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## **Jemaah Islamiyah and the threat of chemical and biological terrorism**

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## Jemaah Islamiyah and the threat of chemical and biological terrorism

### Abstract

Over the course of the past decade, the possibility of the use of chemical and biological weapons (CBW) by non-state actors has been a topic of extensive academic and public debate. Originally, this debate concentrated primarily on capabilities, where the ease of acquisition of CBW materials after the breakup of the Soviet Union, as well as more widespread availability of information needed for the production and weaponization of CBW agents, were the sources of major concern. Relatively recently, the debate was brought to a more realistic level through the acknowledgment of technical hurdles associated with the successful delivery of CBW agents, as well as the possible motivational constraints involved in the decision of terrorist groups to use such weapons. Another shift in the debate was represented by the claim that the rise of religious terrorism had eroded these constraints. According to this argument, religious terrorists whose operations have been observed to be responsible for the vast majority of all casualties in terrorist attacks worldwide are believed to be unconstrained by political considerations, as their only constituency is God. Further, the ability of religious terrorists to dehumanize indiscriminately their enemies is strengthened by the perceived divine sanction of their actions.

### Keywords

Jemaah, Islamiyah, threat, chemical, biological, terrorism

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## Jemaah Islamiyah and the Threat of Chemical and Biological Terrorism

Over the course of the past decade, the possibility of the use of chemical and biological weapons (CBW) by non-state actors has been a topic of extensive academic and public debate. Originally, this debate concentrated primarily on capabilities, where the ease of acquisition of CBW materials after the breakup of the Soviet Union, as well as more widespread availability of information needed for the production and weaponization of CBW agents, were the sources of major concern. Relatively recently, the debate was brought to a more realistic level through the acknowledgment of technical hurdles associated with the successful delivery of CBW agents, as well as the possible motivational constraints involved in the decision of terrorist groups to use such weapons. Another shift in the debate was represented by the claim that the rise of religious terrorism had eroded these constraints. According to this argument, religious terrorists whose operations have been observed to be responsible for the vast majority of all casualties in terrorist attacks worldwide are believed to be unconstrained by political considerations, as their only constituency is God. Further, the ability of religious terrorists to dehumanize indiscriminately their enemies is strengthened by the perceived divine sanction of their actions.<sup>1</sup>

A prominent example of religious terrorism is seen in Jemaah Islamiyah (JI or “Islamic community”), a group in Indonesia which generally supports the global Islamic caliphate vision and anti-Western ideology of al Qaeda. In light of the October 2003 discovery of a JI chemical and biological manual in the apartment of top operative Taufiq Rifqi in Cotabato City in southern Mindanao,<sup>2</sup> the CBW threat has become an issue of an increased importance in the Southeast Asia region. This chapter will analyze the level of this threat by assessing both the motivational and capability aspects of CBW terrorism, followed by the application of this framework to the Jemaah Islamiyah case. Particular attention will be devoted to the assessment of the JI CBW manual, as it provides a unique insight into the current capability level of the organization. In this section, the chemical and biological agents considered by JI will be surveyed, followed by an assessment of the group’s knowledge level with respect to those agents. An overall evaluation of the JI CBW threat will be presented in the conclusion.

### Motivation

#### Terrorism: Old vs. “New”

At the most basic level, terrorists that will succeed in killing thousands of people with chemical or biological weapons must possess the ability to acquire and weaponize successfully

lethal agents, as well as the motivation to inflict indiscriminate mass casualties.<sup>3</sup> But despite the fact that terrorism does typically involve killing and destruction, most terrorists practice a level of restraint on their activities. Traditionally, terrorists have not necessarily been interested in killing a lot of people, but rather in spreading fear among the general population by killing only the necessary few. Possibly for this particular reason, terrorists have traditionally not been very interested in CBW because such weapons were deemed too large-scale to serve any purpose useful to the terrorists.<sup>4</sup> Mass casualties are likely to be counterproductive for terrorists who typically strive to attract popular support in order to force a political change, such as creation of a homeland or implementation of social justice norms within the targeted state. Mass killing would likely hinder such support, rather than attract it. Moreover, a large-scale attack might also strengthen the affected government's resolve to track down and punish the terrorists, and may thus jeopardize the group's very existence.

