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THESIS

**LIBERATION TIGERS OF TAMIL ELAM, AUM
SHINRIKYO, AL QAEDA, AND THE SYRIAN CRISIS:
NONSTATE ACTORS ACQUIRING WMD**

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AND THE SYRIAN CRISIS: NONSTATE ACTORS ACQUIRING WMD**

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ABSTRACT

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LIST OF ACRONYMS AND ABBREVIATIONS

AQ	al Qaeda
AQI	al Qaeda in Iraq
AQIM	al Qaeda in the Land of the Maghreb
BBC	British Broadcasting Corporation
CBRN	chemical, biological, radiological, and nuclear
CDC	Center for Disease Control
CEO	Chief Executive Officer
CNN	cable news network
CNS	Center Non-Proliferation Studies
CS	o-chlorobenzylidene malononitrile
CSIS	Canadian Security Intelligence Service
DoD	Department of Defense
FBIS	Foreign Broadcast Information System
FSA	Free Syrian Army
IAEA	International Atomic Energy Association
ID	identification
IED	improvised explosive device
JDF	Japanese Defense Forces
LTTE	Liberation Tigers of Tamil Eelam
MI5	Military Intelligence Division 5 (United Kingdom)
NPA	National Police Agency (Japan)
NTI	Nuclear Threat Initiative
NYSE	New York Stock Exchange
OPCW	Organization for the Prohibition of Chemical Weapons
PPE	personal protective equipment
RAW	Research Analysis Wing (India)
R&D	research and development
RCIED	radio-controlled improvised explosive device

RDD	radiological dispersal device
TTP	techniques, tactics, and procedures
UN	United Nations
VBIED	vehicle-borne improvise explosive device
VX	o-ethyl S-[2-(diisopropylamino)ethyl] methylphosphonothioate
WMD	weapon of mass destruction
WTC	World Trade Center

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I. INTRODUCTION

Terrorist individuals, groups, and organizations are diversely motivated. Some groups may be motivated for political reasons, while others seek revenge for past policies or acts of aggression committed against those they consider their constituents. Furthermore, terrorists differ in their choices of weaponry/delivery systems to be utilized to achieve their ends. Some resort to violence via small arms/assault weapons, while others favor the notorious improvised explosive device (IED). There are still other groups, like Aum Shinrikyo, al Qaeda (AQ), and others, that seek a more advanced capability to carry out their agendas such as the acquisition of chemical, biological, radiological, and nuclear (CBRN) weapons. A terrorist group with a CBRN capability denotes one of the most significant threats to the United States' national security.

The recent war in Iraq and the ongoing conflict in Afghanistan have displayed to the world terrorists' advancing techniques, tactics, and procedures (TTPs). For example, IEDs have evolved over the last 12 years from relatively simple devices like pressure plate or trip-line activated explosives to complex devices like radio-controlled IEDs (RCIEDs) that now include intricate circuitry and additional features that have wreaked havoc on U.S. forces. As their TTPs continue to advance, it might be logical that such groups would seek advanced capabilities that could inflict greater damage on or have greater consequences for the United States. Integrated CBRN capabilities within a terrorist organization's TTPs pose a serious risk for targeted governments, specifically the United States.

In order for terrorist groups to effectively utilize weapons of mass destruction (WMDs) there are a series of barriers or constraints that these groups must overcome. The first of these constraints is the intent to acquire, manufacture, and/or use a WMD. This is the easiest barrier to overcome. A terrorist group must have the proper motivation within its organization to be successful at acquiring WMDs. This means that leaders within the group are in a consensus that the organization needs these types of weapons for some political or military end state.

Next, a group must overcome the constraint of access to personnel with the necessary expertise that can advance a WMD program is essential. This means that an extremist group must recruit chemists, biologists, physicists, and/or weapon experts that have experience in the field of creating such deadly weapons. Without these personnel the necessary research and development for a terrorist group to manufacture such weapons could not happen. Additionally, should the terrorist group desire to bypass the manufacturing stage of a WMD and steal fully operational WMDs, these personnel are still required since maintaining such weapons is a full-time activity requiring careful observation by experts in the fields listed above. Components of these types of weapons constantly degrade or have shelf lives that require constant monitoring or part replacements. These tasks require experienced scientists. According to the *Nuclear Threat Initiative*, the United States will spend at least \$179 billion between the years 2010 and 2018 maintaining its nuclear weapons.¹ Granted that this budget is for a vast number of nuclear weapons, but it still demonstrates the financial resources that are incorporated in fixing and maintaining such weapons over a period of time. Also, these highly skilled personnel are required to test the weapon as well. WMD initiating systems are not as simple as pushing a single button. There are preparation steps and firing sequences that are a part of the process. Someone in the terrorist group has to have the right training or skill set to be able to perform these functions.

Obtaining the needed materials is a critical constraint for terrorist groups to overcome. There are specific materials that are required in order to manufacture or maintain WMDs. For example, in order to manufacture chemical agents there are specific chemical precursors that are required. These precursors are heavily controlled substances and the purchase of large quantities causes unwanted attention from authorities. The production of biological weapons requires the acquisition of disease cultures whose distribution is highly regulated by federal agencies. Nuclear/radiological weapons require access to radiological isotopes that are even harder to obtain. In addition to these types of materials, there is also the consideration that terrorist groups

¹ “U.S. Nuclear Weapons Budget: An Overview,” last modified September 27, 2013, Nuclear Threat Initiative, accessed November 23, 2013, <http://www.nti.org/analysis/articles/us-nuclear-weapons-budget-overview/>.

need to acquire laboratory grade machinery and equipment to produce such weapons that often require a purchaser to disclose the intended use of such equipment and are subjected to periodic inspections. Also, personal protective equipment (PPE) is needed to keep personnel safe when dealing with such hazardous materials. Since these resources are regulated, terrorist groups potentially could rely on illicit trade markets that drive up prices. This, in turn, requires terrorist groups to have adequate funding that allows for increased expenditures. The acquisition of these types of materials raises concerns for authorities and provides constraints on terrorist to acquire WMDs.

Access to key facilities often provides another constraint for terrorist groups seeking a WMD capability. Extremist groups need to have safe havens that they can operate from without the threat of authorities impeding their progress. Adequate sites are required for terrorist group's personnel to conduct the necessary research and development, testing, manufacturing, and maintenance of these types of weapons. Depending on the type of WMD that the terrorist group is trying to manufacture, facilities with particular specifications are needed. For example, biological production facilities require clean and sterile environments while chemical facilities do not. This constraint is not limited to terrorist groups that are attempting to manufacture such weapons. If a terrorist group could successfully steal an intact WMD from a nation-state it would still need the appropriate facilities to store such a weapon so that its key personnel could conduct maintenance on that weapon until it is used in a terrorist attack.

Finally, there is a significant technological constraint for terrorists in developing an effective delivery system. If a terrorist group is successful at producing chemical agents, biological agents, or obtaining radiological material, it still faces the problem of developing a delivery system that can effectively deliver its deadly payload in an effort to maximize its effects on a target. Experts in the CBRN fields develop delivery systems for nation-states. A terrorist group would have to recruit such specialists into its organization in order to accomplish such a task as information on the designs of delivery systems for nation states is highly classified. This then presents another challenge for the terrorist group that is successful in stealing an intact WMD from a nation-state. The

group must have experts within its ranks that understand the delivery system and know how to operate it in order to either conduct maintenance on the weapon or use the weapon against a target.

The goal of this thesis is to analyze the individual terrorist organizations that have attempted to or have actually deployed WMDs or CBRN material against state actors in an effort to uncover what nonstate actors need to obtain CBRN/WMD capabilities. This analysis will then be used to assess the implications that the situation in Syria presents to the international community, with regard to the proliferation of WMDs and CBRN material. The Syrian government currently is entrenched in a civil war where the rebels have control of significant portions of the country to include areas of WMD production facilities. As a result, this poses the threat of these weapons falling into the wrong hands.

A. DEFINITIONS

There are three main definitions that need to be addressed: weapons of mass destruction (WMDs), weapons of mass disruption, and chemical, biological, radiological, and nuclear (CBRN). Each of these terms has a different definition and they are not necessarily interchangeable, as they all refer to a different aspect of the weapons we are discussing in this chapter. First, Department of Defense Joint Publication 3-40, *Combating Weapons of Mass Destruction*, defines WMDs as “. . . chemical, biological, radiological, or nuclear (CBRN) weapons or devices capable of a high order of destruction WMD and/or causing mass casualties . . .”² This thesis refers to this definition when it references WMDs. They are fully operational weapons utilizing CBRN material in order to inflict mass casualties in support of a militaristic or political end-state.

Weapons of mass disruption are distinctly different from WMDs. These types of weapons may utilize CBRN, but do not inflict mass casualties. Weapons of mass disruption have very different implications that reach into the economic and political realms of government, as they require many state resources to be diverted in order to

² U.S. Joint Chiefs of Staff, *Combating Weapons of Mass Destruction*, Joint Publication 3-40 (Washington, DC: U.S. Joint Chiefs of Staff, 2009), I-1.

address the attack. For example, in 1995, Chechen rebels buried a package containing Cesium-137 (a radioactive element) in Moscow's Izmailovskiy Park and then called authorities to alert them to the container's presence.³ There was no attempt to pair the radiological source with a dispersal device; rather, it was used as a psychological weapon. This type of attack was not meant to result in mass casualties; it was meant to instill fear and panic. The Russian authorities had to evacuate the area, alert a hazardous materials team, and develop a plan for decontamination of the area, as well as recovery of the radiological source. This was a political problem as government officials had to make decisions on what resources were allocated and redirected to address the problem. Imagine this type of attack taking place at the New York Stock Exchange (NYSE). It would then become an economic issue as the NYSE would be closed and evacuated to deal with the problem. Such an attack may not yield a single casualty, but it can have massive disruptive consequences. Finally, CBRN refers to chemical, biological, radiological, and nuclear material, not weapons. CBRN is the material that creates WMDs or is used to implement attacks of mass disruption. CBRN material may have deadly effects on humans in their own right, but they are not weaponized.

B. THESIS ORGANIZATION

This thesis analyzes three different case studies in which CBRN weapons or materials were used in an effort to advance a terrorist group's agenda against a state actor. Chapter II will focus on the Liberation Tigers of Tamil Eelam (LTTE) of Sri Lanka and their use of chemical weapons against the Sri Lankan government in order to obtain their political end state of a free Tamil-Elam state. The LTTE case study represents one of the longest active designated terrorist groups engaged in a civil war with a state actor. For nearly three decades, the LTTE fought the Sri Lankan government to a standstill until the group's ultimate demise in 2009. During this 30-year time period, the LTTE resorted to the use of rudimentary chemical weapons and then abandoned their use shortly before the Sri Lankan military defeated them. Chapter II will attempt to

³ Jeffrey Bale, "The Chechen Resistance and Radiological Terrorism," April 1, 2004, Nuclear Threat Initiative, <http://www.nti.org/analysis/articles/chechen-resistance-radiological-terror/>.

investigate the use of these types of weapons, offer an explanation as to why the LTTE abandoned their use, and what implications this evidence has for states combating the proliferation of CBRN material and WMDs.

Chapter III presents the case study of the Japanese doomsday cult Aum Shinrikyo, and their acquisition and attempted manufacturing of CBRN material in order to create their own WMDs. Aum Shinrikyo stands as a key case study because, arguably, the group has been the most successful in the development and deployment of weaponized CBRN material in an effort to create a WMD. For purposes of this thesis and, in particular, this case study, the term “successful” here refers to the ability to acquire key CBRN materials and the self-manufacturing capability of chemical and biological agents to utilize in rudimentary attacks against a civilian populace or state assets. This chapter will investigate the use of Aum Shinrikyo’s chemical and biological weapons program, and its research and acquisition of material to support a nuclear and radiological weapons program.

Chapter IV studies AQ and its affiliated groups, their use of WMDs, and the acquisition of CBRN material. This case study is pivotal because it represents a current threat to Western nations. The chapter will demonstrate that AQ has proven its desire to not only possess WMDs, but to employ them against targets of opportunity. Furthermore, the chapter will go beyond the group’s extremist rhetoric to discuss what has actually occurred in terms of CBRN material acquisition in their efforts to obtain a fully operational WMD.

The final chapter, Chapter V, analyzes the current situation in Syria with regard to chemical weapons; biological, nuclear, and radiological material; and the implications that these stockpiles of materials and weapons have for terrorist acquisition. The lessons learned from the first three case studies are used to draw parallels and uncover new lessons for the international community. The Syrian problem is a critical juncture in world history, as it is the first time that a country with a known robust chemical weapons program is entrenched in a civil war with rebels who control significant portions of the country. This chapter strives to uncover the implications that this has for the proliferation of WMDs and CBRN material.

II. THE LIBERATION TIGERS OF TAMIL EELAM (LTTE) AND CHEMICAL WEAPONS

A. INTRODUCTION

In the wake of their foundation in Sri Lanka (formerly Ceylon) in 1976, the LTTE (*Tamiḷḷa viṭutalaip pulikal*), also known as the Tamil Tigers, rapidly emerged as one of the most dangerous terrorist groups in South Asia.⁴ The birth of the LTTE is arguably the result of the Sri Lankan government's dismissal of the Tamil communities' grievances.⁵ The LTTE, whose goal was to establish an independent Tamil nation-state in northern Sri Lanka, escalated their struggle to the point of civil war against the Sri Lankan military and the majority Sinhalese population. Prior to their complete military defeat at the hands of the Sri Lankan military in 2009, the LTTE had capitalized on every opportunity possible to gain the battlefield advantage, whether it was through political pressure via the Tamil diaspora or kinetic armed combat,⁶ to include the use of chemical weapons on more than one occasion. Chemical weapons use was limited due either to fear of losing the Tamil diaspora's support or its lack of availability. This chapter attempts to understand why the LTTE resorted to the use of chemical weapons and why that use remained limited. We will also discuss the LTTE's chemical weapons attacks and provide a short analysis on the use of this weapon.

B. CHEMICAL WEAPONS

In retrospect, the LTTE was at the height of its power, politically and militarily, from 1976 to 2002. During this period, the LTTE gained significant support and demonstrated the military skill and ruthless behavior that allowed them to think of themselves as invincible.⁷ For example, the LTTE is the only group categorized as a

⁴ Don Wijewardana, *How LTTE Lost the Eelam War: Defeat of the Tamil Tiger Terrorists Who Ravaged Sri Lanka for Over 30 Years* (Pannipitiya, Sri Lanka: Stamford Lake, 2010); M. R. Narayan Swamy, *The Tiger Vanquished: LTTE's Story* (Thousand Oaks, CA: SAGE Publications, 2010), xix.

⁵ Niloufer Abeyseriya De Silva, "Anti-State Militant Mobilization, Sri Lanka: 1965–1991" (Ph.D. diss., State University of New York, 1998).

⁶ Ibid.

⁷ Swamy, *The Tiger Vanquished*, xix.

terrorist organization that has been credited with the killing of two national leaders—Rajiv Gandhi (India) and Ranasinghe Premadasa (Sri Lanka).⁸ The resources that the LTTE was able to acquire led the group to engage in several chemical attacks against the Sri Lankan government. On multiple occasions, the Sri Lankan Army interdicted LTTE chemical supplies in various locations throughout the northern and eastern areas of Sri Lanka. These interdictions, from both LTTE camps and underground facilities, included:

- 28 unidentified chemical bottles of three liters each
- 2 liquid cyanide bottles containing two liters each
- 1 unidentified chemical can with 20 liters
- 10 unidentified chemical cans containing 1 liter each
- 1 kerosene can containing five liters
- 1 gas cylinder
- 85 acid cans containing six liters each
- 13 acid cans containing 20 liters each
- 12 acid cans containing 10 liters each
- 2 nitric acid cans containing 30 liters each
- 380 nitric acid cans containing two and a half liters each
- 18 cans of an unidentified chemical of 50 liters each
- Ammonium nitrate of unknown quantity
- Cyanide of unknown quantity
- Potassium of unknown quantity
- Seven kilograms of ammonia powder
- 280 liters of unidentified chemicals
- 40 liters of chemical mixtures

Additionally, the Sri Lankan Coast Guard seized an LTTE ship in the Palk Bay transporting eight drums of 55 liters containing an unidentified chemical. Also, the Sri Lankan military recovered 16 chemical-resistant suits and 17 gas masks.⁹ Of particular note, cyanide can be used to make hydrogen cyanide—the very same gas that the Nazis

⁸ Wijewardana, *How LTTE Lost the Eelam War*, 188–189.

