

# The Problem with Nuclear Mind Reading

**James M. Acton**

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The basic technologies that underlie nuclear power were first developed during the Second World War by the United States for purely military purposes. Since then, extensive civilian research and the use of nuclear technologies for peaceful ends has not erased this military heritage. Almost all nuclear technology in use around the world today is 'dual use', able to contribute to the production of fuel for nuclear reactors or the explosive components of nuclear weapons. For this reason, there is serious concern that supposedly peaceful nuclear programmes are being used for, or could become, cover for the development of nuclear weapons.

The inherent ambiguity surrounding almost all nuclear technology complicates the control of nuclear energy. Under the terms of the Nuclear Non-Proliferation Treaty (NPT), non-nuclear-weapons states must declare all their nuclear facilities and activities and permit them to be safeguarded by the International Atomic Energy Agency (IAEA). To date all cases of non-compliance have involved states failing to declare nuclear facilities or activities, rather than diverting safeguarded nuclear material.<sup>1</sup> In the last few years, for instance, clandestine nuclear activities have been uncovered in Egypt,<sup>2</sup> Iran<sup>3</sup> and South Korea (Republic of Korea),<sup>4</sup> and strong evidence of a clandestine reactor in Syria has emerged.<sup>5</sup> These discoveries have prompted debates, of varying intensity, about what, if any, action should be taken in response.

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Given the dual-use nature of the technology involved, these debates have focused on intentions: were the clandestine activities for peaceful purposes or were they part of a nuclear-weapons programme? British, French and American diplomats regularly argue for tougher sanctions on Iran, for instance, on the basis that the country has not done enough to demonstrate that its intentions are benign. Other states oppose tougher sanctions, arguing that Iran's intent to proliferate has not been proven.<sup>6</sup> Similarly, the movement to refer South Korea to the United Nations Security Council in 2004 was blunted because most in the international community were content to give the Koreans the benefit of the doubt regarding their intentions.

The focus on intent in these debates is unsurprising. The notion that intent is relevant to enforcement decisions is familiar from domestic law: the reasons for a killing determine whether it constitutes murder or manslaughter, for instance. Extrapolating to international law, it certainly seems logical that a non-compliant state's intentions should be central to the debate over the international community's response.

Moreover, the importance of intent is supported by the standard interpretation of Article II of the NPT. This article contains the injunction on non-nuclear-weapons states 'not to manufacture or otherwise acquire nuclear weapons'.<sup>7</sup> During negotiations, the definition of the term 'manufacture' was contentious,<sup>8</sup> but agreement was obtained on a set of criteria which state that 'facts indicating that the *purpose* of a particular activity was the acquisition of a nuclear explosive device would tend to show non-compliance'.<sup>9</sup> These so-called Foster Criteria suggest that if a state develops enrichment technology (clandestinely or otherwise) with the intention of using it to produce nuclear weapons, it has violated Article II. When its clandestine nuclear activities were uncovered, Iran claimed that they were directed solely towards the production of fuel for nuclear reactors and hence that it had not violated Article II. In a similar vein, South Korea claimed that its clandestine activities were basic research conducted without the knowledge of the government.

Against this background, some may find it surprising that the IAEA has generally not attempted to assess *why* non-compliant states have conducted undeclared activities. Instead, the agency has, in accordance with its

legal mandate, almost exclusively concerned itself with documenting *what* states have done. This policy is sensible and inevitable. There are very few activities, materials or equipment unambiguously associated with the manufacture of nuclear weapons, and the chances are slim that the IAEA would detect one that was. Moreover, without recourse to the much more intrusive forms of information-gathering employed by national intelligence agencies, the IAEA has equally little chance of proving why an ‘ambiguous’ activity was conducted.

There is, therefore, a significant lacuna in the non-proliferation regime: the IAEA Board of Governors and the Security Council place great importance on something – intent – that their investigatory arm does not and could not assess. Thus, the effect of emphasising intent is to cause discussions about enforcement to descend into irresolvable arguments about ambiguous activities, significantly reducing the chances of robust, decisive action. This in turn reduces the credibility and effectiveness of the non-proliferation regime and should prompt the international community to rethink the way it enforces non-proliferation agreements.

### **Misinterpreting the IAEA**

Much of the debate over an appropriate response to Iran’s clandestine nuclear activities has centred on whether they were conducted for peaceful purposes. There is a widespread assumption, encouraged by Iran itself, that the task of determining intent falls on the IAEA. For instance, commenting on the IAEA’s 22 February 2008 report,<sup>10</sup> the South African ambassador to the Security Council stated, ‘those issues that originally gave rise to serious concern ... have now been clarified’ and that, as a result, ‘there ought to be increased confidence in the peaceful nature of the Iranian nuclear programme’.<sup>11</sup> This interpretation was widespread, but is a significant misrepresentation of the IAEA’s findings.<sup>12</sup>

One of the principal issues discussed in the report was a series of experiments to produce and separate polonium-210, a material that can be used in a device to initiate the chain reaction in a nuclear weapon. In the report, the IAEA repeats Iran’s claims about its intentions, that is, that the experiments were ‘fundamental research aimed at enhancing knowledge’.<sup>13</sup> It

also lists the supporting evidence put forward by Iran. However, the report concludes:

Based on an examination of all information provided by Iran, the Agency concluded that the explanations concerning the *content* and *magnitude* of the polonium-210 experiments were consistent with the Agency's findings and with other information available to it. The Agency considers this question no longer outstanding at this stage.<sup>14</sup>

This statement neither supports nor disputes Iran's claimed intentions. The only parts of Iran's explanation verified by the IAEA were purely technical claims about what the experiments involved and how much polonium was extracted. In other words, the IAEA concerned itself with verifying what Iran did, not why it acted. Similarly, the IAEA did not come to any conclusion about Iran's intentions when it relegated questions of the country's plutonium-extraction experiments,<sup>15</sup> the source of contamination at a technical university,<sup>16</sup> and the country's centrifuge programme<sup>17</sup> to the category of 'matters no longer outstanding'.<sup>18</sup>

The IAEA's policy of not assessing intentions is not limited to Iran. In spite of media reporting to contrary, the IAEA's investigation into South Korea's undeclared nuclear activities did not conclude that 'there wasn't

any evidence South Korea was trying to make nuclear weapons',<sup>19</sup> but rather that 'there is no indication that the undeclared experiments have continued'.<sup>20</sup>