While this traditional interpretation of terrorism has been the consensus for decades, many authors have observed that over the past 20 years, the phenomenon has experienced disturbing new trends. These indicate the rise of violent activities motivated by a religious imperative, as opposed to the still lethal but arguably more comprehensible motives of ethnic nationalism and revolutionary ideologies.<sup>5</sup> Some authors have claimed that religious terrorists are not constrained by the traditional political concerns, such as popular image or the reaction of the constituency or the targeted state. Rather, since they base their justifications for using violence on the sanction of a supernatural authority whose will is absolute, the "new" terrorists are less rational, and therefore more prone to indiscriminate mass-casualty violence.<sup>6</sup> While this logical and widely accepted interpretation of the new trends in terrorism makes intuitive sense, a grave danger lies in its mechanical application to threat assessment without further inquiry into the nature of a given organization's belief system.<sup>7</sup>

It is true that terrorist attacks have over the last two decades become more lethal. It is also true that following the end of the Cold War, religion replaced secular ideologies as the dominant philosophical basis for justifying terrorist violence. However, we should recognize that underlying motives in the belief systems of the majority of today's terrorists have *not* changed. Even the religious fanatic sees his violent activity as an essentially altruistic act of self-defense. It is still the perception of victimization and injustice that drives the so-called "religious terrorist," rather than a perceived universal command from God. The use of holy rhetoric by most groups commonly labeled "religious" serves much more as a uniting and morale-boosting tool than as a universal justification for acts of unrestrained violence.<sup>8</sup> As a result, the commonly defined characteristics of the "new terrorists" as religious fanatics who do not seek to benefit a constituency and whose violent actions are not a means to an end but rather a self-serving end in itself, do not apply to the absolute majority of today's terrorists. Implicitly, many of the organizations that are included in the statistics that show the rise of indiscriminate, divinely sanctioned violence do not belong into this narrowly defined category, rendering the alarmist interpretation of such statistics much less useful than generally believed.<sup>9</sup>

So how do we assess JI's motivational potential to use CBW weapons? The record is clearly mixed. Let us first look at the motivational characteristics suggesting that the JI CBW threat may not be imminent. The most important in this respect is the political

nature of the group's objectives. JI clearly does not fall into the category of organizations that lack a constituency and are thus immune to possible public opinion backlash associated with killing a large number of people with weapons that are universally regarded as inhumane. JI does have a community of sympathizers and shows a great concern for the enlargement of this constituency base by paying special attention to religious training, in order to create a favorable environment for taking over power with the eventual goal of establishing an Islamic state in Southeast Asia.

The emphasis placed on building political influence can be documented by the institution of Majelis Mujahidin Indonesia (MMI), a political umbrella organization headed by Abu Bakar Ba'asyir, the JI's spiritual leader. MMI essentially seeks to unite members of various radical groups in Indonesia with the intent of lobbying for the implementation of the *sharia* through the legitimate political process. This effort documents the willingness of the JI leadership under Ba'asyir to embrace a political solution in order to achieve the group's goals, an aspect that strongly distinguishes JI from the apocalyptically-minded groups that have throughout history shown the greatest propensity toward the use of chemical and biological weapons. From this perspective, it could be argued that the political nature of JI's objectives has a restraining influence on the strategy and tactics the group uses in its armed campaign. This is especially true in the case of the political sensitivity of killing innocent Muslims. Even the first Bali bombing, which was clearly designed to kill as many people as possible, was intended to avoid casualties among locals by the specific timing of the attack, and the selection of targets that were essentially "off limits" to locals.<sup>10</sup>

Even Imam Samudra, one of the key perpetrators of the attack, later expressed his regret about the fact that some locals were killed, and stated that he "seeks forgiveness from God for the 'human error.'"<sup>11</sup> Similarly, the reaction to a wave of popular resentment against the perpetrators of the 2004 Australian Embassy bombing in Jakarta, in which all of the 11 fatalities were Indonesian Muslims, demonstrated JI's sensitivity on this issue. Far from ideologically and strategically immune to this backlash, in its next attack the group decided to move its next operation to Bali, where in the organizers' own words it had a greater chance of success in being more discriminate in killing only "white people."<sup>12</sup> These examples indicate that an indiscriminate mass casualty attack might be viewed as politically too risky even among the more violent elements within the group.

On the other hand, there are many alarming indicators as well. From this point of view, the religious nature of the organization seems to provide the group with an enhanced level of enemy dehumanization, which ultimately leads to an escalating spiral of violence and the associated inclination toward producing an increasingly large number of casualties. This trend seems to be confirmed by the operational progression JI has undergone over the past several years. Inspired by the Darul Islam (DI) movement—which was established in 1967 by a group of activists seeking to engage in *dakwah* (or proselytizing) in order to turn Indonesians into better Muslims—and founded with the intent of creating a regional Islamic government in Southeast Asia, Jemaah Islamiyah originally focused its wrath against local sectarian targets such as Christian churches. But the JI leadership's willingness to become a public political organization had contributed to an ideological split within the group, which effectively triggered the escalation of JI tactics on behalf of the more radical faction under the operational command of Hambali.<sup>13</sup>

In December 2000, JI operatives conducted 38 bomb attacks throughout Indonesia targeting Christian churches, on one hand maintaining the group's targeting logic but on

the other introducing elements of synchronization and grandiosity at a scale previously unknown.<sup>14</sup> The Christmas 2000 church bombings clearly aimed for a much higher level of fatalities than JI had ever produced in the past, and despite the fact that the coordinated attack resulted in the death of “only” 19 people and injuries to 120 others, the *modus operandi* that was used in the attacks represented a significant shift. Further, when one of the cells during the operation encountered a problem with their target—the church they selected was not having a Christmas Eve service—it had been advised by Jabir<sup>15</sup> to select any location such as a discotheque or other establishment, as long as it was either *kafir* (infidel) or Chinese.<sup>16</sup> This suggestion was a good indication of where the JI elements under Hambali were heading. Only six days later, JI launched its first successful attack against transportation infrastructure in the Philippines, killing 14 people on a light railway train and wounding some 70 others by a series of explosions in Metro Manila.<sup>17</sup> This attack again was a sign of an increasingly daring attempt at mass casualties.

