The Nuclear Suppliers Group (NSG) has a vital role to play in preventing the spread of nuclear weapons. Each of its 46 members applies common guidelines to control exports of nuclear materials, equipment, and technology; the guidelines also cover items and know-how that are dual use. The guidelines are essential to ensuring that civil nuclear trade is not diverted to nuclear weapons or terrorist use and that nuclear suppliers do not compete in the international market by minimizing nonproliferation controls.

In recent years, several developments have threatened the effectiveness and relevance of this multilateral arrangement. Nonmembers such as Pakistan and North Korea have transferred nuclear technology to countries aspiring to acquire nuclear weapons. An increasing number of non-NSG countries now have the capability to manufacture and export equipment and technology that can be useful to the nuclear weapons programs of proliferant states. Some NSG members—China, Russia, and the United States—have undermined the important nonproliferation norm of comprehensive safeguards, i.e., that non-nuclear-weapon states should benefit from peaceful nuclear cooperation only if they place all their nuclear activities under International Atomic Energy Agency (IAEA) safeguards. In addition, the NSG decision-making process has become clogged as members have been unable to agree on new criteria for transferring sensitive nuclear technology. They also have not reached agreement on requiring recipient states to adhere to an additional protocol to their IAEA safeguards agreements—a necessary tool to uncover illegal, clandestine nuclear activities. Decision-making is likely to be even more challenging if India becomes an NSG member as the United States and other NSG members are proposing.

The Past

Such challenges and disagreements are not new. Indeed, the NSG was founded in reaction to several shocks to the nonproliferation regime in the mid-1970s. In May 1974, India, a state that had refused to join the nuclear Nonproliferation Treaty (NPT), exploited ambiguous language in agreements with Canada and the United States to use items from those suppliers to manufacture and test its first nuclear device. Major suppliers were on the verge of transferring sensitive nuclear technologies, notably technologies related to uranium enrichment and spent fuel reprocessing, to unstable areas of the world where the intended recipients had not made effective nonproliferation commitments or were trying to enhance their nuclear weapons capability. In the mid-1970s, France was proposing to provide reprocessing plants to Pakistan, South Korea, and Taiwan. West Germany concluded a contract to provide sensitive nuclear technology to Brazil. In addition, France, which was not an NPT party at the time, was supplying Spain, another NPT nonparty, with a nuclear power reactor without requiring IAEA safeguards. These events raised serious doubts about the adequacy of the NPT and the effectiveness of nuclear export controls applied by individual nuclear suppliers.

In response, seven major nuclear suppliers met in London in 1974 with the objective of establishing a common set of guidelines on nuclear exports, closing loopholes in nuclear export controls, and avoiding the use of weak nonproliferation conditions as a means of competing in the international nuclear market. Subsequently eight new members joined the original participants, and all 15 members agreed on guidelines that were published in 1978. Although NSG members did not agree to a moratorium on transferring enrichment and reprocessing technology or requiring...
comprehensive safeguards as a condition of supply, they did adopt guidelines that obliged recipients to provide assurances of peaceful, nonexplosive use; accept appropriate IAEA inspections and conditions on retransfers to third countries; and implement international standards of physical protection. The guidelines also included special restraints on transferring sensitive nuclear technologies. The NSG thus went beyond the minimal export requirements of the NPT, which obliges parties only to require IAEA safeguards on exports of nuclear materials and equipment. To meet that requirement, some NPT parties in 1974 established the Zangger Committee to identify specified nuclear equipment and materials, the export of which would require application of IAEA safeguards.

The original NSG guidelines closed some loopholes in the nonproliferation regime, but disparities remained in the export policies of NSG members. A few, such as Canada and the United States, required comprehensive safeguards as a condition of supply, but most members did not. As a result, NPT nonparties such as Argentina and Brazil played one supplier against the other by giving lucrative contracts to the suppliers that did not require comprehensive safeguards. In addition, most NSG member states did not control dual-use exports. This lacuna enabled nuclear aspirants such as Iraq and Pakistan to obtain important items from European and other industrial states for their nuclear weapons programs. Thus, although the establishment of the NSG in the 1970s strengthened the nonproliferation regime in important ways, its guidelines were far from effective in halting the nuclear weapons programs of proliferators.