Indeed, the IAEA has no legal basis on which to draw conclusions about intent. The IAEA derives its mandate to apply safeguards in all non-nuclear-weapons states from Article III.1 of the NPT. As required by this article, the detailed arrangements for the application of safeguards are set out in a subsidiary agreement, the model Comprehensive Safeguards

Agreement (INFCIRC/153). This states that the objective of safeguards is 'the timely detection of diversion of significant quantities of *nuclear material* from peaceful nuclear activities to the manufacture of nuclear weapons or

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of other nuclear explosive devices or for purposes unknown'.<sup>21</sup> Given the exclusive focus of this article on nuclear material, it is hard to argue that the IAEA has the right to assess intentions. The only possible exception is when the IAEA investigates weaponisation activities (activities connected with the design or fabrication of nuclear weapons). The current IAEA director general, Mohamed ElBaradei, has stated that the agency may investigate such activities where there is 'some nexus linking the activity to nuclear material'.<sup>22</sup> If the IAEA uncovered weaponisation activities (as it has tried to do in Iran) it would also produce proof of the intention to build nuclear weapons. However, proof of intent is a 'by-product'; investigations into weaponisation activities are permitted only because their purpose is to detect undeclared or diverted nuclear material.

### Could the IAEA assess intent?

Regardless of whether the agency is currently entitled to assess intent, it could, in theory, be tasked with doing so. There are two ways that proof of a state's intentions could be obtained. (Whether it is really reasonable to expect proof – as opposed to good evidence – is an important issue, but one that will not be discussed any further here since proof seems to have become the operative standard.<sup>23</sup>) Firstly, if activities or equipment *unambiguously* associated with the development of nuclear weapons were uncovered, there could be no uncertainty about a state's intentions. Such evidence is, unfortunately, very hard to obtain.<sup>24</sup> The overwhelming majority of activities and equipment associated with the manufacture of nuclear weapons is dual use.<sup>25</sup> The few exceptions, such as uranium or plutonium hemispheres used in the 'pit' (metallic core) of a nuclear weapon, are easy to conceal. Moreover, a state would be extremely unlikely to manufacture any such objects in a declared nuclear facility that was subject to regular inspections. Although the IAEA does have the authority to visit undeclared facilities,<sup>26</sup> the time taken to negotiate access would give the state ample opportunity to remove any incriminating items. For the IAEA to have any reasonable chance of finding such unambiguous evidence it would need 'any time, anywhere' access (and even then success would be far from guaranteed without good background information to help inspectors know where to look). The IAEA

has only ever been granted such intrusive access in Iraq, in 1991 and again in 2002, and that was *after* the Security Council became convinced that Iraq had been actively seeking nuclear weapons.<sup>27</sup>

The difficulties of proving intent are borne out by experience in Iran. There, the IAEA succeeded in uncovering the notorious ‘15-page document’, which describes how uranium can be cast into hemispheres, a process that is unambiguously associated with the manufacture of nuclear weapons.<sup>28</sup> Yet even this, it seems, did not constitute proof of Iran’s intentions. In its defence, Iran claimed that the document was given to it, unsolicited, by the Pakistan-based A.Q. Khan network. That this explanation was apparently considered plausible illustrates how difficult *proving* intent really is. More recently, the focus of the IAEA’s investigation has shifted to the so-called ‘alleged studies’, which involve a number of activities unambiguously associated with weaponisation, including the ‘symmetrical initiation of a hemispherical high explosive charge’.<sup>29</sup> To date, however, it has not been possible to prove that these activities took place.<sup>30</sup>

Alternatively, the IAEA could determine a state’s intentions if it came across evidence proving that a dual-use activity (such as the production of polonium-210) was carried out for a proscribed purpose. National intelligence agencies can plausibly obtain such information by intercepting conversations between senior officials or through well-place agents. However, signals intelligence and human intelligence are not means that the IAEA currently has at its disposal, and it is frankly impossible to envisage states ever giving the agency permission to spy on them in this way. Moreover, it would probably be undesirable for the IAEA to have such powers. The agency relies on the cooperation of states to facilitate inspections, provide information and answer questions. Permitting the IAEA to gather covert intelligence would lead to a much more adversarial relationship between states and the agency, significantly undermining the ability of the latter to do its job effectively.

Although the IAEA cannot use intelligence-gathering techniques, it can request interviews with people associated with nuclear activities. Absent specific authority from the Security Council, however, states are under no legal obligation to accede to such a request.<sup>31</sup> Iran, for instance, has been

generally resistant to providing inspectors with access to personnel and has not permitted key individuals to be interviewed.<sup>32</sup> Moreover, interviews can only be effective in determining intent if the agency has access to those at the heart of a suspected nuclear-weapons programme, as they may be the only people who actually know what is going on. The scientists in Iran who conducted the experiments to produce polonium-210, for instance, may not have been told that they were contributing to a nuclear-weapons programme (if indeed they were). Thus, by carefully selecting which scientists and officials the IAEA is allowed to interview, a state could potentially hide its intentions.

Alternatively, a state can undermine the effectiveness of interviews by insisting they take place in the presence of government officials, thus tacitly threatening retaliation if the interviewee gives the ‘wrong’ answer. This has occurred in Iran.<sup>33</sup> In theory, this problem might be circumvented if the Security Council were to insist that interviews take place abroad and that family members be permitted to accompany interviewees. However, even apart from the reluctance of the Security Council to authorise such drastic measures (it has only ever granted this power once, in Iraq in 2002),<sup>34</sup> it would hardly be a practical solution if hundreds of people were wanted for interviews.

Given all these limitations, the only means left to the IAEA to assess intent is to analyse proliferation drivers, trends in capabilities and public statements (much as national intelligence agencies are often forced to do).<sup>35</sup> Indeed, the agency already does this, but only for its own internal planning; results are not publicised. Moreover, because this kind of analysis cannot yield proof, asking the agency to make such information public could actually be counterproductive. The institutional culture of parts of the IAEA makes the agency extremely reluctant to raise suspicions without proof – good evidence is not enough.<sup>36</sup> Requiring that the IAEA make its intent estimates public could lead it to whitewash states, even if the evidence was much more ambiguous.

