Southwest Ohio Hazardous Materials Commodity Flow Study
Brown, Butler, Clermont, Hamilton, and Warren County

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Preface

Blue Rock Enterprises of Castle Rock, Colorado conducted the hazardous materials commodity flow study with a high degree of due diligence. Every precaution was taken to ensure the accuracy and validity of the data gathered and received. Information limitations such as delays and/or not receiving requested information, outdated information, unavailability, and time did not allow for certain efforts to be undertaken. However, Blue Rock is pleased to present the Southwest Ohio Commodity Flow Study group with this study.

This regional hazardous materials commodity flow study report is provided for informational purposes only, and improper use of this information and material may result in property OR environmental damage, bodily injury, or death.

Blue Rock makes no representations, warranties, or endorsements of the information provided to Blue Rock that was not explicitly observed and compiled by Blue Rock. The reader and user of this information is cautioned that although it is substantial and voluminous, the information represents only a very small snapshot of the region. (A 4-hour study on a given roadway represents 0.0005% of roadway travel observation potential in a year as an example.)

Any hazardous material can be transported at *any* time, by *any* mode.

Contents

1. Executive Summary

Brown, Butler, Clermont, Hamilton, and Warren County formed a regional planning group to discuss hazardous materials and Local Emergency Planning Committee related issues. During these meetings the group decided to undertake a 5 county hazardous materials commodity flow study to identify the hazardous materials commodities that are being transported through the region with the following objectives:

- Identifying hazardous materials commodities transported,
- Identify methods of hazardous materials transportation,
- Assess and analyze locations, volumes, and hazard classes of hazardous materials being transported.

During the study period substantial work efforts were undertaken by all members of the commodity flow study group. Not including research related functions, direct observation alone accounted for the following facts:

- Over 550 hours of transportation observation,
- 47,948 commercial motor vehicles counted,
- 5,538 placarded hazardous materials loads documented.

33 separate roadways were studied during the course of the project. The study revealed:

- Some roadways exceeded 54 hazardous materials loads per hour with the regional average being 10.84 hazardous materials loads per hour as observed.
- Roadways were observed with as high as 36% of all commercial motor vehicles handling hazardous materials. The regional average is 8% of commercial motor vehicles observed carried identifiable hazardous materials loads.
- The greatest rates and volume of hazardous materials transportation was observed in the proximity of the I-75 and I-275 interchange.

Pipelines identified in the region carried hazardous materials at rates up to 315,000 gallons of product per hour. Many pipeline providers have yet to be identified and contacted.

Railroad carriers (CSX and Norfolk Southern) provided substantial information on the number of hazardous materials loads carried through the region. The identified majority of hazardous materials carried by the railroad included: alcohols, liquefied petroleum gases, sodium hydroxide, acrylonitrile and sulfuric acid.

Waterway transportation (Ohio River) of hazardous materials identified over 5,948 tons of product passed through the two river locks in a 9-month period. The majority of products included: gasoline/aviation fuel, fuel oils and greases, petro/bitumen/coke/asphalt, or crude petroleum.

Conclusions, observations and recommendations include but not limited to:

- Some roadways designated as hazardous materials prohibited except local deliveries saw volumes worthy of further analysis.
- High volume hazardous materials locations were identified and recommendations to plan for alternative routes in case of an incident is provided.
- The MC-307 container (Specialized chemical transport) was observed in high numbers, these require potential specialized response training.
- Dangerous placards were observed in some areas in high percentages. Efforts should take place to identify if this is accurate or a placarding/marking issue.
- Training and exercising with neighboring and regional partners for hazardous materials incidents should be undertaken.
- Any hazardous materials can be transported at any time, by any mode.

2. Introduction

a. Purpose

The purpose of the Hazardous Materials Commodities Flow Study was to identify the type, amount and routes of hazardous materials commodities transported through the specified geographic area of the five county region and provide an analysis of the data and information collected so that planners may consider activities in prevention, preparedness, mitigation, response, and recovery.

b. Scope

The hazardous materials commodity flow study conducted for the Southwest Ohio region was limited in scope to hazardous materials transported by waterway, rail, pipeline, and roadway in the 5-county region.

The scope of this study encompassed the following for hazardous materials transported by waterway, rail, pipeline, and roadway:

- Review of existing available data, reports, and plans
- Data collection-securing data and information
- Data review and analysis
- Identify hazardous materials transportation areas
- Present the draft plan for comment
- Final written report and presentation

In addition, the report provides conclusions and recommendations at the regional level. Each member county will be responsible for specific conclusions and recommendations at the county and local level.

c. Planning Assumptions

Waterway

Waterway information collected from the providers of the information was assumed to be accurate. In addition, physical observations made assumed that carriers/vessels were marked properly.

Railway

For hazardous materials that were shipped by rail, there are multiple methods for shipment. As the data received from the Railroad provided the number of 'containers' or 'tank cars' shipped in a given year to a specified location, some assumptions had to be made to convert these total number of shipments to volumes. These assumptions were:

- That general bulk commodities (e.g. gas materials) were transported in pressure containers. A loaded pressure container weight of 48,000 pounds was used for these commodity shipments;
- That flammable liquids were shipped in General Service Tank Cars (Non-Pressure containers). A loaded volume of 23,000 gallons was used and verified by the railroad (CSX Corporation, 2012);
- That corrosive materials, as validated by the Railroad, were generally shipped in smaller cars, approximately 15,000-gallon tank cars. The volume was converted to pounds using a conversion of 15 lbs/gallon;
- That hazardous materials containers shipped by rail are dispersed throughout the entire train with other non-hazardous containers.

Pipeline

For hazardous materials that were transported via pipeline the amounts listed within the reporting documents from the pipelines existed in barrels. The following assumptions were used:

- In converting the reported amounts in barrels to US Gallons (fluids) a factor of ONE barrel = 31.5 gallons.
- Note that oil barrels and fluid barrels (beer etc.) are different measurement units.
- 1 Barrel [Fluid] = 31.5 Gallons [US, Fluid]
- 1 Barrel [Oil] = 42 Gallons [US, Oil]
- 1 Barrel [Dry] = 26.24975569 Gallons [US, Dry]
    - It should be noted that these amounts may slightly vary based on the products being moved through the pipeline.

Roadway

For hazardous materials that were transported in commercial vehicles on the highways surveyed, nearly all surveys captured ALL commercial vehicles that moved through the survey area. When evaluating the information captured the following assumptions should be considered:

- The survey results provide what could be referred to as a "Snapshot" of the hazardous materials that were specifically identified in the designated survey location.
- The "Snapshot" results could be multiplied by an appropriate factor to obtain a period of 12 or 24 hours, which would provide an estimate of the total of hazardous materials anticipated on that roadway. For example:

- If the survey time was for a 4 hour period, the factor 3 could be used for a 12 hour period;
    - If during this 4 hour period there were 14 flammable liquids tankers observed, using the factor of 3, an assumption could be made that during a 12 hour period, a total of 42 tankers could be anticipated, or 3.5 per hour.
- Since all roadways were surveyed for several periods of time, on several different days, an average could be created based upon the survey results. These results can also be used by planners and responders to make assumptions when the greatest risk of an accidental release could occur: For example:
    - If on a particular roadway a total of 14 flammable tankers were observed in the morning hours, however in the afternoon hours a total of 36 flammable tankers were observed.
    - One could make the assumption that the community, planners and responders may anticipate the greatest RISK and LIKELIHOOD for an accidental release in the afternoon.
    - Traffic volumes differ from day to night, along with seasonal variations and this can only be used to establish some baseline averages.
- Another assumption that could be made in the transportation of hazardous materials in commercial vehicles are the standard amounts that could be anticipated by the specific transportation containers. For example:
    - A standard MC-306, flammable liquid tanker could transport up to 9,000 gallons of flammable or combustible liquids.

        - Using these known amounts and the number of possible containers that were observed in the survey area, planners and responders can begin to develop some assumptions on response needs, and community protective actions.