⁹ Gulbin Sultana, “Chemical Weapons in Sri Lanka,” *CBW Magazine* 4, no. 3 (2011), accessed July 15, 2013, http://www.idsa.in/cbwmagazine/ChemicalWeaponsinSriLanka_gulbin#.UgpnCtKsiSp.

used in Germany in their genocidal actions against European Jewry.¹⁰ Nitric acid is usually used as a precursor in the production of explosives, but can very well be used as a chemical agent by itself—as an irritant of the eyes, nose, throat, and skin after exposure.¹¹

LTTE used rudimentary chemical weapons against government forces throughout the civil war. In 1986, the LTTE used potassium cyanide to poison tea in an attempt to sabotage the Sri Lankan tea export industry.¹² Four years later, in 1990, the LTTE launched chlorine gas cylinders into a Sri Lankan military camp in Batticaloa, which resulted in one fatality and 60 injured.¹³ The cylinders or drums were stolen from a nearby paper mill, which utilized the chemical.¹⁴ In 1992, the LTTE planted a wooden panel with cyanide-coated nails in a rice field; however, no further details can be found.¹⁵ Most likely, from an operator's point of view, the wooden panel was deployed like an IED, in hopes that a soldier doing patrol would step on the contaminated nails and contract cyanide poisoning. In 1995, the LTTE launched two chlorine gas attacks, each one against the Sri Lankan police and military forces. The attack against the police yielded four fatalities and four injured, while the attack on the military forces was an attempt to draw the military out of Jaffna, which sparked a heavy battle and left 84 people dead.¹⁶ It is unclear how many of these casualties were a direct result of the chlorine gas; however, it is very possible that the gas did play a factor in the casualty numbers. Two other chemical attacks against Sri Lankan military forces were recorded

10 "Facts about Cyanide," Center for Disease Control, <http://www.bt.cdc.gov/agent/cyanide/basics/facts.asp>, under "Emergency Preparedness and Response."

11 "Occupational Health Guideline for Nitric Acid," Center for Disease Control, <http://www.cdc.gov/niosh/docs/81-123/pdfs/0447.pdf>.

12 Theodore William Karasik, *Toxic Warfare* (Santa Monica, CA: Rand, 2002), 18.

13 "Global Terrorism Database, Incident Summary," National Consortium for the Study of Terrorism and Responses to Terrorism, accessed June 12, 2013, <http://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=199006150007>.

14 Jonathan M. McComb, "Closing Pandora's Box: The Threat of Terrorist Use of Weapons of Mass Destruction," *Global Security Studies* 4, no. 1 (2013): 85.

15 "Global Terrorism Database, Incident Summary Sri Lanka," National Consortium for the Study of Terrorism and Responses to Terrorism, accessed June 12, 2013, <http://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=199211020006>.

16 Karasik, *Toxic Warfare*, 22.

in September 2008. In the first, on September 2, 2008, the LTTE spiked the fish supplied to the army's Henanigala Camp in the east with cyanide, leaving 300 soldiers ill. In the second, on September 15, 2008, the LTTE launched a 0-chlorobenzal malononitrile (CS) or tear gas attack against military forces in Akkarayankulam and Wannivilakulam. No estimate or number of casualties was recorded at either location, however.¹⁷

In 1990, the LTTE temporarily seized control of the Paranthan Chemical Company in Kilinochchi from the Sri Lankan government, which gave them access to liquid chlorine, hydrochloric acid, and zinc chloride prior to government forces seizing the factory from them.¹⁸ Furthermore, the LTTE was known to utilize underground bunkers extensively. These bunkers could have housed the chemical precursors obtained from the Paranthan Chemical Company. While this is pure speculation, control of this company does show a chemical supply point for the LTTE and a place for secret storage. For example, in 2008, the Sri Lankan Army seized an underground bunker in Kilinochchi, where a suspected medical facility was operated. In 2009, the Sri Lankan Army uncovered multiple underground bunkers in LTTE training camps, as the Sri Lankan government reclaimed control of 95 percent of previously rebel-held territory. In 2013, four years after the fall of the LTTE, the Sri Lankan Army continues to discover underground bunkers previously held by the LTTE.¹⁹ There are allegations that the LTTE possessed an underground chemical laboratory in the vicinity of Vanni based on

17 "Air Force More than Matches New Tigers Weapon," *Lanka Newspaper*, last modified September 29, 2008, http://www.lankanewspapers.com/news/2008/9/32965_space.html.

18 "Troops Liberate 'Vital' Town in 'Fierce Fighting,'" *Foreign Broadcast Information System*, July 25, 1990 (FBIS Document ID BK2507150490).

19 "Prabhakaran Injured in Air Attack," *Zee News*, December 16, 2007, http://zeenews.india.com/news/world/prabhakaran-injured-in-air-attack_413646.html; "Lanka Army Push Ahead in LTTE Stronghold: Army," *Zee News*, October 26, 2008, http://zeenews.india.com/news/south-asia/lanka-army-push-ahead-in-ltte-stronghold-army_479078.html#; "LTTE Boat Blasted in Air Raid, 5 Rebels Killed in Clashes," *Zee News*, January 11, 2009, http://zeenews.india.com/news/south-asia/ltte-boat-blasted-in-air-raid-5-rebels-killed-in-clashes_497887.html; "Sri Lankan Troops Find LTTE's Underwater Craft in Mullaitivu," *Zee News*, January 29, 2009, http://zeenews.india.com/news/south-asia/sri-lankan-troops-find-ltte-s-underwater-craft-in-mullaitivu_502708.html; "LTTE's Aim to Divide SL Totally Crushed: Rajapaksa," *Zee News*, May 12, 2009, http://zeenews.india.com/news/south-asia/ltte-s-aim-to-divide-sl-totally-crushed-rajapaksa_531028.html; "Sri Lankan Soldiers Injured in Accidental Explosion," *Zee News*, May 8, 2013, http://zeenews.india.com/news/south-asia/sri-lankan-soldiers-injured-in-accidental-explosion_847171.html.

previous findings from other bunkers discovered by Sri Lankan government forces.²⁰ The fact that the LTTE had direct lines to chemical precursors when it temporarily controlled the Paranthan Chemical Company, and utilized underground bunkers, suggests the likelihood of an underground chemical laboratory. The Sri Lankan government suspected that pro-LTTE engineers and chemical experts were responsible for the toxic weapons produced at the laboratory and the building of the facility in Vanni.²¹

C. ANALYSIS OF LTTE CHEMICAL USAGE

Although the LTTE proved to be a ferocious enemy for over two decades, their use of chemical weapons was limited and there is no evidence of biological, radiological, or nuclear aspirations by the group. It is clear that the LTTE resorted to chemical weapons because of their easy availability and development. It is difficult for governments to monitor the proliferation of chemicals or their purchase, as most chemicals have dual purposes; i.e., they can be used with a malevolent intent or for other, more benign, purposes. The LTTE was unable to use chemicals in their purest forms and was limited to a rudimentary capability, lacking a lethal-in-mass chemical weapon.

The psychological effect that CBRN weapons have on a human being surpasses the effect created by conventional weapons. The LTTE took advantage of this aspect of fear, thereby adding to their ruthless aura. The chemical threat was credible enough that in June 1996, the Sri Lankan government alerted the United Nations of the LTTE's potential chemical usage against their forces.²² The LTTE was in pursuit of change within Sri Lanka. While the LTTE sought this change via violence, it needed international support (from its diaspora and other governments) to reach its goal. Therefore, continued aggression past the 2002 ceasefire would only serve as a barrier to

20 "Tamil Tigers Ready to Attack Sri Lankan Forces with Toxic Weapons," *Asian Tribune*, last modified July 12, 2006, <http://www.asiantribune.com/index.php?q=node/1034>; "The Hindu: LTTE Planning Chemical Attack," *Armed Services and Government News*, August 26, 2007, ID FHIN58237282, http://infoweb.newsbank.com.libproxy.nps.edu/iw-search/we/InfoWeb?p_product=AFNB&p_theme=aggregated5&p_action=doc&p_docid=11B4851F7B29ACF8&p_docnum=2&p_queryname=20.

21 "Tamil Tigers Ready to Attack Sri Lankan Forces with Toxic Weapons."

22 Thalif Deen, "UN Alerted LTTE May Possess Chemical Arms," *Colombo Daily News*, January 4, 1996. Translated by Foreign Broadcasting Service, document ID BJ0401100896.

the political objectives that the group sought to achieve (an independent Tamil-Eelam state)—as it would polarize support among the populace. The group’s violent actions and willingness to use chemical weapons against the state grabbed the attention of the international community. It is at this point that, arguably, just prior to the 2002 ceasefire, the LTTE was at its peak. Had the LTTE transitioned to political means of achieving their goals while at their peak, prior to the ceasefire, they may have stood a better chance of achieving their political end state and given up its chemical supplies entirely. Instead, the group continued to utilize chemical weapons until its demise.

Velupillai Prabhakaran utilized chemical weapons as an attempted means to annihilate his enemy. For example, in 2005, Prabhakaran delegated authority to his battle commanders to use chemical weapons against a former LTTE commander, Colonel Karuna Amman, who had defected to the Sri Lankan government.²³ Prabhakaran’s delegation of authority over chemical weapons shows that he had a vision of using chemical weapons as an effective, deployable weapon but given the rudimentary chemical capability of the LTTE, Prabhakaran’s intent did not match his capability. The LTTE commander sought to instill fear in the populace, he expected the people to pressure the government into accepting the LTTE’s demands, but his capability was not significant enough to bring about his expectations.

Bruce Hoffman asserts that the LTTE was motivated to use chemical weapons, initially, by the shortage of armaments, an act of desperation. Furthermore, the LTTE discontinued its use of chemical weapons in order to maintain Tamil support and the legitimacy of their cause.²⁴ Jonathan McComb, author of *Closing Pandora’s Box*, suggests that the LTTE discontinued the use of chemical weapons because of pressure from its core supporters, the Tamil diaspora.²⁵ As previously noted, however, the LTTE continued utilizing chemicals as a weapon against government forces throughout their

²³ “Acquisition of Nerve Gas and Other Lethal Chemical Weapons,” *Asian Tribune*, last modified November 21, 2005, <http://www.asiantribune.com/acquisition-nerve-gas-and-other-lethal-chemical-weapons>.

²⁴ Bruce Hoffman, “The First Non-state Use of Chemical Weapon in Warfare: The Tamil Tigers Assault on East Kiran,” *Small Wars and Insurgencies* 20 no. 3–4 (2009): 471. Bruce Hoffman is the Director of the Center for Security Studies at Georgetown University.

²⁵ McComb, “Closing Pandora’s Box,” 85.

years of conflict with the Sri Lankan government. Additionally, they received sponsorship from India via the Research Analysis Wing (RAW) until 1991, which provided training and equipment to the LTTE, yet it is not confirmed if the LTTE received chemical training as well. Furthermore, Tamil Nadu, a region of India close to Sri Lanka with a large Tamil population, served as a safe haven, where the LTTE was able to store chemicals and transport them via boats and ships into Sri Lanka. Perhaps one reason why the LTTE failed to effectively employ chemicals as a weapon is that they lacked the expertise to efficiently weaponize such agents. A second reason could be that the environment in which they employed the chemicals was not conducive for chemical attacks.

The LTTE sought to achieve a political goal—the establishment of a Tamil-Eelam state. Once the group formed, it needed to ensure that it was taken seriously and used all available means to reach that objective, to include the use of chemical weapons. It is argued that the LTTE ceased the use of chemical weapons to maintain constituency support. Then, we can argue that the LTTE was a rational actor whose goals led them to limit their violence and indiscriminate targeting in order to achieve a political end.

D. CONCLUSION

The LTTE's tactics of violence against those who opposed their cause was recognized internationally. They were credited with being the pioneers of the suicide belt/vest, the use of females as suicide bombers, and the use of water-borne IEDs. Additionally, the LTTE used chemical weapons against the government and military forces in an attempt to generate fear. The Sri Lankan military was prepared to absorb the effects of chemical attacks against its forces,²⁶ thus marginalizing the fear and panic aspect that the LTTE wished to inflict. Moreover, the LTTE case study is a unique case in that it potentially shows a group that does not have a prior motivation for obtaining a WMD capability, but put in extreme conditions may seek the capability.

²⁶ "Battle Increases in East." May 26, 1995. *South China Morning Post*, translated by Armed Services and Government News. Document ID 133CF7265960B440.

The LTTE's use of chemicals as weapons yielded unsatisfactory results for their cause. The numerous constraints that the LTTE faced during its conflict with the Sri Lankan government proved to be insurmountable. These constraints prohibited the group from developing any kind of effective CBRN/WMD capability. The group lacked the intent for such weapons. The only rhetoric that came from the LTTE's commanders on the use of such weapons was the delegation of authority given to LTTE commanders to attack Colonel Karuna. There is no documentation of a consensus within the LTTE that the group needed to pursue a WMD program. Next, the group lacked any kind of personnel or expertise within the CBRN fields. This is clearly evident in the rudimentary style of the group's attacks. The acquisition of the necessary materials to foster a CBRN/WMD capability provided another barrier that the LTTE could not overcome. While the group did temporally control the Paranthan Chemical Company, which gave the group access to chemical precursors necessary to produce chemical agents, and Sri Lankan government interdictions of underground bunkers yielded discoveries of chemical precursors, they lacked the necessary materials to develop those precursors into deadly chemical agents. There is no documentation that shows the group acquiring the laboratory equipment, machinery, or additional materials to weaponize the chemicals that the LTTE did possess.

There is limited evidence suggesting the LTTE did possess sufficient facilities for their chemical weapons. The group is known to have heavily relied on underground bunkers, as was previously discussed, and, to this date, the Sri Lankan government is still uncovering these underground bunkers that the LTTE used to store their supplies. In addition to this, there are rumors that the LTTE did operate an underground chemical laboratory in Vanni. It is quite possible that the LTTE did have the appropriate facilities that would allow them to store and/or experiment with chemicals. Finally, during their 30 years battling the Sri Lankan government, the group only used chemical weapons in seven documented attempts. In these seven attempts there is no evidence to support the idea that the group was able to effectively produce a delivery system for their chemical agents. Each attempted attack was basic in nature and had minimal effects on its target.

While the group may have had sufficient facilities, the other constraints—intent, personnel, materials, and development of a delivery system—hindered the LTTE’s ability to develop a CBRN/WMD capability.

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III. AUM SHINRIKYO: A CHEMICAL AND BIOLOGICAL THREAT

A. INTRODUCTION

Aum Shinrikyo is a religious cult that used terrorism as a means to advance their agenda throughout Japan. The cult started off as a meditation group for 15 individuals in 1984 and, at its height, consisted of roughly 50,000 members, spanning six different countries (Japan, United States, Russia, Taiwan, Germany, and Sri Lanka).²⁷ The casualties resulting from Aum Shinrikyo's operations do not come close to the casualty toll that has been inflicted by other groups, such as AQ. In fact, the cumulative death toll of Aum Shinrikyo's operations was somewhere around the low hundreds, compared to thousands from AQ. It is not the death toll, however, that made this group a deadly threat, but rather the manner in which they conducted their operations. Aum Shinrikyo was like no other terrorist organization because their operations not only included kidnappings, murders, and extortion, but also a chemical and biological weapon capability. It used its chemical and biological weapon capability in an attempt to inflict widespread panic and chaos throughout critical areas of Japan. A critical analysis of the group's history, its financing/logistics, and the operations it conducted, can provide insights into future problems for nations combating terrorism.

