

Weapons of Mass Destruction and the Next Terror Attack

M Matusiak

Citation

M Matusiak. *Weapons of Mass Destruction and the Next Terror Attack*. The Internet Journal of Rescue and Disaster Medicine. 2008 Volume 8 Number 2.

Abstract

The desires of terror organizations to possess and use weapons of mass destruction have sparked conversations in various communities across the globe. Research has shown that weapons of mass destruction have been used by various loosely supported groups in recent years; to include acts in Chechnya, North Korea and others. As of now, biological and radiological weapons possessions are still somewhat vague and unconfirmed by public records. This paper will also explore the probable use of the type of weapon of mass destruction agent, the availability of the agent to a terror organization and the objectives of a terror organization's use of a weapon of mass destruction on a population, based on public information. The author realizes that public information may not contain all necessary information, but believes enough information exists to produce a valid conclusion.

INTRODUCTION

The desires of terror organizations to possess and use weapons of mass destruction (WMD) have sparked conversations in various communities across the globe. Various reports, no matter how factual the information, have been reported in the mainstream media claiming WMD use and injuries associated with a WMD use. How a community responds to a possible WMD release or threat of release weighs heavily on the mind of emergency preparedness personnel. This paper will research, explore and give a detailed assessment of how a significant WMD attack might be conducted in the United States. This paper will also explore the probable use of the type of WMD agent, the availability of the agent to a terror organization and the objectives of a terror organization's use of a WMD weapon.

LITERATURE REVIEW

TERROR AS THE OBJECTIVE

One way to conceptualize terrorism is "communication amplified by violence."¹ Since the bombing of Japan in World War II, the killing power of a nuclear device has been widely understood and generally feared by people. Furthermore, since chemical weapons were introduced, such as chlorine gas, in World War I, the objective of possessing a WMD has been at the fore-front of government and now terror objectives.

Terror organizations and their structures have rapidly and

more widely developed in the past several decades. The organization has moved to "one that has no political or social objectives," making the analysis of whether a WMD will or will not be used more unclear and difficult to determine.² Furthermore, terror organizations have moved from state sponsored organizations to those independent of a country's influence; from demanding money, political freedom for individuals or groups of individuals, or the overthrow of a political regime to ones whose only objective is to inflict pain and fear among the target's population.² The idea of analyzing the next steps or target population for the possible use of a WMD becomes one of analyzing how an organized crime network reacts to varying pressures and tactics by law enforcement.

The idea of a terror organization using a WMD strikes fear directly into its intended target population. "Violence without publicity is ineffective," so terror organizations must be ready to claim the most feared weapon created by humankind.¹ Additionally, a terror organization must be ready to prove that such a weapon of mass destruction is in its possession.

A specific point to consider is the impact that the use of a WMD will have on the terror organization's overall objective. As shown in the Aum Shinrikyo's March 1995 use of sarin gas in a Tokyo subway, the number of deaths and injuries directly related to the WMDs use were highly exaggerated.³ Furthermore, the public view of Aum

Shinrikyo changed from a nuisance organization to one capable of doing great harm to the Japanese people. ³ If an objective is to change some thing, having the support of the public is vital. Negative publicity and exaggeration of actual events certainly becomes a detractor to the terror organization's message or cause.

The major objective of the new terror organization is to instill a sense of fear in a population. High profile attacks can and do produce an initial reaction of fear, but rarely have the impact desired by the terror organization. As seen in the aftermath of the September 11, 2001, World Trade Center (WTC) bombing, the United States did see a period of fear, though not extending a considerable length. In fact, the WTC bombing did not cause the United States to "withdraw from Saudi Arabia and other Muslim countries" and certainly increased the United State's resolve to combat terrorism. ³ Furthermore, the Aum Shinrikyo sarin gas attack in Tokyo failed to persuade the Japanese people to overthrow their government. ³ Fear must be maintained for such organizations to persuade a population to their cause. To date, WMD attacks have not been successful in sustaining the quantity of fear necessary to make populations change political or socio-cultural positions.