- An assumption that should be considered when evaluating a Standard Cargo transport vehicle with a DANGEROUS placard would be:
    - That by placarding the trailer with a Dangerous placard, the trailer is hauling MORE THAN 1,001 pounds of TWO or more placard required hazardous materials commodities.
- Essentially the trailer could be hauling 1001 pounds of flammable liquids, and 1001 pounds of corrosives, or oxidizers, or poisons, etc.
    - An assumption by responders should be to anticipate a MIXED LOAD of hazardous materials, of multiple types, that can react adversely when contacting other materials within the trailer.
- A final assumption that can be made is that many of the commercial vehicles identified at the survey points COULD be transporting hazardous materials that are in amounts LESS than the placard amounts, but all will contain larger amounts of flammable or combustible fuels than the typical passenger vehicle on the highway. In most cases the commercial vehicles traveling the highways can carry several hundred gallons of flammable or combustible fuels.

3. Southwest Ohio Overview

Provided by county agencies.

Regional Description

The Greater Cincinnati area spans three states – Ohio, Kentucky, and Indiana. The region is commonly referred to as the SOSINK region (Southwest Ohio, Southeast Indiana, and Northern Kentucky) and includes eight (8) counties in Ohio (Butler, Hamilton, Warren, Clermont, Clinton, Brown, Highland, and Adams); Dearborn County in Indiana, and three (3) counties in Northern Kentucky (Boone, Kenton, and Campbell). The region encompasses 4,632 square miles and has more than 2.1 million residents.

The SOSINK region is a major commercial air-rail-truck-water transshipment hub. The region possesses an international airport offering more than 120 non-stop flights, two air carrier hubs, four major railroads including two Class 1 rail lines, commercial trucking highways connecting 20 major metro markets within 400 miles, and the fifth largest in-land port. The region is bisected by the Ohio River – separating Ohio and Indiana from Northern Kentucky. Seven roadway bridges, two railroad bridges, and one pedestrian bridge allow for interstate travel and commerce.

The region hosts the headquarters for ten Fortune 500 Companies and an additional 360 Fortune 500 Companies operate with the area. The Region has two major league sports teams, the Reds and the Bengals as well as two minor league teams the Cyclones (Hockey) and the Florence Freedom (Baseball).

a. Butler County

Butler County is located in the southwestern portion of the State of Ohio. It lies north of Hamilton County, south of Preble County, southwest of Montgomery County, west of Warren County, and just east of Franklin and Union Counties in Indiana state line. The County covers a 467.27 square mile area with a 2010 Census population of 368,130. The County has 6 cities, 13

townships, and 6 villages. The majority of the population resides in the seven cities located within the County.

The highest populated area is the County seat, Hamilton, followed by Middletown, Fairfield, Oxford, Monroe, and Trenton. While 2,500 residents within the City of Sharonville reside in Butler County, the majority of Sharonville is located in Hamilton County, making the Hamilton County Emergency Management Agency their primary planning entity. The Cities of Middletown and Monroe each overlap into neighboring Warren County. The highest populated village in the County is New Miami, while West Chester accounts for the highest populated township.

The Butler County Department of Development Land Use Plan states that the majority of the land in the County is primarily used for agricultural purposes. Residential use is the next leading category with 30% of the county's land utilized in this fashion. The Figure below comes from the Butler County 2011 Hazard Mitigation Plan and shows the breakdown of the County's current land use.

Land Use	2010 Acres	%
Agriculture	167,688	56.1
Residential	92,022	30.8
Industrial	6,166	2.1
Commercial	9,029	3
Public	22,983	7.7
Railroad	992	.3
TOTALS	298,880	100

Major transportation routes in the county include: State Routes 4, 63, 73, 128, 129, 177, 503, 744, 747, 122, U.S. Highways 27, 42, and 127. Interstate 75 runs north/south through Butler

County and Interstate 275 runs very near the southern border in Hamilton County. Butler County has three airports; Butler County Regional Airport in Hamilton/Fairfield, Hook Field Municipal Airport in Middletown, and Miami University Airport in Oxford Township. Both Norfolk Southern and CSX Railroads run through the County as well as many underground pipelines. Butler County has close to 300 reporting SARA Tier2 Chemical Reporting Facilities which transport hazardous chemicals on a regular basis.

b. Brown

Brown County is located in the southwest portion of the State of Ohio. It is bounded by Highland and Clinton Counties to the north; Adams County to the east; and Clermont County to the west; and the Ohio River to the south.

Brown County, Ohio was formed in 1817 from parts of Adams and Clermont counties. The name comes from Jacob Brown, a hero of the War of 1812. Georgetown, the largest village in the county, is the county seat. It is also the boyhood home of Ulysses S. Grant. The Rankin House in Ripley was the first established station of the Underground Railroad which enabled slaves to escape to freedom.

According to 2000 U.S. Census figures Brown County's population was 42,285, a nearly 21% increase over the population reflected in the 1990 Census. (2010 census reflects a 6.1 % increase to 44,846 in population since 2000 census.) Commuters seeking a quieter, rural living environment have contributed to local population growth.

Brown County Ohio is described are rural, farm country, with agricultural products that include; tobacco, livestock, and grain. Other principle industries in Brown County include; Milacron (plastic injection molding machines), Mac Tools (tool boxes), and Metal-Tec (powder coating paint) as the primary businesses.

Major transportation routes in the county include: The Ohio River; State Routes 123, 251, 131, 286, 32, 134, 136, 247, 73, 41, 348, 125, 221, 756, 774, 763, 137, 353 and 505; U.S. Routes 68, 50, 62 and 52. There is a small private plane/business airport located northeast of Georgetown on U.S. 68 and we are in high altitude flight patterns of the Northern Kentucky-Cincinnati International Airport (Boone County, Ky.) and Lunken Airport (Hamilton County, Ohio). Several railroads and pipelines run east and west through Brown County.

c. Clermont County

Clermont County is located in southwest Ohio. It is bounded by Warren County and a portion of Clinton County to the north, Brown County to the east, the Ohio River to the south, and Hamilton County to the west. The County is composed of two cities, eleven villages, and fourteen townships.

According to the 2010 Census, the population of Clermont County is 197,363. The highest concentrations of residents live in Miami and Union Townships. Clermont County is a blend of rural and suburban, with specific areas of higher density and growth bordering the Interstate 275 belt.

The southern portion of Clermont County follows 25 miles of U.S. Route 52 along the Ohio River and includes two power plants, the W. C. Beckjord Station and the William H. Zimmer Station.

Farming, general retail centers, manufacturing, and national and international corporations are the primary businesses throughout the County.

Interstate 275 follows the western border of Clermont County adjacent to Hamilton County. Other major routes in the County include State Route 28, State Route 32, U.S. Route 50 and U.S. Route 52. Rail lines run on the northern boundary (CSX) and through the center (Norfolk Southern) of the County. Commercial barge and boat traffic on the Ohio River and car/bus traffic on the highways swell during the summer months. Clermont County has a small airport located just west of Batavia.

d. Hamilton County

Six roadway bridges, two railroad bridges, and one pedestrian bridge connect Hamilton County to Northern Kentucky (the Cincinnati Southern Bridge (Norfolk Southern), the Brent Spence Bridge (I-71/I-75), the Chesapeake and Ohio Bridge Cincinnati-Northern Kentucky International Railroad (CSX), the Clay Wade Bailey Bridge (U.S. 25/42/127), the John A. Roebling Suspension Bridge (KY 17), the Taylor Southgate Bridge (U.S. 27), the Newport Southbank Bridge (Pedestrian), the Daniel Beard Bridge (I-471) and the Comb-Hehl Bridge (I-275).

Four major railroad companies (CSX, Norfolk Southern, Indiana and Ohio Railway, and Amtrack) operate in the County supporting both freight and passenger transportation. CSX has an average of 60-70 trains traversing daily on its seven lines, classification yard (Queensgate Yard) and other support yards. Norfolk Southern operates approximately 40 trains daily on its three major routes and classification yards (Gest Street – with an intermodal yard on the grounds of the former Cincinnati Union Terminal; Sharon Yard in Sharonville, and Berry Yard in Bond

Hill). The Indiana and Ohio Railway operates one yard (McCullough Yard). Amtrak runs into and out of the Cincinnati Union Terminal.