B. BACKGROUND

In order to effectively understand the conditions in which Aum Shinrikyo was able to deploy multiple chemical and biological attacks against the Japanese public, it is important to understand the environment that the cult flourished within. After World War II, Japan became a very different culture than previously existed. Prior to their defeat at the hands of the Americans, the Japanese emperor was not only the de facto ruler of the country, but also the embodiment of Japanese religion. Japan was unified under the emperor as its religious as well as state leader. The American victory lessened

²⁷ Brian A. Jackson et al., *Aptitude for Destruction Volume 2: Case Studies of Organizational Learning in Five Terrorist Groups* (Santa Monica, CA: RAND Corporation, 2005), 12.

the role of the emperor. He remained in power, but a new constitution gave Japanese citizens more liberty in their religious preference.²⁸ This new freedom paved the way for cults to thrive within the country because Japanese authorities treaded very lightly in bringing charges against any cult designated as a religious entity for fear of being perceived as persecuting religious freedom within Japan. This latitude would give Aum Shinrikyo the room it needed to maneuver without fear of intervention.

Another critical factor was the ease of recruitment for Aum Shinrikyo. Their methods were very different from typical terrorist organizations, as they were more like a cult. The group attracted many young, bright minds from not only the Japanese college system, but from the leading Russian universities as well. People from all different fields of expertise flocked to be a part of what Shoko Asahara, Aum's leader, was building. For the scientific minds, Aum Shinrikyo was able to offer far greater resources in order to continue their research in their fields of study. Furthermore, Aum Shinrikyo provided a lucrative alternative to what society had to offer; particularly appealing to the cult-like group were the lonely, depressed, rejected, young, and dropouts from universities, school systems, and the Japanese business world.²⁹ This was important because it gave Aum the technical ability it needed to develop WMD.

C. HISTORY

Aum Shinrikyo's story begins with a man named Chizou Matsumoto, born in 1955 in one of Japan's main islands, Kyushu. Chizou was born completely blind in one eye and with only partial vision in the other. In his early childhood, he attended a school for the blind and became a bully, utilizing what little vision he maintained as an advantage over the other blind children in his school. This type of behavior would continue for the rest of his life, making him an outcast. Upon graduation in 1975 and after failing to obtain admission to medical school, Chizou moved to Tokyo and opened his own pharmacy, selling Chinese medicines to the populace. Two years later, he began

²⁸ David E. Kaplan and Andrew Marshall, *The Cult at the End of the World* (New York: Crown Publishers, 1996), 10.

²⁹ Gavin Cameron, "Micro-Track Microproliferation: Lessons from Aum Shinrikyo and Al Qaida," *Studies in Conflict & Terrorism* 22, no. 4 (2010), 283–284.

teaching yoga and circulating pamphlets about the religious organization he had formed, Aum Shinsen-no Kai.³⁰ His lifestyle would soon be interrupted; in 1982, he was arrested and his business was shut down for fraud. He was selling fake medicines and herbs. Needing a change of venue and spiritual enlightenment, Chizou made a pilgrimage to India in 1987.³¹ After returning from this pilgrimage, he began to make claims of self-enlightenment, self-levitation, and telepathy.³² He changed his name to Shoko Asahara and the name of his religious cult to Aum Shinrikyo. The cult mixed beliefs from several different religions such as Hinduism, Buddhism, the Book of Revelations, and even writings from Nostradamus.³³ While meditating on a beach, Shoko claimed to have heard the voice of God tell him that he was chosen to lead God's Army and later that same year (1987) he met a radical believer who insisted that Armageddon was looming.³⁴ Believing that he would play a crucial role, Asahara began obsessing over the inevitable Armageddon, preaching that only the true followers of Aum Shinrikyo would survive it. Asahara maintained a strict organization within the cult. He was the de facto leader and had the final say in all matters. Furthermore, he began to set up a shadow government within the cult that mirrored the Japanese government, appointing inner circle members as ministers.³⁵ Since he believed that Armageddon was rapidly approaching through a chemical, biological, and/or nuclear attack and that Aum Shinrikyo members were the only ones going to survive, Asahara had a shadow government in place, ready to take over at the appropriate time.

In October 1988, things began to turn violent for the religious cult. A member of the organization died mysteriously during an initiation ritual. Fearing the death might

30 *Global Proliferation of Weapons of Mass Destruction: A Case Study on the Aum Shinrikyo: Hearings before the Permanent Subcommittee on Investigations of the Committee on Governmental Affairs United States Senate, 104th Congress, 1st Sess. (1995)* (Washington DC: Government Printing Office, 1996). http://archive.org/stream/globalproliferat01unit/globalproliferat01unit_djvu.txt.

31 "Profile: Shoko Asahara," *BBC News*, accessed June 20, 2013, <http://news.bbc.co.uk/2/hi/asia-pacific/3504237.stm>.

32 Ibid.

33 Ibid.

34 Kaplan and Marshall, *The Cult at the End of the World*, 12.

35 Richard Danzig et al., *Aum Shinrikyo: Insights into How Terrorist Develop Biological and Chemical Weapons* (Washington DC: Center for a New American Security, 2011): 11–12.

hinder the cult's ability to obtain certification as a religious organization from the government (certification granted the organization numerous advantages such as tax free status), leaders disposed of the body and covered up the death.³⁶ Later, in April 1989, committed members killed another group member who had witnessed the death in fears that he would turn over evidence to authorities. This was the beginning of a long streak of murders by the cult to secure their position.

An important aspect of membership within the cult was that members were required to renounce their former lives, relatives, and friends. This concerned family members who saw their loved ones turning all assets over to Aum Shinrikyo and severing all communications with family members. So great was the concern that family members of the cult's members formed a group, the Aum Shinrikyo Victims' Society, and hired Tsutsumi Sakamoto as their lawyer. When Sakamoto began to investigate into Aum Shinrikyo's affairs, Asahara ordered him, his wife, and his 14-month-old son to be killed.³⁷ Soon after this order was given, six cult members entered the home of the lawyer at 3:00 a.m. with seven syringes filled with potassium chloride. They used the syringes to kill the lawyer, his wife, and his son; disposing of the bodies afterward. One of the cult members had dropped his Aum Shinrikyo identification badge in the lawyer's home while committing the murder. Local authorities found this badge at the crime scene, but failed to make the connection to the cult or admit it as sufficient evidence for a murder charge. Therefore, no action was taken against Shoko Asahara or his organization.³⁸

From this point on, Asahara's rhetoric began to reach absurd levels and he began to pursue CBRN weapon capabilities in order to protect the cult's divine purpose—bringing about Armageddon. Asahara even went as far as procuring a 500,000-acre ranch in Australia so that sarin production tests could be conducted.³⁹ In order to procure biological material, Aum Shinrikyo sent members to Zaire in 1992 to obtain cultures of

36 Jackson et al., "Aptitude for Destruction," 13.

37 Ibid.

38 Kaplan and Marshall, *The Cult at the End of the World*, 41–42; 46.

39 Jackson et al., "Aptitude for Destruction," 23.

the Ebola virus. The cult also had interests in anthrax, Q fever, and botulinum toxin. It claimed to have procured these through university lab cultures.⁴⁰ During this time, Japan had no system in place to regulate the acquisition of or inspect facilities that dealt with such pathogens. The only thing that Aum Shinrikyo would need would be official letterhead and a rational reason, such as medical testing, to obtain such cultures. This was a common practice throughout Japan during this time period.⁴¹

Over its operational time, Aum Shinrikyo conducted three main attacks and made several other attempts at biological terror. The first attack took place in June 1993, when the cult attempted to release anthrax spores from its midrise business building in downtown Tokyo. Witnesses around the area reported to authorities a strange odor emanating from the building. The strain of anthrax used was not a deadly strain and, therefore, Aum Shinrikyo failed to create the mass chaos that it sought. The end result was that a few birds and pets were killed in the attempt.⁴² While the attempt failed to incite chaos, as Aum Shinrikyo had wanted, it was still a success in that the group was able to obtain a strain of anthrax and disperse it among the populace. Although the overall operation proved to be a failure, it would be a precursor of things to come for the cult.

Also, during the same time that the cult carried out the first of its main attacks, another significant event had occurred for the cult. Asahara's cult had finished construction on its Satian 7 complex—a three-story, windowless warehouse that would serve as the cult's chemical weapons mass production facility. It cost Aum Shinrikyo \$10 million to build in total and, at its peak production capability, was able to produce two tons of nerve agent in a single day's effort.⁴³ In order to put this number into perspective, the Center for Disease Control (CDC) and Prevention states that anywhere

40 Ibid. 20.

41 Kaplan and Marshall, *The Cult at the End of the World*, 56.

42 "Terrorist Organization Profile: Aum Shinrikyo/Aleph," National Consortium for the Study of Terrorism and Responses to Terrorism, accessed June 20, 2013, http://www.start.umd.edu/start/data_collections/tops/terrorist_organization_profile.asp?id=3956.

43 Kaplan and Marshall, *The Cult at the End of the World*, 120.

from 1 to 10 mL solution of sarin in contact with the skin can kill an adult.⁴⁴ The amount that Aum Shinrikyo was now able to produce was astronomical and could rival that of most state programs. While it could have produced such a massive amount of nerve agent, two tons, it never did. Aum Shinrikyo was still constrained by lack of a delivery system for the sarin agent. The cult was still experimenting with rudimentary delivery systems that involved evaporation through using hot plates, hand-held spray devices, and injecting victims with a syringe. Aum Shinrikyo struggled with developing an effective delivery system throughout its operational time. The purity of the sarin agent produced in this facility is unknown, but the group was able to produce 30 percent pure sarin for the Tokyo subway attacks in a rush job that was unable to take advantage of the capabilities of Satian 7.⁴⁵ Evidence suggests that the agent produced at Satian 7 was much higher than 30 percent. Nonetheless, the 30 percent sarin agent proved deadly in the subway attacks.

The second major attack occurred in June 1994. During this time, Aum Shinrikyo's land assets were at the center of a real estate lawsuit. Three judges sat on a panel to make the impending decision and, when Shoko Asahara learned that the verdict would not be in Aum Shinrikyo's favor, he ordered the cult to kill the judges using its newly acquired sarin gas capability. That day cult members drove a van equipped with a heating pot utilized to vaporize the sarin gas and a fan to disperse the vapors into the city of Matsumoto, Japan.⁴⁶ The van was parked in a secluded parking lot adjacent to townhomes and a dormitory housing the three judges. The perpetrators exited the van and initiated their computer-controlled system (the heating pot and fan). There were 3–5 knot winds that day, which carried the deadly gas cloud over the city's population, penetrating into windows, door seals, and contaminating local citizens that were in the

44 "The Emergency Response Safety and Health Database: Sarin," last modified June 18, 2013, Center for Disease Control, http://www.cdc.gov/niosh/ershdb/EmergencyResponseCard_29750001.html.

45 "Nerve Agent: GB (Sarin)," accessed October 13, 2013, <http://cbwinfo.com/Chemical/Nerve/GB.shtml>.

46 "Terrorist Organization Profile: Aum Shinrikyo/Aleph," National Consortium for the Study of Terrorism and Responses to Terrorism.

open.⁴⁷ At the end of the day, there were seven dead, 144 hospitalized, and 126 additional people complaining of symptoms.⁴⁸ This attack proved Aum Shinrikyo's willingness to use chemical attacks in order to promote their agenda and, while this was a smaller-scale attack, the potential for a large-scale one was looming.⁴⁹

Aum Shinrikyo is most famously known for its sarin gas attack on the Tokyo subway system. It was this attack that made the group notorious, making it known that WMDs were a viable threat from terrorist/extremist organizations. Prior to this attack, Shoko Asahara was tipped off that police were organizing a raid on Aum Shinrikyo's facilities. In order to preempt the raid, Asahara ordered the sarin gas attacks. On the morning of March 20, 1995, five cult members boarded five different trains in the Tokyo subway system. This attack was to be a simultaneously coordinated attack on multiple fronts. The train cars were miles apart and were all converging on the heart of Tokyo city during the midmorning rush hour. Each assailant carried plastic bags that were sealed and contained sarin nerve agent and each one executed the next few steps simultaneously. Each of them stopped to buy a newspaper to conceal the lethal plastic bags and then boarded their predesignated trains. Once in the trains, and just prior to the first stop, the plastic bags were laid on the floor and punctured with the sharp point of an umbrella that the perpetrators all carried. Next, the cult members exited the train and met up with their get-away drivers, who drove back to Aum Shinrikyo headquarters.⁵⁰ Meanwhile, the plastic bags on each of the five trains began to leak out into the floor of the train. The liquid began to vaporize, releasing a deadly toxic cloud in the train that was headed into the heart of Tokyo.

Pedestrians on each train immediately began to feel the effects of the gas. Train workers, who did not know what the substance was, frantically tried to clean the liquid

47 Kyle B. Olson, "Aum Shinrikyo: Once and Future Threat?," *Emerging Infectious Diseases* 5, no. 4 (1999), 513.

48 "Terrorist Organization Profile: Aum Shinrikyo/Aleph," National Consortium for the Study of Terrorism and Responses to Terrorism.

49 Kaplan and Marshall, *The Cult at the End of the World*, 146.

50 J. Poolos, *The Nerve Gas Attack on the Tokyo Subway* (New York: The Rosen Publishing Group Inc., 2003), 33–37.

up, but died due to excessive nerve agent exposure. Passengers on the train began to panic and rushed out from the train stations to above ground. Doing everything they could to escape the deadly toxin, people trampled over victims to reach fresh air. In the end, there were 12 dead, 1,039 people injured, and 4,460 hospitalized, exhibiting signs of nerve agent exposure.⁵¹ Local hospitals were overwhelmed with people exhibiting signs of exposure or claiming to have symptoms. There is no way of knowing exactly how many of these people were actually affected by the sarin gas. It was discovered later by a Japanese scientist that the sarin nerve agent used was not entirely a “pure batch,” meaning that there were some defects in the manufacturing process that Aum Shinrikyo had used. If this had not been the case and the sarin was pure, the casualty rate for the attack would have been astronomical.⁵² Despite the lower potency of the nerve agent used, the attack achieved the desired result: it produced mass chaos in the Tokyo subway system, mass casualties among the people, and, most importantly, it had lasting effects on the government and populace by instilling fear of additional attacks.

It is astonishing to contemplate that an organization starting out as a 15-person meditation group could end up accumulating the financial and logistical supplies necessary to carry out such attacks, but Shoko Asahara had a plan from the very beginning. As mentioned previously, members wishing to join the cult had to renounce their previous lives and were encouraged to turn over all financial assets to Asahara, the cult leader.⁵³ This provided a major source of revenue since at its height it had 40,000–50,000 followers.⁵⁴ This was only the beginning of the revenue streams for the cult. They held meditation classes, yoga classes, and printed religious pamphlets that were distributed at a premium price. Additionally, within the group, in order to move up in status members were often required to pay large sums of money.⁵⁵ These lines of revenue formed the basis of the financial resources Aum Shinrikyo utilized in order to

51 “Terrorist Organization Profile: Aum Shinrikyo/Aleph,” National Consortium for the Study of Terrorism and Responses to Terrorism.

52 Poolos, *The Nerve Gas Attack*, 39.

53 Jackson et al., “Aptitude for Destruction,” 28.

54 Olson, “Aum Shinrikyo,” 514.

55 Jackson et al., “Aptitude for Destruction,” 28.

develop its chemical and biological capability. Since most of the followers of Aum Shinrikyo were lawyers, businessmen, and technical experts in their previous lives, Asahara exploited this in order to set up a business that either provided additional revenue streams or acted as fronts to procure necessary supplies. Businesses were set up in Russia, Japan, and the United States, where members acquired gas masks and industrial-strength chemical supplies for the charitable hospital that the cult sponsored. These resources were then funneled to the cult's illicit activities.⁵⁶ The biggest business that Aum Shinrikyo was involved in was their computer assembly and sales business. Asahara made his way into this market just as the technological computer boom hit Japan and the cult's profits were exceedingly high.

