

# NUCLEAR PROLIFERATION

## The Role and Regulation of Corporations

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*As the potential for the involvement of corporations in the manufacture of nuclear weapons has increased, particularly through dual-use technology, global regulation has failed to keep pace. Where regulation of private corporations does exist, in the form of treaties, UN resolutions, or more informal arrangements, the obligations fall only on states. This state of affairs is a result of international law's traditional deference to state sovereignty; yet, it has led to significant shortcomings in the global regulatory regime, where states are unwilling or unable to meet their obligations. While radical departures from the traditional model of international law might remove the regulatory gaps caused by noncompliant states, such changes are unrealistic in the current political climate. More realistic changes must be focused on, offering greater recognition of the role of private corporations in nuclear proliferation and increasing state compliance with existing regulation.*

KEYWORDS: Nuclear weapons; proliferation; dual-use technology; corporations; state sovereignty; regulation

Nuclear proliferation has long been recognized as a severe threat to the world.<sup>1</sup> However, since nuclear weapons first appeared at the end of World War II, the technology and expertise used in their creation has drifted from secret government programs into private corporations in a variety of fields. While that change has been typified by the privatization of civilian nuclear energy projects, many non-nuclear industries also utilize technology that might be put to use in a nuclear weapons program. The result is a world in which a nuclear weapons program might be founded using materials, technology, and expertise available for purchase from private corporations. This article examines in more detail the role that private corporations have played and might play in nuclear proliferation.

While the threat posed by nuclear dual-use technologies is well known, the response of the international community has been unsatisfactory. The nature of corporations has traditionally meant that their regulation is within the domain of individual states. Indeed, the very existence of any corporation is owed to its creation under domestic laws. This fact, coupled with the reticence of the international community to interfere with state sovereignty, has led to the control of corporations whose products may be used in the pursuit of nuclear weapons being placed squarely in the hands of individual states. The traditional practice of international law dealing with states, rather than non-state actors such as corporations, has seen any obligations in this area under international law being placed on states alone.

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While this approach has led to restrictions on the global flow of dual-use technology, reliance on all states to implement relevant domestic legislation has led to significant gaps in global regulation. In states where these gaps exist, due either to a lack of will or ability to implement legislation, nuclear weapon-seeking states and non-state actors, such as terrorist groups, are able to purchase whatever technology is available there. Ultimately, state-centered regimes are precluding effective regulation of nuclear technology.

The international community can and should find better ways to deal with the problems posed by dual-use technologies and the corporations that make them. While solutions focused on coercing state action are likely to further enhance global regulation, a more radical response is required to adequately deal with the danger caused by state inaction. However, because such solutions call for significant departures from the traditional focus of international law on the state, such a response is unlikely.

### **Private Corporations in International Law and Nuclear Proliferation**

International law historically applied exclusively to states, regulating conduct between them. Over the past fifty years, however, international law has increasingly dealt with non-state actors, in particular, with individuals in the fields of human rights and international criminal law. As a result of forces such as globalization, other non-state actors, including nongovernmental organizations and corporations (particularly multinational corporations), have also played an increasing role in the formation of international law, even as subjects of international law.<sup>2</sup> Corporations in particular are becoming increasingly significant in the international community, not least because some have yearly profits greater than many states' annual gross domestic product (GDP). Corporations can produce solutions to global problems or perpetuate them. In light of this new paradigm, it is therefore important to consider the role corporations play in the manufacture of nuclear weapons.

Private corporations could potentially act as the source of nuclear weapons or components in a number of ways. Low-grade nuclear waste might be stolen or purchased from private companies that use nuclear material for industrial or medical applications and then be used in a "dirty bomb."<sup>3</sup> Less likely, nuclear weapons or the machines and materials used to make them might also be stolen from a private company in a country's military-industrial complex.<sup>4</sup> This article, however, focuses on the more likely potential (it has already occurred) for misuse of dual-use technology manufactured by private corporations. "Dual-use" technology items can be used in the production of nuclear weapons but also have legitimate applications either in peaceful nuclear industries or non-nuclear industries. The scope of the problem is enormous, as the bulk of a nuclear weapons program can be constructed with dual-use components.<sup>5</sup> With a scattered, globalized industrial sector, a multitude of private companies could unknowingly supply the majority of the necessary tools to create a nuclear weapon.

Companies involved in the production of dual-use technologies have been involved, often unknowingly, in a number of notorious weapons programs. In the late 1970s and

early 1980s, Abdul Qadeer Khan, a Pakistani metallurgist, established a sophisticated procurement network that was able to source uranium enrichment technology by spreading orders for dual-use items across private companies in several countries. The companies were based in states including Malaysia, Singapore, Turkey, South Africa, Switzerland, South Korea, Dubai, Germany, and the United Kingdom.<sup>6</sup> While some companies apparently knew of the purpose to which their products would be applied, others were misled as to the products' intended recipients.<sup>7</sup> In some cases, the sale of goods to Khan's network broke no existing laws.<sup>8</sup> Furthermore, at least one of the suppliers appears to have been incorporated in a favorable jurisdiction for the purpose of producing items for the Pakistani program.<sup>9</sup>

The involvement of private companies has also been seen in Iran, where in the late 1980s a network of front companies, universities, and individuals were used to obtain numerous dual-use components from foreign companies.<sup>10</sup> These parts, most of which could be used in the production of gas centrifuges, were obtained from several different private companies in Germany, the United Kingdom, Switzerland, and the United States. The potential misuse of dual-use components is a significant concern and a difficult one to solve without significantly affecting the efficiency of global industry.

