

Non-Proliferation After Baghdad

SCOTT J. ULM*

As the contrails of the combined force of Israeli F-15s and F-16s dissipated into the gathering twilight over Iraq's destroyed nuclear research center outside of Baghdad, the first shades of life in a proliferated world fell upon the globe. Iraq played by all the rules of the international nuclear game. It had signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and had the appropriate safeguard arrangements in place under the auspices of the Vienna-based International Atomic Energy Agency (IAEA). With only a brief interlude during a peak of the continuing Iran-Iraq war, IAEA inspection had affirmed that there was nothing officially amiss in Iraq's nuclear program. Yet Israel attacked, giving a loud vote of no-confidence in the international nuclear regime designed to assure that civilian facilities acquired "according to the rules," like Iraq's, would not be turned to military ends.

The official Israeli justification for the raid was that Iraq intended to use its nuclear research facility for the production of nuclear weapons.¹ Israel's raid on the Tuwaitha center was aimed at destroying a large research reactor provided by France under a 1976 agreement for nuclear cooperation. The Iraqi reactor, dubbed "Osirak," is essentially a duplicate of the French Osiris reactor located at Saclay which is used for material test experiments.² Osirak could have been used to provide Iraq with nuclear explosive material by two routes: Diverting its highly enriched uranium fuel or "breeding" plutonium by packing blankets of uranium around its core and reprocessing the material in a "hot cell" facility supplied by Italy. Assuming the Iraqis could master the art of nuclear bomb making, either path could have created enough material for a bomb. However, either route was nevertheless likely to be detected. Any effort to divert Osirak's fuel would have been obvious to both the IAEA inspectors and French technicians. Breeding significant amounts of plutonium in Osirak would have required blatant

* Scott J. Ulm is a United States Senate staff member.

1. *The New York Times*, 9 June, 1981, p. A8.

2. Material test experiments are usually intended to assist in the fabrication of fuel elements for nuclear power reactors. Iraq justified this sort of research as a necessary step in the development of a nuclear program independent of foreign suppliers. While the level of nuclear research in Iraq was not inconsistent with an eventual peaceful nuclear power program, its timing seemed inappropriate to some observers, considering that the country had yet to order a nuclear power plant.

modifications to the reactor's cooling system — a clear sign that Iraq was pursuing a weapons option. Although Iraq had taken none of these steps yet, Israel felt sufficiently threatened to send its air force on a dangerous raid to destroy the reactor. The nature of the threat posed by Osirak, particularly as it was perceived by Israel, is indicative of broad changes in the nuclear non-proliferation regime since its central instrument, the NPT, was opened for signature eleven years ago.

Problems with the NPT

The NPT was a bargain intended to square the circle of nuclear power. If a nation would forego the development of nuclear weapons, it would receive the right to peaceful nuclear technology.³ An additional carrot was an undertaking by those nations with nuclear weapons to get on with disarmament.⁴ In the late-1960's, when the NPT was drafted, all of this looked like a good deal. It was broadly assumed that a division between civilian and military nuclear technologies could be maintained. International safeguards, essentially an accounting system for nuclear material combined with some observation of facilities, were expected to assure that the transfer of peaceful nuclear technologies did not translate into a military program without timely warning to the world community. The states with nuclear weapons could spread the gift of nuclear power while leaving the bomb at home.

But there was a problem built into this neat arrangement. The division between civilian and military atoms is inherently ambiguous.⁵ As nuclear power and research programs become more advanced, the knowledge and facilities obtained grow ever closer to the skills and accoutrements of the bombmaker. The clearest example of this is the so-called "back end" of the fuel cycle — the part of a nuclear program which deals with fuel that has already passed through a reactor leaving unused uranium, toxic nuclear wastes, and plutonium. Reprocessing, the means of separating out these constituents of spent fuel, was always considered a logical step in the nuclear fuel cycle. The unused uranium would be made into new fuel, the nuclear waste disposed of, and the plutonium eventually used in advanced breeder reactors. Even in the early stages of the United States's Atoms for Peace program, knowledge of reprocessing was widely dissem-

3. Article III and Article IV of the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT).

4. *Ibid.*, Article VI.