In addition to their numerous restaurant chains, noodle houses, yoga studios, real estate businesses, book sales, and copy shops, the cult engaged in other illegal means to raise money. The cult engaged in what Kyle Olson, one of the United States' leading experts on terrorism and preparedness, calls "green mail." In Olson's research paper on the cult, he describes this process: "Aum would threaten to establish a cult compound in a city and, if the city fathers did not bribe them to go away, the cult would set up shop. Several cities paid rather than have Aum establish operations there."⁵⁷ Furthermore, on top of the murder, extortion, and theft it used for its fundraising efforts, there is some evidence to suggest that Aum Shinrikyo had ties with the Yakuza, the Japanese mafia. Aum Shinrikyo produced illegal drugs and manufactured assault rifles in which it utilized the Yakuza as an open market for these goods.⁵⁸ The cult was very diversified when it came to their revenue streams and very profitable. In fact, in an interview with an anonymous cult leader, the group's wealth was estimated at \$1.5 billion at its height.⁵⁹ Shoko Asahara was essentially the chief executive officer (CEO) of a multinational corporation, with aspirations to bring about Armageddon.

⁵⁶ Jackson et al., "Aptitude for Destruction," 28–29.

⁵⁷ Olson, "Aum Shinrikyo," 515.

⁵⁸ Ibid.

⁵⁹ Ibid., 514.

Asahara used the fortune he had accumulated to not only to buy the necessary supplies that his cult would need to create chemical and biological weapons, but also to invest in training. Between 1992 and 1995, Asahara sent his Minister of Construction, Kiyohide Hakawa, to Russia 21 times in order to secure training from Russian Spetznaz forces. This training included everything from the use of weapons to hand-to-hand combat, as well as riding along in tanks. Asahara even went as far as to purchase an old Russian military helicopter.⁶⁰ Additionally, crime-scene investigators and scientists of the Japanese Self-Defense Forces at the Tokyo train station in 1995 discovered that the sarin residue left in the trains from the attack showed that it was synthesized in a manner consistent with the unique method known to Russian chemical agents. It is believed that the cult had obtained the recipe from its Russian assets.⁶¹ The money flow from Aum Shinrikyo into Russia supports this claim. The group's head of Russian affairs, Fumihiro Joyu, had reportedly spent somewhere close to \$12 million in bribes to high-ranking Russian officials, which granted the cult expedited access to key facilities throughout Russia.⁶² It is through these connections that the process for producing sarin gas was most likely shared with the cult leaders.

It is important to discuss the attempts of Aum Shinrikyo to obtain a diverse multitude of weapons, including CBRN devices. Shoko Asahara was determined to expand his arsenal to include not just chemical and biological weapons, but nuclear ones as well. The cult purchased a 500,000-acre ranch in the outback of Australia for over \$400,000 in 1993. At the same time they purchased this ranch, the cult submitted eight permits backed with \$110,000 to the Australian government in order to secure mining leases on the land. The half a million-acre ranch was home to several uranium ore deposits, which Asahara hoped would be the beginning of its nuclear weapon production.⁶³ Additionally, a year later, in December 1994, the cult successfully broke

60 *Global Proliferation of Weapons of Mass Destruction: A Case Study on the Aum Shinrikyo: Hearings before the Permanent Subcommittee on Investigations of the Committee on Governmental Affairs United States Senate*, 104th Congress, 1st Sess. (1995) (Washington DC: Government Printing Office, 1996). http://archive.org/stream/globalproliferat01unit/globalproliferat01unit_djvu.txt.

61 Jackson et al., "Aptitude for Destruction," 24.

62 Olson, "Aum Shinrikyo," 515.

63 Kaplan and Marshall, *The Cult at the End of the World*, 127.

into Mitsubishi Heavy Industries and downloaded restricted data that included the process of enriching uranium ore with laser technology.⁶⁴

Even with access to uranium ore mines and stolen instructions on how to enrich uranium, Aum Shinrikyo was unable to secure scientists with the critical know-how and the industrial lasers to create and assemble such a weapon. Since making a nuclear weapon seemed to elude Asahara, he decided to send Kiyohide Hayakawa, his right-hand man, to Russia to negotiate the purchase of a nuclear bomb. Notes were found in Kiyohide's notebook with a price of \$15 million written next to the words "nuclear bomb." Aum Shinrikyo failed to purchase a nuclear weapon despite all their negotiations.⁶⁵ Asahara became frustrated with the lack of progress in his nuclear weapons quest and found it easier to focus his efforts on chemical and biological weapons due to the ease of obtaining the required materials. Thus, Aum Shinrikyo's focus became refining its already deadly chemical and biological weapon capability to fulfill its prophecies.

In an effort to diversify its arsenal, Aum Shinrikyo pursued biological agents—in particular, those of bacillus anthracis and *C. botulinum*. The cult had also made several attempts, as mentioned earlier, to acquire and weaponize the ebola virus, and Q fever. In early 1990, the group cultivated a medium consisting heavily of *C. botulinum*. The exact quantity of the medium produced has never been verified; however, it is believed to number somewhere in the range of several hundred metric tons, as this was the capability of their production site.⁶⁶ This medium alone was useless to the group because it had to be refined further in order to extract the deadly botulinum toxin. Nothing that has been discovered thus far shows that the cult conducted the necessary isolation of the toxin from the medium produced. Despite this fact, Aum Shinrikyo still filled trucks equipped with spraying devices to deliver this toxin in key areas around Japan 10-20 times.⁶⁷ All of these dispersal attempts failed to achieve any results, as the substance affected no one.

64 Ibid., 206.

65 Kaplan and Marshall, *The Cult at the End of the World*, 191.

66 Danzig, "Aum Shinrikyo," 18.

67 Ibid.

The biological efforts would take a back seat to Aum Shinrikyo's chemical program until 1992, when a lead scientist, Seiichi Endo, resumed the biological program after acquiring a strain of *b. anthracis* laboratory culture from a contact that the cult had at a local university.⁶⁸

The cult achieved similar results in their efforts with botulinum as they did in cultivating a deadly strain of anthrax. Multiple attempts were made to disperse the substance they had cultivated, but the extent of their results was a foul odor, not death. It was the ability of the cult to produce the chemical agent sarin that led it to focus its resources on chemical means. The biological, nuclear, and radiological programs were stuck in the research and development phase due to lack of know-how and key resources like active, deadly strains of biological agents and radioactive material. It is imperative to note that Aum Shinrikyo had initiated programs in all areas of CBRN, but its chemical program was the most successful because they were able to produce an agent that was deadly. It can arguably be stated that had Aum Shinrikyo not been shut down and dismantled by the Japanese police, they would have continued their research and development in the other realms of CBRN and created a weapon just as deadly as, or more so, than the sarin nerve agent they were producing.

The pivotal event that finally brought the focused attention of the National Police Agency (NPA) of Japan on Aum Shinrikyo was the attempted murder of Shoko Egawa, a journalist, who was critical of the cult. In an effort to silence her criticisms, Asahara ordered her death. On the night of September 20, 1994, several cult members arrived at the journalist's apartment and began to pump phosgene gas into it under her front door. A startling noise during the operation woke the journalist and sent the perpetrators back to their van. Despite inhaling a significant dose of the deadly gas, the journalist was able to make it to a local hospital, where she was treated and survived the attempted murder.⁶⁹ At the time of this event, the NPA was not a consolidated force and did not share information between the districts that held jurisdiction over criminal matters. Hence, when Aum Shinrikyo was suspected of committing a crime in one district that

⁶⁸ Danzig, "Aum Shinrikyo," 21–26.

⁶⁹ Kaplan and Marshall, *The Cult at the End of the World*, 186.

information was not shared with other districts where it was becoming an increasingly difficult problem.⁷⁰ After the attempted murder, the Yokohama District shared the details of the case with the NPA, who then directed that all information on the cult be collected and monitored at their offices. Additionally, the NPA ordered staff chemists to take samples around Aum Shinrikyo's Mount Fuji complex, where traces of decomposed sarin were found. This information prompted the NPA to send an undercover agent into the cult. The NPA's agent did not last long and was murdered by cult members, triggering the agency to plan to raid, simultaneously, multiple Aum Shinrikyo facilities.⁷¹ It was this raid that Asahara was tipped off about, prompting the 1995 Tokyo subway system attack.

The final nail in the coffin for Aum Shinrikyo was the sarin gas attacks in March 1995. Immediately following these attacks, the Japanese Defense Forces (JDF) acted in a swift and decisive manner. Through the JDF's efforts, over 200 key leaders in the cult were arrested and, to this day, many are still serving terms in prison.⁷² Shoko Asahara was arrested in May 1995, two months after the Tokyo subway attacks. He was tried in court for close to a decade before being convicted and sentenced to death. In September 2006, the Supreme Court of Japan threw out his final appeal and upheld his death sentence.⁷³ Currently, Asahara is wheelchair bound and on death row in Japan. Following Shoko Asahara's incarceration, the Aum Shinrikyo group split into two factions. Those who still believe in the peaceful aspects of the religion that Asahara created have separated themselves from the more radical members and renamed their group Aleph.⁷⁴ Aleph has lost its religious organization status from the government, but still solicits donations, holds seminars, and sells computers. The cult still has a significant following—not only in Japan, but in Russia as well. Estimates have placed the number of Aleph followers at as high as 1,650 in Japan and 300 in Russia.

70 Ibid., 149.

71 Kaplan and Marshall, *The Cult at the End of the World*, 186–187.

72 Olson, "Aum Shinrikyo," 515.

73 "Profile: Shoko Asahara," *BBC News*.

74 "Shoko Asahara Biography," A&E Television, accessed June 20, 2013, <http://www.biography.com/people/shoko-asahara-20900591?page=2>.

D. ANALYSIS

This long narration of the history of Aum Shinrikyo operations details a major problem for the world. Stated simply, that problem is that WMDs in the hands of nonstate actors pose a serious threat to state security. Shoko Ashara started out as a simple, lower-class citizen and from these humble beginnings created a multibillion-dollar-a-year corporation that financed his terror plots. This case study proves that it is possible for nonstate actors to acquire capabilities that were once thought only within the reach of state actors. While this case study shows the possibility, it is important to note that Aum Shinrikyo was a very unique terrorist group. The cult was able to combine its intent with its means to actually acquire a rudimentary WMD capability. Therefore, Aum should be considered an outlier within terrorist WMD case studies, an example of what could be, given the right factors existing for that group.

In a short, five-month period, Aum Shinrikyo had one of its dummy companies purchase 180 tons of phosphorus trichloride, 90 tons of methanol, 50 tons of diethylaniline, and 2.1 tons of phosphorus pentachloride.⁷⁵ Even with access to these chemical precursors, Aum struggled with developing an effective delivery system and never achieved the mass chaos, destruction, and panic that Shoko Asahara had desired. The delivery system became the barrier that the group was never able to overcome, as the technological leap in producing one eluded Aum's scientists. Furthermore, Aum had struggled with the purity of its chemical and biological agents, as was illuminated in the group's attacks. Syria presents an opportunity for nonstate actors, like Aum Shinrikyo, to acquire fully operational, already constructed WMDs, bypassing the issues that the cult experienced throughout their tenure. This will be discussed in more depth in Chapter V.

E. CONCLUSION

Aum Shinrikyo is a perfect example of how far an extremist group will go to achieve their agenda, given the resources available to them. The whole world is focused on the threat of AQ and the Taliban, and it is true that these two organizations have produced far greater casualties than Aum Shinrikyo. Had Aum Shinrikyo operated on a

⁷⁵ Kaplan and Marshall, *The Cult at the End of the World*, 98.

more secretive scale until it had perfected its use of chemical and biological weapons, however, the casualties it would have produced through its operations could have potentially eclipsed AQ and the Taliban.

Aum Shinrikyo was able to have marginal success with their CBRN/WMD capability due to their ability to minimize the effects of the constraints that include intent, personnel, materials, facilities, and a delivery system. Aum had a very close-knit, hierarchical structure that allowed Shoko Asahara to make all the decisions and focus the group's resources on creating a WMD capability. Since Shoko had desired a WMD program to bring about his prophecy, he was able to direct all and any resources to the attainment of this goal. Since elevation within the cult relied purely on Shoko's discretion, key leaders within the group fell in line with Shoko's desires to pursue a WMD capability. The cult was very effective at recruiting highly educated personnel, in a wide spectrum of career fields, which enabled Shoko to establish a science program dedicated to experimenting and developing CBRN material into weapons. The scientists that were recruited into the cult, however, lacked the experience and knowledge in creating an effective delivery system for its CBRN material, as demonstrated by the ineffectiveness of each of its attacks. Also, through the use of the cult's front companies and illicit trade Aum was able to procure the necessary materials it needed to develop a WMD capability.

The group even went as far as acquiring businesses whose equipment could be used for the production of such weapons. One of the most startling events was the fact that Aum was able to construct an advanced chemical production facility, Satian 7, which was able to produce mass amounts of sarin. This demonstrates that the cult did not struggle with the need to develop facilities free from government intervention that allowed the group to conduct the necessary testing and development of its weapon capabilities. Finally, developing an effective delivery system was the constraint that hindered Aum Shinrikyo. The group failed to disperse its chemical and biological agents in an effective manner to bring about mass casualties as Shoko Asahara had desired. The bottom line is that Aum Shinrikyo proved that chemical/biological capability exists for

nonstate actors. The Aum Shinrikyo threat provides a model of what states need to be on the watch for in the future to prevent such atrocities from ever reoccurring.

IV. AL QAEDA

Al Qaeda (AQ) is a case that shares similarities with the previous ones, but the group stands apart from each of the other cases. Unlike Aum Shinrikyo and the LTTE, AQ is a current threat. The group still carries out attacks against targets of opportunity in an effort to promote its agenda. The first thing that comes to mind when someone hears the words “al Qaeda” is the September 11, 2001 attack on the World Trade Center (WTC) in downtown New York City. This attack was the most catastrophic demonstration of the terrorist group’s conventional means. There is, however, a completely different side of AQ that remains largely unknown—the group’s CBRN weapons programs. The terrorist group has grand ambitions, as it seeks to establish a caliphate that governs the Islamic world, free from Western influence. In order to achieve this end state, AQ has sought to acquire, manufacture, and weaponize CBRN material. AQ’s long history of rhetoric from the group’s key leaders about the desire to use WMDs against Western targets, its proactive approach to acquiring CBRN materials, and the proliferation of CBRN knowledge among its many decentralized terrorist cells all provide insights into a current assessment of the groups’ WMD capabilities.

To restate, AQ is an ideological group, which seeks a political goal—the removal of all “infidels” from Islamic lands. For the purpose of this chapter, AQ is defined as a worldwide movement of Salafi Jihadists, which include al Qaeda in Iraq (AQI), and al Qaeda in the Land of the Maghreb (AQIM). There are many other groups that are considered to be under the “AQ” umbrella organization and they are believed to operate in approximately 65 countries throughout the world, including the United States.⁷⁶

Over the last two decades, AQ’s central leadership has demonstrated through rhetoric, statements, and their actions that the group not only desires the acquisition of WMDs, but also intends to use the weapons after gaining the capability. Intent proves that there is a willingness to conduct these types of attacks—without intent on the part of

⁷⁶ Sammy Salama and Lydia Hansell, “Does Intent Equal Capability? Al-Qaeda and Weapons of Mass Destruction,” *The Nonproliferation Review* 12, no. 3 (2005): 617, accessed November 23, 2013, doi: 10.1080/10736700600601236; “Al Qaeda in Syria,” *New York Times*, December 10, 2012, <http://www.nytimes.com/2012/12/11/opinion/al-qaeda-in-syria.html>.