### **The Regulatory Environment**

The international community's approach to regulation related to nuclear weapons can be broken into three broad categories: treaty-based agreements, obligations imposed by the UN Security Council, and informal arrangements. As will be seen below, in each approach, the focus of dual-use regulation is squarely on the responsibility of states to implement relevant legislation within their own territory. In other words, international regulation remains tethered to the traditional model of international law as the regulation of states.

States may undertake obligations relating to nuclear weapons through direct consent by entering into agreements with other states or international institutions. The most prominent example of this is the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). The NPT focuses on weapons themselves and fissile material, but Article III also prohibits member states from providing "equipment or material especially designed or prepared for the processing, use or production of special fissionable material" to non-nuclear weapon states.<sup>11</sup> While some states have sought to interpret that language in an expansive manner, on its face it does not appear to be concerned with equipment exported by private corporations or technologies that have alternate non-nuclear weapon uses.<sup>12</sup>

While Article IX of the NPT prohibits the transfer of nuclear weapons to "any recipient whatsoever" or from "any transferor whatsoever," it places legal obligations solely upon states that are party to the treaty.<sup>13</sup> It does so for an obvious reason: the treaty is open for signature to states only.<sup>14</sup> That no obligations are placed on non-state actors may also reflect two other circumstances that have to some extent been eroded over the past few decades. First, historically, the design and construction of nuclear weapons was

such a specialized and resource-intensive pursuit that it was exclusively the domain of public entities. As such, the weapons, and the materials and machinery used to make them, were not constructible in private settings.

In the past few decades, privatization of nuclear energy, technological progress, globalization, and the rise of military-industrial complexes (and an accompanying privatization of weapons expertise) have led to specialized and dual-use components being available for purchase from private entities that have the ability to ship them anywhere in the world. This has created an environment in which a weapons program can be developed by governments, in part, by purchasing the necessary equipment and materials from private corporations. The A.Q. Khan proliferation network is just one example of how that environment might be exploited.

The second major reason that obligations were not placed on non-state actors in the NPT is due to the preconception that only states are capable of entering treaties and only states are subject to international law. These ideas are grounded in the traditional approach to international law. While both ideas remain true in the majority of cases, neither is absolute. The power to enter international agreements has been extended at least to sub-state actors (like components of federal states or overseas territories), supranational actors (like the European Community or the Association of Southeast Asian Nations), and some extra-national actors (like international organizations or international tribunals).<sup>15</sup> While private corporations are not yet able to enter directly into international treaties, their increasing relevance as actors in the international community leads one to question the propriety of ignoring them in contexts such as the regulation of dual-use components. Of course, states are no longer the only subjects of international law; it is not contentious to state that individuals are now subjects of international law in the fields of human rights and international criminal law. As subjects of international law, corporations are also becoming more relevant, particularly as private citizens hold them accountable under international principles in national courts.<sup>16</sup> In light of the fact that corporations now play a role in the creation of nuclear weapons and are potentially subjects of international law, this article later discusses the possibility of offering private corporations greater recognition in relevant international agreements.

### *Regulation and the International Atomic Energy Agency*

While the NPT has on many accounts been a success in restraining nuclear proliferation by controlling the flow of weapons and expertise between states, it is becoming increasingly irrelevant to supply-side regulation, as that supply has become privatized.<sup>17</sup> The International Atomic Energy Agency (IAEA) also plays an important role in the international nonproliferation effort. Under the NPT, non-nuclear weapon states undertake to conclude safeguards agreements with the IAEA, so that the agency may verify that peaceful nuclear projects are not diverted to nuclear weapons programs.<sup>18</sup> The IAEA's work centers on verification and security of nuclear facilities, nuclear safety, and technology transfer. While the IAEA has recognized the influence that globalization has had on the nuclear industry, its attempts to counter such change are limited by the need to couch its activities in terms

of the traditional approach to international law.<sup>19</sup> For example, the IAEA's current Medium-Term Strategy (MTS) declares that the developments associated with globalization "highlight the need for improved national controls over nuclear material and related technology."<sup>20</sup>

This is not to say that the IAEA has overlooked the difficulties that relying on national controls may create. Indeed, its current MTS consistently calls for a strengthening of its mandate to verify state compliance with nuclear safeguards agreements. Its ambition however, is limited by its statute, which was written with obvious deference to state sovereignty.<sup>21</sup> The IAEA's major objectives are to promote the use of and safety in civilian applications of nuclear energy, as well as to verify states' compliance with their commitments under nuclear nonproliferation agreements to use nuclear materials and facilities for peaceful purposes. Its power, particularly with regard to its verification function, stems from safeguards agreements entered into voluntarily by states. Such agreements are generally limited in their scope to verification as to the use of nuclear material, defined as "any source or any special fissionable material as defined in Article XX of the Statute."<sup>22</sup> The Statute of the IAEA in turn defines sources and special fissionable material as being particular isotopes of uranium, plutonium, or thorium. Components used in the manufacture of weapons facilities or in the production of special fissionable material, including dual-use components, are not within the scope of the IAEA's verification mandate.<sup>23</sup>

