

# HAZARDOUS MATERIALS COMMODITY FLOW STUDY



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Johnson County Emergency Management Agency

This report covers road, rail and pipeline transportation routes in Johnson County. Original document was delivered in December 2016. This document incorporates updates as of January 2017.

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# Hazardous Materials Commodity Flow Study

## JOHNSON COUNTY EMERGENCY MANAGEMENT AGENCY

### INTRODUCTION:

It is essential for any jurisdiction to understand the flow of hazardous materials within its area. Through the collection of data on hazardous materials shipments inside the Johnson County's jurisdiction this study will add to the Johnson County's current preparedness, training and equipment needs of its emergency responders.

Johnson County has a large volume of hazardous materials with very diverse commodities and modes of transportation. This is due to a relatively large chemical process industry base in the region and modes of transportation on the Iowa Interstate Rail line along with I-80 and I-380 that run through Johnson County.

### ROLE OF THE HAZARDOUS MATERIALS COMMODITY FLOW STUDY (HMCFS) IN EMERGENCY PLANNING:

A HMCFS is *not* a plan of itself, but it provides a knowledge basis for critical aspects of a jurisdiction's emergency preparedness plan.

An HMCFS can be used for multiple purposes in emergency management and response, as well as in broader community planning and risk assessment. It provides information that can be used to help "anticipate conditions and systematically identify potential problems and workable solutions" to hazmat incidents. In the absence of information that can be obtained through an HMCFS, emergency planners may need to make a great number of assumptions about hazmat transportation in their community. It is urged that planners use assumptions sparingly and to put greater effort into performing research and acquiring facts. Information obtained through an HMCFS can

- Reduce uncertainty about which hazmat transport hazards are locally present;
- Help identify hazmat transportation risks that may present in a community

## PUBLIC AND COMMUNITY OFFICIALS AWARENESS

A frequent concern for LEPCs and local planners is that local officials and the general public “don’t know and don’t care” about hazmat transport risks in their community, except when it “becomes a crisis.” Documenting hazmat risks, such as through an HMCFS, can highlight needs for attention to hazmat transport emergency planning and preparedness. This does not have to be extremely complex. Identifying that hazardous material is present can help draw attention to the potential impacts of hazmat transport on a community and the need to plan, staff, equip, and train accordingly.

## METHODS:

The study will use numerous data sources from local industries in Johnson County and the commodity flow counts in the Johnson County jurisdiction. Highway, rail, and water transport routes will be included in the data collection. Fixed facilities that produce, store, or use hazardous materials can be identified by local industry partners and from reported information about storage of hazardous substances (such as Tier II reports). Hazardous materials may be transported by different modes to these facilities.

## STUDY OBJECTIVES:

The commodity flow study will contribute to an analysis of Johnson County’s preparedness, the training needs of its first responders and also the training and equipment needs of the Johnson County Hazardous Materials Response Team.

- Identify the primary DOT hazard classes transported in the Johnson County jurisdiction.
- Identify the number of hazardous material trucks.
- Identify the types of containers shipping hazardous materials in the Johnson County jurisdiction.
- Discuss the seasonal transportation variation in the Johnson County jurisdiction.

## STUDY DESIGN:

- Identify roads available for hazardous materials transport.
- Truck flow counts.
- IOWA INTERSTATE RAIL (IAIS) Rail count by hazard class.
- Conduct a survey of facilities in Johnson County that produce, store and transport hazardous substances. The facilities identified Analyze results.
- Apply results to the study objectives.

## FACILITY SURVEY

Johnson County is the home to 383 Tier II reporting facilities. This puts Johnson County as one of the highest Tier II reporting counties in Iowa. Facilities that produce, store and use large amounts of hazardous materials in the Johnson County jurisdiction were polled for data to determine trends in amounts of materials shipped, mode of transportation and month of shipment. Flammable liquids and agricultural chemicals (anhydrous ammonia and pesticides) are the most prevalent chemicals found in Johnson County and the shipments show a very distinct pattern in regards to these shipments.

These materials, anhydrous ammonia and pesticides show distinct times when large amounts are being shipped. The flow study was conducted during the "off season" for the peak months for shipments. Note that this corresponds with accident rates for these same months with these hazardous materials. Johnson County is home to several industries that use ammonia year round as a process gas.

Flammable liquids and pesticides used in Johnson County industry and will be steady throughout the year but one would expect peak periods of shipments from the fixed facility.