NSG members experienced an epiphany in 1991 and 1992 when IAEA inspections revealed that Iraq had obtained large quantities of materials, equipment, and technology for its nuclear weapons program from firms in Western countries. This scandal led the NSG to adopt new guidelines in 1992 to control exports of dual-use items and to require comprehensive safeguards as a condition of new nuclear supply. In subsequent years, the NSG took additional steps to strengthen export controls, including establishing a guideline that suppliers should satisfy themselves that their nuclear transfers do not contribute to proliferation of nuclear explosives or to acts of nuclear terrorism; a catchall control to govern transfers of items that are not on export control lists when such items “are or may be intended, in their entirety or in part, for use in connection with a ‘nuclear explosive activity’”; consultations among members of the group in the event a recipient state violates its nonproliferation commitments; and backup or fallback safeguards if the IAEA is not applying safeguards in a recipient country. Further, the NSG updated its control lists and increased its membership from a few advanced nuclear states to a more geographically and politically diversified group of 46 countries.

Current Challenges

Today the NSG faces new challenges. The group has three major items on its agenda: China’s proposed export of nuclear reactors to Pakistan; the adoption of new restraints on the transfers of enrichment and reprocessing; and making adoption of an additional protocol by recipient states a condition for nuclear exports.

Proposed Chinese exports to Pakistan. Recent decisions by certain NSG states have undermined the international standard for comprehensive safeguards as a condition of supply. In 2008, for its own strategic and commercial reasons, the United States persuaded the NSG to exempt India from the comprehensive safeguards standard. Yet, the U.S. action was not the first assault on this important nonproliferation norm, nor the most egregious. When the NSG adopted the guideline on comprehensive safeguards in 1992, it allowed for two exceptions that have proved to be significant loopholes. First, the requirement applies only to subsequent nuclear cooperation and does not cover supply commitments that existed at the time; this provision is known as the “grandfather clause.” Second, the guidelines permit nuclear exports to states without comprehensive safeguards in exceptional cases when such exports are “deemed essential for the safe operation of existing facilities and if safeguards are applied to those facilities.”

Russia has exploited both these loopholes to justify nuclear sales to India. Moscow justified its nuclear exports to India in the late 1990s by claiming that they were grandfathered by the Russian-Indian agreement of 1988. However, that agreement was a general legal framework for cooperation and contained no commitments to supply. The United States and other NSG members raised questions about this cooperation to no avail. In 2001, Russia exported low-enriched uranium to India
for fueling the Tarapur reactors, citing the safety exception. The United States and others regarded this export as a violation of Russia’s commitment to the comprehensive safeguards guideline. Russia signed another reactor deal with India in 2007 and delivered nuclear fuel to India even before the NSG in 2008 exempted India from its comprehensive safeguards requirement.

China now is citing the grandfather clause as justification for its planned assistance to Pakistan’s civil nuclear reactors. In a formal “declaration of existing projects” made at the time it joined the NSG in 2004, Beijing informed the NSG of its 1991 cooperation agreement with Pakistan under which it had supplied a 300-megawatt reactor at Chashma and had just undertaken to supply an additional 325-megawatt reactor at the same location. The Chinese claimed that the supply of these reactors did not constitute a “new” supply commitment and therefore was grandfathered under the NSG comprehensive safeguards guideline. This was a dubious claim at the time because the 1991 Chinese-Pakistani pact was a general framework agreement and reportedly did not contain an actual commitment to supply reactors at Chashma. In any event, Beijing’s 2004 explanations to the NSG did not mention grandfathering any more reactors under the 1991 agreement. Thus, the proposed supply of additional nuclear plants at the Chashma site would not be covered by the 1991 agreement, would not be grandfathered under the NSG guidelines, and clearly would violate the commitments China made when joining the NSG in 2004—a position that the United States has adopted.