For Operation JIBRIL, in which multiple suicide bombers were supposed to detonate truck bombs in Singapore, only Western or *kafir* targets such as embassies and government buildings would be selected. After the failure of Operation JIBRIL due to the swift arrests of the Singapore cell’s members in December 2001, yet another important shift in JI’s targeting preferences took place. Under pressure to deliver a strike that would finally succeed, at the next meeting held in January 2002 in Thailand, Hambali called for a revision of targeting procedures to focus on “soft targets” associated with the West, such as nightclubs, bars and hotels.<sup>18</sup> On October 12, 2002, a man detonated a suicide belt in Patty’s Bar in Bali. As people fled out onto the street in panic, another suicide bomber detonated a van loaded with explosives in the middle of the quickly forming crowd. According to one of the terrorists, the bomb weighed 1,000 kilograms as a symbolic payback for the one-ton bombs America has repeatedly dropped on Muslims in the Middle East.<sup>19</sup>

The shift from hard government targets to soft tourist targets represents a significant escalatory progression—due partly to the difficulty of successfully attacking heavily protected government targets, the terrorists now started considering innocent civilians to be a guilty party in the conflict, regressing their attribution of guilt to the lowest possible common denominator: anyone but themselves and their co-religionists. Indeed, Hambali reportedly distributed bin Ladin’s fatwa advocating precisely this targeting logic among the operatives of the Bali attack. In the bin Ladin text, anyone who supports the infidel governments by paying taxes is declared guilty of the resulting oppression of Muslims, and therefore a legitimate target. Besides embracing this legitimization of indiscriminate violence, JI has also shown the desire to kill in bulk—the Bali bombings killed 202 people, which at the time marked the ninth highest total in a single attack conducted throughout the history of terrorism. Only nine months after the Bali attack, suicide terror would reach the Indonesian capital, when on 5 August 2003, a car bomb exploded outside the J.W. Marriott Hotel in Jakarta, killing 12 people and wounding 150 others.<sup>20</sup> The link between the two attacks was immediately obvious. As in the Bali bombing, the perpetrators in Jakarta used the same kind of explosives, as well as mobile phones for the purposes of remote detonation.

The Jakarta Marriott hotel bombing killed “only” 12, which was considerably fewer than in the Bali attack, but this was largely due to the malfunction of the bomb, as opposed to a lack of intent.<sup>21</sup> Another thirteen months later, on 9 September 2004, a nearly identical suicide truck bombing took place at the Australian Embassy in Jakarta, killing 11 people and injuring more than 180 others.<sup>22</sup> The attack was a clear demonstration of the fact that despite

the apprehension of Hambali in August 2003, the pro-al-Qa'ida wing in the JI was still a potent force. Just in case there was any doubt, on October 1, 2005, three suicide bombers detonated their belts at the seaside area of Jimbaran Bay and the bar and shopping hub of Kuta, killing 26 people and wounding 102 more.<sup>23</sup> By this time it was clearly established that the principle organizers behind the attacks in Indonesia were two Malaysians, Dr. Azahari bin Husin and Noordin Mohammed Top, both members of Hambali's pro-al-Qa'ida faction within the JI.<sup>24</sup> According to Nasir Abbas, who was a key JI operative until his arrest in 2003, members of this faction "see themselves as fighting a new world battle. . . . They say, we can attack civilians anywhere, just as Americans attack Muslim civilians all over the world."<sup>25</sup>

The above chronology carries several important lessons and implications. The first implication stems from the JI ideology, which at least in the interpretation of the more radical wing provides a justification that favors operations that can maximize damage and casualties. In this light, the popular (though often mistaken) perception of CBW as "weapons of mass destruction" provides a logical choice for the group. Furthermore, even the more mainstream faction of JI may be motivated to go down this path, although not necessarily due to the promise of mass fatalities, but more for the purposes of deterrence. Consider Abu Bakar Ba'asyir's reply to the question of whether the use of nuclear weapons was justified: "Yes, if necessary. But the Islamic Ummah should seek to minimize [the intensity of the fighting]. Allah has said in verse 8 chapter 60 that we should equip ourselves with weapon power—that is an order—but preferably to scare and not to kill our enemy. The main goal is to scare them."<sup>26</sup> From this perspective, CBW would provide an ideal weapon of choice, as most attacks with CBW agents would likely result in limited casualties, but also in the spread of a highly disproportionate level of fear and panic.