Beyond the IAEA’s internal culture and limited inspection authority – both of which could possibly be changed – there are two more fundamental

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difficulties with assessing intent. Firstly, nuclear-weapons programmes do not consist of a single decision that results in the construction of an atomic bomb some years later.<sup>37</sup> Rather, such programmes always involve a number of decisions to scale activity up or down, and a programme's nature may change gradually over time. For example, from 1958 Sweden adopted a policy of 'deciding not to decide'.<sup>38</sup> Swedish researchers conducted extensive nuclear research while being 'formally forbidden to cross the line into "research explicitly intended to result in the construction of an atom bomb"'.<sup>39</sup> Their work produced knowledge relevant to the manufacture of nuclear weapons and prevented existing knowledge from being lost. Ultimately, after years of ebbing intent, Sweden finally decided to abandon this policy in the early 1970s. The fact that intent actually lies along a continuum and is not constant does not make it impossible to determine, but it does make it much harder than if intent were an unchanging binary variable.

Finally, and most importantly, many states do not have a single centre of power that sets national policy. Instead, often by design, there may be many competing entities vying for influence. Iran, with its supreme leader, president, cabinet, parliament, Guardian Council, Expediency Council, Assembly of Experts and Islamic Revolutionary Guard Corps, provides a classic example. It is entirely possible that some of these organs support the development of nuclear weapons while others do not. A less hypothetical example is again provided by Sweden. By the early 1960s, the ruling Social Democrats (along with the majority of the population) were generally opposed to the acquisition of nuclear weapons, while the military supported it and, with the government's permission, continued to conduct relevant research.<sup>40</sup> Clearly, the whole concept of a state having well-defined intentions is problematic.

### **Why intent shouldn't matter**

The international community's efforts to enforce arms-control agreements can be divided into two different conceptual 'strands'. The 'multinational-bodies' strand involves the work of the Security Council and other international organisations specifically tasked with enforcement

(such as the IAEA Board of Governors, which has the important task of referring a state that has violated its nuclear-non-proliferation obligations to the Security Council).<sup>41</sup> The tools available to this strand are primarily punitive. The second strand is the 'state-to-state' strand, which consists of ad hoc efforts made by a single state or a coalition. In the case of Iran, this strand is epitomised by the work of the E3 (the United Kingdom, France, Germany) and, more recently, the E3+3 (the E3 countries plus the United States, Russia and China). Direct bilateral talks between the United States and Iran (were they to occur) would also fall under this strand. In contrast to the multinational-bodies strand, incentives to induce compliance, as well as punishments to compel it, are available. This division is not perfect – it is unclear, for instance, where the Proliferation Security Initiative would fit in – but it is useful for current purposes.

A non-compliant state's perceived intent does – and should continue to play – a key role in the work of the state-to-state strand. It would be perverse to suggest, for instance, that in preparing for negotiations, Washington should ignore its intelligence community's assessment of Iran's intent. Moreover, a package of incentives (such as those offered to Iran in June 2006 and June 2008) can be tailored much more carefully with an understanding of a violator's intentions. Similarly, the United States has helped to prevent proliferation in the past by convincing its allies not to export proliferation-sensitive nuclear technology because it feared the intended recipient's intent.<sup>42</sup>

Within the multinational-bodies strand, the IAEA plays a central role by providing the international community with an independent assessment of a state's actions. However, for all the reasons discussed above, not only does the IAEA not attempt to assess intent at the moment, it is hard to envisage it ever doing so. By taking a non-compliant state's intent into account without independent means to assess it, the Board of Governors and Security Council are undermining their ability to prevent proliferation. There are two distinct reasons for this. Firstly, because proof of intent is needed before meaningful enforcement actions are authorised, potential proliferators may rightly conclude that they will face minimal consequences if caught. This erodes the deterrence value of safeguards. Secondly, when deterrence fails, this same

inability to agree upon a course of action severely hinders efforts to prevent a state that is actively seeking nuclear weapons from acquiring them.

Preventing a state that has embarked on a nuclear-weapons programme from succeeding is a difficult and messy business. Successful prevention is not guaranteed. The most effective form of non-proliferation is to dissuade states from choosing to develop nuclear weapons in the first place. For this reason, the deterrence function of safeguards is vital to the success of the non-proliferation regime. The effectiveness of deterrence depends upon a would-be proliferator's perception of two different factors: (1) the probability that the IAEA would detect any non-compliance and (2) the likelihood and severity of the international response. In general, a state will only be deterred if it fears both detection and its consequences.

No matter how good IAEA safeguards are, if proliferators believe they can avoid or severely delay any consequences, whatever deterrence value safeguards have will be severely eroded. One lesson that the next proliferator can draw from the case of Iran is that if its non-compliance is detected, it should play the 'intent card' and argue that its intentions are benign. Given that the IAEA cannot assess intent (and states rarely share the intelligence data on which national estimates of intent are based), this strategy would help mire the Board of Governors and Security Council in an essentially irresolvable debate that would likely prevent decisive action. Deterrence is most effective if clear 'red lines' exist, the crossing of which can be detected relatively unambiguously. Such red lines exist in the form of a state's safeguards agreement and for that reason non-compliance with it ought to be the standard for initiating enforcement actions. The more intent is considered, the less distinct the lines become.

The focus on intent also undermines the ability of the international community to manage a state that has already started down the road of acquiring nuclear weapons. By insisting upon proof of intent before acting meaningfully, it is inevitable that the Security Council will sometimes fail to enact robust sanctions against a proliferator. Indeed, the Board of Governors might even fail to refer the case to the Security Council. (This is not to say that the Board of Governors and the Security Council will always succeed in preventing a would-be proliferator from acquiring nuclear weapons if they do

act robustly, but by not doing so they have little chance of success.) Handing the benefit of the doubt to a non-compliant state is foolhardy where non-proliferation is the goal. The alternative – taking action against any state that violates its safeguards agreement, regardless of intent – is hardly ideal, as it may sometimes result in an ‘innocent’ state being ‘punished’, but a state that found itself in this position would have only itself to blame – after all, it would have violated an international agreement. Ultimately, this outcome is preferable to allowing proliferators to avoid meaningful consequences.

There is a second, more subtle reason why the current focus on intent is corrosive. States do not decide whether to support enforcement actions purely on the basis of evidence presented by the IAEA. Such evidence does matter, but states are also swayed by narrower considerations of self-interest, such as their bilateral relationship with the non-compliant state. States are likely to decide upon enforcement actions on the merits of the case, rather than on the basis of self-interest, if the salient factors are those that can be reliably and accurately assessed by the IAEA. Intent cannot. Thus, if intent occupies a central role in the deliberations of the Board of Governors or Security Council, it becomes easier for member states to prioritise self-interest above non-proliferation.