AQ, there is no threat of WMD. AQ has not been silent on this matter, however. Osama bin Laden released a statement in 1998 where he emphatically asserted that it was every Muslim's personal religious obligation to acquire WMDs in order to "terrorize the enemies of God."⁷⁷ Ten years later, Ayman al-Zawahiri, bin Laden's right-hand man and current AQ leader,⁷⁸ reasserted this fatwa that bin Laden had championed in 1998. In his book, *The Exonerated*, al-Zawahiri goes one step further by proclaiming that every American is the true enemy of Islam and that the use of WMDs against such an enemy is justifiable and in accordance with the Quran, thus absolving a Muslim from any apprehensions in the utilization of such a weapon. He goes on to further claim that any collateral damage, such as innocent Muslims killed, caused by such weapons is of no concern, since these people will be considered martyrs engaged in a fight against nonbelievers. He even goes as far as describing an attack that would kill up to 10 million people.⁷⁹

This demonstrates not only the willingness and intent to use WMDs, but the desire for mass casualty attacks well above the level of the September 11, 2001 WTC attacks. Additionally, Abu Musab al-Zarqawi, a key insurgent leader for AQI, in a tape broadcast on Arabic internet television, stated that, "If we had such a bomb—and we ask God that we have such a bomb soon—we would not hesitate for a moment to strike Israeli towns such as Eilat, Tel Aviv, and others."⁸⁰ While al-Zawahiri is focused on America as the greatest threat to AQ, al-Zarqawi identified Israeli cities as potential targets. Either way, both men are in agreement that AQ not only desires such weapons, but also would not hesitate to utilize them.

Finally, AQ's ambition to possess WMDs has not diminished despite the death of Osama bin Laden. Hardcore extremists within AQ have heavily criticized bin Laden for

⁷⁷ Ben Venzske and Aimee Ibrahim, *The al-Qaeda Threat: An Analytical Guide to al Qaeda's Tactics and Targets* (Alexandria, VA: Tempest Publishing, 2003), 52; Jason Burke, *Al-Qa'ida Casting a Shadow of Terror* (London: I.B. Tauris, 2003), 187.

⁷⁸ "Al-Qa'ida Denies Jordan WMD Plot," *BBC News*, April 30, 2004, http://news.bbc.co.uk/2/hi/middle_east/3672891.stm.

⁷⁹ Rolf Mowatt-Larssen, "Al Qaeda's Nuclear Ambitions," *Foreign Policy*, November 16, 2010, http://www.foreignpolicy.com/articles/2010/11/16/al_qaedas_nuclear_ambitions?page=0,0.

⁸⁰ "Al-Qa'ida Denies Jordan WMD Plot," *BBC News*.

not using WMDs against the West in their attacks. For example, Abu Musab al-Suri, a key operational leader in AQ, stated his grievances with bin Laden in a letter to the U.S. State Department in which he wrote, “If I were consulted in the case of that operation [September 11, 2001 attacks on the WTC], I would advise the use of planes in flights from outside the U.S. that would carry WMD. Hitting the U.S. with WMD was and is still very complicated. Yet, it is possible after all, with Allah’s help, and more important than being possible—it is vital.”⁸¹ While al-Suri may be lacking the technical insights in how to carry out such attacks, this is still an important statement because it further proves that the intent and desire to carry out such attacks exists. Al-Suri and his followers may be lacking the technological capabilities at this time, but they could just be waiting until their capabilities match their intentions and the opportunity exists for them to acquire such weapons. Such an opportunity will be discussed in Chapter V. With Osama bin Laden now dead and key leaders that are much more radical, like al-Suri, taking over the reins of AQ, the desire for WMDs and the resources dedicated to its acquisition could increase exponentially. While these statements are only rhetorical and ignore the technological obstacles that exist, they still demonstrate AQ’s resolve and willingness to pursue a WMD capability.

It is clear that key leaders within AQ have been emphasizing the role of WMDs in AQ operations for over two decades. It is important to look past what has been said, however, to what has actually been accomplished by the extremist group, in order to realize how serious they are about acquiring WMDs. AQ has not only attempted to acquire, but also to develop CBRN, which could be weaponized into WMDs. Between 1993 and 1994, AQ enlisted the assistance of a former Sudanese Army Lieutenant Colonel, Moqadem Salah Abd al-Mobruk, who served as a minister under the Nimeiri administration, while attempting to acquire uranium packed in cylinders, for which AQ paid approximately \$1.5 million U.S. dollars.⁸² This knowledge was brought to light

81 James J.F. Forest, “Confronting the Threat of an al-Qaeda WMD Attack,” December 12, 2006, Accuracy in the Media, <http://www.aim.org/guest-column/confronting-the-threat-of-an-al-qaida-wmd-attack/>.

82 Kimberly Resch and Matthew Osborne, “WMD and Usama bin Laden,” Center Non-Proliferation Studies Reports, last updated November 20, 2001, <http://cns.miis.edu/reports/binladen.htm>.

when Jamal al-Fadl, a defector from AQ in 1996, testified before a U.S. district court in New York. Al-Fadl testified that the cylinders were labeled South African and were transported to Cyprus for authentication testing, where they passed.⁸³ There is no further evidence to support the claim that AQ did, in fact, receive authentic uranium and no uranium attacks by AQ have occurred since this alleged accusation.

In 2001, Algerian terrorists based in London, in collusion with AQ cells in Milan, Italy and Frankfurt, Germany, planned to attack the European Union Parliament in Strasbourg, France with sarin gas. The attack was scheduled to be executed somewhere between February 11 and February 14, when the building was suspected to be at its busiest. The attempt was thwarted when German authorities interdicted the terrorist cell through a series of raids.⁸⁴ There is no evidence in the reports about how the terrorists planned to disperse the deadly nerve agent within the Parliament building or if they actually recovered any of the nerve agent from the terrorists. According to the report, the charges were dropped at the request of the United Kingdom's counterintelligence unit (MI5). In August 2001, two Pakistani nuclear scientists admitted to have met with bin Laden, al-Zawahiri, and two other key AQ leaders in Kabul, Afghanistan. Their discussion included in-depth technical knowledge of chemical, biological, and nuclear weapon systems design. The two scientists claim to have not passed or manufactured any weapons material or weapons to the extremist group, but did admit to sharing blueprints for weapon designs.⁸⁵ This one meeting most likely did not dramatically advance AQ's WMD program, but rather probably highlighted potential problems for the group in establishing a weapons program. It is doubtful that these two scientists were able to share

83 Rolf Mowott-Larssen, "Al Qaeda's Pursuit of Weapons of Mass Destruction," *Foreign Policy*, January 25, 2010, http://www.foreignpolicy.com/articles/2010/01/25/al_qaedas_pursuit_of_weapons_of_mass_destruction?page=full; United States of America versus Usama bin Laden, Indictment 98Cr., United States District Court, Southern District of New York, 360.

84 Scott Christianson, *Fatal Airs: The Deadly History and Apocalyptic Future of Lethal Gases That Threaten Our World* (Santa Barbara, CA: Praeger, 2010), 126–127; David Bamber, Chris Hastings, and Rajeev Syal, "Bin Laden British Cell Planned Gas Attack on EU Parliament," *The Telegraph*, September 16, 2001, <http://www.telegraph.co.uk/news/worldnews/asia/afghanistan/1340692/Bin-Laden-British-cell-planned-gas-attack-on-EU-Parliament.html>.

85 David Albright, "Al Qaeda's Nuclear Program: Through the Window of Seized Documents," Policy Forum Online, 47, November 6, 2002, Nautilus Institute, http://www.nautilus.org/archives/for_a/Special-Policy-Forum/47_Albright.html.

complete weapon design information, since state weapon programs include hundreds of scientists all working on their part of the project, but they could have shared their particular expertise in one area of the larger picture—of which AQ might not otherwise have known.⁸⁶

Interdictions have also provided key insights into the status of AQ's quest for a WMD capability. For example, in 2002, Loa'i Mohammad Haj Bakr al-Saqa and Musab al-Zarqawi were sentenced in absentia in Jordan for a failed plot to execute a chemical attack on American and Israeli citizens residing in Jordan.⁸⁷ There is no further evidence that discusses any additional details of this plot, but two years later, Jordanian intelligence foiled a plot that was aimed at attacking the headquarters of the General Intelligence Department in Amman, Jordan with a chemical IED. Jordanian forces interdicted several trucks that were loaded with over 20 tons of chemical explosives.⁸⁸ The conviction and the foiled plot do demonstrate an attempt to incorporate chemical materials in a terror plot by AQI, however rudimentary it may have been. In May of that same year, Jose Padilla, also known as Abdullah al-Muhajir, was arrested in Chicago, Illinois. Abdullah had recently returned from a trip to Pakistan, where he received training on bomb making and reconnaissance of potential targets. When interrogated, Abdullah revealed that AQ was in the initial stages of developing a dirty bomb to deploy on American soil and that he was sent back to the United States to scout potential targets.⁸⁹ Abdullah was convicted to 17 years and four months in federal prison for assisting Islamic Jihadists abroad, but accusations about his involvement in a dirty bomb

86 David Albright and Holly Higgins, "Pakistani Nuclear Scientists: How Much Nuclear Assistance to Al Qaeda?" August 30, 2002, Institute for Science and International Security, <http://exportcontrols.info/pakscientists.html>.

87 "Turkish Judge Ejects al-Qaida Suspect at Trial," *NBC News*, last modified March 20, 2006, http://www.nbcnews.com/id/10627203/ns/world_news-terrorism/t/turkish-judge-ejects-al-qaida-suspect-trial/#.Umc56RaGndk; Jeannie Shawl, "Absent Zarqawi Sentenced to Death in Jordan for Third Time," *Jurist*, last modified February 15, 2006, <http://jurist.law.pitt.edu/paperchase/2006/02/absent-zarqawi-sentenced-to-death-in.php>.

88 Bruce Riedel, "Al Qaeda Strikes Back," *Foreign Affairs* 86, no. 3 (May–June 2007): 37.

89 Brian Knowlton, "Suspect Trained by Al Qaeda is Arrested: 'Dirty bomb' Plot Uncovered in U.S.," *New York Times*, June 11, 2002, http://www.nytimes.com/2002/06/11/news/11iht-a1_30.html.

plot were dropped due to insufficient evidence.⁹⁰ In addition to Jose Padilla, it was reported that the government prevented terrorists linked to AQ from poisoning the water used by the U.S. embassy in Italy with cyanide; four individuals were arrested in 2002.⁹¹ Two years later, in 2004, the Jordanian government averted a chemical attack on the U.S. embassy in Jordan and other key Jordanian targets.⁹²

Additionally, in January 2004, it was reported by the Associated Press that U.S. forces raided an AQ compound where they found seven pounds of cyanide, which intelligence analysts believed was to be used against Allied forces in Iraq.⁹³ Three years later, in February 2007, U.S. forces in Iraq discovered a car bomb (commonly referred to as a vehicle-borne improvised explosive device [VBIED]) manufacturing facility, where chlorine bombs were being assembled to use in IED/VBIED attacks against coalition forces. The Department of Defense (DoD) released a statement, with regards to the February 2007 discovery, that U.S. forces discovered numerous artillery rounds, mortar rounds, bombs, rockets, gutted anti-aircraft shells, four vehicles in various stages of completion, and chlorine cylinders.⁹⁴ Exact amounts of each were not disclosed in the report or found elsewhere. Two months after this discovery, BBC News reported that AQI had operationalized its chlorine IED capability against coalition forces in Diyala province.⁹⁵ Also, in January 2009, the bodies of 40 individuals with connection to the

90 Kirk Semple, "Padilla Gets 17 Years in Conspiracy Case," *New York Times*, January 23, 2008, <http://www.nytimes.com/2008/01/23/us/23padilla.html?ref=josepadilla>.

91 Nick Pisa, "Cyanide Death Plot at US Embassy," *Mail Online*, <http://www.dailymail.co.uk/news/article-101436/Cyanide-death-plot-US-embassy.html#>; "'Cyanide Attack' Foiled in Italy," *BBC News*, February 20, 2002, <http://news.bbc.co.uk/2/hi/europe/1831511.stm>.

92 "Jordan Militant Confess to 'Chemical' Plot," *NBC News*, April 26, 2004, http://www.nbcnews.com/id/4838076/ns/us_news-security/t/jordan-militants-confess-chemical-plot/#.Umc52BaGndk; "Officials: Terrorist Attack in Jordan Averted," *NBC News*, April 18, 2004, http://www.nbcnews.com/id/4771882/ns/world_news/t/officials-terrorist-attacks-jordan-averted/#.Umc57BaGndk.

93 John J. Lumpkin, "U.S. Forces in Iraq Find Some Cyanide," February 7, 2004, Associated Press, <http://www.mail-archive.com/sam11@erols.com/msg00240.html>.

94 Jim Garamone, "General Discusses Chlorine Bombs, Helicopter Shoot-downs," February 22, 2007, American Forces Press Service, <http://www.defense.gov/news/NewsArticle.aspx?ID=3139>; Bill Roggio, "Al Qaeda's Chlorine Attacks: The Dirty War in Anbar," *The Long War Journal*, March 17, 2007, http://www.longwarjournal.org/archives/2007/03/al_qaedas_chlorine_a.php#ixzz2ji5eM2LR.

95 "'Chlorine Bomb' Hits Iraq Village," *BBC News*, May 16, 2007, <http://news.bbc.co.uk/2/hi/6660585.stm>.

extremist group AQIM were found sealed in a cave in the mountains of the Tizi Ouzou province of Algeria. The 40 individuals all died of the bubonic plague.⁹⁶ The *Washington Times* reported that Washington intelligence assets intercepted a communication between AQIM and AQ leadership that frantically recommended that an AQIM military base be quarantined to prevent the spread of a chemical or biological substance.⁹⁷ Confirmation of these reports was never made; however, 40 individuals with known AQ ties died of bubonic plague and were sealed in a cave. This does raise suspicions, at the very least, that the group was experimenting with biological agents.

Moreover, as seen in news broadcasts around the globe, AQ is known to record videos of training, meetings, messages, and future plans as a means of communication among its many decentralized terrorist cells and to maintain a historical archive. In 2002, *Cable News Network* gained access to 64 AQ video recordings and documents in which the terrorist group described planning operations and tactics, in addition to chemical experiments, biological toxins acquisition instructions, and nuclear weapon designs.⁹⁸ The video recordings show AQ members testing an unidentified chemical agent on three dogs. After injecting each dog with the unknown chemical agent, the dogs' health began to deteriorate rapidly, resulting in death. These video recordings demonstrated to U.S. government officials and chemical weapon specialists that AQ maintains a primitive chemical capability.⁹⁹ Furthering this claim is the fact that among the video recordings seized from AQ safe houses there were instructions on how to employ such chemicals against targets of opportunity.¹⁰⁰ Additionally, among the documents seized, there was

96 Scott Cary, "The Tipping Point: Biological Terrorism," *Journal of Strategic Security* 2, no. 3 (2009): 18, accessed November 23, 2013, doi: 10.5038/1944-0472.2.3.2.

97 Eli Lake, "Al Qaeda Bungles Arms Experiment," *Washington Times*, last modified January 19, 2009, <http://www.washingtontimes.com/news/2009/jan/19/al-qaeda-bungles-arms-experiment/>.

98 Nic Robertson, "Tapes Shed New Light on Bin Laden's Network," *CNN*, August 19, 2002, <http://edition.cnn.com/2002/US/08/18/terror.tape.main>; Barton Gellman, "Al Qaeda Near Biological, Chemical Arms Production," *The Washington Post*, March 23, 2003, <http://www.washingtonpost.com/wp-dyn/content/article/2006/06/09/AR2006060900918.html>; Jack Boureston, "Assessing Al Qaeda's WMD Capabilities," *Strategic Insight* 1, no. 7 (2002), available at http://calhoun.nps.edu/public/bitstream/handle/10945/25379/Assessing_Al_Qaeda%27s_WMD_Capabilities.pdf?sequence=1.