Although hailed at the time as a significant accomplishment, the NSG’s adoption in the early 1990s of the comprehensive safeguards requirement as a condition of supply has proved subsequently to be a somewhat hollow triumph. NPT parties have good reason to complain because the actions of NSG members have made a mockery of Article IV of the NPT by giving non-NPT parties India and Pakistan the same benefits as NPT parties but without the accompanying obligations.\[4\] Russia and the United States have undermined the norm that only states with comprehensive nonproliferation commitments should benefit from international nuclear cooperation. Now, China’s plan to supply Pakistan with three new reactors threatens to render that norm meaningless.

Unfortunately, if China persists in citing the grandfather clause as justification for these reactors, there may be little that the NSG members can do. Calls for expelling China from the NSG unless it cancels the deal with Pakistan are ill advised.\[5\] The NSG is a voluntary multinational arrangement and has no mechanism for resolving disputes about differing interpretations of the guidelines or for sanctioning or expelling members who violate its guidelines. Those are the facts: they are not going to change. Moreover, it took China decades to decide to become a full member of the global nonproliferation regime, and even if it were possible, expelling Beijing from the NSG would serve no useful purpose. Nevertheless, China’s flouting of its NSG commitments threatens the integrity of this multinational arrangement and the NSG’s ability to ensure that member states implement their export control obligations honestly and effectively. NSG members should unanimously press China to seek an NSG exemption for its proposed reactor sales to Pakistan. Given Pakistan’s appalling nonproliferation record, the NSG should reject such a request. Also, the United States needs to reject Pakistani pressures for such an exemption and for a U.S.-Pakistani civil nuclear deal along the same lines as the U.S.-Indian nuclear pact. The United States will gain nothing from a deal with a country that has done such damage to the nonproliferation regime. Fortunately, Washington has been able to resist such temptation so far.

Enrichment and reprocessing transfers. Another challenge facing NSG members is to reach agreement on new criteria on transfers of enrichment and reprocessing technology. In his speech on February 11, 2004, President George W. Bush proposed that NSG members refuse to sell such technology to any state that does not already possess full-scale, functioning enrichment and reprocessing plants. Bush’s 2004 proposal was made in reaction to the clandestine supply operations of Abdul Qadeer Khan, the Pakistani scientist, who had sold enrichment technology to Iran, Libya, and North Korea. However, the Bush proposal did not really address such illegal and clandestine supply networks. Rather, it was directed at the NSG, which already had a guideline on exercising restraint in transferring such technologies. No NSG members have transferred enrichment or technology since the 1970s to states that did not already possess such plants.\[6\] Moreover, with the exception of South Korea’s interest in reprocessing and enrichment, no state that does not have such technology already is actively seeking it. Bush’s proposal thus had little relevance to the problem of clandestine trade in enrichment and reprocessing technology by non-NSG states. Yet, by
trying to formalize and make more specific a moratorium that NSG members had followed in practice for several decades, it exposed sharp commercial and ideological differences about what it means to “exercise restraint”—the current language in the NSG guidelines—in transferring these technologies. Some NSG states saw the Bush administration’s proposal as threatening their economic options, while others saw it as an attempt to widen the divide between the nuclear-weapon states and the non-nuclear-weapon states that would jeopardize the latter’s rights under Article IV of the NPT.

Thus, the U.S. proposal was not relevant to the problem of clandestine transfers of enrichment and reprocessing technology by non-NSG members, was not directed at halting any anticipated NSG transfers of such technology, and provoked a sharp debate within and beyond the NSG about rights to peaceful nuclear technology.

