

Hazmat Quarterly

A Publication of the Iowa Department of Public Health
Division of Environmental Health

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The Iowa Department of Public Health (IDPH), Division of Environmental Health, in cooperation with the federal Agency for Toxic Substances and Disease Registry (ATSDR), has completed data collection for the second quarter of 2009 for the Hazardous Substances Emergency Events Surveillance (HSEES) System. From April 1 through June 30, 2009, Iowa documented 173 hazardous substances releases that met the Iowa HSEES System criteria (136 events met the ATSDR case definition). Hazardous substances emergency events are defined by Iowa HSEES as uncontrolled or illegal releases or threatened releases of hazardous substances. Events involving exclusively petroleum products are not included. Events are included if 1) the amount of substances that was released (or that may have been released) needed (or would have needed) to be removed, cleaned up, or neutralized according to federal, state, or local law; or 2) there was only a threatened release of a substance, but the threat led to an action (for example, evacuation) that could have affected human health. A new event definition was provided by ATSDR in January 2006. The Iowa event definition differs slightly from the one provided by ATSDR. A description of the ATSDR event definition may be found in the January-March 2006 issue of the *HazMat Quarterly*. For the purpose of this newsletter, IDPH will continue to include all uncontrolled or illegal releases or threatened releases of hazardous substances.

TREND ANALYSIS

Second Quarter of 2009

There were 173 hazardous substances events reported to Iowa HSEES during the period April 1 through June 30, 2009. Of the 173 events reported during the second quarter, 135 occurred at a fixed facility and 38 were transportation-related. This compares with 200 releases (160 fixed facility and 40 transportation related) occurring last year during the same time period. During the 173 events, 181 chemicals were released. Of the 181 chemicals released 116 (64%) were chemicals related to the agricultural industry. For the second quarter of 2009, there were 105 people injured during chemical releases. For the same time period last year, there were 85 people injured.

The following are brief descriptions of the events involving victims during the second quarter of 2009.

Twenty three people were injured as the result of improperly mixing cleaning chemicals. Five were employees and 18 were members of the public. Most victims reported respiratory irritation but there were also reports of skin irritation, headache, dizziness, nausea and shortness of breath. Nine victims did not seek medical treatment, two were seen by a private physician and 12 were taken to the hospital, treated and released.

Three separate incidents resulted in four members of the public being exposed to unintentional releases of ammonia. The symptoms experienced by the victims included respiratory irritation, skin irritation, eye irritation, nausea, dizziness and headache. Three of the public members were transported to the hospital, treated and released and the fourth did not seek medical treatment.

Nine employees were injured during nine separate releases of agricultural ammonia. The symptoms included respiratory irritation, eye irritation, skin irritation and chemical burns. Four of the employees were taken to the hospital, treated and released, two were admitted to the hospital, one sought care from a private physician, and two did not seek any type of medical treatment. Equipment failure was sighted as being the cause of five of the releases and it was not reported how the remaining four occurred.

A release of ammonia occurred when employees were replacing a pressure gauge in a meat packing plant. Two employees suffered respiratory irritation and were transported to the hospital. One of the employees was treated and released and the other was hospitalized.

Three trucks collided causing the release of diesel, diammonium phosphate/potash, and soy bean meal. Two of the drivers died as the result of non-chemical, trauma-related injuries.

An employee had a battery explode causing sulfuric acid to be splashed in his face. He suffered eye irritation and was taken to the hospital, treated and released.

An employee passed out after being exposed to hydrogen sulfide. He was transported to the hospital, treated and released. It was not reported how the release occurred.

Victim was at work and had sodium hydroxide spilled on her. She suffered chemical burns and was seen by a private physician.

There was a threatened release of ammonia after a crash occurred on the interstate. Two members of the public died as the result of non-chemical, trauma-related injuries. An employee was taken to the hospital with minor non-chemical, trauma-related injuries.

A container of diethyl ether was spilled by an employee. The employee was found unconscious by a member of the public. The public member who found him and a responding officer were exposed and suffered dizziness. They were taken to the hospital, treated and released. The employee required hospitalization.

An employee was unloading sodium bisulfate when the hose came loose and sprayed him. He was treated at the hospital for skin and eye irritation.

An employee experienced nausea after being sprayed with nitrogen fertilizer. He was transported to the hospital, treated and released. It was not reported how the release occurred.