Of equal concern is the lack of a deterrence method's effectiveness on non-state sponsored or controlled terror organizations. Deterrence is the act of preventing or persuading to not use or do something by some use of power. ⁴ The problem with deterrence is the normal uses of political power do not work against a non-state entity. ⁴ For example, who do you attack in retaliation for a terror incident (deterrence by punishment and isolation)? How do you block a location from receiving materials that could be used against a country's population (deterrence by denial of materials)? A non-state sponsored or controlled terror organization does not fit the current methods of deterrence used and perfected against countries.

Furthermore, in 1999, the Monterey WMD Terrorism Database showed 175 entries of WMD use or hoaxes threatening WMD use globally. ⁵ A closer review shows that only 39 entries were for actual use of a WMD's agent and the remaining were threatened use, possession of, or other non-action uses. ⁵ The 1999 statistics do reveal the desire for some terror and non-terror organizations to possess or claim possession of, and possibly use WMD against a target population.

If one looks at fear being the overall objective of the new

terror organization, possession of a WMD, providing proof of possessing a WMD, and the threat of use of the WMD will strike fear into a population. That potential to strike fear, and subsequently cause a change in policy or position of a government, may be the one driving factor for terror organizations to claim or attempt to possess (or in some cases generate) WMDs.

DEFINING THE WMD WEAPON OF CHOICE

A major concern as it relates to whether a terror organization will or will not use a weapon of mass destruction (WMD) is the varied definitions of what is a Chemical, Biological, Radiological or Nuclear (CBRN) weapon or device. If you think about a release of a chemical (such as chlorine or anhydrous ammonia) that reduces the amount of oxygen below the 19% needed for human survival, would that be a chemical agent? Accepting a wide definition of a CBRN weapon which causes mass casualties logically means terror organizations must have CBRN capabilities as many of these items (especially chemicals) are readily accessible.

Related to the concern of determining what a CBRN is the problematic definition of chemical weapons. Many experts only relate the term to those high end chemical compounds, such as sarin or VX gas. ⁵ However, the likelihood of a terror organization possessing these high end compounds is rare. However, many low end chemical compounds, such as commonly acquired industrial chemicals, are widely available and may be in the possession of terror organizations. ⁵ The distinction between high end and low end chemical compounds is important as the literature is vague when discussing what chemical compounds are being researched for possible possession by terror organizations.

According to Howlett and Littlewood's assessment, CBRN has been used by various loosely supported groups in recent years; to include acts in Chechnya, North Korea and others. ² Furthermore, a conclusion extrapolated from public records and evidence showed "that when particular groups have used CBRN, the primary weapons of choice have been chemical (CW)." ⁶ For now, conclusions can be made that terror organizations possess chemical weapons. As of now, biological and radiological weapons possessions are still somewhat vague and unconfirmed by public records.

Another interesting point is the number of casualties resulting from terror organizations using WMD weapons: "largest death toll from a chemical or biological attack is twelve" and over 90% of the cases where chemical or biological substances were used, the attack resulted in killing

or injuring “three or fewer people.”³ In contrast, widely available chemical compounds, such as those used in manufacturing and agriculture, have killed or injured thousands, as seen in the “1984 Bhopal, India incident where 3,800 died and 11,000 were injured in a matter of hours.”⁷ If a terror organization’s objective is the widespread death of a population, current uses of WMD (high end or military grade weapons) by terror organizations have lacked the killing capacity industrial chemicals or low end WMDs have on a population.

Networking, funding and technological and scientific resources needed to make, store, transport and use WMD becomes self-limiting as many terror organizations lack these resources.⁸ Only a very few non-state sponsored organizations, such as al-Qa’ida, have the resources available to develop, store, transport and deliver high end or military grade WMDs.⁸ Therefore, the possibility of a terror organization having the capabilities of a high end or military grade WMDs or the resources to possess a high end or military grade WMDs is low, making its use extremely rare.