### Motivation Assessment

Ji as an organization is a fairly diverse entity, in which the motivations of various factions need to be analyzed differently. With regard to the motivation to use chemical or biological weapons, we need to look at two elements. The first is an inclination to mass casualty violence, a threshold which at least one faction within the organization has been able to overcome. The second component is the motivation to use chemical or biological agents over conventional weapons as a means to kill a large number of people. If the desire is indeed to kill as many people as possible, why not just attack more often, at more locations, and on a greater scale with weapons that are available and have proven to be effective? Why invest a massive amount of precious resources into a new technology that only few if any know how to use and that could potentially end up killing the perpetrators themselves—all without any guarantee of success? Why risk a negative public reaction and a possibly devastating retaliation likely to be associated with the use of non-conventional weapons?

As we can see from the complexity of these questions, there is clearly an additional element besides the desire to kill on a large scale that plays a decisive role in the equation. Empirically speaking, organizations that have in the past gone beyond merely expressing interest in chemical and biological agents have been groups for whom these weapons had a strong expressive or emotional value, such as the desire to kill without shedding blood or the interpretation of poisons and plagues as God's tools. An example of this is the frequent reference to biblical plagues commonly used by various radical Christian groups, or the strange fascination of Aum Shinrikyo's leader Shoko Asahara who wrote poems

about sarin. Alternatively, environmentalist cults—such as the Church of Euthanasia, the Voluntary Human Extinction Movement, and the Gaia Liberation Front—have interpreted diseases as “natural” tools used by Mother Nature to eliminate the human race that has through technological advances and an inconsiderate use of natural resources caused a natural imbalance, which according to the group could only be restored by an elimination of the world’s most destructive species.<sup>27</sup>

What is important to emphasize is that despite the fact that JI belongs to the many organizations that have inquired into the possibility of using CBW because of their theoretical potential to kill on a large scale and in a way that would succeed in spreading a high level of fear, it seems to lack the all-important emotional/expressive attraction to CBW per se. As a result, even if JI decides to progress to an even higher level of casualties in the future, such operations are much more likely to utilize multiple large explosive devices rather than exotic poisons.

## Capability

Achieving a chemical and biological weapons capability consists of two main steps: the acquisition of a chemical or biological agent in a sufficient quantity, and the acquisition of an efficient delivery system that will allow an effective dispersal of this agent. Acquiring classical warfare agents is certainly not an easy task, although state sponsors of terrorist organizations that possess such agents could serve as a potential source. At the same time, history shows that despite compatible goals and a common enemy, state sponsors have quite rationally been reluctant to provide terrorist groups with more than relatively basic conventional armaments.<sup>28</sup> Not only could terrorist use of relatively sophisticated technologies provide evidence of state involvement in the attack, but terrorist groups could also be very difficult to control and may potentially turn the given technology against the sponsoring state itself.<sup>29</sup> Another possible source for acquisition of biological warfare agents is their purchase or theft from laboratories associated with state-level biological weapons programs. But even more importantly, many biological agents have legitimate uses and are therefore widely available through commercial repositories that isolate, preserve and distribute cultures. Even though the security of many repositories has recently been tightened, there are still many unsecured culture collections around the world from which pathogens can be purchased with few questions asked.<sup>30</sup> Another factor that makes the acquisition of biological agents possible is the relative ease with which even small amounts of biological materials can be converted into large quantities. Moreover, the boom of information technologies and the Internet makes the necessary know-how for successful procurement of cultures more widely available. The acquisition of low-level chemical agents such as cyanide, chlorine or various pesticides is also relatively easy, considering the dual-use nature of these substances. A much more challenging task is the acquisition of ready-made nerve agents or key precursor chemicals needed for the production of such compounds. Other significant challenges include the safety issues involved in handling chemical agents and the difficulties of stabilizing such agents for storage purposes.<sup>31</sup>

The term “weaponization” refers to the process of producing an effective delivery system for the acquired agent. Generally, two basic scenarios for a chemical or biological terrorist attack exist. One is a relatively crude, small-scale delivery along the lines of the 2001 anthrax letters in the U.S., which can succeed in causing massive panic and disruption, but



lacks the potential of inflicting significant damage in terms of loss of human life. The other scenario is a mass-casualty attack, which is much less likely but which could potentially be catastrophic. It is the latter type of attack that is the primary focus of this chapter.