Nevertheless, after four years of spirited debate and only after the United States showed some willingness to compromise on its original proposals, the NSG succeeded in producing a draft document called the “clean text” in November 2008. According to this draft, NSG members would not authorize transfers of enrichment and reprocessing technology unless the intended recipient met certain “objective” criteria. Among other things, the recipient would have to be party to the NPT and in full compliance with the treaty, which would make India ineligible; have a comprehensive safeguards agreement and an additional protocol in effect; be in compliance with its safeguards commitments; implement effective export controls as required by UN Security Council Resolution 1540;[7] have an agreement with the supplier state that includes assurances regarding nonexplosive use and effective safeguards in perpetuity; apply standards of physical protection based on current international guidelines; and adhere to international safety standards.

The clean text also contains a controversial “black box” criterion that would require recipients to accept transfers of enrichment equipment and technology under conditions that do not permit or enable replication of the enrichment facilities. In addition, the clean text provides that NSG members “should exercise vigilance in ensuring that enrichment and reprocessing facilities are intended for peaceful purposes.” As part of that vigilance in making export decisions, the members should consider so-called subjective factors such as whether the recipient has a “credible and coherent rationale” for pursuing an enrichment or reprocessing capability in support of civil nuclear programs, “[w]hether the transfer would have a negative impact on the stability and security of the recipient state,” and “[g]eneral conditions of stability and security.”

Most NSG members are prepared to go along with the clean text, which includes a compromise formula on the black-box criterion. A few members strongly oppose the subjective criteria that suppliers would have to take into account in transferring enrichment and reprocessing technology to recipient countries, particularly the idea that a supplier would have to consider whether the transfer of such technology would have a negative impact on the stability and security of the recipient state and general conditions of stability and security. Others take the position that the only condition of supply for the transfer of sensitive technology should be adherence to the NPT.

Getting the ball over the goal line is still a worthwhile objective, but it may not be the most important or urgent one. The Group of Eight (G-8) agreed at its July 2009 meeting to continue to abide by the clean text for the coming year and renewed that pledge in 2010. This means that the main enrichment technology holders—France, Russia, and the United States and the members of the URENCO consortium (Germany, the Netherlands, and the United Kingdom)—will apply the criteria contained in the clean text for transfers of enrichment and reprocessing technology until the G-8 holds its 2011 meeting.[8] It is unclear how long the G-8 will continue to abide by the clean text if the impasse in the NSG continues. Thus, some resolution of this issue among NSG members may be necessary to fashion a stable and common approach to enrichment and reprocessing transfers. This may require high-level intervention by the major nuclear powers. In the final analysis, however, the precise wording of the guidelines is less important than the continuation by each member of the 30-year practice of exercising responsibility in transferring sensitive technology. Finally, it is appropriate to ask whether the new NSG guideline that emphasizes restraint and denial will be the most effective way of discouraging the spread of these technologies. NSG-supported fuel assurance proposals or offers by NSG technology holders for multinational participation in those countries’ enrichment plants, under black-box conditions, as the Russians have done, may offer better prospects for encouraging states not to build their own facilities. If one or more suppliers could
muster the political will to offer “cradle-to-grave” fuel supply services, i.e., to provide a customer with fresh fuel and accept responsibility for managing the resulting spent fuel, that is likely to be a far more successful and less contentious way to discourage new nuclear states from acquiring these technologies.

Additional protocol. A more important and more pressing issue on the NSG agenda is reaching agreement on a new guideline on making a recipient’s adherence to an additional protocol a condition of new nuclear supply. Supporters of this new guideline suffered a setback at the 2010 NPT Review Conference in May when the members of the Nonaligned Movement (NAM) opposed a consensus statement that the 1997 Model Additional Protocol should be the IAEA safeguards standard. The NSG could help to improve the IAEA safeguards system significantly by adopting a new guideline requiring recipient states to ratify and put into effect an additional protocol as a condition of new nuclear commitments. That step not only should help spur universal adoption of the protocol, but also should improve the effectiveness of the IAEA safeguards system significantly by giving the agency critical, additional authorities to detect clandestine nuclear activities. It is understandable why proposals to restrain transfers of enrichment and reprocessing technology might touch some raw political and economic nerves, but the requirement for an additional protocol as a condition of nuclear supply benefits all states and should not be controversial. Convincing the few holdouts may require high-level intervention by the major nuclear suppliers.