After being splashed with a fertilizer/pesticide mixture, an employee suffered eye irritation, skin irritation and dizziness. He sought treatment with his physician.

An employee was exposed to a pesticide when the container fell from a shelf and broke. He suffered dizziness and nausea but did not seek medical treatment.

A student received a chemical burn after he spilled phenol on his arm. He was treated by the school nurse.

An employee was at work when a neighboring ammonia plant had a release that drifted. He experienced respiratory irritation, eye irritation, and nausea. He was transported to the hospital, treated and released.

A hose blew up on a sprayer and an employee was contaminated with mixture of Roundup pesticide and ammonium sulfate. He suffered eye irritation, skin irritation, and dizziness but did not seek medical treatment.

Two employees were exposed when a fire extinguisher accidentally discharged. They suffered respiratory irritation but did not seek medical treatment.

A student was using a shop vac that held Force pesticide. The hose came apart and exposed the student. He suffered respiratory irritation and was transported to the hospital, treated and released.

An employee had lye spilled on his legs. He suffered chemical burns and was seen by his physician. It was not reported how the release occurred.

A member of the public reported to her physician with skin irritation after being sprayed with nitrogen and atrazine. How the release occurred was not reported.

A refrigerator line containing Freon exploded. An employee suffered minor respiratory irritation but did not seek medical treatment.

An employee was found pinned underneath an ATV that he was using to haul Pathway herbicide. He was transported to the hospital where he later died from non-chemical trauma-related injuries.

Sixteen members of the public experienced nausea and headache after being exposed to carbon monoxide from what was thought to be a malfunctioning ice resurfacers. It was later determined that the ice resurfacers was not the cause of the release. Two people did not seek medical treatment and the remaining fourteen were taken to the hospital, treated and released.

Nine workers were transported to the hospital, treated and released after being exposed to a mixture of sodium hydroxide, sodium hypochlorite and nitric acid. The employees experienced eye irritation and respiratory irritation. The release occurred when an outside vendor was delivering cleaning chemicals and put one of the chemical into the wrong tank creating vapors.

An employee was using a mixture of Status, Harness, and Roundup pesticides when a hose broke spraying him in the face. He experienced skin irritation but did not seek medical treatment.

A member of the public contaminated with ammonia was dropped off at an emergency room. She suffered respiratory irritation and chemical burns and was admitted to the hospital. Two hospital personnel suffered respiratory irritation but did not require treatment.

An employee was spraying weeds with Barrons weed killer when the hose broke and sprayed him. He suffered minor eye irritation but did not seek medical treatment.

A crop dusting plane carrying nitrogen crashed. The pilot was hospitalized with non-chemical trauma-related injuries.

An employee accidentally spilled sulfuric acid on his hands. He suffered chemical burns and sought medical attention from his physician.

A member of the public was cleaning a freezer when he punctured a line containing Freon. One person suffered eye irritation and another member of the household suffered a headache. Neither sought medical treatment.

A member of the public experienced eye irritation after a hose containing Roundup pesticide broke. She was taken to the hospital, treated and released.

A dry chemical fire extinguisher discharged exposing three employees. All three suffered respiratory irritation but did not seek medical treatment.

A hose containing chlorine broke exposing an employee. He suffered eye irritation but did not seek medical treatment.

A canister containing Glystar pesticide broke exposing an employee. He experienced dizziness and was taken to the hospital but was not admitted.

An employee was spraying 2,4-D herbicide from his ATV when it rolled over. He sought treatment from his physician for non-chemical, trauma-related injuries.

A police officer was injured by ammonia while responding to a methamphetamine lab incident. He suffered respiratory irritation and was taken to the hospital, treated and released.

Ten-Year History of Events Occurring During the First Half of the Year
Iowa HSEES
2000-2009

January-June	Fixed Facility Events	Transportation Events	Total Events	Number of Victims
2000	122	68	190	40
2001	158	48	206	35
2002	153	57	210	41
2003	106	55	161	24
2004	125	70	195	27
2005	118	52	170	12
2006	147	48	195	68
2007	207	69	276	112
2008	246	48	294	173
2009	196	47	243	153

Chemical of the Quarter

By Stu Schmitz, Environmental Toxicologist
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Arsenic

Physical Properties

Arsenic is an element widely distributed in the earth's crust. Elemental arsenic is a steel grey metallic material that occurs naturally. However, in the environment, arsenic is usually combined with other elements, such as oxygen, chlorine, and sulfur. Arsenic combined with these elements is called inorganic arsenic. Arsenic combined with carbon and hydrogen is referred to as organic arsenic. Most inorganic and organic arsenic compounds are white or colorless powders that do not evaporate. They have no odor, and most have no taste; thus, it is difficult to tell if arsenic is present in food, water, or air.