99 Robertson, "Tapes Shed New Light on Bin Laden's Network."

100 Boureston, "Assessing Al Qaeda's WMD Capabilities."

information describing rudimentary nuclear weapons designs. Yet, there is no evidence to suggest that AQ has been capable of obtaining or developing nuclear weapons; officials are concerned that acquiring nuclear waste would allow AQ to build a dirty bomb. David Albright, president of the Institute for Science and International Security, was commissioned by *CNN* to review the documents seized. His analysis led *CNN* reporters Mike Boettcher and Ingrid Arnesen to support this concern over AQ creating a dirty bomb by stating:

But if easier-to-acquire radioactive materials are used—like discarded nuclear power plant fuel rods—the design could become something called a ‘radiological dispersal weapon.’ Also known as a ‘dirty bomb,’ the device would not create a nuclear explosion, but instead would blow radioactive debris over a wide area, rendering it uninhabitable.¹⁰¹

In 2003, British authorities discovered an undated manual describing how to carry out assassinations utilizing ricin—a chemical toxin that is extracted from castor beans. The suspect detained from this raid was connected to AQ through an undisclosed training camp that the unnamed individual had attended.¹⁰² In that same year, after the capture of Khalid Sheik Mohammed—a key AQ operational planner—and other seized documents, it was discovered that AQ’s top leadership had plans to manufacture two biological toxins, botulinum and salmonella, as well as cyanide. The documents also provided direction for the purchase of bacillus anthracis, more commonly known as anthrax.¹⁰³ In another attempt to further its WMD program in 1999, AQ recruited a midlevel Pakistani government biologist, Rauf Ahmad, who sympathized with AQ’s ideologies, to develop biological weapons in Kandahar, Afghanistan.¹⁰⁴ Ahmad was later arrested in Pakistan in December 2001, effectively ending his contributions to the extremist group. Ahmad, along with the two Pakistani nuclear scientists mentioned previously, demonstrates the ability of AQ to attract specialists in critical fields of study in order to develop their WMD program. Additionally, the documents described the process, timelines,

¹⁰¹ Mike Boettcher and Ingrid Arnesen, “Al Qaeda Documents Outline Serious Weapons Program,” *CNN*, January 25, 2002, <http://edition.cnn.com/2002/US/01/24/inv.al.qaeda.documents/>.

¹⁰² Lake, “Al Qaeda Bungles Arms Experiment.”

¹⁰³ Gellman, “Al Qaeda Near Biological, Chemical Arms Production.”

¹⁰⁴ George Tenet, *At the Center of the Storm* (New York: Harper Collins, 2007), 278.

equipment, and instructions for the development of biological weapons suitable for aerosol dispersal.¹⁰⁵ These documents provided detailed instructions on how to develop the WMDs AQ desperately seeks; however, they may have lacked the appropriate equipment and the level of expertise required. Alternatively, perhaps they have never been able to achieve the level of experimentation required to perfect the weapons. While the equipment may be relatively easy to obtain due to dual-purpose technologies, the experimentation process requires time.

Drawing a parallel in 1973, during Operation Shocker, the Soviets developed Novichok (a nerve agent), the strongest chemical agent known at the time. The United States had invested resources, manpower, and time attempting to develop and acquire this potent nerve agent but never achieved its development. Yet, the United States leaked documentation on how to develop it in the hope that the Soviets would waste time and resources attempting to acquire this particular chemical capability. After many iterations of experimentation, however, the Soviets were able to successfully develop Novichok.¹⁰⁶ This experimentation stage could very well be the same stage that AQ is operating within and, given enough time to operate and experiment, AQ could get the right combination of materials to create a deadly CBRN agent or perhaps a weapon. While state actors do have access to vast resources, much more so than nonstate actors, the existence of dual technology and the dissemination of technological advances offers an opportunity for AQ to exploit in order to advance its WMD capability.

AQ's continued desire to obtain and develop WMD led them to experiment with chemical precursors, biological bacterium, and nuclear waste. These experiments took place in several secret AQ laboratories. In 2002, the *New York Times* reported that U.S. military forces discovered an unfinished laboratory that was intended for the development of biological weapons.¹⁰⁷ In an assessment of what the laboratory

¹⁰⁵ Gellman, "Al Qaeda Near Biological, Chemical Arms Production."

¹⁰⁶ David Wise, *Cassidy's Run: The Secret Spy War over Nerve Gas* (New York: Random House, 2000), 190–195.

¹⁰⁷ Michael R. Gordon, "A Nation Challenged: Weapons; U.S. Says It Found Qaeda Lab Being Built to Produce Anthrax," *New York Times*, March 23, 2002, <http://www.nytimes.com/2002/03/23/world/nation-challenged-weapons-us-says-it-found-qaeda-lab-being-built-produce-anthrax.html>.

contained, a Pentagon official was quoted as stating, “a centrifuge for separating liquids and an oven in which slurried agents could be dried—supported the assessment that Al Qaeda might have acquired what it needed to make ‘a very limited production of biological and chemical agents.’”¹⁰⁸ In concert with this Pentagon official’s statement, another U.S. DoD official said:

[T]he equipment and the documents found in the lab suggested that Al Qaeda had intended to make a wide variety of chemical and biological agents to use against people, plants and animals. Intelligence analysts say the lab could have been used eventually to make biological agents that cause anthrax, plague and cholera, as well as a variety of rusts and blights that attack plants, and foot and mouth disease to use against animals with cloven hooves.¹⁰⁹

The discovery of this laboratory provides insight into AQ’s research and development in their efforts to acquire WMD. In addition to the aforementioned incidents and failed attempts to develop WMDs, documents seized in 2001 mentioned Abdur Rauf, a Pakistani microbiologist who specialized in food and was an AQ sympathizer. Rauf attempted to obtain both anthrax spores and the necessary equipment in order to develop them into a lethal weapon.¹¹⁰ Rauf was detained in Pakistan in 2001 for questioning by U.S. and Pakistani forces; however, he was never arrested due to what the Pakistani government cited as lack of evidence. He remains under the close scrutiny of both governments. This close surveillance has more than likely curtailed any serious contributions to the extremist group.

U.S. experts expressed concerns about AQ’s attempts to hire and recruit CBRN expertise from foreign experts. For example, Milton Leitenberg, a biological weapons expert associated with the University of Maryland’s Center for International and Security Studies, referring to Abdur Rauf, was quoted in 2006 as stating, “He was someone who at least understood the professional procedures and methods . . . in theory, if he went in the

108 Judith Miller, “Lab Suggests Qaeda Planned to Build Arms, Officials Say,” *New York Times*, September 14, 2002, <http://www.nytimes.com/2002/09/14/international/asia/14LAB.html>.

109 Ibid.

110 Joby Warrick, “Suspect and A Setback in Al-Qaeda Anthrax Case,” *Washington Post*, October 31, 2006, <http://www.washingtonpost.com/wp-dyn/content/article/2006/10/30/AR2006103001250.html>.

laboratory and tried and tried, maybe he could have gotten it right.”¹¹¹ This statement demonstrates the danger that AQ presents to the international community. While Rauf might have been curtailed in his actions, there is still not very much known about whom else AQ has recruited to assist them. Also, AQ’s possession of precursors, or samples of agents, allow it to conduct experiments in its facilities. While those resources may not have yielded WMDs yet, it could be only a matter of trial and error, as Leitenberg suggests.

This is a major contrast between the rhetoric and intent for AQ, and what the group has actually been able to achieve with regard to its WMD program. On numerous occasions, key leaders within the terrorist group have expressed the desire to obtain a WMD capability that would be capable of causing mass casualties that would rival the effects of the September 11, 2001 attacks. What the group has actually been able to execute is well short of this aspiration. AQI, in particular, has only been able to deploy rudimentary chemical devices such as the chlorine bombs it used in Diyala province in Iraq. AQIM appeared to have problems in its testing of biological agents and it most likely was not even weaponized biological material. These types of attacks do not inflict mass casualties, but rather mass disruption in that particular area, as casualties are minimal. The psychological aspect of using these types of weapons is perhaps greater than the actual collateral damage that is apparent. This seems to be the level on which AQ is operating—small, rudimentary attacks with primitive, CBRN-developed material. The lack of evidence detailing AQ’s CBRN operations suggests that the technological jump to a fully operational delivery system of CBRN material that is weaponized seems to be eluding the terrorist group.

The Canadian Security Intelligence Service (CSIS) speculates that AQ will grow stronger and unpredictable in the next five years, resulting in more small-scale attacks that have greater impact.¹¹² These small-scale attacks could potentially be a continued effort by AQ and its affiliates to keep trying to advance its utilization of CBRN material.

111 Warrick, “Suspect and A Setback in Al-Qaeda Anthrax Case.”

112 “The Future of Al-Qaeda: Results of a Foresight Project,” May 2013, Canadian Security Intelligence Services, https://www.csis.gc.ca/pblctns/cdmctrch/20130501_eng.pdf.

The extremist group has already proven it has the intent to carry out WMD attacks but does not possess the capability to conduct such operations. Small-scale attacks, like using chlorine bombs, have the ability to inflict terror on a populace while at the same time allow AQ to continue to experiment with CBRN TTPs. While there is a tremendous technological barrier for AQ to overcome, small-scale, fear-based operations like the chlorine attacks can prove detrimental to the governments that are attacked. These types of attacks have the potential to tie up and divert critical governmental resources. The CBRN threat is different from the WMD threat because it does not have a mass killing or mass destruction effect on its target; rather, it creates political problems like hazardous material waste removal and evacuation of the populace from public areas, in addition to inciting fear and panic in that region. This threat is then amplified when the current situation in Syria, with regard to the civil war, is taken into context since AQ has the opportunity to obtain CBRN material to carry out such attacks. Syria is a breeding ground for terrorist groups such as AQ, who have already shown a presence there. It allows it an opportunity to train and test new TTPs against a state actor. However, of greater concern is the threat that AQ could potentially acquire CBRN capabilities in Syria if the situation continues to deteriorate.

Despite AQ's ambition to obtain and develop a WMD capability, it is heavily hindered by constraints in personnel, materials, facilities, and a delivery system. The radical leaders within AQ have demonstrated through their rhetoric that a WMD capability is very much desired but this is not enough for a terrorist group to be successful at obtaining such a capability. In addition to having intent to use and obtain such weapons, it is important to have the right personnel to develop a WMD program. AQ has struggled in recruiting the right personnel to conduct the necessary research, testing, and development of CBRN material into WMDs. For example, there have been meetings between AQ leadership and Pakistani scientists with expertise in nuclear weapons but nothing substantial enough to further or sustain an AQ WMD program. Furthermore, there is no documented evidence that suggests AQ has acquired significant amount of CBRN material or the manufacturing equipment needed to turn CBRN material into weaponized agents. Without the acquisition of the necessary materials and

the recruitment of the essential personnel, a delivery system is a moot point since there is no weaponized material to put into a delivery system. This would be a future constraint to AQ if it were able to overcome the first constraints. Since AQ is a current threat it is hard to say they do or do not have adequate facilities that would serve as storage sites, research sites, or manufacturing sites for a potential WMD program, free of government intervention. The fact that AQ still operates against state actors may be some indication that there are suitable safe havens for such an endeavor. The bottom line is that rhetoric from key leaders of AQ, and the lack of operational uses of CBRN material demonstrates its willingness to possess and develop WMDs but no capability yet to match its intent. Rudimentary attacks, such as the chlorine bombs used in Diyala province, are all that AQ is capable of at this time due to these constraints.

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V. SYRIA: PUTTING IT ALL TOGETHER

In the previous chapters, we explored three terrorist organizations that attempted to acquire, attempted to develop, attempted to use, or actually used, CBRN WMDs. The LTTE case study demonstrated a terrorist group that lacked serious intent to use CBRN material against its targets. Their use of chemical resources was limited to acts of desperation, in that when their conventional means were running low, the group resorted to chemical attacks. Additionally, the LTTE was constrained by its ethnic constituency since it had a political goal of attaining a separate Tamil-Eelam state. If the group continued its use of chemical weapons it may have undermined constituency support for its political goal. Additionally, the LTTE was constrained by acquiring the necessary materials to produce CBRN material into weapons, the necessary personnel with expertise to produce WMDs, and an effective delivery system for its CBRN material.

The Aum Shinrikyo case study was unique, in that it demonstrated a terrorist group with the intent, resources and numerous safe havens to accomplish the objective of acquiring a WMD capability. Aum had serious difficulty and was constrained by developing a delivery system for its weapons, which limited their effectiveness drastically. The group did attempt to buy fully operational WMDs, but was unsuccessful. The best they were able to accomplish was the purchase of some material and the sarin nerve agent recipe. The AQ case study displayed a terrorist group with overwhelming intent to acquire/use WMDs, but no serious capabilities to include the necessary personnel with expertise, CBRN material, or the necessary facilities to develop such weapons. The group, much like Aum, was unable to purchase such weapons. The information in these case studies suggests that for a terrorist group to acquire a WMD capability it would be much easier for the group to circumvent potential constraints and steal a fully operational, already constructed weapon. Syria presents a potential opportunity for such terrorist organizations.

The Syrian problem presents a highly unique situation in that never before has a civil war taken place in a country with a known, robust WMD program in the form of chemical weapons. The al-Assad regime faces a large population of rebels that have

risen up in opposition since early 2011, calling for the immediate removal of al-Assad himself. The rebels have proved themselves formidable opponents, with nations such as the United States supplying weapons and other resources.¹¹³ The Syrian rebels have managed to hold strategic areas and make advances on strongholds of the Syrian state and threaten to overthrow the current regime. This situation, however, has far greater implications than the removal of just one president or a regime. Syria poses a complex set of issues that deal with the fundamental security of the world at large with regard to WMDs. The ongoing battle between the rebels and the state will likely lead to three possible scenarios: the current regime is defeated; a military strike against WMD facilities is conducted by a coalition of the willing; and/or the current regime maintains control of the infrastructure that provides security of WMDs and WMD material, but is severely weakened. Additionally, a series of catalysts that propel these three scenarios include various factions among the rebels; the presence of violent, extremist organizations; a lack of WMD inventory by the state; and, finally, a robust presence of WMD material residing in the state. Although there is a United Nations-sanctioned intervention in Syria to destroy Syria's chemical weapons, this does not solve the entire problem and the risk still exists that nonstate actors will acquire WMDs or WMD material. This will be discussed later in the chapter.

First, before explaining the above scenarios, it is imperative that we discuss what WMD resources and weapons the Syrian government currently possesses. Syria's nuclear program was thwarted when an Israeli air strike destroyed a nuclear reactor facility known as Dair Alzour in the northeastern region of Dayr az Zwar. This reactor was allegedly capable of producing enough plutonium to create one to two weapons per year.¹¹⁴ Syria's nuclear assets were not all destroyed by the airstrike. Key personnel and scientific expertise still exist within Syria. Additionally, Syria runs a Chinese-built research reactor (SRR-1), under the careful watch of the International Atomic Energy

113 Ernesto Londono and Greg Miller, "U.S. Weapons Reaching Syrian Rebels," *Washington Post*, September 11, 2013, accessed October 4, 2013, http://articles.washingtonpost.com/2013-09-11/world/41972742_1_lethal-aid-syrian-rebels-chemical-weapons.

114 "Syria Country Profile," last modified September 2013, Nuclear Threat Initiative, accessed October 4, 2013, <http://www.nti.org/country-profiles/syria/delivery-systems/>.

Association (IAEA).¹¹⁵ Nuclear research and the production of radioisotopes for medical, agricultural, and geological purposes are still conducted at the Der al-Hadjar Nuclear Research Center and the Scientific Studies and Research Center in Damascus.¹¹⁶ Therefore, while Syria's nuclear weapons program was effectively destroyed, there still exists spent nuclear fuel, radioactive isotopes, and key personnel with expertise in the nuclear field—all of these vulnerable for acquisition by nonstate actors should the right conditions arise. Granted that spent nuclear fuel and radioactive isotopes do not constitute a nuclear bomb, but they could be used to create a dirty bomb.

In the realm of Syria's biological warfare program there is very little that is known from open sources. According to the *Chemical and Biological Defense Primer October 2001*, Syria is not believed to have progressed past the research and development (R&D) process using biological agents in warfare.¹¹⁷ However, in a statement from James Clapper (Director of National Intelligence) before the Senate Armed Services Committee in April 2013, he admitted that due to the longevity of Syria's biological program it is more realistic to believe that the state has progressed beyond the R&D phase and is capable of limited agent production without an effective delivery method.¹¹⁸ Despite the fact that these two statements are roughly 12 years apart, there are still many experts that believe that Syria remains in the R&D phase and has not progressed. This is still alarming with regard to the current situation. Even if Syria is in the R&D phase, this means that there is the potential for the presence of sample biological agents that the government is experimenting with in laboratories. These laboratories are still vulnerable, much like the nuclear research centers. If a nonstate actor were to take advantage of a deteriorating security situation within these facilities, sample biological agents, as well as research, could fall into the wrong hands and further the capability of such actors.

