet of 50 reactors or more, pretty much limiting where such plants can be located, and not favouring propositions such as those of the Director General for a large network of regionally based fuel cycle facilities.

Much the same considerations apply to reprocessing where, again, the present market situation is comfortable, with existing capacity expected to exceed demand for reprocessing services for at least the next two decades. And, again, as with uranium enrichment, the financial arithmetic of reprocessing only adds up where there is a large quantity of spent fuel to treat, of the order of 800-1000 tonnes a year, thus, again, limiting where any new reprocessing plant can be sensibly located. None of this might deter important stakeholders if multilateral facilities, regionally located, and suitably fenced around with safeguards, could head off suspected nuclear weapons aspirants like Iran. But few in the expert group believed that an Iran (or a North Korea) could be credibly roped in in this way. Rather, they were seen as among those who would likely reject their own participation in a multilateral arrangement more or less under any circumstances.

The expert group's report stopped short of such an explicit conclusion. Indeed, the formal findings of the group included recommendations for further work on developing the full range of multilateral options. This was a typical instance, however, of linguistic fudge in the report masquerading as proposed policy and inadequately reflecting

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the real reservations evident within the group, reservations that actually amounted to considerable scepticism about any proposals for multilateral arrangements entailing the construction of new facilities, or the conversion of existing national facilities to multilateral ownership and control. Importantly, however, at least for fuel enrichment, there can be models for a multilateral approach that need not entail new large, full-scale facilities. Something more modest but perhaps no less effective in delivering greater assurance of supply of nuclear materials for countries wishing to enjoy the full peaceful benefits of nuclear energy, would be to graft new institutional arrangements on to what already exists, essentially within the present IAEA.

**IAEA as Guarantor of Supply**

The expert group identified a number of possibilities, including IAEA fuel leasing and an IAEA operated fuel bank. The option considered to be the most feasible, however, requiring minimum new institutionalisation, and likely to be least burdened by financial, legal and technical complications, was that of the IAEA acting as a guarantor of supply. The concept as developed in the group envisages the IAEA standing ready to supply states in good standing under the NPT and willing to accept the requisite conditionality, including forswearing a parallel path to enrichment/reprocessing plus acceptance of the Agency's Additional Protocol which allows for much more intrusive inspections than provided under traditional safeguards. The IAEA would not have fuel of its own (as would be implied under, for instance, a fuel bank idea) so that its assurance and guarantee would need to be

backed up by agreements of supplier countries to fulfil commitments made by the IAEA effectively on their behalf. These assurances in turn may need to be backed up by stand-by arrangements whereby one nuclear supplier would step into the shoes of another should the first fail to perform. In effect, however, the IAEA would be establishing a default mechanism, only to be activated where a normal supply contract had broken down for other than commercial reasons, when the IAEA would then interpose itself between supplier and consumer to assure supply. The whole arrangement moreover could be fitted into and based on the existing provisions of Articles III and IX of the IAEA Statute.

It remains to be seen whether or how these ideas are now pursued in the IAEA or elsewhere. But of more than passing interest is that the IAEA acting as a guarantor of nuclear fuel supply has also emerged as a separate proposal from the High-level Advisory Panel established last year by the Secretary-General of the United Nations to report on ways to boost international peace and security. It was the recommendations of that panel that constituted a large part of the backdrop to the Secretary-General's own proposals for UN reform and the strengthening of the global collective security system ("In larger freedom: towards development, security and human rights for all" — UN document A/59/2005 published on 21 March 2005) which are to be debated at the follow up to the Millennium Summit to be held in New York later this year.

Of course, the recommendations on nuclear matters covered only part of the work of the High-level Panel, and how they and the many other individual proposals for change and

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reform play out now and in the months to come are still to unfold. Almost certainly, many otherwise good ideas will be squeezed out simply because of the pressure of events, while others may falter because of focus elsewhere (Security Council enlargement for example; or transforming the present cumbersome UN human rights machinery into something leaner, more action oriented and more selective as to membership) or due to a lack of a sufficiently disciplined group of countries dedicated to pushing for adoption of the change sought. So the possibility is more than real that ideas for a more definitive role for the IAEA in nuclear supply might slip between the cracks. On the other hand, threats from weapons of mass destruction and from nuclear proliferation in particular are recognised, certainly in the West, as an urgent priority for collective security, with specific concern about the erosion and possible collapse of the current NPT regime. And in that regard it must help that the Secretary-General, having considered the proposals of his High-level Panel, is himself also now on record as urging a focus on creating incentives to persuade states “to voluntarily forego the development of domestic uranium enrichment and plutonium separation capabilities” with one option being that the IAEA instead should step in to “act as a guarantor for the supply of fissile material to civilian nuclear users at market rates”.