Uses

About 90 percent of all arsenic produced is used as a preservative for wood, to make it resistant to rotting and decay. The preservative is called copper chromate arsenic (CCA), and the wood is referred to as "pressure-treated." In 2003, U.S. manufacturers of wood preservatives containing arsenic began voluntary transition from CCA to other wood preservatives without arsenic in wood products for certain residential uses, such as play structures, picnic tables, decks, fencing, and boardwalks. This change was completed on December 31, 2003; however, wood treated with arsenic prior to this date may still be used, and existing structures made with CCA-treated wood prior to December 31, 2003 contain arsenic. Inorganic arsenic compounds have been used in pesticides in the past. Organic arsenic compounds are used in some pesticides. Small quantities of elemental arsenic are added to other metals to form mixtures or alloys with improved properties.

Arsenic is most commonly used as an alloy in lead-acid batteries for automobiles. Another important use of arsenic compounds is in semiconductors and light-emitting diodes.

Source of Exposure in Iowa

Because arsenic occurs naturally in the environment, everyone is exposed to very low levels in air, water, and food. For most people, diet is the largest source of arsenic exposure. Arsenic concentrations may be substantially higher in certain seafood, although much of it is in the form of arsenobetaine, a relatively nontoxic organic compound. Arsenic is naturally present in Iowa soil and, in some areas, Iowa private water supplies may contain slightly elevated levels of arsenic. People who produce or use arsenic compounds in occupations such as nonferrous metal smelting, pesticide manufacturing or application, wood preservation, semiconductor manufacturing, or glass production may be exposed to substantially higher levels of arsenic, mainly from dusts or aerosols. One form of inorganic arsenic, arsenic trioxide was formed during the smelting of ore that contained arsenic, lead and copper. Arsenic and lead are no longer smelted in Iowa.

Health Effects from Large Acute Exposures

Arsenic had been recognized as human poison since ancient times. Doses larger than 60,000 parts per billion (ppb) in food or water can result in death. Smaller doses of inorganic arsenic (300 to 30,000 ppb in food or water) may cause irritation of the stomach and intestines, with symptoms such as stomachache, nausea, vomiting, and diarrhea. Other effects of ingesting inorganic arsenic include decreased production of red and white blood cells, causing fatigue, abnormal heart rhythm, blood vessel damage resulting in bruising, and impaired nerve function causing a "pins and needles" sensation in the hands and feet. Inhaling a large dose of inorganic arsenic may cause sore throat and irritated lungs.

Health Effects from Smaller Chronic Exposures

Perhaps the single-most characteristic effect of long-term oral exposure to inorganic arsenic is a pattern of skin changes. These include darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso, often associated with changes in the blood vessels of the skin. A few corns may ultimately develop into skin cancer. Swallowing arsenic has also been reported to increase risk of liver, bladder, kidney, prostate, and lung cancer. Arsenic is classified as a known human carcinogen. Direct skin contact with inorganic arsenic compounds may cause irritation, redness and swelling. Skin contact does not appear to cause serious internal effects.

Protection from Exposure

All regulated public water supplies must be tested for the presence of arsenic. Some private wells may contain elevated levels; therefore, well water should be tested for arsenic. Reverse osmosis is the most reliable method for reducing arsenic levels in drinking water. To minimize the risk of exposure to arsenic from CCA-treated playsets, parents and caregivers should thoroughly wash a child's hands with soap and water immediately after outdoor play, especially before eating. Children should be discouraged from eating on CCA-treated playgrounds.

Event of the Quarter

An outside vendor was delivering cleaning chemicals to a facility. The vendor was unloading a chemical and put it in the wrong tank creating airborne vapors. The two chemicals involved were Chloro Clean, a liquid base composed of sodium hydroxide and sodium hypochlorite and Image, a liquid nitric acid. Nine workers were exposed to the fumes and the area had to be evacuated. The workers were transported to the hospital where they were evaluated, treated with oxygen and observed for four hours before being released.

Hazardous Substances Emergency Events in Iowa January – June 2009