Such a limited mandate might be traced back to the limitations placed on such intergovernmental bodies by the traditional model of international law. That influence manifests in a meek application of the IAEA's mandate. First, the agreements giving the IAEA its mandate are entered into only by consent, even if there is an obligation under international law to do so once a state is a member of the NPT regime (also entered into by consent). Second, even where consent is given to the IAEA to implement safeguards, it must do so in a manner such that potential risks to the state are minimized or removed. For example, the agreement template suggests that safeguards must be implemented so as to "avoid hampering the economic and technological development of the State" and to "avoid undue interference in the State's peaceful nuclear activities." Agreements also ensure the protection of "commercial and industrial secrets and other confidential information coming to its knowledge in the implementation of the agreement."<sup>24</sup> Third, the IAEA may only enter into agreements with states. Any power to deal with non-state actors must be exercised through a state with which the IAEA has an agreement, or if the IAEA has a serious complaint, through the UN Security Council.

In summary, treaties relating to nuclear weapons impose obligations only on states, generally deal with dual-use components as a secondary concern, and ignore the private corporations that manufacture them.

### *UN Resolutions and the 1540 Committee*

Another way in which states have become subject to obligations relating to nuclear weapons and dual-use components is through UN Security Council resolutions,

particularly Resolution 1540 of 2004. That resolution is another example of the international community's focus on the responsibility of states to regulate nuclear-related activities and trade within their own territories. The resolution moves the regulatory focus to non-state actors, in particular, terrorist organizations. It also moves beyond the direct consent-based creation of legal obligations seen in the NPT and IAEA safeguards agreements by requiring all states to:

1. refrain from providing support to non-state actors seeking to acquire weapons of mass destruction and their the means of delivery;
2. adopt and enforce domestic laws which prohibit non-state actors from being involved in the manufacture or transfer of weapons of mass destruction; and
3. create and enforce measures to control such items, in order to prevent their proliferation, including appropriate controls over related materials.<sup>25</sup>

Such obligations are not taken up by direct consent of states, as they are in the NPT, for example. Here, the consent is implied through the state's membership in the United Nations, which delegates certain authority to the Security Council. Of course, the legitimacy of the Security Council in acting in such a legislative fashion is controversial.<sup>26</sup> For that reason, to say that there is implied consent is perhaps overly deferential to the Security Council's authority. For one thing, one of the reasons that this subject matter was dealt with by a binding Security Council resolution, aside from speed, was that the universal obligation that it creates would not have been possible if direct consent was required, as in a multilateral treaty.

In any event, despite the resolution's focus on non-state actors, the third obligation listed above is arguably the only obligation related to manufacturers of dual-use components, which might fall under the definition of "related materials." The fact that it did not explicitly refer to dual-use items is problematic, but perhaps not surprising, as the non-state actors that the resolution is aimed at are primarily on the demand side; the resolution was made in response to a growing global threat of terrorism.<sup>27</sup>

The lack of specificity regarding dual-use components has been remedied to some extent by the committee formed to supervise the implementation of obligations created by the resolution. The Resolution 1540 Committee, in its first report to the Security Council in 2006, defined "related materials" in a footnote: "materials, equipment and technology covered by relevant multilateral treaties and arrangements, or included on national control lists, which could be used for the design, development, production or use of nuclear . . . weapons and their means of delivery."<sup>28</sup> In furtherance of that assertion as to the definition of related materials, both reports of the committee discuss implementation of domestic controls of dual-use items.<sup>29</sup> Despite this welcome addition to Resolution 1540, it is unclear what authority the committee has to define terms within the resolution.<sup>30</sup> Although the Security Council created the above legal obligations, even if they do relate to dual-use items, the obligations remain on states only. Any obligation on non-state actors requires subsequent enactment of complying domestic legislation by states. Thus, it can again be seen that this type of regulation focuses on placing obligations on states and deals with dual-use components incidentally, if at all.

*Informal Groups of States*

The specific problem of the control of dual-use components related to nuclear weapons has been taken up most directly by an informal group of states called the Nuclear Suppliers Group (NSG).<sup>31</sup> The NSG seeks to prevent non-nuclear weapon states (under the NPT) from acquiring nuclear weapons. There are currently forty-five member states, including the five permanent members of the UN Security Council. The NSG was created in 1974 in response to the detonation of a nuclear device by India, which was classed as a non-nuclear weapon state under the NPT. Originally, the NSG's intention was to ensure that transfers of nuclear material for peaceful purposes would not be diverted to weapons programs or to nuclear fuel cycles that were not monitored by the IAEA.<sup>32</sup> However, in response to Iraq's purchase of dual-use items for its covert nuclear weapons program in the early 1990s, the NSG extended its controls by adopting a new regime that included restrictions on the export of particular dual-use items.<sup>33</sup>

The NSG's control regime begins with two sets of guidelines for export of items from a member state. One set relates to nuclear material, the other to dual-use items. The dual-use guidelines operate on the basic principle that member states should not authorize the transfer of the listed items where such items would be used in a non-nuclear weapon state in either an unsafeguarded nuclear fuel cycle or a nuclear explosive activity, or where there is an unacceptable risk that the items might be diverted to such activities or to acts of terrorism.<sup>34</sup>

