Joint FBI-DHS Bulletin

(U//FOUO) Incidents at Water Treatment and Other Facilities Highlight Chlorine Security Vulnerabilities

11 May 2007

(U) THIS INTELLIGENCE BULLETIN PROVIDES LAW ENFORCEMENT AND OTHER PUBLIC SAFETY OFFICIALS WITH SITUATIONAL AWARENESS CONCERNING INTERNATIONAL AND DOMESTIC TERRORIST TACTICS.

(U) HANDLING NOTICE: Recipients are reminded that FBI Intelligence Bulletins contain sensitive terrorism and counterterrorism information meant for use primarily within the law enforcement and homeland security communities. Such bulletins shall not be released, either in written or oral form, to the media, the general public, or other personnel who do not have a valid need-to-know without prior approval from an authorized FBI official, as such release could jeopardize national security.

(U//FOUO) This intelligence bulletin addresses the weapons of mass destruction (WMD) topic of the NIPF and responds to FBI Intelligence Requirements CBRN-II.A.2, CBRN-II.A.7, CBRN-II.C.1, and CBRN-II.C.2.

(U//FOUO) Between February and April 2007, five break-ins were reported at four different California facilities that house chlorine. A number of thefts and attempted thefts of 150-pound chlorine cylinders[i] have occurred in the United States in the past five years.[1] Some of these incidents are believed to be the result of individuals mistaking the contents of the cylinders for anhydrous ammonia, which is used in the production of

UNCLASSIFIED

(U) One-ton chlorine containers

---

[i] (U) Typical pressurized chlorine cylinders hold either 150 pounds or one ton of chlorine. A 150-pound cylinder is approximately four-to-five feet tall, one foot in diameter, holds 54 liters (approximately 14 gallons) of liquid chlorine, and actually weighs 250 pounds when full. One-ton containers are approximately six to seven feet tall, three feet in diameter, hold 725 liters (approximately 191 gallons) of liquid chlorine, and weigh 3,500 pounds when full. These size containers are generally used for water treatment and industrial purposes and not for swimming pool maintenance.

the street drug methamphetamine.[ii] While thefts of 150-pound cylinders are not uncommon, two of the four California facilities stored large chlorine containers. As of 8 May 2007, investigators had neither established a nexus to terrorism nor determined motives for the break-ins. However, the incidents highlight the vulnerability of chlorine to theft by extremists.

- (U//FOUO) Sometime between 6 and 16 April 2007, two 150-pound chlorine cylinders were stolen from a farm in Lemoore, California.[2] The cylinders were housed in cages secured by padlocks. Neither of the cylinders was full and the farm's owner estimated each contained only 20 to 40 pounds of chlorine. On 17 February 2007, a 150-pound chlorine cylinder was stolen from the same farm.[3]

- (U//FOUO) On 23 March 2007, unidentified individual(s) gained access to the main tank building housing three one-ton storage containers at a water treatment facility in San Bernardino, California.[4] The chain straps of one tank marked "FULL" were cut and left on the floor nearby. The overhead hoist for moving the containers had an independent locking system that was not compromised and the container did not appear to be tampered with. No chlorine tanks were taken, but the individual(s) stole a self-contained breathing apparatus and chlorine tank repair kit.[iii]

UNCLASSIFIED

(U) 150-pound chlorine cylinders at a water treatment facility

- (U//FOUO) On or around 20 February 2007, unidentified individual(s) used bolt cutters and a cutting torch to access a Department of Water and Power facility in Corona, California, which housed a large[iv] chlorine tank for water treatment. Nothing was apparently removed from or tampered with at the facility.[5]

- (U//FOUO) On 6 February 2007, two 20-pound chlorine cylinders were stolen from a company[v] in Upland, California, that provides chlorination services for swimming pools.[6]

(U) Other Thefts of Chlorine from Water Treatment Facilities

[ii] (U) Anhydrous ammonia is normally stored as liquid in pressurized cylinders, similar in size and appearance to chlorine cylinders. Some water treatment facilities keep anhydrous ammonia on site to use in conjunction with chlorine in the water treatment process.

[iii] (U) Chlorine tank repair kits for one-ton containers generally consist of various gaskets, wrenches, screws, and hammers.

[iv] (U) The exact size of the chlorine tank was not reported.

[v] (U) At the facility where the theft took place, chlorine is repackaged from one-ton containers into 20 pound cylinders for use by the company's service staff to chlorinate customer's swimming pools.

(U// FOUO) Fifteen burglaries were reported at water treatment facilities in the United States between October 2005 and December 2006. The majority involved the theft of copper wire or personal property, but three involved the theft of chlorine or a chlorine-related compound.[7] Investigators have found no evidence of a terrorism connection in any of the thefts.

- (U//FOUO) Between 24 and 27 June 2006, a utility trailer containing a 150-pound chlorine cylinder was stolen from a rural water system in Union Parish, Louisiana.

- (U//FOUO) On 5 February 2006, 40 gallons of granular sodium hypochlorite[vi] were stolen from a water treatment facility in Boone County, Iowa. The individual(s) entered the building by using bolt cutters to cut the padlock.