## PESTICIDES

Johnson County has three facilities reporting pesticides on hand. This number is small when compared to other counties in Iowa. Growmark, Lone Tree; Consumers COOP, Coralville and Eldon Stutsman INC Hills all reported pesticides. These pesticides include herbicides and/or insecticides.

Note: Materials may be in DOT bulk and non-bulk containers at these facilities. Some of these liquid loads are generally shipped in MC 307/DOT 407's that have a capacity of 5,500 gallons, 300 gallon totes and non-bulk packages down to 1 gallon size containers.

## ANHYDROUS AMMONIA AND OTHER HAZARDOUS MATERIALS OF CONCERN

Anhydrous Ammonia is being used at eight locations in Johnson County for two purposes. Four are for ammonia use agriculture. It is also used as a refrigeration gas at four facilities.

Ag: Growmark Lone Tree and Oxford; Consumers COOP Coralville and Eldon Stutsman Inc. Hills, IA

Refrigeration systems: Lineage Logistics Iowa City; Twin Counties Dairy Kalona; United national Foods Iowa City and US Foods Coralville.

## OTHER MATERIALS OF CONCERN: FLAMMABLE, CORROSIVE AND REACTIVE

These are of concern due to their acute toxicity, the fact that they produce a large amount of vapors during a release along with being located in populated areas. Quick actions by the HAZMAT team will be needed to reduce any exposures.

These are transported into Johnson County mainly by highway Cargo trucks but a few are supplied by rail.

## CHLORINE

Johnson County has eight facilities reporting chlorine. This is a large number of facilities reporting chlorine when compared to other counties in Iowa.

ASR well #7 North Liberty; Coralville Municipal Water; Iowa City Water Purification; Newton Rd Chilled Water Facility; Oakdale Utility Well House; U of Iowa Water Plant; Water Pollution Control North Liberty and Water Treatment Plant North Liberty.

## FLAMMABLES

Johnson County has five bulk flammable storage facilities reporting. These facilities are storing flammable liquids for motor fuels and solvents such as gasoline, diesel, kerosene, ethanol, heptane and toluene.

Buckeye Terminal North Liberty, motor fuels; Harney Oil Coralville, motor fuels; Magellan Iowa City motor fuels; Loparex Iowa City industrial solvents toluene, isopropyl alcohol and heptane.

International Automotive Components Iowa City reports large quantities of five materials that are flammable that can also potentially polymerize.