While the guidelines outline what would be an effective control regime for the export of dual-use items, there is one obvious deficiency: their non-binding, aspirational nature. Thus, while the guidelines include a call for universal application—"In the interest of international peace and security, the adherence of all states to the Guidelines would be welcome"—ultimately, the guidelines are informal and create no legal obligations on member, or non-member, states. The relevant legal authority extends from their non-obligatory translation into national legislation.<sup>35</sup>

Another informal group of states created the Zangger Committee, the work of which is to contribute "to the interpretation of Article III, paragraph 2" of the NPT and thereby help to "prevent the diversion of exported nuclear items from peaceful purposes to nuclear weapons or other nuclear explosive devices."<sup>36</sup> The Zangger Committee's focus has been on the development of export control lists, which contain items it interprets as covered by Article III, paragraph 2. Of course, as the committee's mission is one of interpretation, it creates no additional legal obligations on states or non-state actors. Even if its work has influenced other states' interpretation of the NPT, resulting obligations under the NPT remain on states party to the treaty alone.

Finally, prevention of dual-use items being diverted to weapons programs is also one of the goals of the Proliferation Security Initiative (PSI), another informal grouping of states. The PSI aims to counter the proliferation of weapons of mass destruction by interdicting shipments of those weapons or related materials, including dual-use items to or from states or non-state actors of proliferation concern. It is difficult to describe the PSI as an international agreement; it is not treaty-based and does not have any international secretariat.<sup>37</sup> Indeed, the U.S. government has said that the PSI is an activity, rather than an

organization.<sup>38</sup> Though a group of countries has agreed upon principles for the PSI, there are no binding commitments.<sup>39</sup> The principles include the qualification that efforts be “consistent with national legal authorities and relevant international law and frameworks.”<sup>40</sup> Thus, the consent of the relevant states remains necessary before any action can be taken. No legal obligations are placed on states or non-state actors unless national regulation is created.

As with treaty-based regimes and Security Council resolutions, where the problems of dual-use technology are approached directly by these informal groups of states, the traditional deference to state sovereignty translates into the weakest approach to regulation of any of the categories. Consequently, there is a consistent theme that the regulation of private corporations that manufacture and export dual-use items, if and where it exists, is left to domestic law and individual state actors. This creates problems of significant concern, particularly with regard to what this article will call noncompliant states: those states who do not enter into relevant treaties like the NPT, do not fulfill their obligations under Resolution 1540 and the NPT, or do not follow the NSG or the PSI guidelines.

Noncompliant states may lack either the will or the capacity to set up relevant domestic regulatory regimes. Furthermore, even in those states that are able to enact sufficient regulatory regimes, enforcing them requires very particular expertise and significant resources. Paragraph 7 of Resolution 1540 recognized that capacity problems might pose a threat to its objectives: “some States may require assistance in implementing the provisions of this resolution within their territories and invites States in a position to do so to offer assistance as appropriate in response to specific requests to the States lacking the legal and regulatory infrastructure, implementation experience and/or resources for fulfilling the above provisions.”<sup>41</sup>

The concerns thereby expressed have been repeated in the 1540 Committee’s 2006 report, which notes that “passing legislation and regulations is not sufficient in and of itself. There also need to be effective domestic enforcement; credible control lists of dual use items; appropriate implementation and enforcement measures; effective training of enforcement officials; and information sharing.”<sup>42</sup> The report also notes that after four years, “Member States need to do far more than they have already done to implement resolution 1540 (2004).” The 1540 Committee’s reports attempt to track compliance levels by national governments and to report such compliance in a series of graphs. A problem arises, however, in reporting states as either being in compliance or not. The strength of the national laws is not evaluated. Furthermore, no distinction is made as to whether the laws concern weapons themselves, materials solely used in the production of weapons, or dual-use items, let alone whether the laws cover nuclear, biological, or chemical weapons, which are all subject to Resolution 1540. For example, one category of legislation is simply entitled “border control,” another “export control legislation in place.” One statistical category that sheds the some light on the true compliance of states with relation to dual-use items is the number of states that have control lists as part of their national legal framework. Only sixty-nine states have such lists. Of those, only fifty-three have laws allowing them to be updated.<sup>43</sup> Furthermore, the 2006 report shows that only eighty-six states have provided technical assistance to their border authorities.<sup>44</sup> Peter Crail has

written thoughtfully about the problems of a piecemeal approach to the implementation of Resolution 1540.<sup>45</sup> He notes, for example, that as of mid-2006, an average of only 22.2 percent of the border and export control provisions of Resolution 1540 have been fulfilled.<sup>46</sup>

Similar problems reduce the effectiveness of the NSG guidelines. Of the forty-five countries with the highest GDP, fifteen are not members of the NSG, including non-NPT states India and Israel, as well as states like Indonesia and Malaysia.<sup>47</sup> It is worth recalling that Indonesian and Malaysian companies were part of the A.Q. Khan proliferation network.<sup>48</sup>

The U.S. government claims that ninety-four states “participate” in the PSI.<sup>49</sup> It is difficult, however, to ascertain what that participation amounts to; for example, the Holy See is listed as a participant. Elsewhere, it is claimed that these states “support” the PSI, but again, what amounts to support is not specified.<sup>50</sup> A report prepared for the U.S. Congress noted that in 2005, the requirements for participation were fairly weak and included states being *encouraged* to:

- formally commit to and publicly endorse, *if possible*, the Statement of Principles;
- review and provide information on current national legal authorities and *indicate willingness* to strengthen authorities as appropriate;
- identify specific national assets that *might* contribute to PSI efforts;
- provide points of contact for interdiction requests;
- *be willing* to actively participate in PSI interdiction training exercises and actual operations as they arise;
- *be willing* to consider signing relevant agreements or to otherwise establish a concrete basis for cooperation with PSI efforts.<sup>51</sup>

At the time, more than seventy nations were said to have met at least one of those standards. These methods of participation have been updated slightly; the reference to “if possible” in the first bullet point has been removed, and the phrase “and indicating willingness to take all steps available to support PSI efforts” has been added. The fourth bullet point was changed by adding “and other operational activities, and establishing appropriate internal government processes to coordinate PSI response efforts.”<sup>52</sup> It is unclear whether the seventy states that met one of the earlier methods of participation still meet one of them under the newly drafted methods of participation. Thus, not only is it unclear how any of the ninety-four states said to participate in the PSI actually do so, but legitimate questions might also be raised as to whether some of them do at all.

Noncompliant states will create gaps in the regulatory regime that could undermine efforts made elsewhere. Particularly as a result of globalization, corporations may have subsidiaries in different jurisdictions, allowing potential customers with nuclear objectives to place their orders in the most favorable jurisdiction. Furthermore, a state pursuing a nuclear weapons program may simply establish a company in a favorable jurisdiction where the relevant expertise exists, in order to obtain particular components. This was precisely what the Khan proliferation network did with SCOMI Precision Engineering, which was incorporated in Malaysia and produced custom-made gas centrifuge parts.<sup>53</sup>

The problem of noncompliant states is only exacerbated by the fact that the international community's attention is usually fixed on the demand side of nuclear weapons programs.<sup>54</sup> This leads to fewer resources and less political capital being available to pressure states that have failed to comply with supply-side regulation.

In approaching the problems posed by private corporations—and their potential solutions—it should be recognized that there is an underlying assumption that nuclear weapons programs should not be pursued, particularly by states not recognized as nuclear weapon states under the NPT. However, such an assumption is not shared by all states and may not even be supported as a norm in international law. The central apparatus by which weapons programs are made illegal in international law is the NPT, which requires the consent of states before obligations are placed on them. Furthermore, it is unclear that any state enters that agreement solely because of the aspirational objective of ridding the world of nuclear weapons. Indeed, at least some have entered the NPT with the view of entering a bargain by which the “right” to pursue a nuclear weapons program is voluntarily given up in exchange for access to other states’ nuclear energy technology and expertise.

In addition, while developed countries may support and in general have supported restrictions on the trade of dual-use components, developing countries may see such regulation as unduly restricting their ability to pursue legitimate nuclear energy projects. By hampering their access to technology freely available in developed countries, such regulation may perpetuate the development gap between developed and developing countries. In proceeding on the basis that nuclear weapons programs per se should not be allowed to be developed, one must accept that the concerns outlined above, however legitimate, will be subordinated to that belief.

### **Policy Recommendations**

This article has considered the increasingly important role of corporations in both the international community and in the creation of nuclear weapons, the current regulation aimed at corporations that manufacture dual-use components, and the problems facing that regulation. It is clear that, while some movement away from the traditional model of international law and its preoccupation with states, sovereignty, and consent has occurred (in the form of Resolution 1540, with its focus on non-state actors and imposition of obligations on all states), the model's limitations have left significant gaps in the global nonproliferation regime that could be exploited by governments or non-state actors seeking nuclear weapons. Those gaps are able to exist because no obligations are placed on non-state actors until domestic legislation is in place. Furthermore, such obligations will have little effect unless they are also competently enforced. A range of regulation more suited to the problem could potentially better serve the international community's nonproliferation efforts.

The key difference, in moving away from the traditional model of international law, is that regulation need not fit neatly into one of the categories of regulation discussed above. However, because of states’ resistance to impositions on sovereignty, the more

radical proposals, which shift the focus away from state actors, would probably receive little support. Ironically, it is the very thing that makes them infeasible that would address the shortcomings of more realistic regulation.

Simply calling for an international treaty more specifically focused on corporations and dual-use technology would do little to address the underlying problem of current regulation. Not only would such a treaty have to be entered into voluntarily, but compliance would also remain an issue either because of lack of political will or lack of domestic capabilities. Security Council resolutions, while less reliant on state consent, remain within the realm of possible measures recognized by the traditional model of international law. As discussed above, the regime called for by Resolution 1540 has the potential to be effective if universal compliance were achieved. Further proposals within the traditional model of international law ought to center on ensuring further compliance; however, it is surely more efficient to pursue compliance by certain states with certain provisions of Resolution 1540 that would deal with the most serious risks, rather than blindly pursuing universal implementation.<sup>55</sup>

Noncompliance may be a matter of will or of ability. Expanding the mandate of the IAEA in order to provide technical assistance regarding identification and control of dual-use items and their trade to states who request it would help to lessen the impact of the latter problem. As it stands, Resolution 1540 only encourages technical assistance from other states that are willing to offer it.<sup>56</sup> Such assistance might be incorporated into existing agreements that states have with the IAEA under the NPT regime. While such a proposal would be expensive and require significantly increased funding for the IAEA, the proposal has a number of benefits when compared with others considered below. First, it pays due deference to state sovereignty, allowing states to request such assistance where needed. Second, because the proposal would allow for consensual assistance to be provided, it would enable better detection of those states that are unwilling to comply with their obligations under Resolution 1540 but have previously hidden behind a veil of incompetence. For those states where will is the problem, even mandatory technical assistance by the IAEA would have little impact.