The County has 17 Hospitals and Medical Centers (Christ; Children's; Drake; University; Mercy – Mt. Airy, Anderson, Western Hills, Harrison; Jewish; Regency Hospital of Cincinnati; Select Specialty Hospital; Shriners; Summit Behavioral Health; Bethesda North (Tri-Health); Good Samaritan; Veteran's Affairs Medical Center; and Deaconess. The County hosts three professional sports teams (Cincinnati Reds, Cincinnati Bengals, and Cincinnati Cyclones). The county has multiple large venues and sporting arenas (Great American Ballpark, Paul Brown Stadium, U.S. Bank Area, Nippert Stadium, Fifth Third Bank Arena, Cintas Center, Riverbend Music Center, and Cincinnati Music Hall).

The County also has ten (10) Class I Dams. Class I Dams have a storage volume greater than 5,000 acre-feet or a height greater than 60 feet. In addition, failure of these dams would result in the probable loss of human life and/or present a serious hazard to health, damage to homes, high value industrial or commercial properties or major public utilities.

Demographics

As of 2009 census estimates, there are 802,374 people (2010), 373,393 housing units, and 213,448 families residing in the County. The population density is 1971/mi².

Additional factors impacting demographics on the County are:

- University of Cincinnati has a student population of 39,667 during the months of September to June. Additionally Fifth-Third Arena seats 13,176 people and Nippert Stadium seats 35,000 people during sports and other special events.

- Xavier University hosts a student population of approximately 6,996 (graduate and undergraduate) during the months of August to May. Additionally, the Cintas Center seats approximately 10,000 people during sports and other special events.
- Cincinnati State Technical and Community College hosts a student population of approximately 20,000 in day, evening and weekend classes.
- The College of Mount St. Joseph hosts a student population of 2,300 during the months of August to May.

Economic Profile

The County hosts the headquarters for six Fortune 500 Companies (Proctor & Gamble, Kroger Company, Macy's, Fifth Third Bancorp, Western Southern Financial, and American Financial Group. Other major employers include: Chiquita Brands International Inc.; General Electric Co.; Johnson & Johnson/Ethicon; Mercy Health Partners, Tri-Health, University of Cincinnati, Hamilton County, and the City of Cincinnati. The county's current unemployment rate is 9.1%, just below the national average of 9.2%. As of 2009 Census estimates, the county's civilian labor force has 438,800 individuals, with 399,900 of those employed. The median household income is $40,964.

e. Warren County

Warren County is located in central Ohio. The county has a total land area 400 square miles. It is bounded by Montgomery and Greene counties to the north, Butler County to the west, Clermont and Hamilton counties to the south and Clinton County to the East. As of the Census of 2010, there are 217,241 people, an increase of over 34% when compared to the Census of 2000. Warren County also contains 75,283 households. The population density is 530 people

per square mile. There are 81,843 housing units in Warren County, resulting in an average density of 204 units per square mile.

Warren County is mostly rural in setting and agricultural areas dominate the landscape. The urban component of Warren comprised of a series of cities, villages and unincorporated areas of development. Warren County consists of 11 townships, 7 cities and 10 villages. The county seat of Warren County is the City of Lebanon. Warren County also includes 57 unincorporated communities. Interstate 71 runs through the southern and central portions of the County. Interstate 75 traverses the northwest portion of the county. There are two US Routes, US 22 and US 42, which run through the county. State Routes include 3, 28, 48, 63, 73, 122, 123, 132, 350 and 741.

4. Stakeholders

Provided below is broad identification of stakeholder groups. The goal is to educate them about the study findings so they may better prepare activities including prevention, preparedness, mitigation, response, and recovery. Stakeholders include but are not limited to:

State, Local, and Federal Agencies: Local Emergency Planning Committees, Emergency Management, Environmental, Natural resources, Planning, Agriculture and Transportation among others.

Local Fire/EMS/Police Departments (First Responders): It is essential that the first responders are aware of the potential hazards they face on a day-to-day basis. The findings will assist them in preparing for an event, and how they will properly respond to protect lives, property and the environment.

Hospitals: They will be caring for those injured in an event and need to be educated on the potential hazards coming into their facilities. They can consider training their employees accordingly and work closely with local emergency responders to implement and coordinate plans in case of an emergency.

Community: Among the common responsibilities of the Local Emergency Planning Committee is one of public education. From this report, Local Emergency Planning Committees can create plans and educate the community of the hazards in addition to preparing the community.

a. Participating / Resource Agencies

Emergency Management Agencies

- Brown County, Ohio: http://www.browncountyohio.gov
- Butler County, Ohio: http://www.butlercountyohio.org

- Clermont County, Ohio: http://www.clermontcountyohio.gov
- Hamilton County, Ohio: http://www.hamilton-co.org
- Warren County, Ohio: http://www.co.warren.oh.us

Water Transportation

- National Transportation Safety Board: www.ntsb.gov
- United States Department of Homeland Security: www.dhs.gov
- United States Army Corps of Engineers: www.usace.army.mil
- United States Coast Guard Maritime Information Exchange: cgmix.uscg.mil
- United States Department of Transportation: www.dot.gov

Rail Transportation

- CSX Corporation: csx.com
- Norfolk Southern Railway Company: nscorp.com
- United States Department of Transportation Federal Railroad Administration: www.fra.dot.gov
- United States Department of Transportation: www.dot.gov
- United States Department of Transportation Research and Innovative Technology Administration Bureau of Transportation Statistics: http://www.rita.dot.gov/bts/node/11792

Pipeline Transportation

- United States Department of Transportation: www.dot.gov

- United States Department of Transportation Pipeline Hazardous Materials Safety Administration: www.phmsa.dot.gov
- United States Department of Transportation Research and Innovation Technology Administration: www.rita.dot.gov
- National Association of Pipeline Safety Representatives: www.napsr.org
- Public Utilities Commission of Ohio: www.puco.ohio.gov

Roadway

- United States Department of Transportation www.dot.gov
- National Transportation Safety Board: www.ntsb.gov

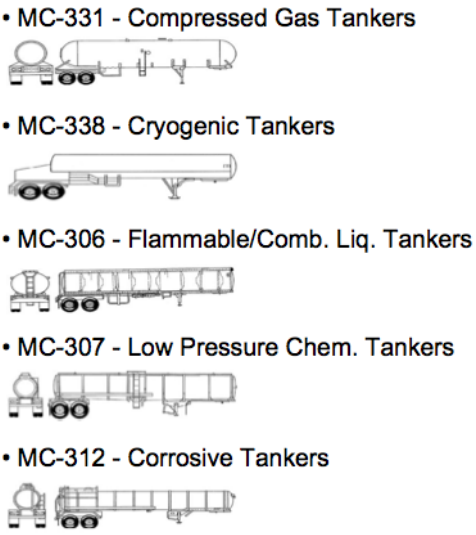
5. Methodology

Roadways are the most visible form of transportation of hazardous materials. Although by comparison the amounts present at one particular location or incident are limited by the container size, the sheer volume of containers alone increases the risk of an incident. Coupled with volume of commercial motor vehicle traffic and increased speeds (relative to roadways not commonly traveled by commercial motor vehicles except for local deliveries) and once again an increase in risk is developed.

In collecting roadway data, the roadways were assigned by members of the hazardous materials commodity flow study group. All results are expressed in 4 hour observation blocks. Data collected included the following:

- Global Positioning System (GPS) coordinates
- Total commercial vehicle counts (where possible)
- Direction of travel
- Carrier type including;
    - MC -331 (Compressed gases)
    - MC – 338 (Cryogenics)
    - MC – 306 (low-pressure liquids)
    - MC – 307 (low-pressure liquids)
    - MC – 312 (Dense-low-pressure liquids)
    - Standard cargo (typically box-type)
    - Other (stake beds, single-axle boxes, etc.)
- If marked with a United States Department of Transportation (DOT) placard;
    - Hazard class (Class 1 through Class 9) and division (See glossary)
    - UN/NA number if possible

Sample carrier type icons



Based on the chemical identification either by class or UN/NA number, further data is developed and collected. It is then assigned the ratings given by the National Fire Protection Association (NFPA) 704 system for classifying risk of a given chemical. The NFPA 704 System, chemicals identified, locations and associated volumes are located in section 'a' of the appendix of this document.