Several policy questions spill from the foregoing. Is there a country — Australia perhaps — or group of countries prepared to take on the necessary catalytic role? How to proceed in any case in the face of the inevitable preference of some, including probably important allies, for the status quo? And how to co-opt regional partners in promoting the

exercise when at least one, Japan, has been wary of the whole multilateral approach, given its heavy national investment in its own enrichment and reprocessing facilities? These concerns need to be offset, however, by some other telling realities, including Australia’s proclaimed commitment to non-proliferation, its standing as a respected voice in the IAEA, and its keen national interest in resolving proliferation worries, immediately in the North East Asia quadrant of China, the two Koreas, Japan and Taiwan, but potentially in South East Asia as well, where for instance an Indonesian decision to proceed with long talked about plans for nuclear power generation would inevitably resonate with significant elements in the Australian community.

Negotiating the modalities of an IAEA guarantor arrangement would not be easy and doubtless require concessions from all sides including, for supplier states, some generic delegation to the IAEA of prior consent rights; and, for the consuming countries, acceptance of very tough conditions, particularly regarding inspection requirements, probably extending beyond the Additional Protocol to include blanket arrangements for Agency teams to visit sites on the basis of anywhere/anytime. Other issues would arise with respect to the IAEA and its special status as an international organisation subject to control by its member states. Decision-making procedures spring to mind, with final authority for a decision to supply presumably needing to be vested in the IAEA Board. Again, there would be plenty of scope for stiff argument.

Still, the basic concept is not unprecedented. A mechanism for guaranteeing the supply of LEU fuel lays at the heart of the offerings by the EU-

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3 in their current negotiations with Iran aimed at inducing Iran not to proceed with a domestic enrichment program. A similar package that includes guarantees of fuel supplies (also with take back provisions) has been on offer from Russia for fuelling the Bushehr reactor in Iran. Then, for a recent multilateral precedent of a tough negotiation nonetheless leading to a successful outcome, look no further than the four-year effort to negotiate the IAEA's Additional Protocol. Just as in that case, the negotiation of a new role for the Agency in nuclear supply might well come to be seen by most states as an opportunity rather than a burden, with the prospect for an outcome that could measurably advance the non-proliferation cause.

At all events, of the multilateral options examined in the expert group, the only one with seemingly near term operational potential was that of the IAEA as guarantor of supply. The review conducted in the group of more ambitious options, on the other hand, served mainly to underscore the dubious underpinnings of such ideas, and to suggest that they would be mostly fraught on technical, political and, especially, financial grounds.

**Storage/Final Disposal**

Where the case for a full-blown multilateral facility might be stronger is in regard to the interim storage of spent fuel. Such fuel containing plutonium is frequently stored for long periods while awaiting reprocessing or decisions on final disposal. This can be quite expensive for countries with small nuclear programs (or with research reactors only) as well as problematic in public acceptance terms.

In the event, the conclusion of the group was that significant economies of scale would likely result and problems of acceptance could well be eased, including for any host country, were the storage task to be handled multilaterally. More to the point, concentrating storage in several regional sites (in lieu of the current practice of storage at reactor site) and imposing IAEA safeguards over each, were thought likely to yield positive non-proliferation benefits, including reduced risk of penetration by terrorist organisations who would be glad to get their hands on dangerous radioactive material that could be used in a dirty bomb or some other radioactive dispersal device.

Final disposal of spent fuel and radioactive waste — a process beyond interim or even long-term storage — was likewise seen as offering scope for multilateral collaboration, with many of the same cost and non-proliferation benefits. On the other hand, the perception of possible complications was keener, with questions arising over long-term liability obligation and with the additional compelling consideration that, since final disposal of spent fuel implies no prospect of reversibility, the problem of public acceptance in any potential host country could be vastly increased. Indeed, the exchanges in the group here were all somewhat unreal in that what perhaps made sense on technical and economic grounds never really came to grips with what is still the insurmountable obstacle of lack of domestic receptivity to long-term disposal arrangements even on a national basis.

For some countries, and for many operators of nuclear plants wanting to off-load spent fuel as early as possible, the opportunity to get rid of the stuff immediately, preferably in a deep

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repository, might be a godsend; and perhaps a large incentive to pursue a multilateral option if available, instead of a national fuel cycle one. But for any potential host country, the multilateral pedigree of the spent fuel or waste would if anything likely render the whole arrangement even more unpalatable to its people. So far only one state, the Russian Federation, has dabbled with the idea of taking in other countries' waste, and even there it now seems that current Russian legislation allows only for acceptance of waste from Russian origin fuel, not at all extending to the open-ended disposal option that some in the international community might have been hoping for.