When states do not comply with Resolution 1540 for lack of will, the Security Council might impose sanctions on them until bona fide efforts at compliance are made. While Resolution 1540 does not specifically allow for such sanctions, it does state that the Security Council intends to "take further decisions that may be required" for implementation of the resolution. Furthermore, it would be difficult for any state to argue that the subject matter of nuclear proliferation is not such that the Security Council's powers to act would be enlivened under Chapter VII of the UN Charter.

Alternatively, for those states unwilling to comply with their obligations under Resolution 1540, the mandate of the IAEA might be expanded to include mandatory export controls. Under such a mandate, the IAEA could attach itself to domestic customs agencies to oversee the trade of dual-use items. Guidelines produced by the NSG and published by the IAEA could offer a focus for its activities. However, despite the fact that the IAEA already acts in the vast majority of countries pursuant to their safeguard agreements, and that as an institution it has the relevant expertise, a change of this nature

is likely to be opposed for a number of reasons. First, it would allow the IAEA to impinge on a nation's sovereignty in a way that its mandate has not in the past, by allowing conduct not consented to by the state. Despite the threat of nuclear weapons, it is unlikely that member states would support such a measure. Second, such a mandate would require significant funding increases, and while that issue might be tempered by focusing on key states that present the greatest risk to nonproliferation, in light of the first issue, it would be difficult to obtain approval.

While the traditional model of international law focuses on placing obligations on states, an alternative approach to the problem of nuclear proliferation and non-state suppliers might involve a more direct approach. Of course, if international regulation is to directly regulate corporations, the different incentives facing them must be considered.

While it is foreseeable that a corporation might become involved with supplying a nuclear weapons program for political favor, the incentive more particular to the case of corporations is profit. A corporation creates products in order to sell them. Where a willing buyer exists, it is in the interests of the corporation to sell them the product. As such, the incentives placed on corporations must be such that, not only would it be against the interests of the corporation to sell its product to a buyer who it knows would use it in a weapons program, but also to ensure effective procedures are in place and followed to ensure a sale is not unknowingly made to such a buyer. Because the costs, particularly in avoiding unknowingly assisting a weapons program, are so high, the incentives need to be significant.

The UN Security Council has recently shown its willingness to apply sanctions to non-state actors when such actors are suspected of supporting terrorism.<sup>57</sup> Making similar sanctions against corporations involved in the supply of dual-use technologies to nuclear weapons programs might provide such corporations with the necessary financial incentive to avoid such transactions. This method of regulation, however, has two significant setbacks.

First, even where sanctions such as fines or freezing of assets are imposed, the Security Council relies on compliant member states to implement those sanctions. As such, only those corporations with assets in compliant state jurisdictions would be subject to any real detriment. The gaps in current regulation created by noncompliant states would be likely to overlap significantly with gaps in implementation of any such sanctions. That is not to say, however, that such sanctions would be ineffective. It would certainly create additional incentive to corporations with subsidiaries operating in noncompliant states, where domestic regulation provided no such incentive. It would also similarly impact corporations operating in noncompliant states with assets or subsidiaries in compliant states. Purely domestic corporations operating in noncompliant states could continue to operate with impunity. This shortcoming could be exploited by corporations set up for the sole purpose of supplying dual-use items to nuclear weapons programs. Second, even if such a sanctions regime successfully froze the assets of a corporation, new corporations could be set up to continue the work of those already identified by the Security Council. It may be difficult to prove that a corporation is simply a continuation of one that has already been sanctioned.

Where monetary incentives prove insufficient, individual criminal liability might be imposed on those directors and executives of companies who knowingly oversee the sale of dual-use items to nuclear weapons programs; however, the extension of international criminal law to such activities is unlikely. Currently international criminal law tends to deal with such crimes as genocide, crimes against humanity, war crimes, and aggression.<sup>58</sup> Adding a type of white-collar crime to that jurisdiction, whatever the gravity, is unlikely. Furthermore, reliance on compliant states to enforce any arrest warrants would be required, once again leading to issues of gaps in the regulatory framework.

## Conclusion

The issue of dual-use technology regulation has many difficulties woven through it. Technological advancement, issues of sovereignty, political capability, and willingness to act, together make this a complex issue with no easy solution. Nuclear proliferation has been well contained so far, but in an increasingly connected world, tensions are being placed on the nonproliferation regime. Increased recognition of the role of private corporations as potential suppliers of nuclear technologies must be accompanied by a change in the approach to their regulation.