Data collected is assembled on a spreadsheet for analysis and production of ratings, locations, top values such as volume, percentages, locations, etc. Spreadsheet size prohibits printed inclusion within this document, and will be maintained by primary regional contacts. Significant further analysis is possible using this information and would be based on the users perspective and goal of data extraction and examination. However, maintaining the focus on the most pertinent, relevant information was key to the methodology utilized in the analysis.

6. Data Analysis

a. Waterway Transportation Analysis

The Ohio River splits the states of Ohio and Kentucky and borders the counties of Brown, Clermont and Hamilton. This major waterway constitutes the only major waterway included in this study.

The method of data collection included, 30 hours of observing traffic on the Ohio River at various locations, reports obtained from the Marine Casualty and Pollution Database (United States Coast Guard), Markland (Birge, 2013) and Captain Anthony Meldahl (Kelling, 2013) Locks traffic reports`.

According to the Marine Casualty and Pollution Database (United States Coast Guard) between the years 2002-2010 there were 44 recorded incidents. A number of small releases were identified. These releases involved hydrocarbon based chemicals such as fuel and oil products.

Along the Ohio River there are a number of facilities that import hazardous materials. The facilities contacted would not provide specific vessel transporting information. It was determined that many of the hazardous materials obtained were from rail or waterway shipments. The commodity classes identified in the facilities via their existing Tier II reports were:

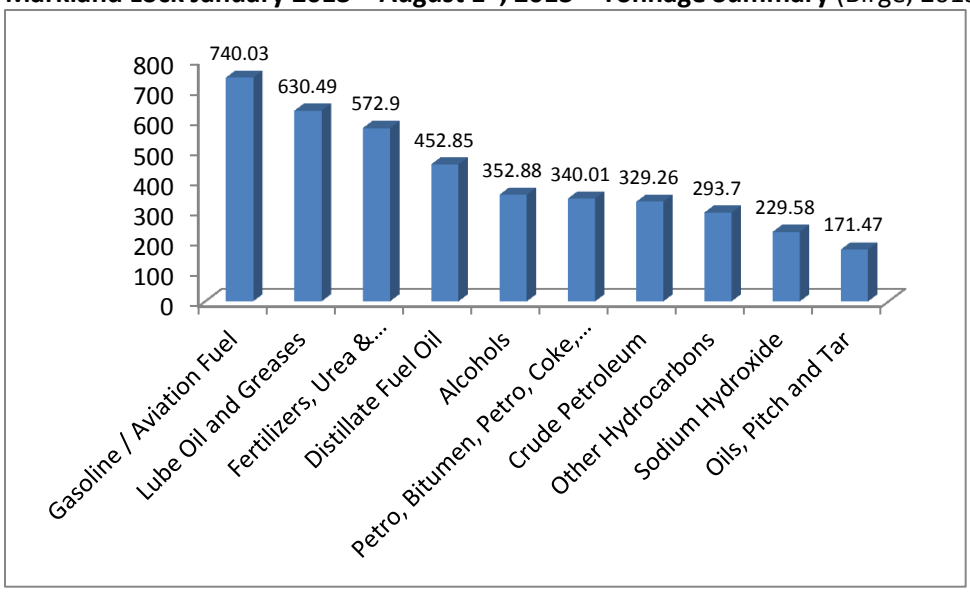
- Hazard Class 3 – Flammable and Combustible Liquids
- Hazard Class 5 – Oxidizing Substances
- Hazard Class 8 – Corrosive Substances

The commodity classes are consistent with the tonnage reports that the most prevalent hazardous material transported on the Ohio River are Class 3 flammable and combustible liquids such as, Gasoline and aviation fuel (Birge, 2013)(Kelling, 2013).

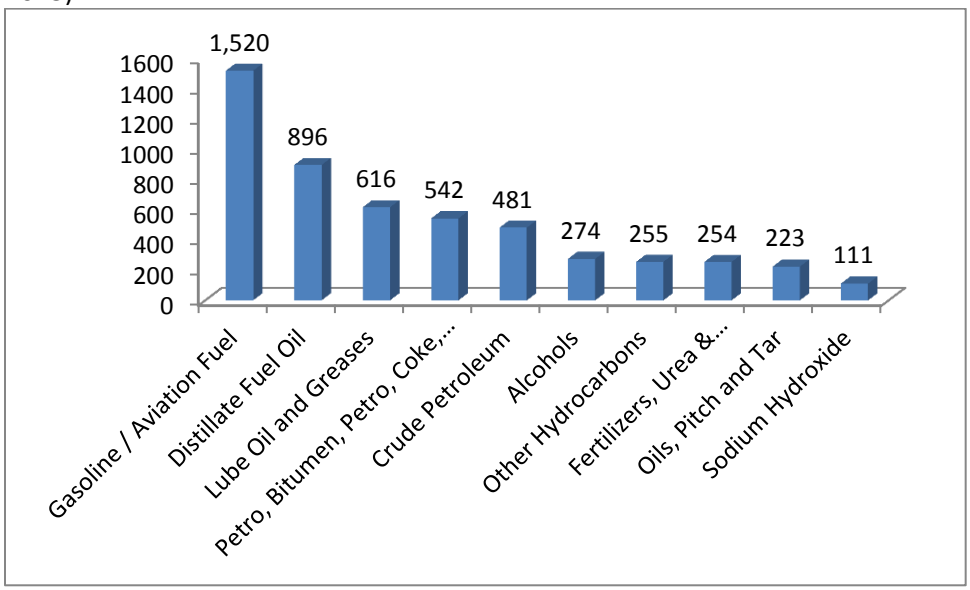
With the investigation we can conclude that even though the likelihood for a remarkable event is low, there are hazardous materials products being transported along the waterway that could pose a potential threat to the environment and to the public, as seen in the data collection sheets. The top 5 commodities of hazardous materials that make up nearly 70% of all reported traffic on the waterway include:

1. Gasoline/Aviation Fuel
2. Distillate Fuel Oil
3. Lube Oil and Greases
4. Petro, Bitumen, Coke and Asphalt
5. Crude Petroleum

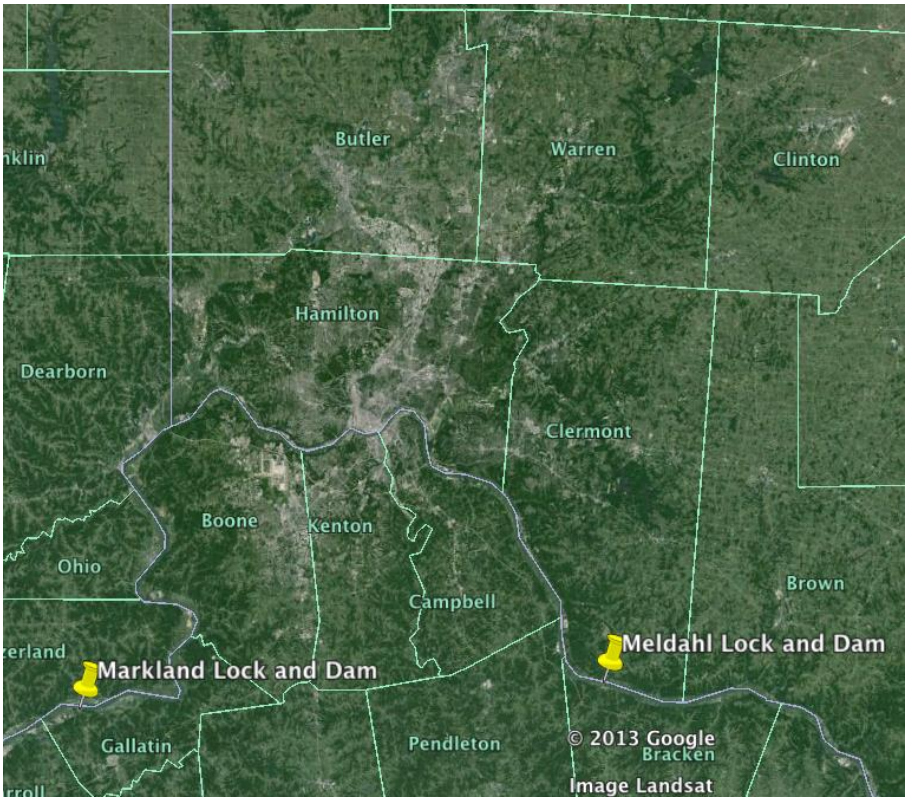
Markland Lock January 2013 – August 1st, 2013 – Tonnage Summary (Birge, 2013)



Captain Anthony Meldahl Lock January 2013 – August 1st, 2013 – Tonnage Summary (Kelling, 2013)



Lock Locations



b. Rail

Norfolk Southern Railway and CSX Railway are the identified transporters via rail (Class 1) through the five county region. There are several hundred other subsidiaries of Norfolk Southern and CSX that are called "Short Lines". Short lines are not within the scope of this document.