This has occurred in the case of Iran. The focus on intentions has allowed Russia in particular to downplay the compelling evidence of non-compliance presented by the IAEA. Moscow has frequently argued that the United Nations should not impose or ramp up sanctions in the absence of proof that Iran is seeking nuclear weapons.<sup>43</sup> Whether or not Russia genuinely questions Iran’s intentions, it is clearly politically convenient for it to do so. Had the international debate over Iran focused more on its actions, there would have been less political space for the Russians to oppose sanctions. Indeed, since the implementation of Security Council Resolution 1696 (2006), the most persuasive argument for convincing Russia to support subsequent resolutions imposing sanctions has been Iran’s failure to abide by the Security Council’s demands – an argument about Iran’s actions, not its

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intentions. For instance, Russia's ambassador to the United Nations justified his nation's decision to support Resolution 1803 (2008) by saying, 'the resolution is in fact a political signal to Iran of the need to cooperate with the international community by implementing the decisions of the Board of Governors of the International Atomic Energy Agency (IAEA) and the Security Council'.<sup>44</sup>

The more decisions about enforcement are made on the basis of self-interest rather than the merits of the case, the more a rules-based system like the non-proliferation regime is corroded. If the Security Council or Board of Governors focuses on intent, the inconclusive nature of the evidence can make it easy for one of the United States, Russia or China to oppose enforcement actions when they contradict short-term considerations of self-interest. Given that all three states possess a Security Council veto, and that at least one will almost always have a self-interested reason for opposing enforcement, this is a recipe for preventing the international community from ever acting.

### **Assessing the severity of non-compliance**

A frequent objection to the idea of de-emphasising intent in cases of non-compliance is that this would lead to all safeguards violations being treated equally: while all non-compliant states might receive an automatic 'slap on the wrist', it would become even harder to build a consensus for robust action in the most serious cases.<sup>45</sup> However, as the following tentative framework demonstrates,<sup>46</sup> there are other grounds for assessing the severity of non-compliance:

1. *The quantity and 'strategic significance' of the nuclear material involved.* The actual amount of fissile material clandestinely produced or diverted is one obvious factor in assessing severity, although it is important to note that highly significant research and development can be conducted with very small quantities of material. In addition, although any nuclear material is potentially relevant to a nuclear-weapons programme, some types are more useful than others (highly enriched uranium metal is more significant than

low-enriched ceramic reactor fuel, for instance). For this reason, the 'strategic significance' of the nuclear material involved could be considered.

2. *Capability.* The closer an undeclared programme is to giving a state the capability to manufacture fissile material in militarily significant quantities, the more serious the breach could be considered. The existence of facilities (declared or undeclared) that would permit clandestine experiments to be quickly exploited on a larger scale could be an aggravating factor.
3. *Intensity.* A focused, concerted effort at developing fuel-cycle technology could be considered more serious than a few isolated experiments.
4. *Termination.* A voluntary decision by the state to terminate its non-compliance *before* discovery could be a mitigating factor.
5. *Military dimension.* The involvement of the military could be an important aggravating factor, as could the discovery of experiments with potential relevance to weaponisation.
6. *Concealment.* Active attempts to conceal the non-compliance while it was occurring could be an aggravating factor.
7. *Detection.* The voluntary self-reporting of non-compliance to the IAEA (as Romania did in 1992)<sup>47</sup> could be a mitigating factor.
8. *Cooperation with the IAEA.* Failures to cooperate actively with an IAEA investigation, or even more seriously, active attempts to impede it, could be an aggravating factor.
9. *Compliance with IAEA Board of Governors or Security Council resolutions.* A failure to abide by relevant legally binding resolutions could compound the seriousness of a violation.

These criteria are already routinely assessed by the IAEA when it investigates non-compliance (as its reports on recent investigations make clear, though they are not structured in this form). Some of these criteria undoubtedly correlate with intent, albeit imperfectly. However, unlike intent, they can all be measured objectively by the IAEA within its current mandate.

Table 1: Comparison of the nuclear-safeguards violations of Iran and South Korea

Criteria	Iran <sup>1</sup>	South Korea <sup>2</sup>
<i>Quantity and strategic significance of the nuclear material involved</i>	<p>Small amounts of LEU and separated plutonium were produced in bench-scale experiments and pilot-scale facilities:</p> <ul style="list-style-type: none"> <li>Centrifuge experiments involved 1.9 kg UF<sub>6</sub> feedstock, enriched to probably no more than 1.2%;</li> <li>Bench-scale AVLIS experiments involved the evaporation of 0.5 kg of uranium metal and the collection of milligram quantities of product enriched to an average of 8% and a maximum of 13%;</li> <li>Pilot-scale AVLIS experiments used 0.5 kg uranium metal and resulted in enrichment levels of less than 1%;</li> <li>Depleted uranium was irradiated to produce 0.1 g plutonium, of which milligram quantities were separated.</li> </ul> <p>About 0.5 t of various uranium-containing compounds were used in a number of undeclared conversion experiments. The import of about 2 t of various uranium-containing compounds was undeclared.<sup>3</sup></p>	<p>Very small amounts of LEU, HEU and partially separated plutonium were produced in bench-scale experiments:</p> <ul style="list-style-type: none"> <li>AVLIS experiments produced 200 mg of uranium enriched to an average of 1.0% and a maximum of 77%;</li> <li>A 'very small' quantity of uranium was enriched via chemical exchange;</li> <li>Depleted uranium was irradiated to produce 0.7 g of plutonium, of which some was partially separated but not converted to metallic form.</li> </ul> <p>15.4 kg of undeclared natural uranium was produced in conversion experiments.</p>
<i>Capability</i>	<p>Very high. Iran's undeclared activities were part of a systematic attempt 'to master an independent nuclear fuel cycle'. In particular, its undeclared centrifuge work was a concerted effort to develop a significant enrichment capability. Even the pilot-scale AVLIS system 'would have been capable of HEU production had the entire package of equipment been delivered'. Iran failed to declare a pilot-scale centrifuge facility (PFEP). It possessed or was building production-scale facilities (UCF and FEP) to take advantage of its undeclared research into and development of centrifuge technology.<sup>4</sup></p>	<p>Medium. No part of South Korea's undeclared enrichment, irradiation or plutonium-separation experiments progressed beyond laboratory scale. However, like Iran, the country experimented with uranium-metal production (the feed material for AVLIS). The throughput of the conversion facilities is not known.</p>
<i>Intensity</i>	<p>Very high for some aspects of the programme at certain times. Centrifuge work, for instance, was particularly focused and intense after about 1997. AVLIS and conversion research appears to have been fairly focused. Plutonium production and separation research was isolated and sporadic.</p>	<p>AVLIS and conversion work was reasonably focused. Chemical enrichment and plutonium production and separation research were isolated and sporadic.</p>
<i>Termination</i>	<p>Ongoing when detected in 2003.</p>	<p>Terminated voluntarily before discovery.</p>
<i>Military dimension</i>	<p>Yes. Centrifuge components were manufactured in at least one workshop on a Defence Industries Organisation site. Potential weaponisation activities included (1) possession of the uranium-metal document; (2) production of polonium-210; and (3) the 'alleged studies' which involve high-explosive development (including detonator development, hydrodynamics testing and plans for an underground test facility) and designs for a nuclear-armed missile re-entry vehicle.</p>	<p>No.</p>