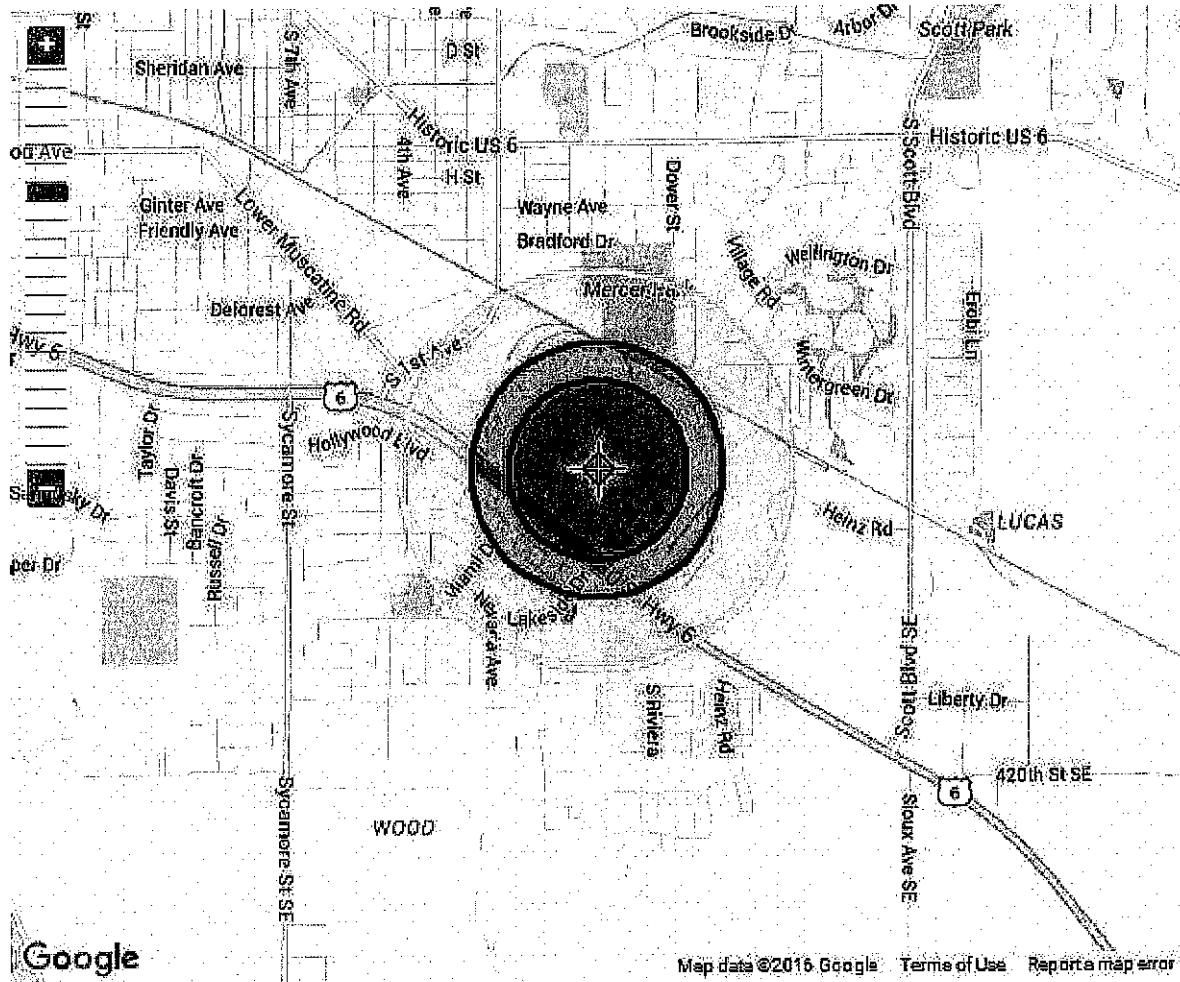
Integrated DNA Technologies reported twelve flammable solvents and acrylamide which is flammable and also capable of polymerization.

Proctor and Gamble Iowa City reports more than two dozen corrosive, oxidizer and flammable materials. Materials in bulk storage of concern are chlorosulphonic acid, hydrochloric acid, ammonium hydroxide, hydrogen peroxide and ethyl alcohol.



## PROCTOR AND GAMBLE ALOHA MAXIMUM THREAT ZONE: FLAMMABLE LIQUID TANK BLEVE.

Maximum zone threat area includes a population of 1813 and 861 living units. The map below is a maximum scenario of a flammable liquid tank of flammable liquid monomer involved in a fire with the eventual rapid disintegration of the tank known as a boiling liquid evaporating vapor explosion (BLEVE). The areas of the first two circles would be exposed to radiant heat and the outer circle to the potential of flying tank parts.