According to the Federal Railroad Administration database (Federal Railroad Administration Office of Safety Analysis, 2013) from 2005-2012, there were 12 incidents in Ohio. There were 4 derailments, 2 crossing incidents, 2 rear end collisions, 1 side collision, 1 head end collision, 1 other impact, and 1 hazardous materials release.

The notable hazardous materials release that occurred during this time frame happened in Cincinnati, OH on August 28, 2005. The product released was 21,000 lbs of the chemical Styrene. Styrene is a known carcinogen and very toxic when ingested, inhaled or contact is made with the skin.

Norfolk Southern Railroad and CSX provided the study with their top 25 commodities that were transported and the total number of shipments made in 2012. These numbers are consistent with the information gathered in the 20 hours of on-site surveys.

In Hamilton County, the top 25 hazardous materials made up 76% of all reported hazardous materials carloads handled. Liquefied Petroleum Gas (LPG), Alcohols NOS (Not Otherwise Specified) and Sodium Hydroxide made up nearly 30% of the top 25.

In Butler County, the top 25 hazardous materials made up 80% of all reported hazardous materials carloads handled. LPG, Alcohol NOS and Sodium Hydroxide made up 29% of the top 25.

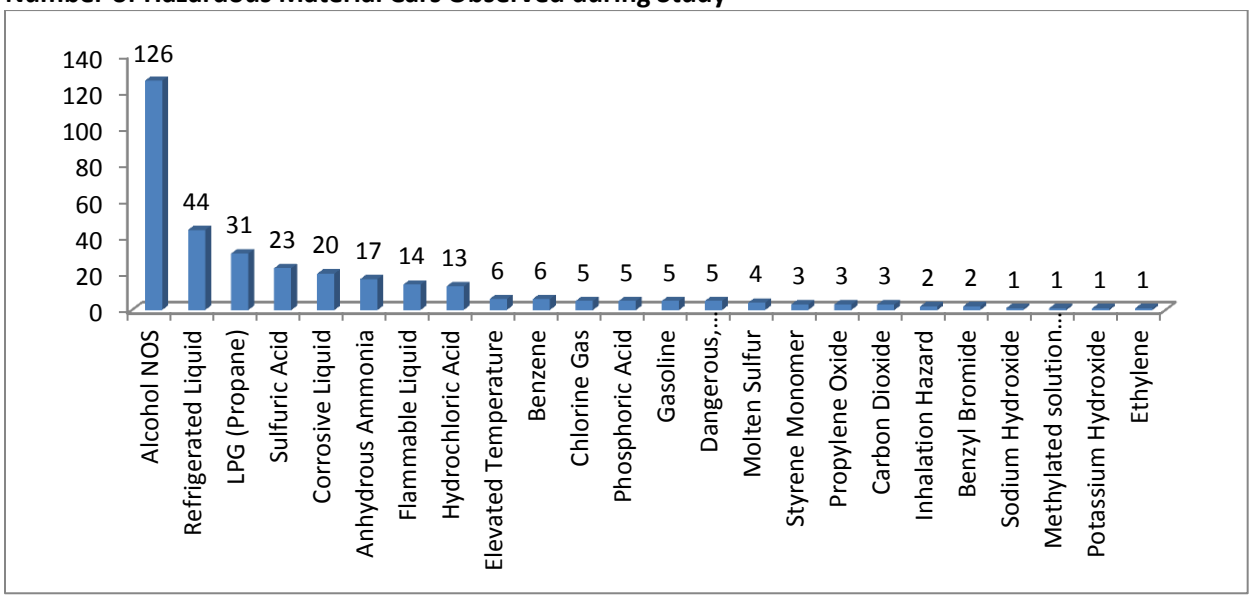
In Warren County, the top 25 hazardous materials made up 82% of all reported hazardous materials carloads handled. LPG, Sodium Hydroxide, Sulfuric Acid and Alcohol NOS made up 37% of the top 25.

The top 5 commodities by volume of hazardous materials that make up approximately 40% of all rail traffic are:

1. Petroleum Gases

2. Sodium Hydroxide
3. Sulfuric Acid
4. Alcohol NOS
5. Acrylonitrile

Number of Hazardous Material Cars Observed during Study

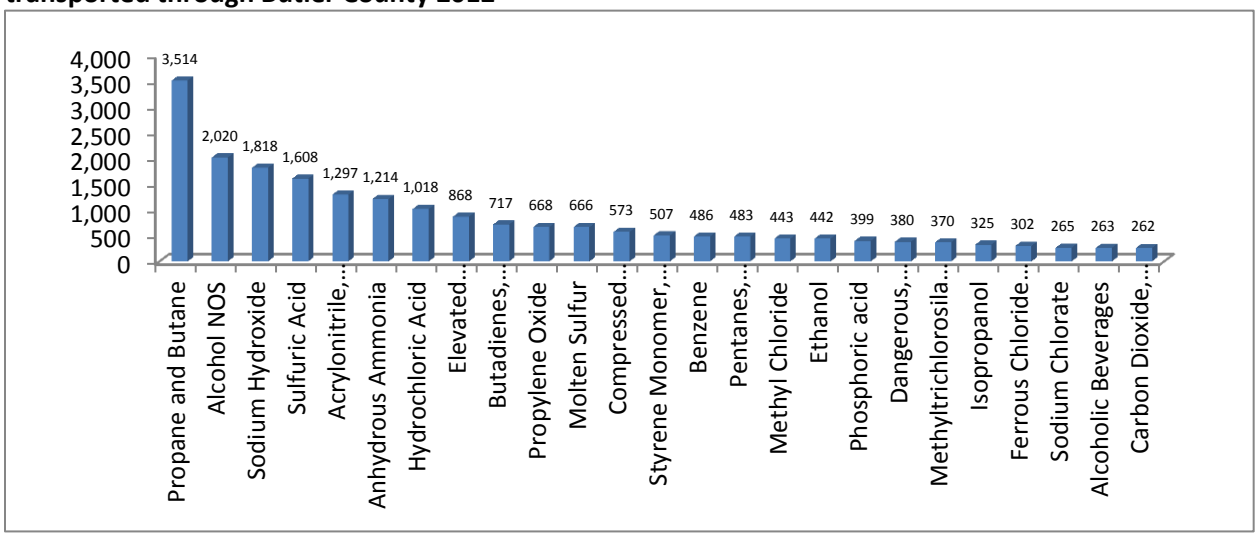


Top 25 Hazardous Materials Reported by Norfolk Southern – 2012 (no quantities reported)