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Table 1: Comparison of the nuclear-safeguards violations of Iran and South Korea

Criteria	Iran <sup>1</sup>	South Korea <sup>2</sup>
<i>Concealment</i>	Extensive. Iran went to great lengths to keep its programme secret (for instance, it made use of the nuclear black market to procure centrifuge technology), built underground facilities, and submitted incorrect reports to the IAEA).	Unclear. Seoul twice refused a voluntary 'transparency visit' to the Laser Technology R&D Centre but the government claims it was unaware that nuclear material had been used there. It also issued incorrect reports in the early 1980s about the material used in the irradiation experiments. In contrast, chemical-exchange activities were discovered from published literature.
<i>Detection</i>	The existence of the enrichment facilities at Natanz was publicly revealed by an Iranian resistance organisation. Subsequent IAEA investigations revealed the extent of Iranian non-compliance.	The country voluntarily reported on its AVLIS experiments, but only after the IAEA had become suspicious. The plutonium-separation experiment, certain conversion activities and the chemical-exchange experiment were discovered as a result of IAEA verification activities.
<i>Cooperation with the IAEA</i>	Generally poor, including the use of 'extensive concealment activities' to hinder IAEA investigations (such as the renovation of the Kalaye Electric Factory in an attempt to interfere with environmental sampling and the provision of incorrect and misleading information to inspectors). During the IAEA's five-year investigation Iran has cooperated more actively at points but significant issues remain, including the suspension of Additional Protocol implementation, the suspension of modifications to Iran's Subsidiary Arrangements, <sup>3</sup> and a refusal to enter into meaningful discussions about the alleged studies.	Active.
<i>Compliance with IAEA Board of Governors or Security Council resolutions</i>	Consistent failure to comply with IAEA Board of Governors and Security Council demands. For instance, work on centrifuge installation at the FEP and the construction of the IR-40 reactor at Arak is continuing. Centrifuge operations in both the PFEF and FEP are ongoing (from February 2007 to November 2008, 9,750 kg of UF <sub>6</sub> had been fed into the cascades at the FEP).	Not applicable (no relevant Board of Governors or Security Council resolutions were passed).
<b>Key</b>	2 All information obtained from IAEA, GOV/2004/84.	Arrangements that required it to declare a new facility as soon as it took the decision to build one. Iran subsequently accepted the modified subsidiary arrangements on 26 February 2003, but on 29 March 2007 announced it would no longer be bound by them. Iran's failure to declare the Pilot Fuel Enrichment Plant was a safeguards violation under either version of the Subsidiary Arrangements. See Pierre Goldschmidt and George Perkovich, 'Correcting Iran's Nuclear Disinformation', Proliferation Analysis, Carnegie Endowment for International Peace, 27 March 2007, <a href="http://www.carnegieendowment.org/npp/publications/index.cfm?fa=view&amp;id=19078">http://www.carnegieendowment.org/npp/publications/index.cfm?fa=view&amp;id=19078</a> .
AVLIS: Atomic vapour laser isotope separation (a type of laser-enrichment technology)	3 In addition, Iran had been very slow in declaring some previous imports. Most notably, the import of 531t of U <sub>3</sub> O <sub>8</sub> in 1982 was not reported until 1990.	5 See note 4.
LEU: Low-enriched uranium	4 The Uranium Conversion Facility was declared to the IAEA in 2000, although the design information Iran provided was later shown to be incomplete. The Fuel Enrichment Plant was not declared to the IAEA until February 2003.	
HEU: Highly enriched uranium	Technically, this was not a safeguards violation as Iran's Subsidiary Arrangements only obliged it to declare a new facility 180 days before the introduction of nuclear material. At that time, however, Iran was the only state that had not accepted a modification to its Subsidiary	
FEP: Fuel Enrichment Plant (Natanz, Iran)		
PFEF: Pilot Fuel Enrichment Plant (Natanz, Iran)		
UCF: Uranium Conversion Facility (Esfahan, Iran)		
<b>Notes</b>		
1 All information obtained from the IAEA Director General's reports on Iran, available at <a href="http://www.iaea.org/NewsCenter/Focus/laealran/index.shtml">http://www.iaea.org/NewsCenter/Focus/laealran/index.shtml</a> .		

Using this framework, Iranian non-compliance is analysed in Table 1. For the purposes of comparison, a similar analysis is presented for South Korea. It is clear that these cases are far from equal and that there are grounds (other than intent) for judging Iran's activities to be much more serious than South Korea's. As a result, the fear that it would be necessary to treat all cases of non-compliance equivalently would appear to be misplaced.

Another criticism that has been made of this approach is that it is overly 'mechanistic' and would lead to action being taken when it was not merited, as in the case of a state that has made a bureaucratic error in its reporting to the IAEA. However, the IAEA (quite properly) does not consider genuine reporting errors grounds for non-compliance, and such cases are not referred to the Board of Governors or Security Council, so the question of assessing the severity of non-compliance is moot.