The overall conclusion as this paper defines the WMD weapon of choice would not be a high end or military grade WMD. The obstacles for acquiring, possessing, transporting, etc. these high end or military grade WMDs are too great for a non-state sponsored organization. Only a very few well networked and well funded terror organizations, such as al-Qa’ida, have the resources to conduct high end or military grade WMD attacks.

THE WMD WEAPON OF CHOICE – THE CHEMICAL WEAPON

The United States and other countries have been dealing with chemical incidents since the start of the Industrial Revolution. “Emergency services have dealt with numerous chemical incidents caused by either accidents or deliberate contamination.”⁹ Additionally, the World Health Organization’s guidance on biological and chemical weapons clearly shows their belief that common, low end or industrial chemical agents are of a greater concern than high end or military grade chemical weapons.¹⁰ In a brief statement, the World Health Organization stated

there is a somewhat similar lesson in the fact that the chemical agent that has thus far figured most commonly in deliberate releases in the United States has been not some deadly nerve gas, but butyric acid, which is a malodorant.¹⁰

This statement by the World Health Organization shows the

concern by public health authorities on readily available chemicals and their possible possession and use by terror organizations.

A significant point to consider is the broad definition of chemical weapons. To reiterate, chemical weapons range in compounds from those widely available chemical compounds, such as those used in manufacturing and agriculture, to high end or military grade weapons. According to the 1993 Chemical Weapons Convention, any chemical causing a disruption of life activities is considered a chemical weapon.⁹ Terror organizations have used chemical agents on populations in recent times. For example, Aum Shinrikyo’s use of sarin gas in a Tokyo subway in 1995,⁹ and two remarkable events in 2003, one in Michigan where an individual sprayed ground beef with an insecticide and the other in South Carolina where an individual left ricin at a postal facility.¹¹ With such a variety of chemicals available for commercial use, terror organizations have the capability and access to chemicals that would be classified as chemical weapons. If terror organizations have access to low end or industrial chemicals, they have and do use them as a weapon.

Furthermore, research has shown that low end or industrial chemical agents tend to be the weapon of choice for terror organizations.⁶ The chemical agents are readily accessible, many chemicals are used in facilities where storage and security measures are questionable or lax, and many chemicals have been used in the past by terror organizations. However, one must realize most terror organizations use readily available chemicals and “increases in the number of casualties and disruptions have been achieved with conventional rather than CBRN weapons.”⁹ Consequently, even if chemicals are the choice of agents for terror organizations, most prefer explosives over chemical. Will this use of explosives on a chemical storage facility be the next target for terror organizations?

THE TARGET, CHEMICAL MANUFACTURING IN THE US

Remember the attack on the Federal Building in Oklahoma in the late 1990s? Fear spread through the entire United States about how a terror organization could mastermind an attack in the heartland. People started to wonder if another attack was possible in the Heartland, and how the United States was going to be prepared for such an attack. The author of this paper submits that an attack in the Heartland is possible, and chemical manufacturing and storage facilities

will be the next target for a major terror organization.

Chemicals are a part of life in the United States and throughout the world. Chemicals are used in a variety of products and businesses, such as agriculture, manufacturing, refining, pharmaceutical production, waste and water treatment, to name a few. ¹² The safety of these chemicals and the security of manufacturing facilities have sparked discussion in the United States government and private sectors since the World Trade Center attack in 2001. In the course of researching this topic, I discovered varying opinions and facts; but I feel with such a variety of opinions, the risk may be real for these facilities to be possible terror organization targets.