Resolution 1540 was a significant step, moving beyond obligations voluntarily taken on by states, but more must be done to ensure compliance with its provisions. The IAEA's mandate could be enlarged, allowing it to offer technical assistance to those states lacking capability to implement Resolution 1540, and potentially allowing it to oversee export controls in those states lacking the will. More than five years after the passing of Resolution 1540, the Security Council ought to now begin sanctioning those states that have, for lack of political will, failed to implement its provisions. Furthermore, Resolution 1540 ought to be supplemented with action focused on direct regulation of corporations. However, as such additional regulation would require compliant states for its enforcement, it would only marginally improve the regulatory landscape. Ultimately, the kind of regulation that would best address the problem of noncompliant states requires a significant shift from the current model of international law, making such regulation politically infeasible at this time.

While none of the feasible actions outlined above would alone remove the threat posed by the trade of dual-use technology, together they would nonetheless significantly lower it. Unless and until more radical changes can be entertained, smaller efforts must be made. The more gaps that can be filled in the current global regulatory regime, the more difficult it will become for states or terrorist groups, either openly or covertly, to attain weapons capable of immense and indiscriminate destruction.

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## NOTES

1. See, for example, President John F. Kennedy, News Conference 52, State Department Auditorium, Washington, DC, March 21, 1963, <[www.jfklibrary.org/Historical+Resources/Archives/Reference+Desk/Press+Conferences/003POFO5Pressconference52\\_03211963.htm](http://www.jfklibrary.org/Historical+Resources/Archives/Reference+Desk/Press+Conferences/003POFO5Pressconference52_03211963.htm)>.
2. See, e.g., Joel R. Paul, "Holding Multinational Corporations Responsible under International Law," *Hastings International & Comparative Law Review* 24 (2000–2001), p. 285.
3. Galya I. Balatsky, Stacey Lee Eaton, and William R. Severe, "Illicit Trafficking of Nuclear and Radiological Materials," in James E. Doyle, ed., *Nuclear Safeguards, Security, and Nonproliferation: Achieving Security with Technology and Policy* (Burlington, MA: Butterworth-Heinemann, 2008), p. 420. On use in a "dirty bomb," see Rob Edwards, "Risk of Radioactive 'Dirty Bomb' Growing," *New Scientist* Online, June 2, 2004, <[www.newscientist.com/article/dn5061-risk-of-radioactive-dirty-bomb-growing.html](http://www.newscientist.com/article/dn5061-risk-of-radioactive-dirty-bomb-growing.html)>.
4. For example, the management, day-to-day operation, and maintenance of the United Kingdom's nuclear weapon stockpile is contracted to a private company, AWE Management Limited, whose shareholders include a U.S. company, Lockheed Martin. Lockheed Martin produces and sells submarine-launched nuclear missiles to both the U.K. and U.S. governments, <[www.lockheedmartin.com/products/TridentIID5/index.html](http://www.lockheedmartin.com/products/TridentIID5/index.html)>.
5. Matthew C. Fuhrman, "Industry and Nonproliferation: Don't Neglect the First Line of Defence," *Disarmament Diplomacy* 82 (Spring 2006).
6. See, generally, Gordon Corera, *Shopping for Bombs: Nuclear Proliferation, Global Insecurity, and the Rise and Fall of the A.Q. Khan Network* (New York: Oxford University Press, 2006), p. 114; Ian Anthony, Christer Ahlström, and Vitaly Fedchenko, *Reforming Nuclear Export Controls* (New York: Oxford University Press, 2007), p. 108.
7. Corera, *Shopping for Bombs*, p. 23.
8. *Ibid.*, p. 119.
9. *Ibid.*, p. 114.
10. *Ibid.*, p. 67.
11. Treaty on the Non-Proliferation of Nuclear Weapons, March 5, 1970, Article III, para. 2.
12. See later discussion of the Zangger Committee.
13. NPT, Article I and Article II.
14. *Ibid.*, Article IX.
15. Duncan B. Hollis, "Why State Consent Still Matters: Non State Actors, Treaties and the Changing Sources of International Law," *Berkeley Journal International Law* 23 (2005), pp. 137, 146, 155–62.
16. See Paul, *Multinational Corporations*, p. 290.
17. On the NPT's successes, see John Simpson, "The Future of the NPT," in Nathan E. Busch and Daniel H. Joyner, eds., *Combating Weapons of Mass Destruction: The Future of International Non-Proliferation Policy* (Athens, GA: University of Georgia Press, 2009), p. 45.
18. NPT, Article III, para. 1.
19. IAEA, "Medium Term Strategy: 2006–2011," p. 2, <[www.iaea.org/About/mts2006\\_2011.pdf](http://www.iaea.org/About/mts2006_2011.pdf)>.
20. *Ibid.*, p. 3.
21. The granting of the agency's most invasive powers is premised by "where the Agency is requested by the parties concerned." Statute of the International Atomic Energy Agency, July 29, 1957, Article XII, para. A.
22. IAEA, "The Structure and Content of Agreements Between the Agency and States Required in Connection With the Treaty on the Non-Proliferation of Nuclear Weapons," INFCIRC/153 (corrected), para. 112.
23. But see U.S. Congress, Office of Technology Assessment, *Nuclear Safeguards and the International Atomic Energy Agency*, OTA-ISS-615 (Washington, DC: U.S. Government Printing Office, June 1995), pp. 93–94.
24. IAEA, "The Structure and Content of Agreements Between the Agency and States Required in Connection With the Treaty on the Non-Proliferation of Nuclear Weapons," paras. 4–5.
25. UN Security Council Resolution 1540, April 28, 2004.
26. See Sumon Dantiki, "Power Through Process: An Administrative Law Framework for United Nations Legislative Resolutions," *Georgetown Journal of International Law* 40 (Winter 2009), pp. 655–56.