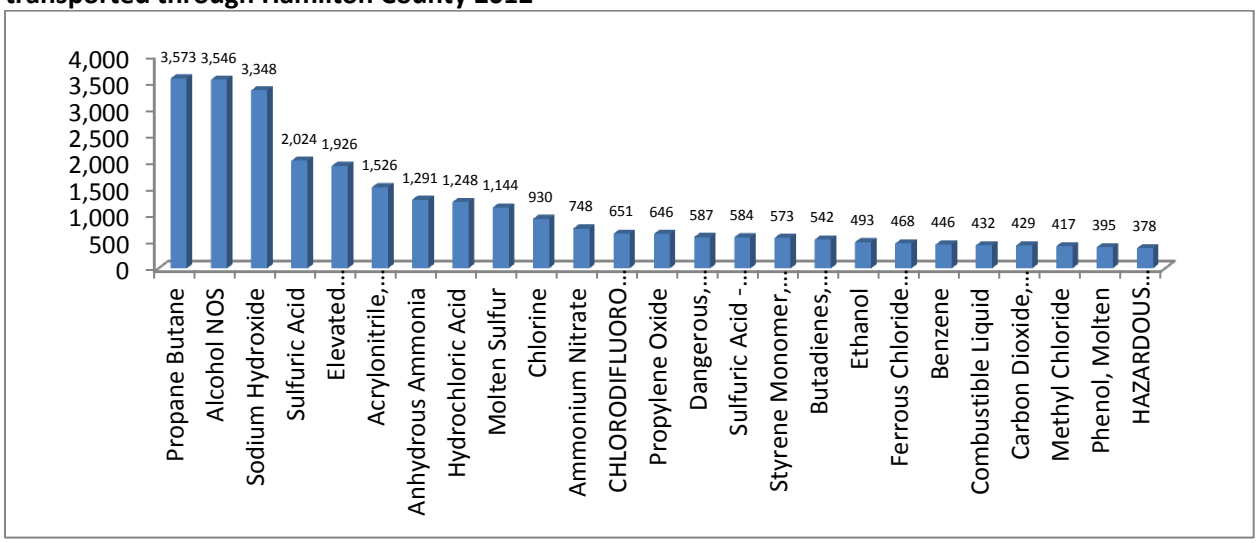
In review of the information provided by Norfolk Southern Railroad on the top 25 commodities they transport the following analysis of hazards, NFPA 704 ratings and Emergency Response Guidebook guide numbers was completed. This information is consistent with onsite surveys completed (See section 'c' in the appendix).

UN NUMBER (Lerner, 2013)	CHEMICAL NAME (Lerner, 2013)	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF RAIL CARS
			HEALTH	FLAM.	REACT.		
1987	Alcohol NOS	Flammable	1	3	0	127	N/R
2924	Flammable Liquids	Flammable				132	N/R
3363	HAZARDOUS MATERIALS • Not otherwise specified	All Hazard				111	N/R
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	N/R
3257	Elevated Temperature	Flammable	1	2	1	128	N/R
1114	Benzene	Flammable	2	3	0	130	N/R
1789	Hydrochloric Acid	Corrosive	3	0	1	157	N/R
1830	Sulfuric Acid	Corrosive	3	0	2	137	N/R
1824	Sodium Hydroxide	Corrosive	3	0	1	154	N/R
1993	Combustible Liquid • Fuel Oil	Combustible Liquid	1	2	0	128	N/R
2312	Phenol, Molten	Toxic, Corrosive, Combustible	4	2	0	153	N/R
3077	Waste	Low to Moderate Hazards	2	2	2	171	N/R
2448	Molten Sulfur	Flammable Solids	4	0	4	133	N/R
1814	Potassium Hydroxide	Corrosive	3	0	1	154	N/R
1170	Ethanol	Flammable • Water miscible	2	3	0	127	N/R
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	N/R
1247	METHYL METHACRYLATE	Flammable • Water miscible	2	3	2	129	N/R
1805	Phosphoric Acid	Corrosive	3	0	0	154	N/R
1805 1760 3266	Corrosive Liquid	Corrosive	2	0	1	154	N/R
3256	Elevated Temperature	Flammable	1	2	1	128	N/R
1402	Calcium Carbide	Water Reactive	3	3	2	138	N/R
3065	Alcoholic Beverages	Flammable • Water miscible	1	3	0	127	N/R

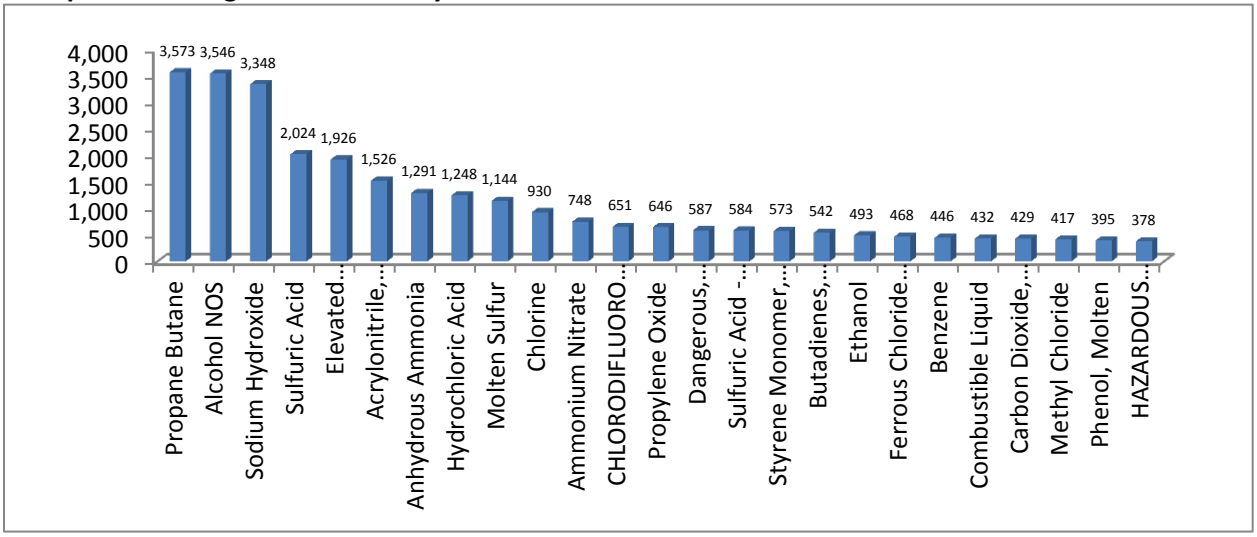
Top 25 Hazardous Materials Reported by CSX (CSX Corporation, 2012) **– Number of carloads transported through Butler County 2012**



Top 25 Hazardous Materials Reported by CSX (CSX Corporation, 2012) **– Number of carloads transported through Hamilton County 2012**



Top 25 Hazardous Materials Reported by CSX (CSX Corporation, 2012) **– Number of carloads transported through Warren County 2012**



c. Pipeline

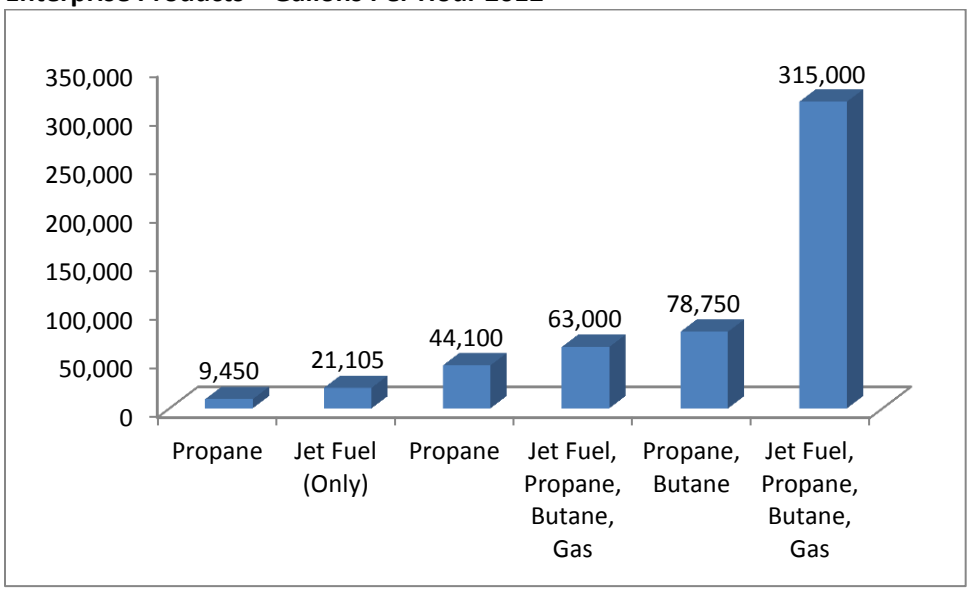
Pipelines in the region include large-diameter lines carrying energy products to the population, as well as many smaller-diameter lines that may deliver natural gas to the community. When a pipeline incident does occur they can present significant risk to the public and the environment.