One area of debate is whether chemical manufacturing facilities are safe. A report from Eben Kaplan suggests that experts disagree on the answer. ¹² Kaplan's research describes a reporter walking into a chemical facility, without being challenged by security, and was even given directions to highly sensitive facility location. ¹² In contrast, the research also suggested that a lapse of security by a single or few facilities cannot be the catalyst for concern, as the "industry policies itself are extremely vigorously." ¹² Additionally, at a chemical plant security summit, previous Department of Homeland Security Secretary Michael Chertoff stated "I don't need to tell you the consequences of ignoring a clear warning about securing dangerous chemicals". ¹³ Another report suggests that "current chemical security efforts ... are inadequate to protect workplaces and communities." ¹⁴ This disagreement among experts causes public concern about chemical manufacturing security.

One of the disagreements in the debate is whether a chemical manufacturing facility in the United States has actually been attacked or the target of an attack, or is the hype just about fear and government intrusion into the private sector. According to a Government Accounting Office report, the Department of Justice has been concerned about attacks on chemical facilities since the early 1980s. ¹⁵ The report further goes on to reveal that "domestic terrorists plotted to use a destructive device against a U.S. facility that housed millions of gallons of propane in the late 1990s." ¹⁵ Another report suggests that convicted World Trade Center bomber Nidal Ayyad used his position at a chemical manufacturing facility to illegally obtain cyanide for use by his terror organization. ¹²

Another argument suggests that chemical manufacturing facilities are not located in densely populated areas or would

not cause massive casualties if a release happened.

According to the Environmental Protection Agency, 15,000 facilities produce chemicals harmful if released and the Department of Justice suggests that 7,000 of these facilities are located near populations greater than 1 million. ¹² Another report suggests the top 101 dangerous chemical facilities are located in dense population areas ranging from 996,117 to 12,000,000 people, affecting a total of 80 million people across 30 states. ¹⁴ A report from the U.S. Army Surgeon General suggested that an attack on a chemical facility near a populated area could kill or injure 2.4 million people. ¹² Additionally, the Department of Homeland Security has suggested "a major chlorine gas spill [release by terror or non-terror means] in an urban area could kill 17,500 people." ¹⁶ These reports suggest that chemical facilities are located near densely populated areas and a terror organization could cause mass casualties attacking these facilities.

Current developments in facility security and chemical safety have lessened the possibility that terror organizations will attempt an attack on a chemical facility. Since the 1984 Union Carbide chemical release in Bhopal, India, Congress has become concerned about regulating chemical manufacturing in the United States. ¹² Furthermore, subsequent federal legislation has required states and local governments to have an emergency plan in the event that chemicals from manufacturing facilities were released and for manufactures to have a Risk Management Plan to identify shortcomings in security and safeguard chemicals in their possessions. ¹²

However, many critics argue that "there is no clear, unambiguous legal or regulatory authority at the federal level to help ensure comprehensive, uniform security standards for chemical facilities." ¹² Others call the current efforts by the Bush Administration as a "piecemeal" effort and accuse the Administration and Congress of "bowing to the wishes of the chemical industry behind closed doors to negotiate the weak, inadequate language." ¹² Others claim the current regulations offer an "off-site consequence analysis," allowing the public, governmental agencies and facilities to ensure safety and security standards are met or exceeded. ¹⁴

The previous argument emphasizes how low end or industrial chemicals may be a target for terror organizations. Chemical facilities are located near densely populated areas, allowing an attack to have the fear desired by a terror

organization. Furthermore, facilities near densely populated areas have the ability to cause massive casualties in an attack, extending the fear from a localized event to a nationwide event, as chemical facilities are located across the United States. In addition, the debate over the security and governmental or industry standards of chemical facilities does allow the possibility for an attack to be successful, as security plans may not be as widely used or in place as the industry suggests.