- (U//FOUO) A five-foot long tank of liquid chlorine[vii] was stolen from a remote Iowa water treatment facility in October 2005.

(U) Properties of Chlorine

(U) In 2005 the United States produced over 11 million metric tons of chlorine.[8] Of this amount, five to six percent was used at the approximately 176,000[viii] water treatment facilities in the United States.[9] Chlorine is also used in the production of paper, plastics, dyes, insecticides, and paints. Despite its wide range of industrial uses, chlorine gas is not available in retail outlets and extremists would need to obtain it via theft or fraudulent transaction. Alternatively, terrorists could breach a container at the site where it is being stored or target a shipment while in transit.

(U//FOUO) Chlorine is a greenish-yellow gas at room temperature and has a distinctive pungent, irritating odor. It is normally stored as a liquid in pressurized cylinders. When released from a pressurized cylinder, liquefied chlorine rapidly disperses as a gas to 460 times its original liquid volume.[10] Chlorine gas, which is two and one-half times denser than air, will concentrate in low-lying areas. The effects of a chlorine release would depend on several factors, including the amount released, method of release, climate at the time of and after the release, and local topography. Symptoms of exposure include eye irritation, burning in the throat and nasal tract, and coughing. Although sustained low-level exposure to chlorine gas can result in major health consequences, the gas' distinctive odor is detectable even when present at very low concentrations. This property makes such exposure unlikely.

[vi] (U) Sodium hypochlorite is used as a disinfectant and bleaching agent. While sodium hypochlorite cannot be used directly in an explosive device to produce chlorine, it will produce chlorine gas when heated or mixed with hydrochloric acid. However, this method of release does not pose a significant threat.

[vii] (U) The volume or weight of the cylinder was not reported, however, the length of the container is consistent with a 150-pound cylinder.

[viii] (U) The approximately 176,000 water treatment facilities include 160,000 public water systems and 16,000 publicly owned treatment works (wastewater utilities). EPA frequently cites the number of water treatment facilities as over 53,000 community water systems, which are defined as public water systems that serve at least 25 year-round residents or 15 service connections to year-round residents. This number does not include water systems that service schools, hospitals, and other non-residential facilities. Community water systems are included in the approximately 160,000 public water systems in the United States.

(U) Potential Impacts of a Chlorine Release

(U//FOUO) Exposure to chlorine gas is fatal within 30 minutes at 430 parts per million (ppm) and after only a few minutes at 1,000 ppm.[11]

(U//FOUO) According to DHS Chemical Security Analysis Center computer modeling, the catastrophic outdoor release of chlorine from a 150-pound cylinder would produce lethal concentrations up to 150 meters downwind from the source.[ix] These concentrations would result in the death of 50 percent of a population if exposed for 10 minutes. Lethal concentrations, however, would only last for several minutes until the cloud dispersed. Potentially life threatening[x] and incapacitating[xi] concentrations of chlorine gas would extend up to 0.75 km and 1.8 km, respectively. Duration of exposure at these levels would persist for only 5-20 minutes depending on the location along the path of the cloud and the meteorological conditions at the time. Because the toxic effects of chlorine are dependent on both concentration and duration of exposure, the exact consequences of a release are difficult to predict.

(U) Outlook

(U//FOUO) As of 8 May 2007, none of the chlorine thefts or attempted thefts within the United States has been linked to terrorism. However, recent vehicle-borne improvised explosive devices in Iraq underscore terrorists' ability to conduct attacks that incorporate chlorine. Extremists in the United States could be inspired to carry out similar attacks and could target water treatment or other chemical facilities as a means to obtain the chlorine for such an attack.

- (U) The US Environmental Protection Agency (EPA) and the FBI are engaged in efforts to help mitigate this risk through enhanced awareness and security efforts. EPA recommendations include securing equipment in a building or enclosing the equipment in a commercial add-on structure, erecting walls or fences around the buildings and equipment, monitoring the area with closed circuit television cameras, and incorporating active and passive barriers at facility access points.[12]

- (U) The FBI provides security education to the chemical industry and water sector through its Chemical and Biological Outreach Program and national InfraGard

---

[ix] (U//FOUO) The hypothetical scenario modeled a nighttime release with a temperature of 77°F, 50 percent relative humidity, and an approximate three meter per second wind. The catastrophic release assumed all of the chlorine was released as a mixture of gas and aerosol at a rate of 2.5 pounds per second.

[x] (U) Potentially life threatening levels, also referred to as Acute Exposure Guideline Level (AEGL) 3, are defined as the airborne concentration of a substance above which it is predicted that the general population could experience life-threatening health effects or death. AEGL 3 for chlorine is a level equal to or greater than 58mg/m^3 or 20 ppm. This concentration is based on a 60-minute exposure.

[xi] (U) Potentially incapacitating levels, AEGL 2, are defined as the as the airborne concentration of a substance above which it is predicted that the general population could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape. AEGL 2 levels are between 5.8mg/m^3 or 2 ppm. Again, this concentration is based on a 60-minute exposure.

program.[xii] For more information regarding the Chemical and Biological Outreach Program, please contact the WMD coordinator at the local FBI field office.