**Issues for the Future**

Beyond these agenda items, the NSG faces challenges both within and without.

*National export controls.* Each NSG member needs to ensure its own export control house is in order. Nuclear proliferators such as Iran continue to employ ingenious techniques such as false end-use statements, dummy companies, and exploitation of other countries’ weak export controls on dual-use goods to procure nuclear-related equipment and technology in support of their efforts to acquire a nuclear weapons capability. To thwart such efforts, members of the NSG will have to devote sufficient resources to their own export control, law enforcement, and customs organizations; establish tough criminal penalties for violations of export control laws; and give law enforcement officials the authority to investigate and prosecute illegal procurement. NSG states will need to improve intelligence collection and sharing among themselves and with nonmembers on important export cases and clandestine procurement attempts. The member states should be willing to provide information to the IAEA on exports of dual-use goods, procurement practices of nuclear-weapon aspirants, and denials of exports in order to help the agency obtain a complete assessment of a country’s program or resolve safeguards inconsistencies.

*Decision-making.* The NSG membership has evolved from a narrow collection of Western industrialized countries to a much more diverse group. Decisions in the NSG are made by consensus. This will not change. A broad-based membership with divergent interests will likely make it more difficult to forge decisions on needed upgrades to export standards. This may require high-level intervention by the major nuclear powers to forge needed decisions on such matters as the requirement for an additional protocol. That also means picking priorities for expending political capital.

*Control lists.* As it has done periodically in the past, the NSG is presently engaged in a process of clarifying and reviewing the nuclear and dual-use items on its control lists in order to keep abreast of technical developments. The NSG should engage in this kind of an exercise on a regular basis.

*Image problem.* The NSG has an image problem. Some nonmembers continue to regard the NSG as a cartel of supplier states that is trying to deny them their right to the peaceful uses of nuclear energy. Recent U.S. efforts to restrict the export of enrichment and reprocessing states to those already possessing such facilities have only exacerbated this problem. The NSG has made efforts in the past to combat this image by various outreach activities and transparency measures. The group needs to continue to rebut charges of discrimination and denial of rights and to work to make its guidelines an accepted international norm for nuclear export controls.

*Proposed membership for India.* The United States, France, and Germany have recently indicated
their intention to support Indian membership in the NSG. This step is clearly designed to give further recognition to India’s nuclear status, but it is questionable whether New Delhi’s membership in the NSG would strengthen the international nonproliferation regime. For one thing, India already adheres to the NSG guidelines as a nonmember; admitting India as a member therefore would not strengthen international export controls. Although adding another leading member of the NAM to the NSG would enhance the legitimacy of the suppliers group, it would complicate the NSG’s decision-making on issues such as strengthening NSG guidelines. Among other things, India’s accession to the NSG would make agreement impossible on the clean text because that document proposes to bar transfers of enrichment and reprocessing technology to non-NPT parties. It will be important for the NSG members to retain the ban on enrichment and reprocessing technologies to non-NPT states before they agree to admit India to the group.

**Nonmember suppliers.** Many states outside the NSG have the capability to provide significant assistance to nuclear weapons programs but do not have the legal or regulatory regimes, the resources, or, in some cases, the will to implement effective nuclear export controls. The NSG should find ways to persuade nonmembers either to join the NSG or abide by its guidelines, as India and Israel have done. Some NSG nonmembers may find the Zangger Committee more palatable than the NSG; NPT parties, particularly developing countries, may find this group less exclusivist than the NSG. The NSG also should make a more active and coordinated effort to assist nonmembers to meet the obligations under UN Security Council Resolution 1540. The NSG has had outreach programs to urge nonmembers to put in place effective legislation and regulations for their nuclear and dual-use exports. Individual NSG states have offered assistance to nonmembers in establishing and implementing such controls. However, these efforts do not appear to be well coordinated. The NSG should play a more active role in the efforts of the committee that has been charged by the UN Security Council with helping countries meet their export control obligations under Resolution 1540.