CHEMICALS: THE ACQUISITION OF CHEMICAL AGENTS

THE CHEMICAL MANUFACTURING FACILITY

Terror organizations have the option of attacking a facility to cause fear and mass casualties or obtaining low end chemicals for future WMD use.¹²

A chemical release from a direct attack of future use is a concern for chemical manufactures and companies. The temporary standards enacted by the Department of Homeland Security raise concerns, as they focus “almost entirely on physical measures, such as adding gates and guards.”¹⁴ Does the addition of a gate or guard provide enough incentive to stop a terror organization? Orum suggests that “the only certain way to protect our communities is to remove the possibility of toxic gas release by converting facilities to safer, more secure alternative technologies.”¹⁴

As has been previously reported, safety and security of chemical manufacturing facilities are of a concern, ambiguous in development and implementation, open for discussion or alteration with governmental agencies and a concern, allowing terror organizations to see these facilities as viable options. All these reasons suggest an attack on a chemical manufacturing facility is possible, and the risk is somewhat high that an attack is planned or being carried out at this time.

However, is an attack on chemical facilities the only way for a terror organization to use low end or industrial chemicals in an attack or a way to acquire chemical agents? The answer for this question is no, as chemicals must be transferred to a facility for them to be processed, combined or manufactured.

TRANSPORTATION OF CHEMICALS

More than 90% of the most dangerous facilities transport chemicals by rail.¹⁴ Over 80% of these facilities receive shipments of toxic gas chemicals, which if released can

cause medical problems if inhaled.¹⁴ Furthermore, current regulations state chemical manufacturing facilities are only responsible for chemical safety when chemicals are in the facility, not during transport.¹⁴ Therefore, what prevents a terror organization from attacking chemicals in transit, by rail or other methods?

The Association of American Railroads understands the high risk that shipments of chemicals can be attacked in transit.¹⁷ Furthermore, the Association of American Railroads estimates that 1.7 to 1.8 million carloads of hazardous chemicals are transported annually by rail and about 0.3% of the carloads are “especially hazardous” chemicals which may cause inhalation issues if released.¹⁸ Although the railroad industry knows of the problem and risk of attack, what is the industry doing to protect the public from an attack?

A cause for alarm is that “hazardous chemicals are delivered by rail and road ... through almost every major American city and town.”¹⁴ Another complication is that “today, the federal government requires railroad to transport TIH materials [toxic chemicals], whether railroads want to or not.”¹⁸ The current federal requirement that the railroad industry must transport hazardous materials is not made of any other transportation sector/industry in the United States.¹⁸

In November 2008, the United States Department of Transportation created a final rule requiring railroads to transport toxic chemicals “on the safest and most secure rail lines.”¹⁸ Many of the provisions looked at the security and safety of tanker cars carrying hazardous materials, routes and assessment of alternative routes for hazardous materials and proposed a 27 point assessment for possible routes.¹⁹ The new rule is meant to strengthen the safety of hazardous material transportation to ensure consistent and safety delivery of these chemicals.

Although the rule is set to be implemented by 2009, various organizations have called for further revisions. The AFL-CIO, in a public comment to the proposed rule, outlined several concerns. First, the rule does not call for a plan to train employees on security and threat assessment.²⁰ The AFL-CIO was concerned that employees will not know when and what constitutes an emergency or terror organization threat and tampering of hazardous materials railcars. Another concern was the lack of the plan to recognize the failure of railroad employees reporting suspicious activities due to management pressures.²⁰

Concerns will continue to be raised, but having a plan to start from is better than no plan at all.

Chemical transportation by rail has the potential to attract terror organization's attention as a means to acquire low end WMDs.

DISCUSSION

The paper was designed to answer a variety of questions. The author would like to take each question separately and answer it. The author wants to ensure that the reader understands the specifics of each question, due to the complexity of this paper.

First, is the threat of a terror organization to acquire, possess and use WMDs real? Yes, in this author's opinion the threat is real. As shown, gaining access to a high end or military grade WMDs may not be feasible for a terror organization. Nonetheless, low end chemicals can be acquired with relative ease - and have been in the past - by terror organizations.