Another example of non-compliant behaviour that many believe should not merit an international response because of the absence of malign intent is the failure to meet a deadline for destroying munitions under a disarmament agreement. In particular, both the United States and Russia look likely to miss the destruction deadline set by the Chemical Weapons Convention. Although this article focuses on the Non-Proliferation Treaty and its associated safeguards instruments, this example presents an interesting conceptual challenge. Under the framework outlined above, such a failure would only constitute a comparatively minor violation provided that the state in question had been transparent (criteria 6). However, such a violation *would* deserve censure, albeit of a relatively mild form. For all the reasons discussed above, a rules-based system is eroded if exceptions are continually made. By being willing to accept censure where they fail to meet the terms of an agreement, the United States and Russia would set a precedent that would help to build a consensus for action when other states did likewise.

### **Is downplaying intent practical?**

One important question remains: is a policy of avoiding questions of intent actually practical? Can the international community ever be persuaded to agree upon robust enforcement actions while doubts about intent remain?

An answer to this question is that there is much the United States and its friends could do *unilaterally* to reduce the emphasis on intent. The steps outlined below would certainly not remove intent entirely from international deliberations, but they might gradually move it into the background and create an environment in which meaningful enforcement actions could be agreed upon in the presence of doubts about a non-compliant state's intentions.

Firstly, the United States and its allies would almost certainly bring about a reduced focus on intent if they stopped using it as an argument themselves. As discussed above, Russia became somewhat more receptive to tightening sanctions against Iran when the argument was made in terms of Iran's refusal to abide by Security Council resolutions rather than in terms of its intent. If the case against future non-compliant states is put in terms of proven safeguards violations (and non-compliance with Board of Governors and Security Council resolutions) it will probably result in a tougher response.

Secondly, the deterrence value of safeguards would be strengthened if the Security Council were to adopt a generic, legally binding resolution spelling out automatic consequences for any state that was found in non-compliance with its safeguards agreement. Pierre Goldschmidt, for instance, proposes that the Security Council require non-compliant states to extend enhanced access rights to the IAEA and, if the IAEA Director General is not satisfied with the progress of an investigation, demand that all sensitive fuel-cycle activities be suspended.<sup>48</sup> However, regardless of the exact terms of such a resolution, any agreement on one would emphasise the futility of playing the intent card.

Finally, and most importantly, the United States should be willing to lead by example and apply a universal standard to its friends as well as its adversaries. Washington has a pivotal role to play in preventing proliferation because the next proliferator is likely to be a US ally. Egypt, Saudi Arabia and Turkey – three of the states widely considered most likely to proliferate – are all friends of

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*The US should  
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the United States. The same is true of many states that might seek nuclear weapons over the longer term, including Japan, South Korea, Argentina and Brazil (not to mention Taiwan). It is vital that these states believe that if they proliferate and are detected, an attempt to avoid any consequences by arguing benign intent will be unsuccessful. It is therefore imperative for the United States to make it clear that if a friend violates its non-proliferation obligations, Washington will permit a proportionate response, irrespective of the friend's claimed intent. For minor violations this would entail the Board of Governors referring the case to the Security Council, which might then choose to censure the state. In more serious cases, it would involve the Security Council implementing sanctions.

The United States scored an 'own goal' in its handling of South Korea's non-compliance. The country acknowledged in 2004 that it had conducted some undeclared enrichment experiments in 2000. This prompted an investigation by the IAEA that uncovered evidence of other clandestine nuclear activities, including reprocessing experiments. These activities constituted violations of South Korea's safeguards agreement.<sup>49</sup> In the run-up to the crucial Board of Governors meeting in November 2004, Seoul launched a major diplomatic offensive, arguing that the experiments had not been authorised by the government and that South Korea had no intention of building nuclear weapons.<sup>50</sup> This gave US officials, who were subject to desperate lobbying by the Korean government and who were already reluctant to refer an ally to the Security Council, the political space to argue that it was inappropriate to make a formal finding of non-compliance. In the end, the Board of Governors stopped short of finding South Korea in non-compliance and did not refer it to the Security Council.

The United States' failure to support South Korea's referral to the Security Council was a lost opportunity for non-proliferation. As its desperate lobbying demonstrates, Seoul would have considered referral a serious form of censure in itself and, given the nature of the non-compliance, no further consequence would have been necessary. Permitting a friend or ally to be referred to the Security Council has a cost, but this must be weighed against the benefits of deterring proliferation. By arguing against referral, the United States sent a signal to its friends that should one of them violate

its non-proliferation obligations but claim (truthfully or not) that its intentions were benign, it would be spared any consequences. This undermined the deterrence value of safeguards and, ultimately, reduced the ability of the United States to prevent proliferation.

## Notes

- 1 For a discussion of the procedure for finding a state in non-compliance and the cases of Iran, Egypt, Libya and South Korea see the article by Pierre Goldschmidt in this issue.
- 2 IAEA, 'Implementation of the NPT Safeguards Agreement in the Arab Republic of Egypt', GOV/2005/9, 14 February 2005, [http://www.carnegieendowment.org/static/npp/Egypt\\_Feb\\_2005.pdf](http://www.carnegieendowment.org/static/npp/Egypt_Feb_2005.pdf).
- 3 The IAEA's reports on Iran are available at <http://www.iaea.org/NewsCenter/Focus/laeaIran/index.shtml>. For an assessment of the Iranian case see Mark Fitzpatrick, *The Iranian Nuclear Crisis: Avoiding Worst-Case Outcomes*, Adelphi Paper 398 (London: Routledge for the IISS, 2008).
- 4 IAEA, 'Implementation of the NPT Safeguards Agreement in the Republic of Korea', GOV/2004/84, 11 November 2004.
- 5 IAEA, 'Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic', GOV/2008/60, 19 November 2008; David Albright and Paul Brannan, 'The Al Kibar Reactor: Extraordinary Camouflage, Troubling Implications', ISIS Report, 12 May 2008, [http://www.isis-online.org/publications/syria/SyriaReactorReport\\_12May2008.pdf](http://www.isis-online.org/publications/syria/SyriaReactorReport_12May2008.pdf). The video by the US Intelligence Community that contained the first publicly released evidence of the reactor programme can be found at <http://www.veoh.com/videos/v7050611ztAGtFDJ>.
- 6 For instance, in casting the only vote against the adoption of UN Security Council Resolution 1696 (2006) – the first legally binding call for Iran to halt its enrichment programme – Qatar's ambassador pointed to uncertainty about Iranian intentions, saying, 'we would have seen no harm in waiting a few days so as to exhaust all possible ways and means in order to determine Iran's real intentions'. The importance of Iran's intentions was not disputed. Indeed, the British ambassador stated that 'we have given Iran many opportunities to show that it has no intention to develop nuclear weapons. Regrettably, Iran has not taken the steps required by the IAEA Board and the Security Council that would help build confidence.' United Nations Security Council, 5500<sup>th</sup> Meeting, S/PV.5500, 31 July 2006, pp. 3–4, available at <http://www.un.org/Depts/dhl/resguide/scact2006.htm>.
- 7 For the complete text of the treaty, see 'Treaty on the Non-Proliferation of Nuclear Weapons', INFCIRC/140, 22 April 1970.
- 8 Jozef Goldblat, *Arms Control: A New Guide to Negotiations and Agreements*

(London: Sage Publications, 2002), p. 102.