115 "Syria Country Profile."

116 Ibid.

117 Deputy Assistant to the Secretary of Defense for Chemical and Biological Defense, *Chemical and Biological Defense Primer*, Darby, PA: Diane Publishing (2001).

118 *Statement for the Record, Worldwide Threat Assessment of the U.S. Intelligence Community, Senate Committee on Armed Services*, 113th Cong. (2013) (statement of James Clapper), <http://www.dni.gov/index.php/newsroom/testimonies/194-congressional-testimonies-2013/845-remarks-as-delivered-by-dni-james-r-clapper-on-the-2013-worldwide-assessment,-sas>.

Among the biological agents that Syria is speculated to possess are bacillus anthracis, plague, tularemia, botulinum toxin, alotoxin, cholera, camelpox, ricin, and smallpox.¹¹⁹ Furthermore, in July 2012, Syrian Foreign Minister Jihad Makdissi made a public statement that the Syrian military was guarding all chemical and biological stockpiles and facilities. He went on to note that Syria would never resort to utilizing its chemical and biological weapons, suggesting the existence of a state-run biological program.¹²⁰

While there is very little known about the biological and nuclear programs of Syria, its chemical weapons program is much more advanced. Syria is purported to have the capability to independently produce mustard gas, sarin, and O-ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate (VX) nerve agent, all weaponized in the form of artillery shells, bombs, mines, warheads, and other air-dropped munitions.¹²¹ Syria relies on outside sources such as Iran, Egypt, China, and North Korea that have all provided and/or are still providing assistance in the form of chemical precursors, technological know-how, and specialized equipment to the al-Assad regime.¹²² What makes Syria's chemical arsenal extremely dangerous is that the country also possesses a sophisticated missile program donated by the Soviet Union and North Korea. The Scud-D is the most lethal, short-range, ballistic missile that has been confirmed to be in the Syrian inventory by intelligence sources. This missile is capable of transporting a chemical warhead up to 700 kilometers.¹²³ Unlike Syria's other WMD programs, its chemical arsenal is ready to unleash its destructive potential—it is weaponized and

119 "Syria Country Profile;" Dany Shoham, "The Fate of Syria's Chemical and Biological Weapons," perspective paper no. 177, Begin-Sadat Center for Strategic Studies, Ramat Gan, Israel, 2012; Jerry Gordon, "Syria's Bio-Warfare Threat: An Interview with Dr. Jill Dekker," *New English Review* 2007, http://www.newenglishreview.org/Jerry_Gordon/Syria's_Bio-Warfare_Threat%3A_an_interview_with_Dr._Jill_Dekker/.

120 Jill Bellamy van Aalst and Oliver Guitta, "Syria's Real Threat: Biological Weapons," last modified September 19, 2013, *The National Interest*, <http://nationalinterest.org/commentary/syrias-real-threat-biological-weapons-9093>.

121 Director of Central Intelligence Agency, *Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, Covering 1 January to 31 December 2011*, 2011, Federation of America Scientists, <http://www.fas.org/irp/threat/wmd-acq2011.pdf>.

122 Dasa Adaskova, "Armed Conflict in Syria and its Implications for Chemical and Biological Security," *Contemporary Issues of World Economics and Politics* (2012), 7.

123 "Syria Country Profile."

loaded onto ballistic missiles. This fact creates a very sensitive security environment given the current conditions within the country. These chemical weapons pose serious security risks not only for the Middle East, but also for the world.

In the case where the al-Assad regime fails and ceases to maintain control over the Syrian state, WMD stockpiles could be in danger of proliferation among terrorist organizations. With their growing strength in numbers and the resources that the rebels have acquired, coupled with the growing discontent of the international community towards the al-Assad regime, this is a very viable outcome to the current situation. Should the current regime fail there are serious implications that could potentially follow. A UN inspection team confirmed the chemical attacks that occurred on August 21, 2013 in the Ghouta area of Damascus, Syria. Fragmented remains of surface-to-surface rockets, capable of carrying a chemical payload, were found at the site.¹²⁴ This suggests that the current regime indiscriminately targeted rebels with chemical munitions, much like the LTTE and the Sri Lankan government did. The delivery method used is far too advanced for the rebel's capabilities and, given the target, all evidence points towards the al-Assad regime. This demonstrates two key points: one, a willingness to use chemical weapons in times of desperation and, two, the fact that Syria's chemical weapons are fully functional and operational.

Similar to the Syrian situation, the LTTE demonstrated both of these points when they resorted to the use of chemical munitions in the 1990 attack on an army base near Batticaloa and again when a top-level commander for the LTTE stated that they would resort to chemical weapons in times of despair, proving intent.¹²⁵ Therefore, should the regime find itself losing control of the situation to the point of regime failure, it would likely ensue that al-Assad would delegate authority to his commanders to further use chemical weapons. By comparison, in 2005, the LTTE commander, Velupillai Prabhakaran, delegated the authority to unleash chemical weapons to his commanders

124 Ibid.

125 "Global Terrorism Database, Incident Summary," National Consortium for the Study of Terrorism and Responses to Terrorism, accessed June 12, 2013, <http://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtid=199006150007>.

against Karuna, a defecting regional commander.¹²⁶ At that point, the LTTE commander was losing control of his forces as many of his supporters were defecting to the Sri Lankan government. Moreover, Syria maintains close ties with Iran and Hezbollah, suggesting that, in desperation, WMDs could be disseminated to its allies to prevent the rebels from obtaining such a capability.¹²⁷

Delegation of authority to use such weapons creates an opening for nonstate actors to acquire such weapons. First, the delegation of authority creates a greater need for security measures to track and maintain accountability of the weapons authorized for use. This delegation of authority then has greater points of failure than when the authority is centralized, thus giving nonstate actors more targets of opportunity. Secondly, WMD material, such as chemical weapons, could be moved around the country to arm combatant commanders for the al-Assad regime. Reports are already coming from Syria that al-Assad has ordered WMDs relocated to more secure locations within the country; whether or not the move is for ease of operational use is unclear at this time.¹²⁸ Every time weapons are moved around the country it poses a risk of theft by nonstate actors. Additionally, a failing or failed regime would create a security vacuum within the country. The world would be reliant on the rebels to assume critical security measures to safeguard WMD facility locations in addition to the nuclear research reactor and biological weapons facilities. The period between when the regime collapses and when the rebels assume control provides a window of opportunity for nonstate actors to acquire fully capable chemical weapons, radiological isotopes, biological agents, or other material that could advance their own agendas within the realm of WMDs. This period, however brief, is a time when the al-Assad regime has lost total control, but the rebels have not fully cemented their control over all territory and all assets belonging to the Syrian government. This is a grey area that nonstate actors could use to their advantage.

126 "Acquisition of Nerve Gas and Other Lethal Chemical Weapons."

127 Eyal Zisser, "Syria and the Question of WMD," *Middle East Review of International Affairs* 8, no. 4 (2004): 6.

128 Alex Spillius, "Syria: Bashar al-Asaad has Spread Chemical Weapons Around 50 Sites," *The Telegraph*, September 13, 2013, accessed October 4, 2013, <http://www.telegraph.co.uk/news/worldnews/middleeast/syria/10306852/Syria-Bashar-al-Assad-has-spread-chemical-weapons-around-50-sites.html>.

The next scenario has been heavily debated within the United States and among its allies: a military strike against critical WMD facilities by a coalition of the willing. However appealing this avenue of approach may be, it could potentially risk placing WMD material in the hands of nonstate actors. Despite the current situation in which the al-Assad regime has agreed to allow UN inspectors back into the country to inventory Syria's WMDs as part of international oversight, there is still the possibility of al-Assad backing out of the agreement. The regime has lied about using chemical weapons on its own populace so there is no reason to believe that al-Assad will fully comply with international oversight of its WMDs, thus bringing about the scenario of a military strike. Additionally, while the United States is working with the international community to destroy Syrian stockpiles, this scenario is still a possibility because other nations, like Israel, that have vital interests in stopping the proliferation of Syrian weapons could take the initiative in carrying out its own military strike, absent concurrence of the United States.

There are three main issues with a military strike against Syrian WMD facilities. First, bombing WMD facilities in Syria runs the risk of detonating WMDs that are stored there and endangering the lives of innocent Syrians. Bombing facilities that house these weapons would expose them to mass amounts of heat, shock, and friction, which, in turn, could activate the weapons. This would counter any desired end result of the original objective of the military strike. Second, a military strike against Syrian facilities could erode the already weakened security infrastructure that maintains control over Syrian WMDs. This weakened security structure provides an opportunity for nonstate actors to acquire such weapons through theft. For example, bombing a secure structure that houses chemical weapons could reduce the building and surrounding area to rubble and create mass chaos within the area. This allows a perfect set of conditions for a terrorist group to sift through the rubble and steal weapons that have survived the strike. Additionally, a military strike against one target could provide the perfect distraction for terrorists to attack another site. Third, as mentioned previously, there is very little known about the Syrian WMD program and exactly what the country has, as well as where it all resides. In September 2013, the Nuclear Threat Initiative (NTI) assessed that chemical

facilities were believed to be located near Hama, Homs, and al-Safira villages in the Aleppo region.¹²⁹ Outside of these estimates, little is known about additional locations of the WMD program. A military strike carried out with limited intelligence would only slow WMD mobilization, operationalization, and proliferation, not eliminate the threat.

Finally, the last scenario is one in which the current regime is not defeated, but is weakened to a point where it no longer has de facto authority over all matters of security within the country. This is similar to the collapse of the Soviet Union. During its decline, the Soviet Union lost control of pivotal areas within its borders that controlled WMD production and safeguarding. The government's inability to keep paying its scientists and soldiers led these highly skilled and well-connected people to sell their services and government property to the highest bidder. As we saw in the Aum Shinrikyo case study, Shoko Asahara was able to purchase chemical recipes, Russian military supplies, and recruit chemists from a shut-down Russian chemical plant, all because the Soviet Union/Russian government did not or was not able to maintain control over its security.¹³⁰ A similar situation could develop in Syria as the battle rages forward. If the Syrian government is unable to maintain accountability and loyalty of its soldiers that operate WMD facilities there exists the potential for nonstate actors to exploit the situation and perpetuate a leakage of WMD material. There have already been key defectors during the conflict, such as Syria's former Prime Minister Riad Hijab; Brigadier General Manaf Tlas; and Syria's ambassador to Iraq, Nawaf Fares, to name just a few.¹³¹ While these defectors are not known to have brought WMD material to the Syrian rebels, the possibility of more defectors in such positions, with the ability to bring such weapons to the rebels' cause, still remains open as the situation deteriorates.

129 "Syria Country Profile."

130 Jackson et al., "Aptitude for Destruction," 24–25; Kaplan and Marshall, *The Cult at the End of the World*, 108.

131 "Syria Prime Minister Riad Hijab Defects," *BBC News*, August 6, 2012, accessed October 4, 2013, <http://www.bbc.co.uk/news/world-middle-east-19146380>; "Defected Syrian General Manaf Tlas Says Seeks to Unite Opposition," *Israeli News Haaretz*, July 26, 2012, accessed October 4, 2013, <http://www.haaretz.com/news/middle-east/defected-syrian-general-manaf-tlas-says-seeks-to-unite-opposition-1.453793>; "Syrian Crisis: Assessing Defector Nawaf Fares' Claims," *BBC News*, July 17, 2012, accessed October 4, 2013, <http://www.bbc.co.uk/news/world-middle-east-18868526>.

In the current situation within Syria there are certain catalysts that perpetuate the likelihood of the above scenarios. The first of these is the composition of the Syrian rebels. The Free Syrian Army (FSA) was organized in 2011 to protest and take action against the al-Assad regime. The FSA recruited its base from army deserters and local militia, and estimates have placed their numbers at over 100,000.¹³² These are not the only people that have joined the fight. There are several smaller groups that have thrown their weight behind the FSA, not necessarily uniting with them, but nonetheless opposing al-Assad. Specifically, Syria has become a new training ground for jihadists and extremists from all over the world. With the end of the Iraq War and the current drawdown of the war in Afghanistan, Syria offers the only place where extremists can go to participate in asymmetrical warfare against a state actor in order to hone their skills.

In addition to the FSA operating within Syria, the Washington Institute for Near East Policy published a report stating that there were at least 17 different known groups that have suffered casualties since the beginning of the conflict. Additionally, the report continued to mention that fighters from Libya, Saudi Arabia, Tunisia, Jordan, Egypt, Lebanon, and Chechnya, to name a few, were among the bodies recovered so far during the conflict.¹³³ With so many groups and entities participating in the fighting, coordination among all of these elements is nearly impossible. More importantly, they may all be working towards the common goal of ousting al-Assad at the moment, but each group has its own motivations for their actions. Should the rebels succeed in toppling the regime the conflict will quickly change from unity of effort to every group for itself, which would place WMD material at great risk as the security situation would deteriorate rapidly the various factions turn on each other. There is no guarantee of which faction or coalition of factions would emerge in control and whether or not that coalition would believe in the notion of nonproliferation of WMDs.

132 Primoz Manfreda, "Syria's Armed Opposition: Free Syrian Army," Middle East Issues, accessed October 4, 2013, <http://middleeast.about.com/od/syria/p/Syrias-Armed-Opposition-Free-Syrian-Army.htm>.

133 Aaron Y. Zelin, Evan F. Kohlmann, and Laith al-Khouri, *Convoy of Martyrs in the Levant: A Joint Study Charting the Evolving Role of Sunni Foreign Fighters in the Armed Uprising Against the Assad Regime in Syria* (Washington DC: The Washington Institute for Near East Policy, 2013), available at <http://www.washingtoninstitute.org/uploads/Documents/opeds/Zelin20130601-FlashpointReport-v2.pdf>.

The presence of extremist organizations provides another catalyst that is connected with the factions among the Syrian rebels. Among these extremist organizations is the Lebanese terrorist group Fatah al-Islam, which lost several key leaders in fighting around the city of Homs; rogue members from Hezbollah; Hamas; and Jabhat al-Nursa, whose leader (Abu Mohammed al-Joulani) has sworn allegiance to AQ leader Ayman al-Zawahiri.¹³⁴ At least one of these terrorist groups, AQ, has made clear statements that it desires a WMD capability to further its political agenda. These terrorist organizations have placed themselves in the middle of the conflict, disguised as rebels, except Hezbollah. This then allows those groups to take advantage of any situation that presents itself in order to obtain WMD material. Furthermore, it is important to note the existence of state-sponsored terrorists that have influence within the al-Assad regime. Most notably, Hezbollah's leader, Shaykh Hasan Nasrallah, has frequently met face-to-face with Bashar al-Assad in recent years, while his father, Hafez al-Assad (the previous Syrian president), is not known to have ever met with Nasrallah. This demonstrates that the al-Bashar presidency has a greater relationship and dialogue with Hezbollah. In fact, Israeli intelligence reports that the al-Assad government supplied the terrorist group with advanced tactical rockets in 2002.¹³⁵ If the regime is willing to openly supply Hezbollah, a known terrorist organization, with that kind of weaponry, what is to stop the regime from supplying WMDs or WMD material without the international community knowing? It is true that no state has done this to date, as far as is known, but there are already allegations stating that al-Assad has begun moving chemical weapons and associated materials into the hands of Hezbollah.