Second, can a terror organization access low end WMDs or industrial chemicals in the United States and cause fear or mass casualties? Again, the answer is yes. As shown, government regulations and industry standards have been called into question by experts. Furthermore, the varying opinion on government regulations and industry standards leaves the author to believe more needs to be done to ensure the public is convinced safety and security of low end WMDs or industrial chemicals occurs in a way that takes the public into consideration.

Third, can a terror organization, if they have the capabilities, target a population with a low end WMDs and cause fear? Again, the answer is yes. As shown, the safety and security of chemicals in facilities and in transport have various challenges, not yet overcome or addressed. The public needs to know chemicals are secure. An accident or intentional release would cause a localized event to spread fear across the 30 states having chemical manufacturing facilities in them; thus ensuring a terror organization meets its objectives.

Finally, can a terror organization, if they have the capabilities, target a population with a low end WMDs and cause mass casualties? Unfortunately again, the answer is yes. As shown, chemical manufacturing facilities are located in many densely populated areas. Furthermore, chemical transportation by rail has various challenges that have yet to

be overcome by the government or industry. Additionally, chemicals transported by rail are a viable target for terror organizations, as the railroads are required to transport these chemicals, rail lines go through major cities, and how can you secure so many miles of rail? An accident or intentional release of a hazardous chemical in an urban area is capable of causing fear and mass casualties.

CONCLUSION

The general view of what a terror organization will or will not do is no longer applicable to this debate. Society and governments must continuously be vigilant for those terror organizations whose only goal is to kill indiscriminately and instill fear. Those rogue or non-state sponsored or controlled terror organizations may have the ability, lack of self efficacy and lack of concern for public outcry to use weapons of mass destruction on a target population. Such terror organizations, in this author's opinion, are the ones that require the most concern of society and governments.

The major consideration for government officials must be the out of the box thinking employed by terror organizations. From the data presented in this paper, the likelihood of a terror organization's use of a high end or military grade weapons of mass destruction on a target population is low. However, the author will not go so far to say the use of a weapon of mass destruction will not happen or that the risk of use is so low that efforts should not be taken to address the problem. Public pressures, access to available resources, and overall lethality of current weapons of mass destruction attack all suggest and support the low risk conclusion.

Generally, an acceptance exists that weapons of mass destruction (mainly low end agents) are in the possession of terror organizations. Furthermore, the ability of terror organizations to manufacture high end or military grade WMDs on a large scale, disperse them on a population to create mass casualties and have the technological abilities to do so are challenges terror organizations have not overcome. Furthermore, increasing security around chemical manufacturing facilities and their transportation routes will deter a terror organization's option for its use. However, this deterrence will not stop the terror organizations resolve to obtain what scares people, a weapon of mass destruction; in the case present, that weapon is a low end WMD chemical device.

Nonetheless, governments need to be prepared for possible use of low end WMD chemical agents. A government cannot assume that since a terror organization has not used a low

end chemical agent in a major attack yet that they will not in the future. If a government is not prepared, a terror organization may seize the opportunity and wreak havoc on a population.