5. The difference between peaceful and military atoms is likely to become even more vague if the United States goes through with its announced intention to use spent nuclear fuel from commercial power plants as a source of plutonium for its weapons program. This will be possible by the end of the 1980s by the application of a process called plutonium laser isotope separation which will refine reactor-grade plutonium to the high purity needed for weapons use.

inated.⁶ The difficulty with reprocessing, though, is that it gives a nation the ability to turn a nuclear program dedicated to peaceful power into a weapons manufacturing industry in short order. Stored stocks of plutonium, even though of "reactor grade," can be used in weapons.⁷ Moreover, a nation with access to all parts of the nuclear fuel cycle could at some point exercise its right to withdraw from the NPT with three months notice and proceed to dedicate its facilities to the production of nuclear weapons material.⁸ Reprocessing presents the international nuclear regime with a further challenge as well: It is extremely difficult, some would say impossible, to safeguard nuclear fuel adequately. The amount of material flowing through a reprocessing facility leaves a certain amount of the weapons-usable plutonium in valves, pipes, and tanks. This "material unaccounted for" (MUF) could conceivably be used to camouflage the diversion of small, but adequate, amounts of material for military use.⁹ All of this conspires to erode the concept of "timely warning," the idea that international safeguards would let the world know well in advance that a peaceful program had turned military.

The consequences of the near identity of advanced peaceful nuclear programs with a nuclear weapons option is potential conflict between articles II and IV of the NPT. On the one hand, the non-nuclear weapons states had promised "not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices." Yet they were guaranteed that "nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with . . . article II of this Treaty." The nature of this "conformity," of course, is left undefined.

In practice, the world's nuclear "haves" increasingly tended to deny the nuclear "have nots" the technology required to complete those sensitive steps in the nuclear fuel cycle that could give them access to nuclear explosive material. The problem, so heavily underscored by Israel, is that the definition of "sensitive" material and facilities has steadily broadened. Although by most accounts Iraq's weapons potential was limited in the short and even medium terms, the difficulty was that they could eventually

6. The United States still, however, keeps secret most of the technology related to uranium enrichment.

7. Plutonium produced in a nuclear power reactor tends to have more of the isotope Pu-140, and Pu-242 that are not particularly well suited for weapons use. These isotopes spontaneously fission and emit heat and gamma radiation which complicate weapons design. Pu-239 is the most desirable material for a plutonium bomb.

8. *NPT*, Article X.

9. It is generally assumed that about 8 pounds is sufficient for a plutonium bomb. Greater or lesser quantities may be used depending on the sophistication of the explosive's design.

make nuclear weapons, regardless of the restrictions imposed by Iraq's membership in the international nuclear regime.¹⁰ Israel, a country outside that regime, made its realpolitik choice on this basis. Iraq's signature on the NPT and the IAEA's safeguards notwithstanding, the weapon-making potential of Osirak caused the pre-emptive attack that proliferation theorists have long warned could be a consequence of a dedicated weapons program in a non-nuclear nation. IAEA safeguards failed in Iraq in their most fundamental purpose: to provide a credible assurance that a peaceful nuclear program was not being used to build a bomb. Israel, regardless of its non-membership in the NPT/IAEA regime, did not feel the safeguards, or the international political will necessary to back them up, were adequate. It is little wonder that Sigvard Eklund, Director General of the IAEA at the time of the Israeli raid, said "it is the Agency's safeguards which have also been attacked."¹¹

Consequences of the Attack

The immediate reaction to the Israeli attack on Osirak was easy to discern — a UN resolution, a delay in the shipment of US jets to Israel, and censure of Israel at the IAEA General Conference. But the most important effects of the raid will become apparent as the Iraqi program is rebuilt. While it is likely that any reconstructed Osirak will have even tighter safeguard provisions, the Israeli raid has turned the intentions behind the Iraqi nuclear program from an ostensibly peaceful purpose to what can only be considered a dedicated weapons program. According to President Saddam Hussein of Iraq, ". . . any country in the world which seeks peace and security, respects peoples and does not wish to fall under the hegemony or the oppression of external foreign forces should assist the Arabs in one way or another to obtain the nuclear bomb in order to confront Israel's existing bombs."¹²

What was a suspect peaceful nuclear program has been catalyzed by the raid into a defense program couched in the time-honored rhetoric of deterrence. If Saddam Hussein's thinking holds, a reconstructed Osirak may not be used to make nuclear explosive materials, but it will be used to advance a program to construct weapons at some point in the future. And the unfortunate fact of nuclear bombmaking is that it is easier and cheaper to make nuclear weapons with facilities specifically dedicated to that purpose than by diverting elements of a peaceful nuclear power program. So Iraq's nuclear program may continue in an ostensibly peace-

10. See Charles Van Doren's unpublished report for the Arms Control Association on this issue.

11. *The Economist*, 13 June 1981, p. 33.