The difficulty of weaponizing chemical and biological substances varies greatly based on the agent of choice. Inflicting mass casualties with chemical and non-contagious biological agents such as anthrax or tularemia requires a high-tech delivery, as every victim has to come into direct contact with the agent in order to be affected. Contagious agents on the other hand, allow for a much less efficient delivery, as it is only necessary to infect a small group of people, who can then spread the disease by secondary transmission. At the same time, the likelihood of the spread of a contagious disease beyond the desired target population is likely to be viewed by most terrorist groups as a liability, rather than an asset, due to the lack of control over the final outcome.<sup>32</sup>

### The JI CBW Manual

The JI manual is a 26-page document consisting of hand-written notes, apparently compiled from a number of different sources. One of the main sources appears to be the *Mujahidin Poison's Handbook*, a sourcebook compiled by anonymous *jihad* sympathizers from open source literature and widely distributed over the Internet. It appears to be the case that the author(s) of the Bahasa-written JI manual had directly copied parts of the more extensive English-written *Mujahidin* handbook. The two publications not only share the same format for listing agents, they also cite common experimental data. On the other hand, some of the information about production procedures is in many cases significantly different, suggesting either the lack of attention on the part of the note taker or alternatively, the consultation of additional source(s) that were deemed as more reliable. The manual itself covers a number of toxins as well as chemical agents, pesticides and even narcotics. All of the agents are discussed in a uniform structural manner, describing the materials and the procedures needed for the production of the given agent, expected effects, dosage, experimental results, and in some cases, delivery methods. The following section will explore the agents covered in the manual in more detail.

With regards to the scope of the chemical agents listed, it is noteworthy that with the exception of phosgene—one of the agents that were developed and used for assassination purposes by the Aum Shinrikyo—none of the listed substances can be accurately described as warfare agents. The chemical substances covered in the manual include hydrogen cyanide, hydrogen sulfide, phosgene, chlorine, and arsenic, which are each described in some detail. The manual also discusses various less threatening or completely unusable agents such as potassium ferrocyanide, potassium permanganate, chloroform, and aniline, as well as a number of narcotics including cocaine, heroin and morphine. These agents are discussed in less detail, omitting the information on composition, manufacture and weaponization.

Hydrogen cyanide, the blood agent that was used in the Nazi gas chambers under the name Zyklone-B, is the one substance that is covered in most detail. The manual expresses optimism that a victim exposed to this agent would die in less than 30 seconds, also showing a considerable level of excitement over the fact that hydrogen cyanide is extremely easy to produce—it consists of only a simple mixture of ingredients that are easily accessible on the open market (potassium or sodium cyanide and sulfuric acid). The manual also spends a considerable amount of space describing two “firing devices” for this agent, one of which utilizes a close up release consisting of a mechanical break

of a glass plate separating the binary components, triggering their mixture and immediate release. The other firing device relies on the use of a table tennis ball as a delay mechanism. In this scenario the ball injected with sulfuric acid is placed into an open container filled with potassium or sodium cyanide, relying on the acid to eat through the plastic in order to combine with the other ingredient. Having described the production and delivery, the manual moves on to prescribing ideal targets, focusing mainly on buildings that are air-conditioned in order to "achieve a more rapid spread of the gas." Overall, the production as well as delivery mechanisms for hydrogen cyanide are described accurately, but the author(s)' descriptions contain some logical flaws—e.g., when they indicate that a human being would be killed by the same dose and in the same amount of time as a rabbit.

Two other agents are discussed in the same category—hydrogen sulfide and phosgene, the most widely used choking agent of World War I. The whole group of agents is then analyzed collectively, suggesting that hydrogen cyanide should be the agent of choice because of its ease of production, also referring to the favorable characteristics of the above described delivery system, which is praised for the possibility of delayed action. What the authors apparently do not realize is that the same delivery system could be used for both of the other two agents as well. Also, the manual at this point makes several important mistakes, such as the statement that: "in post-operation, the firing device is difficult to detect, and they will keep asking who the real culprits are."

Another mistake is the reference to a precedent in the use of hydrogen cyanide, when the manual states that "[the agent] was used in a Japanese railway several years ago killing a number of people." This statement is highly inaccurate—it refers to the 5 May 1995 incident in the bathroom of the Shinjuku subway station, where two plastic bags containing 1.5 liters of diluted sulfuric acid and 2 liters of powdered sodium cyanide, respectively, were found on fire. The objective of the attack (which was later ascribed to Aum Shinrikyo) was the production of hydrogen cyanide with the hope that the air-conditioning system would suck in the gas, dispersing it over the platform. The delivery system in this incident was particularly interesting: mixing of the two chemicals was to be achieved by the means of fire, triggered by an incendiary system consisting of two condoms placed inside each other and filled with sodium chlorate and sulfuric acid, respectively. The sulfuric acid eats through the rubber and combines with the sodium chlorate to produce fire.<sup>33</sup> The attack however failed to impact anyone, nor did the three duplicate attempts that took place later during the same year. Overall, the chemical weapons section of the manual discusses fairly accurately the production of several highly potent agents that could theoretically cause the death of a large number of people. At the same time, only agents which can be produced about as easily as making Kool-Aid are considered in further detail—the manual completely omits the category of nerve agents, which are the most potent but also most difficult to produce. The chemical weapons section also pays little attention to the concept of effective weaponization. While crude methods for releasing hydrogen cyanide into the open are discussed in some detail, other agents are either to be directly injected into the victims' body or smeared onto the skin, which makes them about as lethal as a knife or an axe, in the sense that the attacker must approach each victim individually and up-close in order to kill. As a result, some of the methods described in the CW section could potentially be used to kill kidnapped victims, but their use to produce hundreds of fatalities is extremely unlikely. It is clear from the language used in the manual that the authors do not understand this fact.