References

1. Martin B. 2007. Nuclear Power and Antiterrorism: Obscuring the Policy Contradictions. Prometheus [online], 25(1), March 2007. Available: EBSCO host database. [01 February 2009]
2. Purcell J and Weintraub J. 2005. Topics in Terrorism: Toward a Transatlantic Consensus of the Nature of the Threat. [online] Available: <http://www.acus.org/publication/topics-terrorism-toward-transatlantic-consensus-nature-threat> [15 January 2009]
3. Smithson A. 2005. Observations on the Nature of the Terrorist Threat. In Topics in Terrorism: Toward a Transatlantic Consensus of the Nature of the Threat. [online] Available: <http://www.acus.org/publication/topics-terrorism-toward-transatlantic-consensus-nature-threat> [15 January 2009]
4. Auerswald D. 2006. Deterring Non-state WMD Attacks. Political Science Quarterly [online], 121(4). Available: EBSCO host database. [01 February 2009]
5. Cameron G, Pate J, McCauley D, and DeFazio L. 2000. 1999 WMD Terrorism Chronology: Incidents Involving Sub-National Actor and Chemical, Biological, Radiological and Nuclear Materials. The Nonproliferation Review 7(2).
6. Dolinik, A. 2003. Die and Let Die: Exploring the Links Between Suicide Terrorism and Terrorist Use of Chemical, Biological and Nuclear Weapons. Studies in Conflict and Terrorism 26(1), p. 31.
7. McFadden R. 1984. India Disaster: Chronicle of Nightmare. The New York Times.
8. Dolinik A. 2001. America's Worst Nightmare? Osama bin Laden and Weapons of Mass Destruction. PRI Center.
9. Howlett D and Littlewood J. 2005. Future Terrorist Weapons. In Topics in Terrorism: Toward a Transatlantic Consensus of the Nature of the Threat. [online] Available: <http://www.acus.org/publication/topics-terrorism-toward-transatlantic-consensus-nature-threat> [15 January 2009]
10. World Health Organization. 2004. Public Health Response to Biological and Chemical Weapons, WHO Guidance. Geneva: WHO Press
11. James Martin Center for Nonproliferation Studies. 2006. Agro-terrorism, Chronology of CBW Targeting Agriculture and Food Systems 1915-2006. [online] Available: <http://cns.miis.edu/research/cbw/agchron.htm> [14 February 2009]
12. Kaplan, E. 2009. Targets for Terrorists: Chemical Facilities. Council on Foreign Relations. [online] Available: http://www.cfr.org/publication/12207/targets_for_terrorists.html?breadcrumb=%2Fissue%2F452%2Ftargets_for_terrorists [25 February 2009]
13. Sissell K. 2007. DHS Poised to Notify Highest-Risk Plants. Chemical Week [online]. Available: EBSCO host database. [27 February 2009]
14. Orum P. 2008. Chemical Security 101, What you don't have can't leak, or be blown up by terrorists. Center for American Progress. [online] Available: http://www.americanprogress.org/issues/2008/11/chemical_security.html [25 February 2009]
15. Government Accounting Office. 2006. Homeland Security. DHS is taking steps to enhance security at Chemical Facilities, but additional authority is needed. [online] Available: <http://www.gao.gov/new.items/d06150.pdf> [22 February 2009]
16. Department of Homeland Security (2005). National Planning Scenario 8: Chemical Attacks. Retrieved 27 February 2009 from <http://cees.tamtu.edu/covertheborder/TOOLS/NationalPlanningSen.pdf>
17. Association of American Railroads. 2008. In Congress – Transportation Hazardous Materials. [online] Available: <http://www.aar.org/InCongress/HazmatTransport/Hazmat.aspx> [26 February 2009]
18. Association of American Railroads. 2009. Hazmat Transportation by Rail: An Unfair Liability. [online] Available: http://www.aar.org/InCongress/~media/AAR/PositionPapers/Hazmat_Transport_by_Rail_July_2008.ashx. [22 February 2009]
19. United States Department of Transportation. 2008. US Department of Transportation Interim Final Rule: Enhancing Rail Transportation Safety and Security for Hazardous Materials Shipments. [online] Available: <http://www.fra.dot.gov/downloads/PubAffairs/RailHazmatRoutingIFRBackgrounder041608.pdf> [25 February 2009]
20. AFL-CIO. 2007. Transportation Security Administration Proposed Changes to Rail Safety Regulations. [online] Available: ttd.org/index.asp?Type=B_PR&SEC={0EC3FD88-00DC-44B4-8812-F5A49CC673C8}&DE={3E995A1B-2F66-4225-BB4F-44E0D329EADE} [22 February 2009]
- 21.

Author Information

Matthew M. Matusiak

Doctor of Health Science (Nova Southeastern University) Assistant Professor (University of Louisiana at Monroe)