Some suppliers outside the NSG also threaten the effectiveness of international controls. Beginning in the 1990s and continuing into the present decade, NSG nonmember Pakistan aided Iran, Libya, and North Korea with enrichment technology and nuclear weapons designs. More recently, North Korea appears to have provided a plutonium-production reactor to Syria, and there have been controversial reports about North Korean assistance to possible nuclear weapons efforts by Myanmar (Burma). Unfortunately, the NSG can do little as a multilateral institution to prevent the irresponsible supply policies of nonmembers such as Pakistan or North Korea from undermining the effectiveness of international nuclear export controls and of the nonproliferation regime. This type of behavior has to be addressed through such means as vigorous diplomacy; sanctions; interdiction measures, such as the Proliferation Security Initiative; or perhaps, in extremis, pre-emptive military actions.

**Conclusions**

The NSG has taken steps over the years to bolster its effectiveness, albeit not always in a timely fashion. It did not stop Iran, Iraq, North Korea, Pakistan, or South Africa from acquiring a nuclear weapons capability or sensitive nuclear technology; these countries were successful in clandestinely obtaining from NSG members many items that contributed to their nuclear weapons programs. However, it is fair to conclude that NSG controls increased the costs and risks of the procurement efforts of these states and delayed their weapons programs. The group has given progressively more specific definition to the nuclear and dual-use equipment and related technology on its control lists and increased the number of controlled items significantly. Each member state has strengthened its national export control system. In addition, the NSG has established an international norm for national export control systems. As a result of these various improvements, the NSG now is much better equipped to block the procurement efforts of proliferant states. The group’s abandonment of the comprehensive safeguards norm has been a clear setback, but it does not need to be fatal, nor does it render the NSG irrelevant. Continued agreement among the group’s members on common rules of the game remains essential to prevent the major nuclear suppliers from competing in the international marketplace by minimizing the nonproliferation conditions on their nuclear exports. However, to maintain the role of the NSG as an effective multilateral barrier to proliferation, its members need to press forward to reach agreement on requiring an additional protocol, to strengthen their own national export control systems, and to help nonmembers to implement effective export control systems.
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ENDNOTES

1. The term “dual use” refers to the transfer of certain equipment, materials, software, and related technology that could make a major contribution to a “nuclear explosive activity,” an “unsafeguarded nuclear fuel-cycle activity,” or acts of nuclear terrorism.

2. In 1974, India used plutonium produced in a research reactor supplied by Canada that used heavy water from the United States to detonate what New Delhi called a peaceful nuclear device. India had given Canada and the United States assurances that such equipment and material would be used only for peaceful purposes. Canada and the United States regarded this assurance as prohibiting the use of nuclear explosive devices. The Indian government took the position that there is a difference between a nuclear weapon and a so-called peaceful nuclear explosive.


4. NPT Article IV states:

1. 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 articles I and II of this Treaty.

2. All the Parties to the Treaty undertake 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. Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world.

5. For an example of a call to expel China, see Selig Harrison, “U.S. Fuels Dangerous Deal in Pakistan,” The Boston Globe, June 29, 2010.

6. In the mid-1990s, Russia planned to provide some enrichment assistance to Iran, but this effort was thwarted by U.S. intervention.

7. The resolution addresses items relating to weapons of mass destruction, calling on all states to put in place “appropriate effective measures to account for and secure” such items in production, use, storage, or transport and to “maintain appropriate effective physical protection measures” of these items.

8. Of the six enrichment technology holders, all except the Netherlands are members of the G-8.