12. *The New York Times*, 24 June 1981, p. 1.

able fashion, yet, beneath the surface will always lurk the possibility that Iraq will turn to a dedicated weapons program with reactors constructed specifically for that purpose. Perhaps the civilian, safeguarded facilities will never be used to make explosives, but the knowledge and training gained through them may serve a military program quite well indeed. Thus, the Israeli raid, far from ending the Iraqi program's proliferation potential, may in fact accelerate it by pushing Iraq outside of the NPT system. In the same way that the NPT and safeguards failed to reassure Israel of Iraqi intentions, so did it fail to protect Iraq. The only reason for Iraq to continue to play by the international rules is to assure access to its nuclear technology. Once Iraq is technologically self-sufficient, there will be little value in toeing the line of the international nuclear regime.

Nuclear Prestige, Security, and Politics

If one accepts that Iraq, once in possession of a nuclear capability, was not particularly likely to attack Tel Aviv, given the limited chances of getting through Israeli air defenses and the almost certain Israeli nuclear counterattack, the motivations for obtaining a nuclear weapon boil down to prestige and security. It seems to be an almost irrevocable fact of twentieth century life that possession of nuclear weapons makes the world take account of just about any country's actions. The security benefit of nuclear weapons, however, can be questioned. As Thomas Schelling of Harvard University testified before a Senate committee, "What should a wise head of government respond if offered the immediate delivery of a few nuclear weapons, free of charge? I think he or she should respond, 'Not yet — let me think where to put them.'"¹³ A nuclear weapons program holds the potential to destabilize the internal machinery of a government by vastly augmenting the power of one element over another. Should the weapons be spread between the branches of military service? Can they remain under the direct control of the head of state? What if they fall into the hands of an officers' cabal? Or will they cause a pre-emptive strike? All of these elements conspire to argue that a proliferator's security actually decreases dramatically with the possession of its first nuclear weapon. In Iraq's case, simply the appearance of being on the way to obtaining an actual atomic bomb was all that was needed to bring on the last of these possible consequences for joining the nuclear club.

Nonetheless, barring an outbreak of unusually good sense, Iraq's drive for nuclear weapons is likely to continue — overtly driven by the logic

13. Testimony of Thomas Schelling, Harvard University, before the Senate Subcommittee on Energy, Nuclear Proliferation, and Government Processes, Committee on Governmental Affairs, 24 June 1981.

of deterrence outlined in Saddam Hussein's call for Arab atom bombs to match those of Israel. Consequently, the only long-term prospect for stemming the spread of nuclear weapons in the Middle East, or at least neutralizing their effects, is a political assault on the broader security concerns that beset the region. At this point, the discussion revolves more around the dynamics of the Middle East peace process than the problems of nuclear proliferation. Yet because there seem to be no insuperable barriers to obtaining nuclear weapons for any state, given sufficient time and resources, the issues of the Middle East peace process and nuclear proliferation in the region are really one and the same. As President Reagan said in his non-proliferation policy statement:

In the final analysis, the success of our non-proliferation efforts depends on our ability to improve regional and global stability and reduce those motivations that can drive countries toward nuclear explosives.¹⁴

The factor really determining how far and wide nuclear weapons will spread in the world is not the technical ability to obtain them, but rather the desire to have them in the first place. To date non-proliferation policy has evolved to concentrate primarily on technical barriers to nuclear weapons proliferation. Suppliers of nuclear technology, such as the US, increasingly refuse to sell certain technology and equipment to particular customers; others even question the wisdom of introducing any additional nuclear technology into politically volatile regions of the world. But these attempts to prevent proliferation by refusing to supply suspect items is not working in practice as well as it does in theory. There are too many loopholes which a determined government can use to obtain the technology and equipment it requires. An example of a failing worldwide effort at technical denial is Pakistan's reported ongoing construction of a clandestine uranium enrichment plant. With parts gathered by subterfuge and deception from around the globe, Pakistan appears to be building a uranium enrichment plant that could have no other purpose in that country than the manufacture of bomb material.¹⁵ Despite Pakistan's deserved reputation as a "bad actor" in international nuclear affairs, every month more stories appear in the press of bits and pieces that got through — from pipes and tubing to fluoride plants. The example of Pakistan's successful sub rosa nuclear program seems to argue that proliferation must be com-

14. Statement by the President, The White House, Office of the Press Secretary, 16 July 1981.

15. Pakistan's only nuclear power plant is a Canadian-supplied heavy water reactor that uses natural uranium for fuel. Enriched uranium is used in pressurized water reactors. Therefore, Pakistan's Construction of a uranium enrichment facility could only have an application in a nuclear explosive program.

batted politically, or not at all. So if the proliferation problem is fundamentally political, what place, if any, is there for efforts to deny potential proliferators the technical means to develop nuclear weapons?