The state of Ohio has 3,908 miles of hazardous liquid lines, 10,356 miles of gas transmission lines, 1,167 gas gathering lines and 56,824 miles of pipeline equaling a total of 72,256 miles of pipeline. (United States Department of Transportation Pipeline and Hazardous Materials Safety Administration, 2007, 2012, 2013)

The Pipeline and Hazardous Materials Safety Administration in Ohio from 2002-2013 showed there were 91 incidents classified as “significant incidents”. There were 27 people injured and 8 deaths as a result of accidents involving pipelines. The total dollar amount of property loss and damage from these incidents over 12 years was $70,012,042.00.

The following chart represents information provided by Enterprise Products (Enterprise Products) and the product and volume shipped through pipeline in 2012.

Enterprise Products – Gallons Per Hour 2012



Additional pipeline data:

- Texas Gas Transmission LLC
    - Average flow rate of 300-800 MMCF/Day natural gas (MMCF = Million cubic feet) (Texas Gas Transmission LLC, 2013)
- Utility Technologies International
    - AK steel "moves" 70 MMCF of natural gas (International, 2013)

Pipeline providers identified with no information available at the time of the report:

- Columbia Gas
- Duke Energy
- Dominion
- Sunoco Logistics

- Vectren
- Boardwalk Pipeline Providers
- Tallgrass
- Spectra Energy
- BP

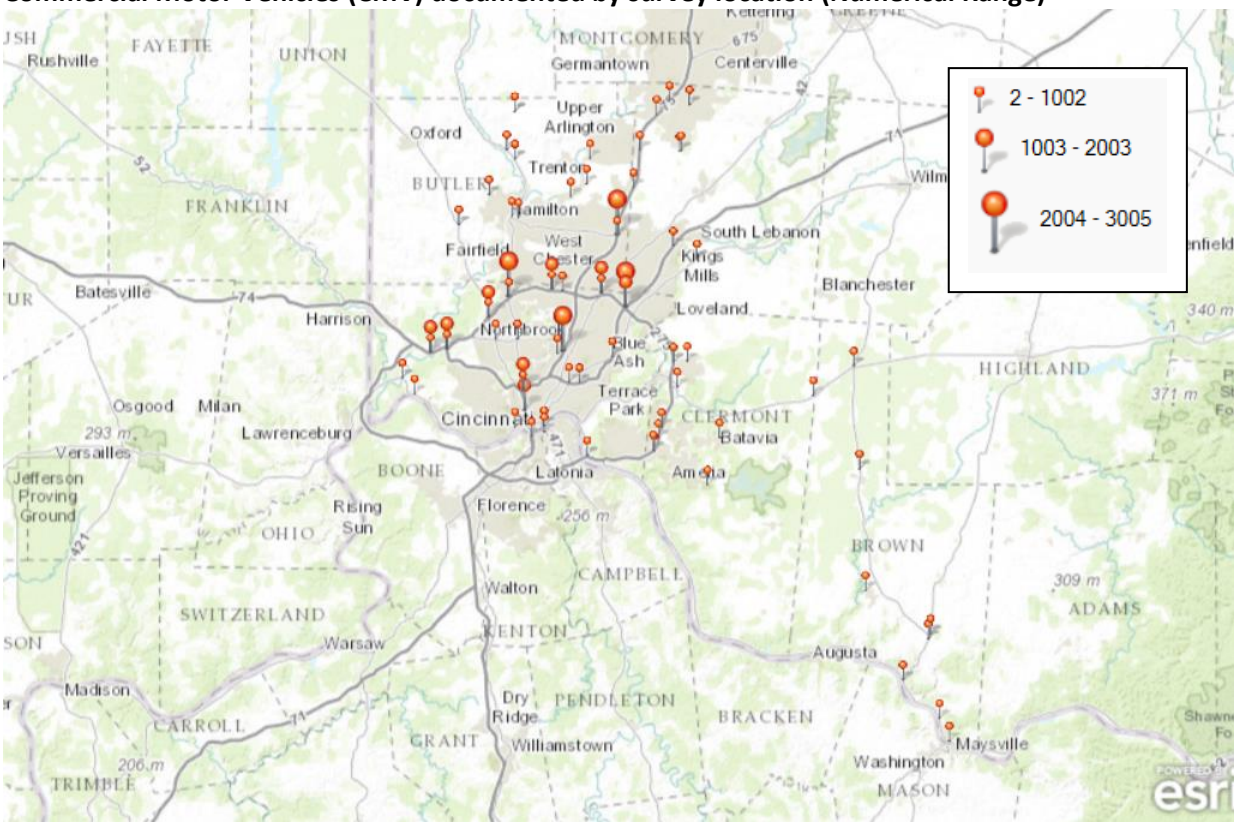
d. Roadway

Roadways, as stated in the methodology, represent the most visible form of transportation of hazardous materials. Data collection (specifically roadside observation) revealed some remarkable statistics for analysis. Keeping in mind that a hazardous material can be transported anywhere at any time by any mode, the roadside data collected consisted of all commercial motor vehicle traffic. Any CMV estimated by the observer to be greater than 10,000 pounds gross vehicle weight rating (GVWR) capable of containing substantial amounts of hazardous materials was documented. With this statistical data we are not only capable of determining how much commercial motor vehicle traffic exists on a roadway at a certain time, one can also determine how much potential may exist. The user of this document must understand that only amounts above required thresholds require placarding (Transportation, 2013). One can assume that loads of hazardous materials are transported considering this requirement in three different ways. A) They are transporting hazardous materials below the required thresholds (which vary by product), B) the transporter is not marking the hazardous materials load as required by regulation, or C) they are placarding properly. Regardless, CMV's over the estimated 10,000# GVWR were counted in most cases. In a small percentage of areas, this data was not captured due to traffic volume. These roads are marked with an asterisk in addition to being marked in the hazardous materials only column of the final data collection spreadsheet.

The graphic below indicates the relative volumes of CMV's (numerical values). The volumes of

CMV's are predictable given the roadway type assessed with no remarkable findings. (Interstates saw higher volumes than state roads or US Highways)

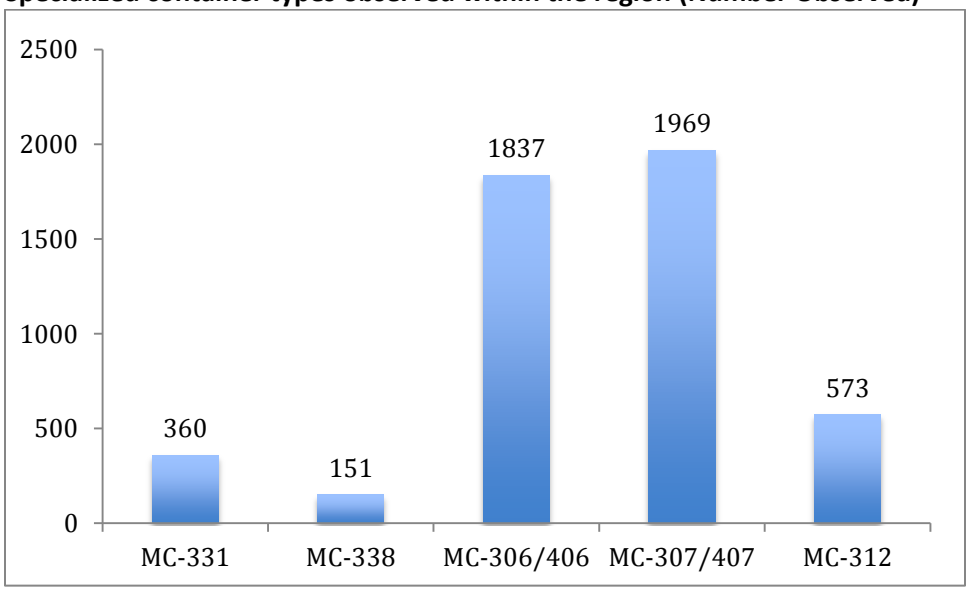
Commercial Motor Vehicles (CMV) documented by survey location (Numerical Range)