(U) Recipients should immediately report suspicious or criminal activities potentially related to terrorism to their local FBI Joint Terrorism Task Force and the National Operations Center (NOC). FBI regional phone numbers can be found online at http://www.fbi.gov/contact/fo/fo.htm and the NOC can be reached by telephone at 202-282-8101, or by e-mail at HSOC.Common@dhs.gov. For information affecting the private sector and critical infrastructure, contact the National Infrastructure Coordinating Center (NICC), a sub-element of the NOC. The NICC can be reached by telephone at 202-282-9201, or by e-mail at NICC@dhs.gov. Each report submitted should include the date, time, location, type of activity, number of people and type of equipment used for the activity, the name of the submitting company or organization, when this information is available, and a designated point of contact.

(U) Administrative Note: Law Enforcement Response

(U) Information contained in this intelligence bulletin is for official use only. No portion of this bulletin should be released to the media, to the general public, or over nonsecure Internet servers. Release of this material could adversely affect or jeopardize investigative activities.

(U) This intelligence bulletin was prepared by the WMD Directorate of the FBI. Questions or comments may be directed to the WMD Intelligence Analysis Section at (202) 324-7252.

[xii] (U) The InfraGard program shares information on threats to of the United States' critical infrastructures and can be accessed online at www.infragard.net.

(U) Endnotes

---

[1] (U//FOUO) FBI WMD Directorate, (U//FOUO) *Unsecured Chlorine Gas Cylinders at Water Facilities: A Potential Tool for Terrorist Chemical Attacks*, 23 October 2006 (UNCLASSIFIED).
[2] (U) FBI Case Information (UNCLASSIFIIED).
[3] (U) FBI Case Information (UNCLASSIFIED).
[4] (U) FBI Case Information (UNCLASSIFIED).
[5] (U) Law Enforcement Reporting (UNCLASSIFIED).
[6] (U) FBI Case Information (CONFIDENTIAL).
[7] (U//FOUO) Department of Homeland Security Homeland Infrastructure Threat & Risk Analysis Center, (U) Draft - Annual Infrastructure Suspicious Activity Analysis, Water Sector October 2005 – September 2006 (UNCLASSIFIED).
[8] (U) Chlorine Institute, www.chlorineinstitue.org (UNCLASSIFIED).
[9] (U) Environmental Protection Agency, Draft - Final Sector Specific Plan, Water Sector, 8 December 2006 (UNCLASSIFIED).
[10] (U) Chlorine Institute, www.chlorineinstitue.org (UNCLASSIFIED).
[11] (U) National Safety Council, www.nsc.org/ehc/chemical/chlorine.htm (UNCLASSIFIED).
[12] (U) Environmental Protection Agency, http://cfpub.epa.gov/safewater/watersecurity/guide/index.cfm (UNCLASSIFIED).

Distribution

Executive Assistant Director, National Security Branch
Associate Executive Assistant Director, National Security Branch
Assistant Director, Directorate of Intelligence
Assistant Director, Counterintelligence Division
Assistant Director, Counterterrorism Division
Assistant Director, Criminal Investigative Division
Assistant Director, Cyber Division
Deputy Assistant Director, Directorate of Intelligence
SAC/ASACs
All Field Offices
LEO
Intelink
NCTC On-Line
SIPRNet
FBI Intranet

FBI Customer Satisfaction Survey

Return to: WMDIAS FBI HQ, Room 4371, ATTN: Unit Chief

Marking instructions: Circle the appropriate response accordingly.

1	Strongly Disagree
2	Disagree
3	Neither Agree or Disagree
4	Agree
5	Strongly Agree
N/A	Not Applicable

Dear Customer:

Please take a moment to complete this survey and help evaluate the quality and value of FBI products. Your response will help us serve you more effectively and efficiently in the future.

Thank you for cooperation and assistance.

Product Title **(U) Incidents at Water Treatment and Other Facilities Highlight Chlorine Security Vulnerabilities**

Product Date 11 May 2007

Customer ______________________________

Intelligence Function/Investigative Program ______________________________

Quality

1	2	3	4	5	N/A	This product was delivered within established deadlines.
1	2	3	4	5	N/A	The product was timely and relevant to your mission, programs, priorities or initiatives.
1	2	3	4	5	N/A	The product was clear and logical in the presentation of information with supported judgments and conclusions.
1	2	3	4	5	N/A	The product is reliable i.e., sources well documented and reputable.

Value

1	2	3	4	5	N/A	The product contributed to satisfying intelligence gaps or predicating cases or intelligence operations, especially in previously unknown areas.
1	2	3	4	5	N/A	The product resulted in change in investigative or intelligence priorities and/or a shift from unaddressed to addressed work, or vice versa.
1	2	3	4	5	N/A	The product resulted in more informed decisions concerning investigative or intelligence initiatives and/or resource allocation.
1	2	3	4	5	N/A	The product identified new information associated with pending matters or offered insights into information that could change the working premise in a program or initiative.

Comments