In the category of biological agents, the JI manual focuses only on toxins (poisons produced by living organisms) such as botulinum toxin, nicotine, toxins from poisonous

mushrooms and potato buds. In comparison to the time and space devoted to chemical agents, this section is considerably less extensive and consists mainly of the description of production procedures and results of tests on various animals. In terms of agent selection, only substances that can be easily produced from conventional materials such as cigarettes, potatoes, castor beans, mushrooms, or meat are considered. The described production methods are fairly accurate, but it is crucially important to note that the lethal doses stated throughout the document refer to agents with a high level of purity—a level that is unachievable through the prescribed production methods. For instance, the ricin recipe describes how castor beans with a removed seed coat (the nontrivial procedure for removing the coat is omitted) should be grounded in a blender or coffee grinder with acetone and then filtered through a coffee filter to remove the oil. After repeating this step several times, the remaining extract is air-dried to a fine powder. This preparation is purported to be a highly toxic material capable of killing within a few minutes, namely through skin contact when mixed with a suitable lotion or carrier solvent such as dimethylsulfoxide (DMSO). According to experts, however, if such an approach were followed it would produce a crude mixture the trans-dermal toxicity of which would be negligible, as large proteins of this nature do not readily cross the skin even in a carrier solvent. As a result, following the ricin recipe from the JI manual would not yield any usable results.<sup>34</sup>

Another problem with this manual is the complete lack of mass-casualty capable delivery systems for a biological terror attack. In contrast to chemical agents, where some (albeit extremely crude) methods are suggested, the toxins described in the manual would be of little use, even if produced successfully.

The JI manual is noteworthy in that there is no discussion at all of contagious pathogens that could theoretically be delivered by a human carrier via secondary transmission. The non-inclusion of contagious agents is by no means a surprise—the lack of control over the outcome of the attack makes them highly unattractive for terrorist purposes, unless of course the perpetrators desire to kill everyone including themselves, their constituency and even their own family members.

### **Capability Assessment**

The JI manual provides useful insights into the CBW capability of the group. On the one hand, the document surveys several agents of disturbing potency and expresses considerable optimism and fascination with regard to how miniscule amounts of the respective agent are theoretically needed to kill a large number of people. When discussing botulinum toxin, for instance, the manual states that “30 ml of the agent can kill 60 million people, God willing!!!” Further the manual provides chilling details on the killing of mammals such as rabbits or dogs during experiments with the described agents.

On the other hand, the author(s) of the manual are in many respects only re-inventing the wheel by presenting advice that falls into a “no-brainer” category. For instance, the manual instructs the group’s members on obvious safety considerations (e.g., “stand against the wind when dispersing a lethal agent” or “don’t smell the highly toxic substance [you just produced]”) and provides ridiculous “insights” on dosage, such as stating that when using pesticides, “the dosage for people will need to be different than the prescribed amount for insects.” Also the author(s) demonstrate a lack of understanding of the differences between

individual agents and their effects, combining blood and choking agents into the same category for comparison. In addition, the cited experiments—despite being described in a familiar way—were in all probability not conducted directly by the author(s), as they are word-by-word descriptions plagiarized from standard open-source literature. Moreover, the author(s) commit a number of elementary mistakes, such as in the conversion of the dosage needed to kill a rabbit versus a human, or the suggestion that “every poison can be placed upon the skin with lethal results.” And finally, the manual reflects a complete lack of knowledge with regards to efficient delivery of the produced agents. While in some cases very simple but mass-casualty incapable methods are suggested, in most cases ambiguous statements such as “there is a specific way of making the potential victim take this poison” or “one has to think of an effective way to apply it on the target” are used. To conclude, the “manual” more closely resembles an initial survey of openly available literature, as opposed to an operational cookbook.

Another element that is critical to assessing the CBW capability characteristics of a group is its innovativeness, defined as the ability to improve operationally. Quite simply, since achieving CBW capability constitutes a point of considerable innovation for any existing terrorist organization, understanding the capacity of a group to suddenly alter its established *modus operandi* in a creative way is an absolutely essential component of predictive threat assessment. From this perspective, the JI’s tactical repertoire has been a relatively modest one, at least when comparing to other major contemporary terrorist organizations. Virtually all of the group’s operations have involved the use of explosive devices, detonated either remotely or by suicide bombers.