27. Lars Olberg, "Implementing Resolution 1540: What the National Reports Indicate," *Disarmament Diplomacy* 82 (Spring 2006), <[www.acronym.org.uk/dd/dd82/82lo.htm](http://www.acronym.org.uk/dd/dd82/82lo.htm)>.
28. Resolution 1540 Committee, "Report of the Committee Established Pursuant to Resolution 1540," S/2006/257, April 25, 2006, p. 14, fn. 3.
29. *Ibid.*, pp. 20–21; Resolution 1540 Committee, "Report of the Committee Established Pursuant to Resolution 1540," S/2008/493, July 8, 2008, pp. 13–14.
30. The committee's fifth program of work included "Outreach, including awareness raising about the obligations and requirements of SCR 1540." See "Programme of Work of the Security Council Committee Established Pursuant to Resolution 1540 (2004)," <[www.un.org/sc/1540/docs/pow/programmeofwork01Oct2006\(E\).pdf](http://www.un.org/sc/1540/docs/pow/programmeofwork01Oct2006(E).pdf)>.
31. Similar work relating to conventional weapons is undertaken by the Wassenaar Arrangement, a group of forty states.
32. A nuclear fuel cycle comprises the steps involved in generating atomic energy: mining, processing, "burning," reprocessing, and, finally, treatment of remaining waste. Anthony, Ahlström, and Fedchenko, *Nuclear Export Controls*, pp. 3, 9.
33. "Australian Practice in International Law: Use of Force and War," Patricia Hewitson, ed., *Australian Yearbook of International Law* 14 (1992), pp. 658, 677.
34. IAEA, "NSG Guidelines," INFCIRC/254 (Rev. 7).
35. Anthony, Ahlström, and Fedchenko, *Nuclear Export Controls*, p. 4.
36. Zangger Committee, "Our Mission," <[www.zanggercommittee.org/Zangger/Mission/default.htm](http://www.zanggercommittee.org/Zangger/Mission/default.htm)>.
37. Sharon Squassoni, "Proliferation Security Initiative," Congressional Research Service Report for Congress, RS21881, June 7, 2005, p. 3.
38. *Ibid.*, p. 4.
39. *Ibid.*, p. 3.
40. "Interdiction Principles for the Proliferation Security Initiative," Bureau of International Security and Nonproliferation, State Department, September 4, 2003.
41. UN Security Council Resolution 1540, April 28, 2004, operative para. 7.
42. Resolution 1540 Committee, "Report of the Committee Established Pursuant to Resolution 1540," S/2006/257, p. 13.
43. *Ibid.*, Annex XIV.B.
44. *Ibid.*, p. 14.
45. Peter Crail, "Implementing UN Security Council Resolution 1540: A Risk-Based Approach," *Nonproliferation Review* 13 (July 2006), p. 355. See also Monika Heupel, "Surmounting the Obstacles to Implementing UN Security Council Resolution 1540," *Nonproliferation Review* 15 (March 2008), pp. 95–102; Johan Bergenäs, "The Slippery Slope of Rational Inaction: UN Security Council Resolution 1540 and the Tragedy of the Commons," *Nonproliferation Review* 15 (March 2008), pp. 373–80.
46. Crail, "Implementing UN Security Council Resolution 1540," p. 378.
47. Of the top forty-five states by GDP, as published in the IMF's 2008 World Economic Outlook Database, the following are not NSG members: India, Mexico, Indonesia, China/Taiwan, Saudi Arabia, Iran, Thailand, Venezuela, Colombia, United Arab Emirates, Malaysia, Nigeria, Israel, Chile, and Singapore.
48. Corera, *Shopping for Bombs*, pp. 113, 119.
49. "Proliferation Security Initiative Participants," Bureau of International Security and Nonproliferation, State Department, May 27, 2009.
50. "Proliferation Security Initiative," Australian Department of Foreign Affairs and Trade, undated, <[www.dfat.gov.au/globalissues/psi/index.html](http://www.dfat.gov.au/globalissues/psi/index.html)>; "Proliferation Security Initiative," Bureau of International Security and Nonproliferation, State Department, undated, <[www.state.gov/t/isn/c10390.htm](http://www.state.gov/t/isn/c10390.htm)>.
51. Squassoni, "Proliferation Security Initiative," pp. 2–3. Emphasis as published in the Squassoni.
52. "The Proliferation Security Initiative (PSI)," Bureau of International Security and Nonproliferation, State Department, factsheet, May 26, 2008, <[merln.ndu.edu/archivepdf/wmd/State/105217.pdf](http://merln.ndu.edu/archivepdf/wmd/State/105217.pdf)>.
53. Corera, *Shopping for Bombs*, pp. 113–14.
54. Consider the current focus on the Iranian and North Korean nuclear programs.
55. Crail, "Implementing UN Security Council Resolution 1540," pp. 383–84.
56. UN Security Council Resolution 1540, April 28, 2004, operative para. 7.
57. See "Kadi v. Council of the European Union," *Common Market Law Reports* 3 (2008), p. 41.
58. Rome Statute of the International Criminal Court, July 1, 2002, Article 5.