Brigadier General Zaher al-Sakat was a chemical specialist with the Syrian Fifth Army, where he was in command of chemical weapons. He defected after disobeying orders to use those weapons. In an interview on September 21, 2013, he claimed that the al-Assad regime is transferring chemical weapons to Hezbollah in Lebanon and also to Iran. He further cites that rebels discovered 28 heavily guarded trucks moving from Jdeet

134 Zelin et al., "Convoy of Martyrs in the Levant."

135 Zisser, "Syria and the Question of WMD," 6.

Yabous, Syria to Lebanon and another 50 trucks moving into Iraq.¹³⁶ Brigadier General Sakat asserts that these 28 trucks were transporting WMD material, but they could very well have been used to transfer other sensitive material not related to WMDs. There is no further information on what happened to the vehicles or what they contained, or any other information that corroborates the allegations that al-Assad is, in fact, moving chemical weapons to Iran and Hezbollah. Yet, the movement does raise suspicion of the al-Assad regime.

U.S. Secretary of Defense Chuck Hagel warned the Senate Foreign Relations Committee that, “If Assad is prepared to use chemical weapons against his own people, we have to be concerned that terrorist groups like Hezbollah, which has forces in Syria supporting the Assad regime, could acquire and would use them.”¹³⁷ The fact that al-Assad has a close relationship with Hezbollah’s leader, along with Brigadier General Sakat’s statements that Syria is already moving WMDs into the hand of Hezbollah, and Secretary Hagel’s warning to the Senate all lend credibility to the theory that al-Assad could transfer material and weapons to entities outside of the country. Moreover, Syrian scientists that possess CBRN training could also be persuaded to join the cause of terrorist groups fighting in Syria or forced to join these organizations, which would be just as serious of a security risk for the international community. AQ has ambitions to obtain WMDs. In addition to AQ’s ambitions, Hezbollah already possesses missiles capable of carrying chemical and biological warheads.¹³⁸ It also stands in staunch opposition to Israeli and U.S. policies within the Middle East.¹³⁹ While there are no public statements that Hezbollah desires WMDs, the potential acquisition of chemical warheads could add the military might behind any threats and/or negotiations the group makes.

¹³⁶ Ryan Mauro, “Syrian Defector: Assad Moved Chemical Weapons, Hiding Sites,” last modified October 3, 2013, The Clarion Project, <http://www.clarionproject.org/analysis/syrian-defector-assad-moved-chemical-weapons-hiding-sites>.

¹³⁷ *The Authorization of Use of Force in Syria: Hearing Before the Senate Committee on Foreign Relations*, 113th Congress, 1st Sess. (2013) (statement of Chuck Hagel, Secretary of Defense).

¹³⁸ “Gates Warns of Hezbollah WMD Threat,” last modified May 25, 2011, Nuclear Threat Initiative, <http://www.nti.org/gsn/article/gates-warns-of-hezbollah-wmd-threat/>.

¹³⁹ Casey L. Addis and Christopher M. Blanchard, *Hezbollah: Background Issues for Congress* (CRS Report R41446) (Washington, DC: Library of Congress, Congressional Research Service, 2011), 11.

The next catalyst, a lack of any kind of WMD inventory, offers nonstate actors a window of opportunity to exploit the weaknesses of the current regime in order to gain WMD material. Syria's WMD program has been progressing in extreme secrecy over the years. In fact, as mentioned previously, there is very little open source information that details what the country actually possesses and how far along its chemical, biological, and nuclear research programs have come. With facilities spread out around the country, there is no complete inventory of WMD material that exists for the international community. As mentioned earlier, Syria did agree to allow international control of its chemical weapons stockpile, the inspectors announced November 7, 2013 that they had verified the destruction of weapons at 22 of 23 of Syria's declared chemical weapons sites, but it is very unlikely that the Syrian government will hand over a complete inventory list of all of its WMD assets.¹⁴⁰ Even if the country does hand over an inventory, there is no telling if it will be accurate.

There are so many unknowns in what exactly Syria possesses and where their facilities are actually located that inspectors may not ever discover the true extent of all their weapons. Brigadier General Sakat (Syrian Fifth Army defector) states that al-Assad maintains at least four secret chemical sites in addition to the 30 sites that the Syrian government has already disclosed to inspectors.¹⁴¹ Moreover, the Syrian WMD program has been built on deception and concealment since its inception. There is no evidence to support a claim that Syria has an interest in full disclosure of its WMD facilities. If Syria does not disclose all locations of its WMD facilities, this would leave unknown facilities and material out of the reach of inspectors.¹⁴²

Also, the number of personnel needed to effectively search and inspect weapons is potentially greater than the UN's capability due to the sheer size of Syria and the number of potential WMD sites. The UN Secretary General stated that the UN was

¹⁴⁰ Alan Cowell and Rick Gladstone, "Inspectors in Syria Have Only One Site Left to Check," *New York Times*, November 7, 2013, http://www.nytimes.com/2013/11/08/world/middleeast/syria.html?_r=0.

¹⁴¹ Mauro, "Syrian Defector."

¹⁴² Dore Gold, "What Might Be Expected in Monitoring Syria: Lessons from Past Middle East Weapons Inspections," *Jerusalem Center for Public Affairs* 13, no. 25 (2013), <http://jcpa.org/article/what-might-be-expected-in-monitoring-syria-lessons-from-past-middle-east-weapons-inspections/>.

prepared to send in up to 100 experts to dismantle and destroy chemical weapons.¹⁴³ Inspecting every area and every possible site with less than the desirable amount of personnel would take decades; this buys time for the regime to move its weapons around to avoid detection. This lack of personnel could lead to areas being overlooked or not addressed. An assessment on the appropriate number of experts is a necessity in order to establish the personnel requirement. Additionally, there is a great chance that the inspection teams will not discover all the weapons and that some will be left unaccounted for around the country, ripe for acquisition by nonstate actors. The UN News Centre described the difficulty and complex nature of the situation in Syria in an October 9, 2013 interview with UN Secretary-General Ban Ki-moon, where he admitted to the daunting task ahead of weapons inspectors and demonstrated the difficulty of ensuring the destruction of all weapons. The UN official described the situation as:

. . . an operation the likes of which, quite simply, have never been tried before, the Joint mission will be expected to support, monitor and verify the destruction of a complex chemical weapons programme involving multiple sites spread over a country engulfed in violent conflict, which includes approximately 1,000 metric tonnes of chemical weapons, agents and precursors that are dangerous to handle, dangerous to transport and dangerous to destroy.¹⁴⁴

This task is an extreme workload for a team consisting of, at most, 100 people. It will take time, and the longer it takes inspectors to verify WMD sites and destroy those weapons, the longer that those nonstate actors have to make a move. An overwhelmed workforce has the potential to miss things. If there was a record of the weapon's existence and it were to get stolen, the international community would know it is missing and could direct all resources into the recovery of that weapon. If a weapon is stolen without a record of that weapon's existence, this becomes a greater issue of concern.

143 "Security Council Approves joint OPCW-UN Mission to Oversee Destruction of Syria's Chemical Weapons," *UN News Centre*, last modified October 11, 2013, <http://www.un.org/apps/news/story.asp/h%3Cspan%20class='pullme'%3EIn%20short,%20when%20you%20empower%20a%20woman,%20you%20change%20the%20world%3C/span%3Ehttp://www.unfpa.org/html/www.unicef.org/story.asp?NewsID=46250&Cr=syria&Cr1=#.UmLnvxasjww>.

144 "Chemical Watchdog Urges Cooperation in Syria to Carry Out UN-Joint Mission," *UN News Centre*, last modified October 9, 2013, <http://www.un.org/apps/news/story.asp?NewsID=46229#.UmLurRasjww>.

With no record, no one knows that it is missing and the first time that the world becomes aware of its existence could be when the weapon is used against a target in an act of terrorism. Despite weapons inspectors' claims that all facilities have been cleared and inspected, there is still one declared facility that has not been inspected. Additionally, the sites that have been inspected are only the ones that the Syrian government is claiming. There could be undisclosed locations that Syria is maintaining secrecy about. Furthering this point is the fact that Syria's borders are poorly managed. Over the last two years, 1.5 million refugees have flooded out of Syria during the course of the civil war.¹⁴⁵ Additionally, it is estimated that over 6,000 foreign fighters have crossed the borders into Syria in order to participate in the struggle.¹⁴⁶ This demonstrates the porous nature of Syria's borders. This is an advantage for nonstate actors because if they were to acquire WMD material it could easily be smuggled through the poorly defended and weakly regulated borders and out of the region.¹⁴⁷ This was another point that was demonstrated in the LTTE case study, as the Tamil Tigers had freedom of movement from Sri Lanka to the Tamil Nadu region in India. This allowed them to traffic weapons, personnel, and other resources to further their fight against the state.

The final catalyst is the simple fact that Syria had a robust presence of chemical weapons prior to the entry of weapon inspection teams from the Organization for the Prohibition of Chemical Weapons (OPCW). As previously mentioned, these inspection teams left one site unaccounted for and only inspected the sites that the Syrian government declared. This leaves the unaccounted site and any additional undeclared WMD material at risk within the country. Furthermore, the Syrian WMD program has the potential to include limited biological and radiological material within its borders. The number of WMDs and material sites, combined with the fact that there are terrorist

¹⁴⁵ "Syria Regional Refugee Response," United Nations High Commissioner for Refugees, September 27, 2013, accessed October 4, 2013, <http://data.unhcr.org/syrianrefugees/regional.php/download.php?id=2868>.

¹⁴⁶ Annie Barnard and Eric Schmitt, "As Foreign Fighters Flood Syria, Fears of a New Extremist Haven," *New York Times*, August 8, 2013, accessed October 4, 2013, <http://www.nytimes.com/2013/08/09/world/middleeast/as-foreign-fighters-flood-syria-fears-of-a-new-extremist-haven.html?pagewanted=all>.

¹⁴⁷ Stephen Hummel, "The Risk of Non-State Actors Acquiring Chemical Weapons in Syria," *The Sentinel* 6, no. 2 (2013): 1.

organizations within the rebel army, provides ample opportunity for WMD material acquisition. While the deal made for international control of chemical weapons was agreed upon by the al-Assad regime, there is no agreement right now to take control of the other critical sites. The Chinese-built nuclear research reactor (SRR-1), the Der al-Hadjar Nuclear Research Center, the Scientific Studies and Research Center in Damascus, and the biological R&D facilities are just a few of the known facilities that provide prime targets for these terrorist groups, especially in a deteriorating security environment. Material that is gained from any of these facilities is just as dangerous as the acquisition of a chemical weapon.

Intelligence reports may only suggest that Syria's biological program is in the R&D phase, but if a terrorist organization were to steal biological agents or disease samples it could still be disastrous. If terrorist organizations were to acquire biological samples of agents, this does not mean that the terrorist group has acquired biological weapons. It does mean, however, that the group has acquired a different mode to create panic and terror among a targeted populace. For example, terrorists could infect several individuals with diseases procured at these facilities and release them into the public (rudimentary dispersal device). While not all agents are as easy to disperse as this, it provides an example of how these samples could be made deadly. This poses a serious political and world health issue, not just a security issue.

Additionally, the nuclear research centers that are creating medical, agricultural, and industrial radiological isotopes provide terrorists with the means to create a radiological dispersal device (RDD); much like when Chechen rebels created an RDD out of stolen Cesium-137 and buried it with explosives in Moscow's Izmailovskiy Park.¹⁴⁸ City planners were faced with the issues of evacuating the park area and setting up a recovery team to safely recover the Cesium-137 without exceeding radiation limits on the human body. It became a hazardous materials problem for the city and federal government. Again, it is important to note here that the acquisition of radiological sources does not mean that terrorist groups would obtain nuclear weapons, but, rather,

¹⁴⁸ Bale, "The Chechen Resistance and Radiological Terrorism."

another method to terrorize. Leaving radiological isotopes bundled with explosives or alone by themselves in a public setting creates fear and panic among the populace. More importantly, it becomes a political situation where local/federal governments have to evacuate entire cities or sizable areas. Moreover, scientists that have training in WMDs are also in jeopardy. Scientists that are kidnapped by terrorist groups could provide those groups with an advanced capability to make rudimentary WMD devices that could then be used against government targets. The mere existence of Syria's WMD materials creates a risk for the world. The fact that Syria is engaged in a brutal civil war, that terrorist organizations are operating within Syria's borders, and the existence of this material creates an extremely sensitive and dangerous situation for the international community.

The situation unfolding in Syria presents the world with a unique set of issues. The previous case studies provide us with pivotal areas to investigate and questions to ask. In the case of Aum Shinrikyo, materials were acquired from an outside actor, where the security infrastructure had deteriorated significantly (Russia) and corrupt officials were willing to sell critical WMD materials and training to the highest bidder. This gives us insight into where Syria could be heading. If the regime fails or is weakened significantly, as previous scenarios suggest, then the world could very well expect to see a similar situation arise, in that Syrian officials in charge of WMD stockpiles might be willing to negotiate with nonstate actors for the purchase of WMDs or WMD material. Moreover, Aum Shinrikyo struggled with creating an effective delivery system for their chemical and biological agents, but in Syria terrorists may have the opportunity to acquire fully functional WMDs.

This makes the situation in Syria all the more dangerous and requires serious action. The Syrian situation is worth studying because if the situation resolves itself and the al-Assad regime remains in power without serious and drastic reforms, the rebels are likely to rise up again, thus re-creating the precarious situation that exists now. Syria is currently ranked twenty-first of 178 countries on the failed state index-indicating that it is

likely to become a failed state.¹⁴⁹ This suggests the need for either a new government or reforms, and should neither of these happen then it is likely that Syria would remain in a state of civil war. If the rebels are successful in ousting the current government, then the international community needs to ensure the safe transition of WMD material to a new regime and provide oversight to be certain that all WMD weapons are accounted for and secure to the best of its ability. Without this oversight, the international community risks having WMDs or associated materials fall into the hands of nonstate actors.

The above case studies demonstrate that there are terrorist organizations that desire a WMD capability and each terrorist group may be constrained by different aspects that are required in order to achieve this goal. The three terrorist organizations that were studied in this thesis provide insights into what a terrorist group might require in order to obtain a WMD capability. Aum Shinrikyo, arguably, has been considered the most successful in its production of WMD but was still constrained by manufacturing an effective delivery system for its chemical and biological agents. Aum had successfully acquired CBRN material, constructed the appropriate facilities, recruited top scientists in their respective fields, and had the intent to produce and use such weapons. The group faltered on delivering its chemical and biological arsenal among the populace. This suggests that there is a significant technological leap that must be made from producing the CBRN material and creating a delivery system, one that Aum could not make.

The LTTE was constrained by all the factors except for the possibility that it did maintain appropriate facilities that would act as safe havens for the extremists group. It is important to note that the LTTE severely lacked the intent to use or actively acquire such weapons. There is no documented rhetoric among its leaders stating a WMD desire. The group only used chemical material as weapons in extremis situations. Finally, while AQ has the intent to obtain and use WMDs against state actors, it has not overcome the other

149 "Failed States: An Annual Special Report by Foreign Policy and the Fund for Peace," *Foreign Policy*, accessed October 4, 2013, http://www.foreignpolicy.com/articles/2013/06/24/2013_failed_states_interactive_map.

constraints of recruiting the right personnel, obtaining the required materials, establishing designated facilities, or being able to make the technological leap in creating an effective delivery system.

The Syrian situation provides serious implications for states combating the proliferation of WMDs and CBRN material. Since Syria is embroiled in a civil war with a rebel force, many of its WMD stockpiles are in serious danger of acquisition from nonstate actors. Prior to the OPCW intervention, Syria possessed a robust presence of chemical weapons that were fully operational and, while the majority of those weapons have been claimed dismantled and destroyed, one facility remains unaccounted for, in addition to any facilities that the Syrian government has chosen not to disclose. The opportunity for nonstate actors to acquire this material allows the group to bypass some of the constraints. For example, stealing a fully operational chemical weapon allows a terrorist group to bypass the production stage of a delivery system and the constraint of acquiring the necessary materials to manufacture that weapon. The delivery system constraint was the only stage that held Aum Shinrikyo's casualty rate low. Had the group been able to bypass this stage it could have inflicted much higher casualties. Syria presents a lucrative opportunity to any terrorist group. Such a group, with or without a longstanding interest in WMDs, might, in extremis, find WMDs more attractive if they had an opportunity like the situation in Syria to exploit.

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