Even in the area of explosive devices JI has been rather conservative, settling for the design that has worked in the past accompanied by minor incremental improvements over time.<sup>35</sup> These improvements were essentially the result of a “learning from failure” approach. For instance, during the 2000 Christmas church bombings the explosive devices were made out of carbon, potassium, sulfur and TNT,<sup>36</sup> wrapped in gift paper and rigged to mobile phones for remote detonation. In this case however, a number of the bombs malfunctioned, either failing to detonate completely or detonating at the wrong time. This has resulted in the death of several JI operatives including Hambali’s close friend Jabir, who forgot to change his SIM card and died in an explosion triggered by an unexpected phone call.<sup>37</sup> JI bomb makers reviewed their mistakes and during the next major attack in Bali, not only were the destructive effects of the large bomb enhanced by packing the delivery vehicle with a dozen plastic filing cabinets filled with a mix of explosive materials; the device was also rigged with four separate detonation mechanisms (remote, timing, manual and anti-handling mechanism) to ensure that it would detonate as planned.<sup>38</sup> Although the 1,000 kg bomb was only 30 percent efficient—that is, according to Australian authorities, only about 30 percent of the chemical mixture exploded, while the rest simply burned—it produced a large enough explosion and subsequent fire to kill 202 people. According to interrogation reports, the Bali terrorists originally planned for even greater carnage, by incorporating a third suicide bomber who was supposed to ride a motorcycle through the doors of the packed Sari Club and detonate himself. The plan was abandoned only after it was discovered the man chosen for the suicide task could not properly operate a motorcycle.<sup>39</sup>

The explosive device used in the bombing of the J.W. Marriot in Jakarta was identical to the one used in Bali, and although it was considerably smaller consisting of six

plastic boxes weighing 19 kilograms each,<sup>40</sup> it was still clear the attack was aimed to create as many casualties as possible. In order to increase lethality, the terrorists attached dozens of bars of laundry soap to containers of inflammable liquid which were placed next to the bomb. The mixture of sodium and fatty acids in the soap helped create fireballs which engulfed some of the victims.<sup>41</sup> According to investigators, the bomb was personally detonated via a mobile phone by Dr. Azahari bin Husin, JI's top bomb maker who escaped from the scene on the back of a motorcycle. The explosion produced a two-meter wide crater, penetrating through 32-centimeter thick concrete into the basement, and the suicide bomber's head was catapulted all the way to the hotel's 5<sup>th</sup> floor. As earlier in Bali, in this attack the perpetrators tried to prevent easy attribution by attempting to scrape off the identification numbers on the vehicles used so they would not be easily traceable to the original owner.<sup>42</sup> However, in both of these cases as well as in the case of the Australian Embassy bombing, the Indonesian authorities were still able to recover and reconstruct the registration number from the debris, leading to the arrest of many of the JI members involved in the bombings.<sup>43</sup> This fact, along with the failure to achieve significant damage to the Australian Embassy due to anti-vehicle barriers installed in front of the building, apparently led to a change in JI's bombing approach. Instead of using trucks packed with explosives which had trouble approaching their targets, the group adopted the use of suicide backpacks, which would not only be more difficult to trace, but could also be more successful in reaching the desired target.

Such devices were not only used in the second Bali bombing, but were also recovered from the hideouts of Dr. Azahari during his elimination in Malang in November 2005, and even more importantly, in the safe house of Noordin Mohammed Top during the unsuccessful apprehension attempt in Wonosobo in May 2006.<sup>44</sup> The Wonosobo discovery is particularly significant, as it demonstrates JI's ability to construct these explosive devices even after the demise of Azahari, the group's chief bomb maker. Nevertheless, there has been only a limited amount of operational innovativeness involved in the JI campaign so far. The points of shift that did occur assumed the form of incremental improvements in the construction and delivery of explosive devices, as opposed to radical innovation involving the adoption of weaponry or tactics that the group had not used before. This is another reason why JI's operational capacity to attack with chemical or biological agents on a large scale is currently rather low.

Could this reality suddenly change? History tells us that terrorist organizations rarely alter their established *modus operandi*, and when they do, these changes are driven by very specific reasons.<sup>45</sup> The first such reason comes in the event of an introduction of government countermeasures, such as target hardening efforts that serve as a direct obstruction to the tactics used by terrorists in the past. While most groups can be expected to respond by selecting substitute targets, an innovative organization will refuse to go down this path of least resistance in order to increase its probability of success. Instead, such a group will work to overcome these countermeasures by means that have not been accounted for by the enemy, often placing an emphasis on projecting an image of invincibility as well as mocking the state for failing to stop the attack despite all of its resources. This is not a profile that would fit the JI in the current state. The group has responded to government countermeasures in the past precisely in a regressive fashion, by refocusing their target preferences to less challenging targets such as tourist spots, while making only minor incremental improvements along the way in their tactics and weapons.

Another scenario in which a group can be expected to alter its operational methods in a novel direction comes in the presence of an inherent ideological pre-determination toward using certain technologies or the need to innovate in order to obtain the capability to match the level of violence associated with the respective ideological and strategic preferences.<sup>46</sup> This is not the case of JI at this moment; Azahari—whose personal technological zeal was one of the major drivers of the incremental improvements in explosive devices—is no longer available, and the group is dependent on the codification of his knowledge via various manuals and past training. For this reason, it is highly unlikely that JI's *modus operandi* will change because of ideological or strategic reasons, especially given the limited resources and capability of the group.