From the perspective of the early-1980's, the best answer seems to be to employ a policy of technical denial as a tactic that, with luck and cooperation, will force a delay in nuclear programs of questionable motivation. This is a meager gain indeed for a policy that is very costly to nuclear vendors and their foreign policies. In addition, technical denial has a substantial chance of actually being counterproductive by driving international nuclear commerce into autarchy. Increasingly, in international forums like the IAEA and NPT review conferences, as well as bilateral discussions, the most vocal nuclear clients, mainly developing nations, are angered that the technical denial policy is run by nuclear suppliers, all developed nations. The non-proliferation restrictions on international nuclear commerce seem to many nations like a disingenuous attempt to shore up the developed world's security at the expense of the third world's energy. The terms of international nuclear trade are increasingly becoming part of the world's larger North-South rift. The IAEA, a UN organization, is being pressured by developing nations voting *en bloc* to further their interests, among which is more technical assistance in the uses of nuclear technology rather than more advanced, stringent, and expensive safeguards.¹⁶ In addition, some of the multilateral actions taken by the nuclear suppliers in the 1970s, such as the London suppliers' group meetings, have increased the fears among many nuclear customers of a suppliers' cartel exercising control over technologies and materials for political ends.¹⁷ Consequently, "security of supply" is increasingly used as a justification for obtaining the sensitive fuel cycle facilities needed for enrichment and reprocessing, the spread of which the more restrictive supplier practices were designed to prevent. The perceived security benefits of having an independent full fuel cycle seem to outweigh the fact that such small plants will almost certainly be uneconomical. Not surprisingly, much of the rhetoric about the necessity of security of nuclear supply could have been lifted directly from the late-1970s energy security debate in the United States which culminated in a multi-billion dollar synthetic fuels program designed primarily to support energy technologies that were currently uneconomic but had a perceived security benefit.

16. The IAEA has a dual character, since it is charged with both advancing the use of nuclear technology and power around the world as well as safeguarding its application. Some critics have seen this as a fundamental contradiction in the IAEA's charter.

17. The IAEA feels so strongly about the scars left from the suppliers group meetings that it has formed the Committee on Assurance of Supply to try to reforge some consensus among nuclear suppliers and customers.

Questions for the Future: Non-NPT Exports and Client Discrimination

A further question mark is the future export policies of a number of countries with advanced nuclear programs which lack full membership in the international nuclear regime, in that they have neither signed the NPT nor accepted full scope safeguards. Before the end of this century, India, Argentina, Brazil, and South Africa are all likely to have the capability to export some combination of nuclear technology, facilities, or materials. It is not difficult to imagine that some of these countries, with leadership ambitions in the third world or simply in search of political coin, will use their nuclear exports as a diplomatic tool, like the United States did in the 1950's, in a sort of "Atoms for Peace *redivivus*." Independent national nuclear programs, with the weapons option that "independence" necessarily entails, could become the next century's symbol of freedom from foreign control — equivalent to the national airline and steel mill that most developing nations have today regardless of their economic prospects.

Clearly, as the developing world becomes independent of the industrialized West's nuclear supplies, so will it become independent of its nuclear non-proliferation policies as well. The challenge, then, is to design a nuclear regime that does not accelerate the move towards independent nuclear facilities by being overly restrictive, yet at the same time does not sell to potential proliferators what they would not be able to obtain without substantial political and economic expense. For a nuclear supplier like the United States, the implementation of an optimal export policy is complicated by the United States' variety of nuclear customers. In the most general terms, there are two groups. One consists of advanced industrial nations that the United States has long cultivated as customers for its nuclear equipment vendors and uranium enrichment program. The nations among these customers that have not already developed nuclear weapons are the least likely to do so in the world's current political climate. If the global picture should change so much in future years as to make nuclear weapons attractive to nations like Canada, West Germany, and Japan, one might also argue that the problem of nuclear proliferation would be subsidiary to other concerns on the world's agenda. Most of these nations have developed an interest in advanced single atomic power research including breeder reactors, reprocessing, and other activities which provide access to weapons material thereby significantly reducing any "timely warning" that safeguards might be able to provide. The United States could only stop this type of nuclear activity abroad with very high foreign policy costs, if at all. While in many cases the United States does have the legal right to prevent certain nuclear activities through

its control over use and transfer of US-supplied nuclear fuel, exercising these rights to block other advanced nations' nuclear programs would prove to be a diplomatic fiasco.