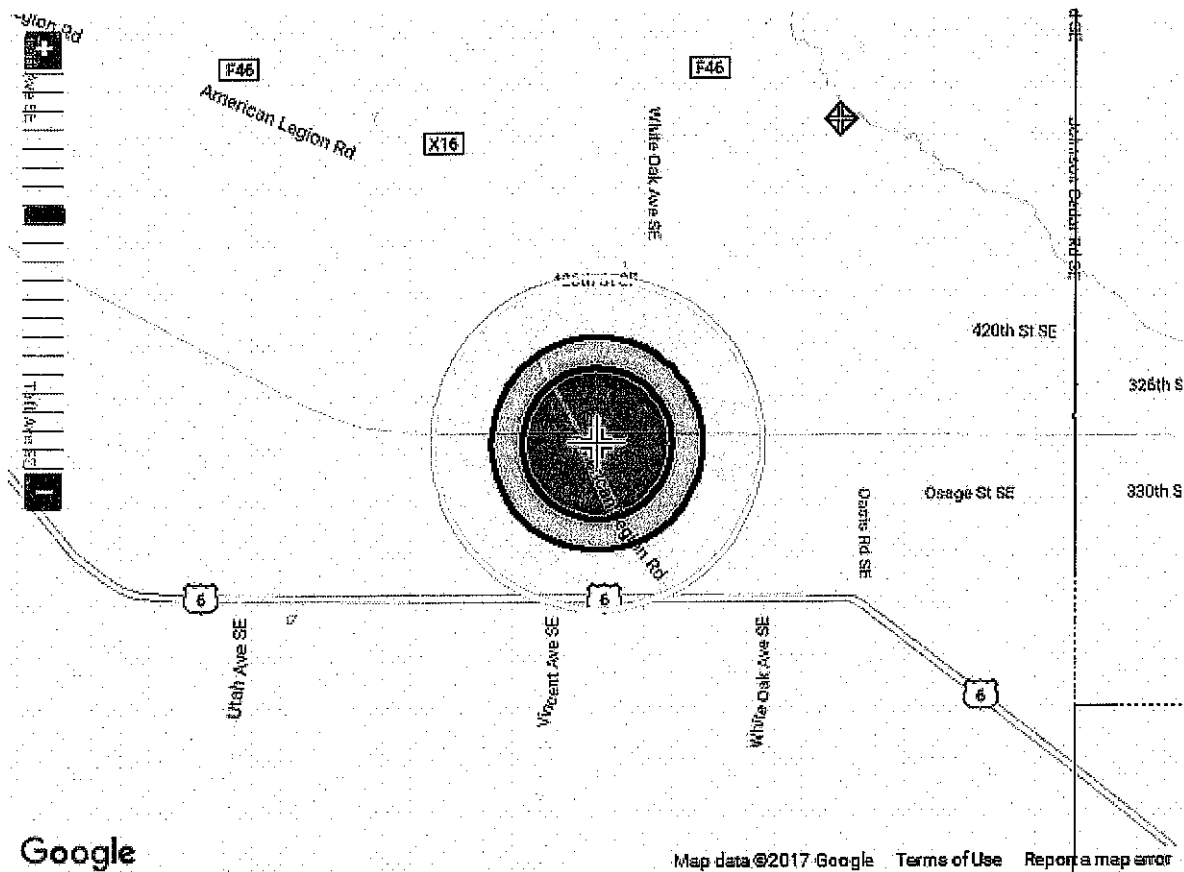
## MID AMERICA NGL STORAGE: 5453 AMERICAN LEGION RD

This facility is a storage and highway cargo tank loading facility. It does contain large quantities of (natural gases liquified) propane/ethane. It has 2 underground storage areas of 184,000 and 340,000 barrels. This converts to 7.7 and 14.3 million gallons.

Above ground storage at the facility consists of 3 qty. 63,000 gallon tanks.

The above ground tank having a fire and eventual BLEVE would be a worse case senarion at this facility. The below ground storage is impressive but an explosion is not likely. A pipe fire above ground could be possible. The facility has 6", 8" and 10" piping. A fire would be impressive, but the hazard of radiant heat area would be localized to the facility and immediate area.

Below is senario of a tank BLEVE. The area has very few residents and housing units in the hazard area. 15 people and 6 housing units.



## MAXIMUM SCENARIO AND PROTECTIVE ACTION DISTANCES FOR TOXIC INHALATION MATERIALS

These materials being transported to the facilities that use them have the greatest potential to cause the greatest harm due to their chemical and health properties.

The following distances are based on worse case scenarios, cargo tank or cylinder release during the evening with low wind speeds. The distances are from the Department of Transportation Guide Book recommendations 2016.

- Anhydrous Ammonia
  - Tank Truck: 1.6 miles
  - Nurse Tank: .8 miles
- Chlorine
  - Ton Cylinder: 1 mile