**Conclusions**

There are those who will insist that, in the spread of sensitive nuclear technologies, the train has already left the station and has been gathering steam for some time. In focussing attention on possibilities for multilateral management of such processes, the Director General of the IAEA has sought to address this gap in the non-proliferation regime. The expert group he set up last year has usefully examined some of the issues, even if to get at them one has to dig pretty deep into its report. The likelihood is that the report will now be sent to another group or committee for further "study" which, in truth, in the IAEA, can sometimes be the closest thing to oblivion. On the other hand, that one of the options, that of the IAEA itself acting as a guarantor of supply, has also been advanced by the Secretary-General and his High-level Panel in New York can be a significant factor in adding important political weight to the recommendation. Even

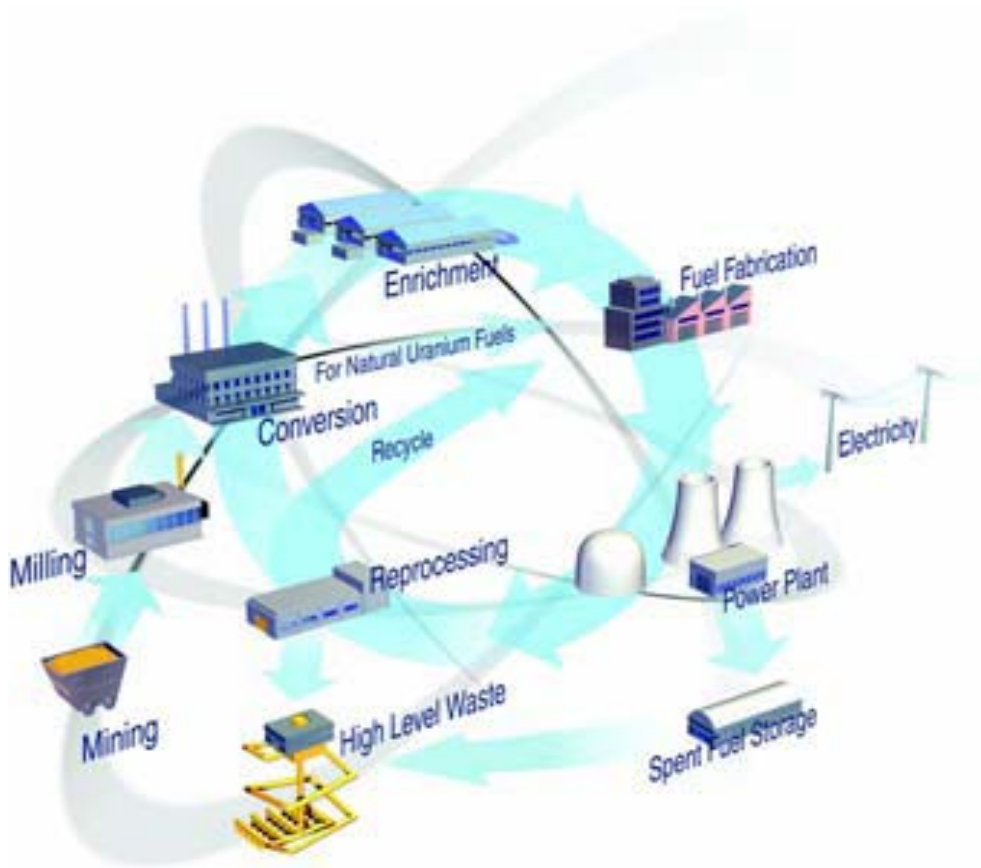
so, if such an initiative is to prosper, it will require support from a significant group of sponsors. Someone would need to step forward as a catalyst. Australia's non-proliferation credentials and strong regional interests might point to a role for Australia here, at least, initially, in terms of the feeling out of others.

Meanwhile, the problems and the risks attendant on the dissemination of sensitive technologies will continue. Iran has become the important test case with America in particular, ever fond of a make-my-day approach to foreign policy, almost daring Iran to proceed. But hang on, is it not so that what is fair for others in nuclear technologies should also be fair for Iran, not least given the recent concessions accorded to India, not even an NPT party? For a country with the suspect credentials of Iran, the answer surely must be no; in these matters, and in the real world, not all countries are created equal.

None of the foregoing is to deny the continuing validity of the NPT, or its importance in maintaining the international norm against the spread of nuclear weapons. To be sure, this thirty-seven year old document might ideally be amended to reflect contemporary realities. Yet a careful balancing of the divergent interests in the NPT suggests that any attempt to renegotiate or reinterpret the treaty, especially if directed explicitly at curtailing nuclear access even for peaceful purposes, would be a fraught exercise. Instead, therefore, a more pragmatic approach is needed. Thus this fresh look at management of the fuel cycle which, while perhaps preserving ultimate national rights of access under the NPT, would introduce some multilateral guarantees and inducements into the system hopefully giving pause to a state

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otherwise thinking of establishing its own independent, but more problematic, alternative.



Schematic drawing of the nuclear fuel cycle<sup>3</sup>

<sup>3</sup> Multilateral Approaches to the Nuclear Fuel Cycle: Expert Group Report to the Director General of the International Atomic Energy Agency. Vienna, IAEA, 2005, p. 21

## **ABOUT THE AUTHOR**

The author is Lance Joseph, Australian Governor on the Board of the International Atomic Energy Agency (IAEA) from 1997 until 2000.

Lance Joseph, a former Australian Ambassador to Rome and Vienna, was most recently a member of an expert group established in 2004 by the Director General of the IAEA to advise him on placing peaceful nuclear activities under multilateral control. Its report was published in February 2005.



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