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- <sup>9</sup> Quoted in full in Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty: Origin and Implementation 1959–1979*, Volume 1 (New York: Oceana Publications, 1980), p. 251 (emphasis added).
- <sup>10</sup> IAEA, ‘Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006) and 1747 (2007) in the Islamic Republic of Iran’, GOV/2008/4, 22 February 2008.
- <sup>11</sup> United Nations Security Council, 5848<sup>th</sup> Meeting, S/PV.5848, 3 March 2008, pp. 7–8, available at <http://www.un.org/Depts/dhl/resguide/scact2008.htm>.
- <sup>12</sup> For instance, Joseph Cirincione (a non-proliferation expert) and Ray Takeyh (a Middle East expert) wrote that the IAEA ‘is also satisfied that experiments with polonium-210 (that can be used as a trigger for an explosive nuclear chain reaction) were not part of a larger weapons project’. See Ray Takeyh and Joseph Cirincione, ‘ElBaradei is Quietly Managing to Disarm Iran’, *Financial Times*, 27 February 2008, <http://www.ft.com/cms/s/0/06a1fa90-e4d7-11dc-a495-0000779fd2ac.html>; for another example, which quotes an Iranian official promulgating the same interpretation, see Associated Press, ‘Nuclear Watchdog Says Iran Rejects Evidence Linking it to Nuclear Weapons’, *International Herald Tribune*, 22 February 2008, <http://www.ihf.com/articles/ap/2008/02/22/europe/EU-GEN-Nuclear-Iran.php>.
- <sup>13</sup> IAEA, GOV/2008/4, para. 21.
- <sup>14</sup> *Ibid.*, para. 24 (emphasis added).
- <sup>15</sup> IAEA, ‘Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran’, GOV/2007/48, 30 August 2007, para. 9.
- <sup>16</sup> IAEA, GOV/2008/4, para. 11.
- <sup>17</sup> IAEA, ‘Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006) and 1747 (2007) in the Islamic Republic of Iran’, GOV/2007/58, 15 November 2007, paras 8–23.
- <sup>18</sup> This interpretation of the IAEA’s findings has been confirmed by a senior IAEA official. Private communication, Vienna, 2008. It would, however, probably be wrong to claim that the IAEA has *never* commented on Iranian intentions. For instance, given the Foster Criteria, the director general’s notable but never-to-be-repeated 2003 comment that ‘there is no evidence that the previously undeclared nuclear material and activities ... were related to a nuclear weapons programme’ would seem to be a comment on how he perceived Iran’s intentions. IAEA, ‘Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran’, GOV/2003/75, 10 November 2003, para. 52. (See also note 36.) Similarly, in regard to Iran’s centrifuge programme, the IAEA did state that it was ‘not in a position, based on the information currently available to it, to draw conclusions about the original underlying nature of parts of the programme’, which suggests that it might be in such a position in future. IAEA, GOV/2007/58, para. 7.

- 19 Jonathan Tirone and Matthias Wabl, 'UN Won't Refer South Korea Nuclear Activity to Security Council', *Bloomberg*, 26 November 2004, <http://www.bloomberg.com/apps/news?pid=10000103&sid=a.54F3Aqem4&refer=us>.
- 20 IAEA, GOV/2004/84, para. 41.
- 21 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), June 1972, para. 28.
- 22 Mohamed ElBaradei, 'Nuclear Non-proliferation and Arms Control: Are We Making Progress?', Remarks at the 2005 Carnegie International Nonproliferation Conference, Washington DC, 7 November 2005, [www.iaea.org/NewsCenter/Statements/2005/ebsp2005n017.html](http://www.iaea.org/NewsCenter/Statements/2005/ebsp2005n017.html); for a detailed discussion of the IAEA's right to inspect suspected weaponisation activities see James Acton with Carter Newman, *IAEA Verification of Military Research and Development*, Verification Matters 5 (London: Verification Research, Training and Information Centre (VERTIC), 2006), pp. 11–18, [http://www.vertic.org/publications/VM5%20\(2\).pdf](http://www.vertic.org/publications/VM5%20(2).pdf).
- 23 Russia, in particular, has stressed the need for 'proof' or 'certainty'. See, for instance, 'Block on Iran Sanctions: Russia Demands Proof of Hidden Program', *International Herald Tribune*, 22 April 2006, <http://www.ihrt.com/articles/2006/04/21/news/russia.php>; 'Ahmadinejad Declares Victory in Nuclear Dispute', *Times Online*, 5 December 2007, [http://www.timesonline.co.uk/tol/news/world/us\\_and\\_americas/article3004070.ece](http://www.timesonline.co.uk/tol/news/world/us_and_americas/article3004070.ece). For a discussion of the effect that an insistence on proof has on enforcing non-proliferation agreements see George Perkovich and James M. Acton, *Abolishing Nuclear Weapons*, Adelphi Paper 396 (Abingdon: Routledge for the IISS, 2008), p. 75.
- 24 Then IAEA Deputy Director General for Safeguards, Pierre Goldschmidt, wrote about Libya that if it 'had not admitted that it had a nuclear weapons programme, the Agency would not have been in a position to prove that the uranium conversion and enrichment activities undertaken covertly by Libya over more than 20 years were for such a programme'. Pierre Goldschmidt, 'Reinforcing Nuclear Safeguards and the Role of the IAEA', High Level Seminar of Weapons of Mass Destruction, Brussels, 17 March 2005, <http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=22328>.
- 25 James Acton with Carter Newman, *IAEA Verification of Military Research and Development*, pp. 26–33.
- 26 Using either the special inspection provision of the Comprehensive Safeguards Agreement or Article 5.c complementary access (if an Additional Protocol is in force).
- 27 UN Security Council Resolution 707 (1991), para. 3(b); UN Security Council Resolution 1441 (2002), para. 5.
- 28 IAEA, 'Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran', GOV/2005/87, 18 November 2005, para. 6.
- 29 IAEA, 'Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council