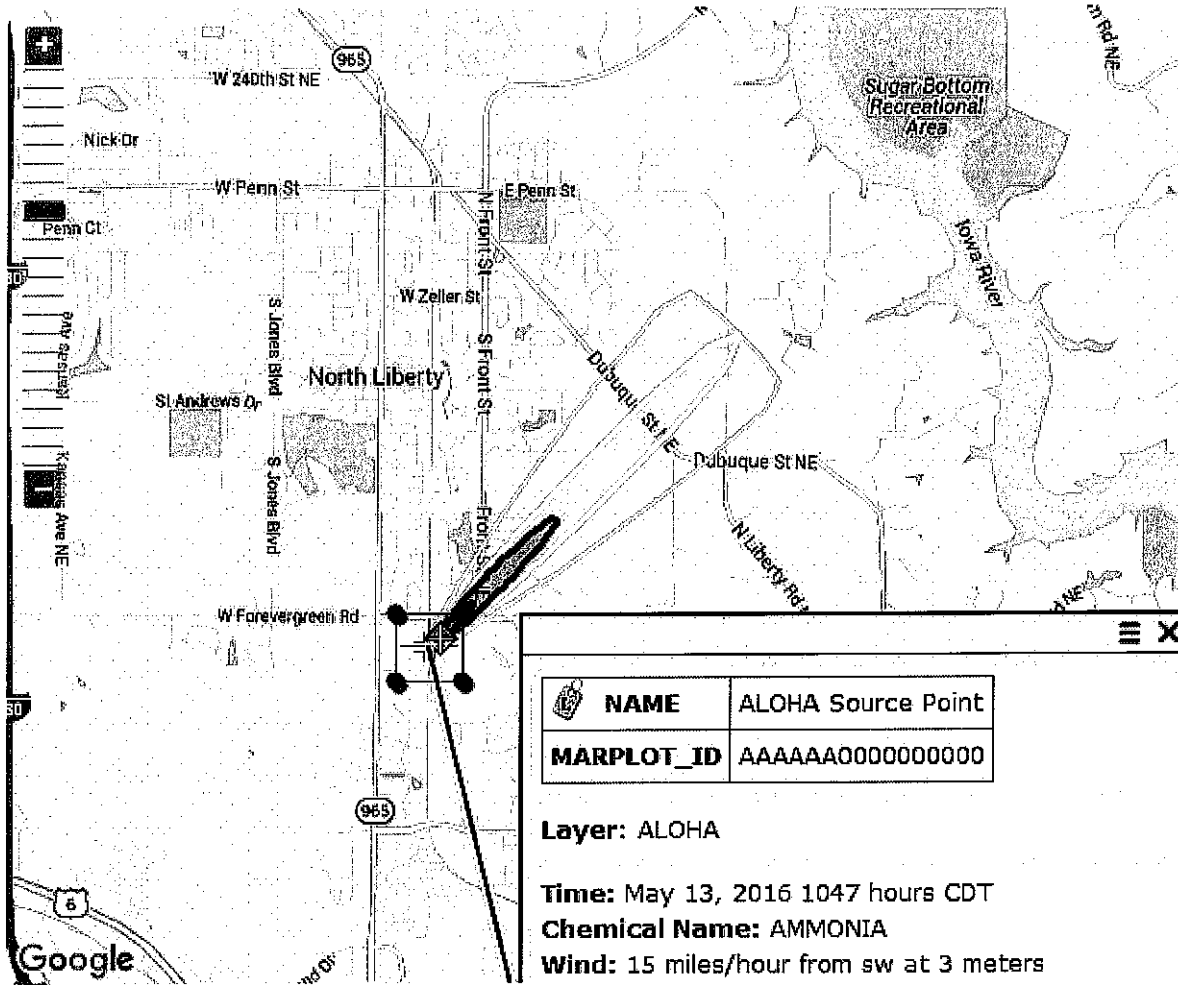
## ALOHA MAXIMUM THREAT ZONE: ANHYDROUS AMMONIA.

The below scenarios in Iowa City. Conditions used are winds 15 MPH and 78F temperature. The two maps below are maximum release example using a toxic inhalation material, anhydrous ammonia. Ammonia was selected due to its common use found in Johnson County. The releases are plotted in the most populated area Johnson County to demonstrate the potential areas that could be affected. The affected areas population and number of housing units is provided.

The weather conditions, temperature and wind speed used in the scenario are typical weather conditions with a S wind. If this release were to occur in the winter months we would have colder temperatures and winds from the prevailing north. Colder temps may result in a smaller plume of ammonia. During summer months with higher temperatures leading to higher pressure in a tank the plume would likely be larger.

# AMMONIA RAIL TANK:

.5" Liquid leak. Population 226. 81 Housing units.



## CHLORINE RELEASE:

1 ton cylinder with .25" valve leak

This release scenario with a SW wind during a chlorine release at the Iowa City Waste Water treatment plant would include a population of 0 and 0 living units. If the wind was from the S/SW or N the plume could impact hundreds of people. It is critical that the HAZMAT Response Team be able to contain a release of chlorine from any of the locations it is used in Johnson County as quickly as possible. An understanding of 150 lb. and one ton chlorine cylinders along with the skills/equipment to contain a release should be a priority for the HAZMAT Response Team.

Johnson County does not appear to have any chlorine rail tank cars that travel through by Iowa Interstate. Having the skills and equipment (chlorine C kit) would not be relevant for the HAZMAT Response Team.