The other group of nuclear customers consists of developing nations that are not as closely linked to the United States by broad political, economic, and security ties and could more conceivably desire to develop nuclear weapons. Included in this group are the former US customers that constitute the "problem nations" which have not given up a nuclear weapons option and have unsafeguarded facilities — namely India, Argentina, Brazil, and South Africa. In addition, there are two predominantly US supplied nations, Korea and Taiwan, that have full scope safeguards but also have substantial motivations to build nuclear weapons. Refusing to supply these nations with nuclear technology brings forth charges of discrimination.

The United States' statutory nuclear export policy has attempted to treat both classes of customers evenhandedly. The Nuclear Nonproliferation Act of 1978 insisted on either signature of the NPT or full-scope safeguards as a precondition for nuclear exports to any nation.¹⁸ In addition, it required the renegotiation of bilateral nuclear agreements for cooperation to enhance US control rights with all of our customers including our allies in EURATOM, the European nuclear energy agency. Yet it is obvious that the realities of international politics require different approaches for the different classes of nuclear customer. The East Asian situation is an example. While reprocessing and possession of weapons-usable plutonium was not of vital concern to Japan, it was quite another story just across the water in Korea. In the mid-1970s, the United States actively sought to prevent the sale of a reprocessing plant to Korea while at the same time it allowed Japan to reprocess small quantities of US-supplied fuel at their Tokai Mura plant. In short, the United States adopted a policy that actively discriminated between classes of customers. Nonetheless, a watchful eye was maintained over the Japanese, limiting the amount of fuel that could be reprocessed in Japan as well as requiring case-by-case approval for the reprocessing of US-origin Japanese fuel in other countries. In comparison, no limit was placed on the amount of US-supplied fuel that could be reprocessed in Europe, though the requirement for case-by-case approvals retained some US control over these programs.¹⁹

The Reagan Administration's approach to non-proliferation must still confront the touchy issue of discrimination among nuclear customers.

18. P.L. 95-242, 10 March 1978.

19. For all of its official even-handedness, the Nuclear Non-Proliferation act allows US trade with EURATOM to continue with the issuance of a year-by-year Presidential waiver despite lack of US consent rights over fuel retransfer within the European consortium.

Indications are that the United States is moving towards a more openly discriminatory policy. According to President Reagan,

The Administration . . . will not inhibit or setback civil reprocessing and breeder reactor development abroad in nations with advanced nuclear power programs where it does not constitute a proliferation risk.²⁰

While this approach will certainly remove a persistent irritant in US bilateral relations with its advanced industrial allies, like Japan, it will exacerbate problems with those nations that are defined as "proliferation risks." Will the Administration define Argentina and Brazil as "proliferation risks," not to be trusted with advanced nuclear facilities? If not, the United States ends its current policy of technical denial, what incentives will remain for these countries to accede to full scope safeguards and sign the NPT? The United States can maintain its guarantee of South Korea's security, but is any US official so confident of the guarantee's effect on South Korea's security concerns that all sorts of advanced nuclear activity can be allowed without raising proliferation concerns? More importantly, would North Korea perceive South Korea's near-nuclear status with equanimity and not seek a nuclear option itself? A non-proliferation policy that openly discriminates between nuclear customers is easier to implement and reduces tensions between the United States and its like-minded industrialized allies, yet it runs the risk of exchanging what were the apparently bearable problems of hampering our friends' advanced nuclear programs for the larger difficulties of a discriminatory policy that forces the United States to classify its customers into the categories of "trust-worthy" and not.

Conclusion

If the United States no longer seeks to inhibit its allies' nuclear programs in the name of non-proliferation, then we may find it easier to regain some common ground in dealing with the real proliferation problems around the globe. In particular, one might hope for more cooperation among the nuclear suppliers in technical denial, especially the sale of those "gray area" components — those not exclusively nuclear in application — which Pakistan in particular has apparently had such success in obtaining. While technical denial seems unlikely to stop any dedicated program, it may inject delay that can be used to reinvigorate and expand the political consensus originally behind the NPT. The problems and contradictions faced in the formulation of the United States' nuclear export policy are

20. *Statement by the President*, The White House, Office of the Press Secretary, 16 July 1981.