- Resolutions 1737 (2006), 1747 (2007) and 1803 (2008) in the Islamic Republic of Iran', GOV/2008/38, 15 September 2008, para. 17(d).
- <sup>30</sup> IAEA, 'Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions 1737 (2006), 1747 (2007), 1803 (2008) and 1835 (2008) in the Islamic Republic of Iran', GOV/2008/59, 19 November 2008, paras. 15–17.
- <sup>31</sup> Article XII.A.6 of the IAEA's statute does envision inspectors having the right to access 'any person who by reason of his occupation deals with materials, equipment, or facilities which are required by this Statute to be safeguarded'. However, the legal principle of *lex specialis derogat legi generali* (a more specific law supercedes a more general one) means that this right is not enforceable as it is not contained in the subsequent and much more detailed Comprehensive Safeguards Agreement.
- <sup>32</sup> IAEA, GOV/2008/59, para. 16; Pierre Goldschmidt, 'IAEA Safeguards: Dealing Preventively with Non-Compliance', 12 July 2008, pp. 8–9, [http://www.carnegieendowment.org/files/Goldschmidt\\_Dealing\\_Preventively\\_7-12-08.pdf](http://www.carnegieendowment.org/files/Goldschmidt_Dealing_Preventively_7-12-08.pdf).
- <sup>33</sup> Goldschmidt, 'IAEA Safeguards: Dealing Preventively with Non-Compliance', pp. 8–9.
- <sup>34</sup> UN Security Council Resolution 1441 (2002), para. 5. Such a provision did not appear in Resolutions 687 (1991) or 707 (1991) that provided the initial mandate for IAEA investigations in Iraq.
- <sup>35</sup> Annette Berriman, Russell Leslie and John Carlson, 'Assessing Motivation as a Means of Determining the Risk of Proliferation', paper presented to the 45<sup>th</sup> Annual Meeting of the Institute of Nuclear Materials Management, Orlando, FL, 18–22 July 2004, [http://www.asno.dfat.gov.au/publications/inmm2004\\_motivation.pdf](http://www.asno.dfat.gov.au/publications/inmm2004_motivation.pdf).
- <sup>36</sup> A good example of this is the director general's claim from 2003 that there was 'no evidence' of a nuclear-weapons programme in Iran (see note 18). The fact that in the following sentence he added 'given Iran's past pattern of concealment, it will take some time before the Agency is able to conclude that Iran's nuclear programme is exclusively for peaceful purposes' would strongly suggest that there was indeed evidence (if not proof). IAEA, GOV/2003/75, para. 52. Moreover, according to recent press reports, the director general attempted to make the IAEA's February 2008 report more positive than his technical staff believed was warranted. 'UN Nuclear Watchdog Could Delay Iran Nuclear Report', *Global Security Newswire*, 12 February 2008, [http://www.nti.org/d\\_newswire/issues/2008\\_2\\_12.html](http://www.nti.org/d_newswire/issues/2008_2_12.html).
- <sup>37</sup> I am very grateful to Jeffrey Lewis of the New America Foundation for pointing this out to me. See also Bruno Tertrais, 'Has Iran Decided to Build the Bomb? Lessons from the French Experience', *Proliferation Analysis*, Carnegie Endowment for International Peace, 30 January 2007, <http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=18993>.
- <sup>38</sup> Paul M. Cole, *Atomic Bombast: Nuclear Weapon Decisionmaking in*

*Sweden 1945–1972*, Occasional Paper 26 (Washington DC: The Henry L. Stimson Center, 1996), pp. 19–26, <http://www.stimson.org/wmd/pdf/cole.pdf>.

<sup>39</sup> *Ibid*, p. 21.

<sup>40</sup> Eric Arnett, 'Norms and Nuclear Proliferation: Sweden's Lessons for Assessing Iran', *Nonproliferation Review*, vol. 5, no. 2, Winter 1998, p. 35.

<sup>41</sup> Pursuant to Article XII.C of the Statute of the IAEA, the Board of Governors also has a few modest enforcement powers such as the suspension of technical cooperation, which it recently exercised with respect to Iran and was called upon to use in the case of Syria in November 2008, although it declined to do so. See Mark Heinrich, 'IAEA Chief, West Clash over Nuclear Aid for Syria', Reuters, 24 November 2008, <http://www.reuters.com/article/worldNews/idUSTRE4AN5BB20081124?rpc=401&>.

<sup>42</sup> This essay does not criticise such practices. Its focus is on the work of the multinational-bodies strand.

<sup>43</sup> See note 23.

<sup>44</sup> United Nations Security Council, 5848<sup>th</sup> Meeting, S/PV.5848, 3 March 2008, p. 21, available at <http://www.un.org/Depts/dhl/resguide/scact2008.htm>.

<sup>45</sup> This objection was raised several times during discussions about the

ideas raised in this essay prior to publication.

<sup>46</sup> This framework is not authoritative or definitive, but is a first attempt to demonstrate that it is possible to distinguish between instances of non-compliance without focusing on intent.

<sup>47</sup> Very little information about this event is in the public domain. See, for instance, David Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), p. 321, fn. 152, [http://www-pub.iaea.org/MTCD/publications/PDF/Pub1032\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub1032_web.pdf).

<sup>48</sup> Goldschmidt, 'IAEA Safeguards: Dealing Preventively with Non-Compliance'.

<sup>49</sup> The IAEA's findings are published in IAEA, GOV/2004/84.

<sup>50</sup> Dafna Linzer and Anthony Faiola, 'US Won't Report South Korea to UN for Nuclear Tests', *Washington Post*, 25 November 2004, p. A19. Indeed, as part of this diplomatic offensive, then Korean Foreign Minister (now UN Secretary-General) Ban Ki Moon wrote an op-ed outlining his country's defence in the *Washington Post*. Ban Ki Moon, 'South Korea's Nuclear Safeguards', *Washington Post*, 8 October 2004, p. A35, <http://www.washingtonpost.com/wp-dyn/articles/A16508-2004Oct7.html>.

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