The third relevant scenario of a trigger to terrorist adaptation of new operational methods is an incidental or unintended acquisition of a particular human or material resource. This is a real threat. If, for instance, a highly skilled microbiologist decided to ally himself with the JI, this would be a considerable boost to the group's biological weapons program. At the same time, even such a development would still leave the group miles away from launching a feasible *mass casualty* biological weapons plot. This was clearly demonstrated by the interaction of JI and al-Qa'ida with regards to the latter's biological weapons program. As far back as 1999, al-Qa'ida initiated the so-called "Project Yogurt," a secret plan to develop chemical and biological weapons.<sup>47</sup> In the initial stages, the plan was to conduct a survey of literature while the organization looked to recruit a scientist to run the program. In 2001, al-Qa'ida's third in command, Mohammed Atef, approached Hambali with a request to find a scientist that would take over the program. Hambali introduced Yazid Sufaat, a U.S. trained bio-chemist and former Malaysia military officer, who subsequently spent several months attempting to cultivate anthrax in a laboratory near the Kandahar airport.<sup>48</sup>

Plans were also established to set up another laboratory in Malaysia and a third lab in Bandung, Indonesia, through Sufaat's company called Green Laboratories Medicine.<sup>49</sup> In addition, on August 1, 2006, the Philippine military raided an Abu Sayyaf Group hideout in Jolo, Sulu Province, and recovered a detailed 2004 proposal from JI to build a chemical lab in the Philippines. The project was shelved due to the difficulty of procuring the necessary precursor chemicals and the comparatively high costs.<sup>50</sup> But while this intent may sound scary on paper, it is interesting to compare the logistics and expertise of al-Qa'ida's biological weapons program with that of the Aum Shinrikyo, the apocalyptic cult that in 1995 became famous for its sarin nerve agent attacks in the Tokyo subway. Prior to deciding on the production of chemical agents, Aum Shinrikyo had conducted no less than 10 attacks with biological agents, particularly *bacillus anthracis* and botulinum toxin. Aum's biological weapons program was founded in 1990 under the direction of Dr. Seichi Endo, a molecular biologist with a degree in genetic engineering, genetics, and medicine from the prestigious Kyoto University.<sup>51</sup> Even though the group had at its disposal an unrivaled amount of resources equaling nearly \$1 billion, a team of no less than 20 graduate level scientists, and state of the art laboratories and equipment, it failed to kill a *single* person with a *biological* weapon. Compare that with al-Qa'ida's project Yogurt, which had the startup budget of only \$2–\$4,000, was based on an initial survey of literature from the 1920s to 1960s,<sup>52</sup> and its chief "scientist" only had a bachelors degree in biological sciences and a minor in chemistry from Cal State University in Sacramento.<sup>53</sup> What does this comparison tell us about the capacity of JI or al-Qa'ida to kill thousands of people with biological agents?

## Conclusion

The likelihood of a JI terrorist attack using chemical or biological weapons needs to be assessed both at the level of motivation and capability. At the motivational level there are at least some segments within the JI that have embraced bin Ladin's ideas, both in the sense of deliberately targeting westerners and the propensity toward launching high-profile, synchronized attacks using suicide bombers, with the objective of inflicting a large number of casualties. This faction of JI can be expected to search for increasingly destructive means in order to keep escalating their struggle. At the same time, given the considerable sacrifices JI has invested (both in terms of resources and personnel) into achieving a sufficient expertise with manufacturing and handling explosives, JI can be expected to make use of suicide truck bombs and not CBW in its future operations. This is especially true in the absence of an expressive fascination with nonconventional weapons that could override the costs associated with these technologies in an otherwise rational cost-benefit calculation. This, ironically, can be seen as a circumstance that is rather unfortunate.

Judging by the manual, the group is nowhere near a noteworthy CBW capability. At best, the group may be able to mount a small scale hydrogen cyanide attack that may succeed in killing a handful of individuals, but even this is doubtful. The manual suggests that JI clearly lacks the knowledge to produce CBW agents in the necessary level of purity, and lacks the knowledge to achieve a reliable weaponization of these materials. Further, JI operatives have demonstrated an extremely low level of improvisational skills, at least with respect to producing explosive materials for their past operations. For instance, both of the potassium chlorate mixtures used in the Bali and Jakarta bombings were relatively inefficient, due to mistakes in the recipe that was blindly followed to the last detail. If the same lack of improvisation and tacit knowledge transpires during the production of CBW agents following the manual discussed above, the process will almost certainly fail to produce usable results.

In conclusion, JI's motivation and capability to use CBW do not overlap, making the prospect of JI successfully using such agents on a large scale a very low probability. And while a small scale attack using very simple chemical mixtures cannot be ruled out completely, it is critical to emphasize that such an attack would represent a regression, as opposed to a progression in terms of the lethality of JI's operations.

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