In addition to the documentation that a CMV was travelling past the survey location, several over-the-road container types are designed for, and commonly transport hazardous materials. Compressed gas (MC-331), cryogenic (MC-338), low-pressure liquid MC-306/DOT406, low-pressure liquid MC-307/DOT407, acid/corrosive low pressure liquid (MC-312), were all worthy of note and subject to data collection efforts. Although many are used and were documented carrying hazardous materials, not all of them did. So, one should not assume that based on the container type, that a hazardous material was present. However, risks to the responder still exist. Specialized containers are not mapped as to their observed location, but as these 4,890 containers represent 10% of all observed CMV's and many require specialized technical training

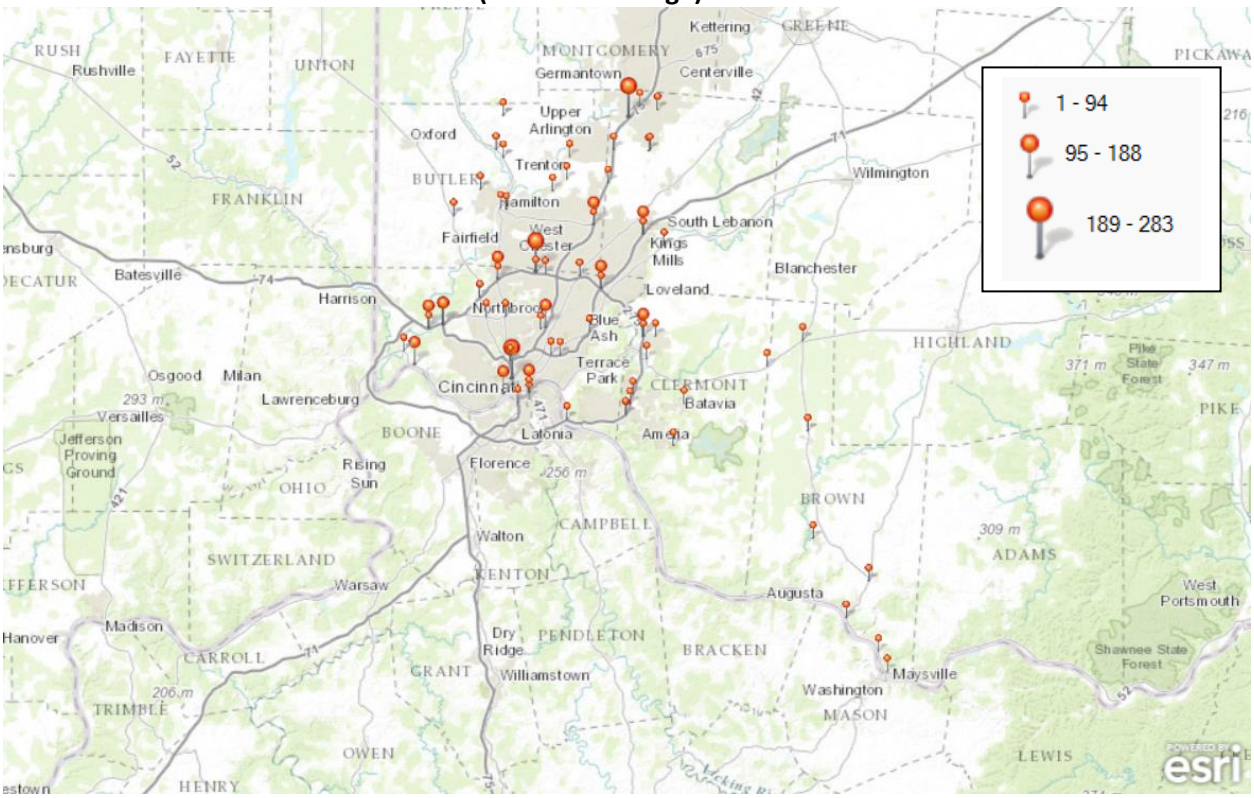
to respond to, the data is presented here. It is remarkable that there exists an amount of MC-307/DOT 407 greater than the MC-306/DOT 406.

Specialized container types observed within the region (Number Observed)



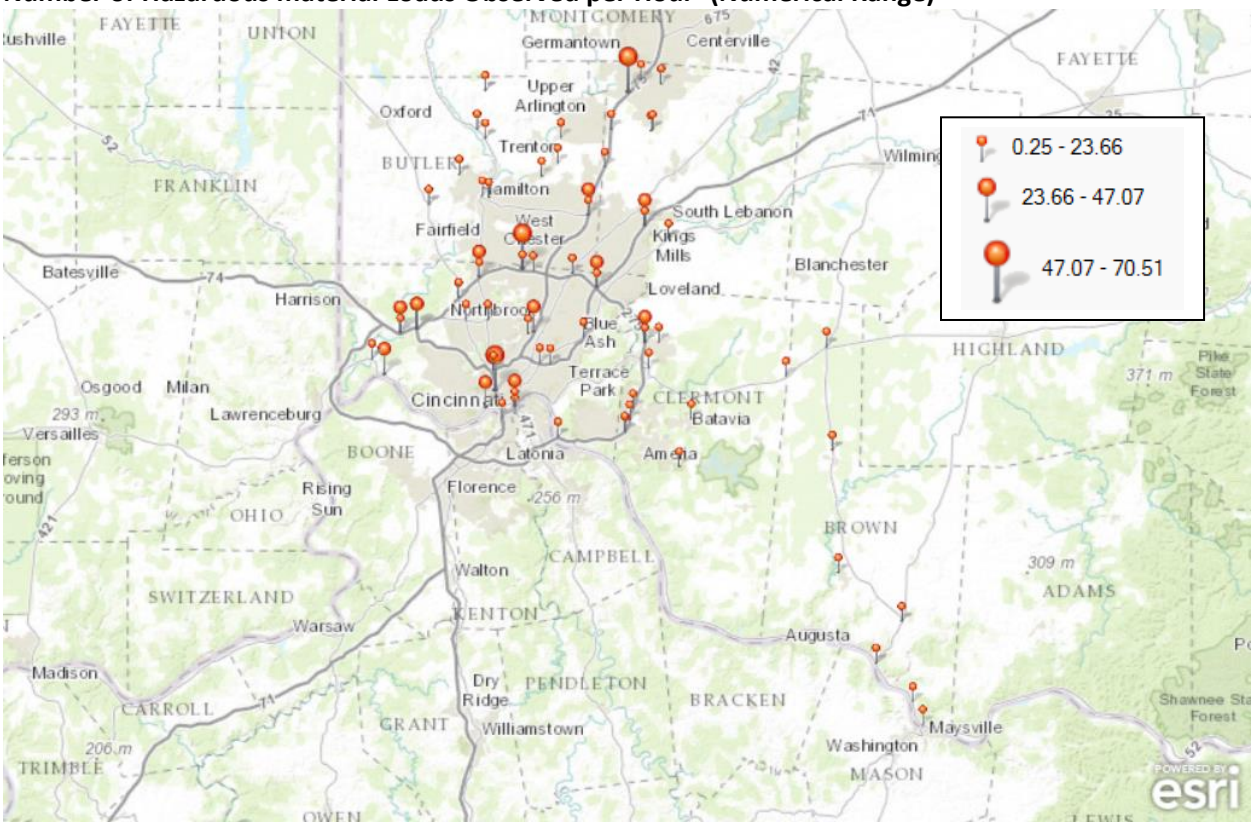
Placarded loads are the recognizable indicator of the presence of hazardous materials. It is not unusual to find a placarded hazardous materials load in virtually any location. The map below indicates the count of placarded loads as they passed by the survey location.

Number of Placarded Loads Observed- (Numerical Range)



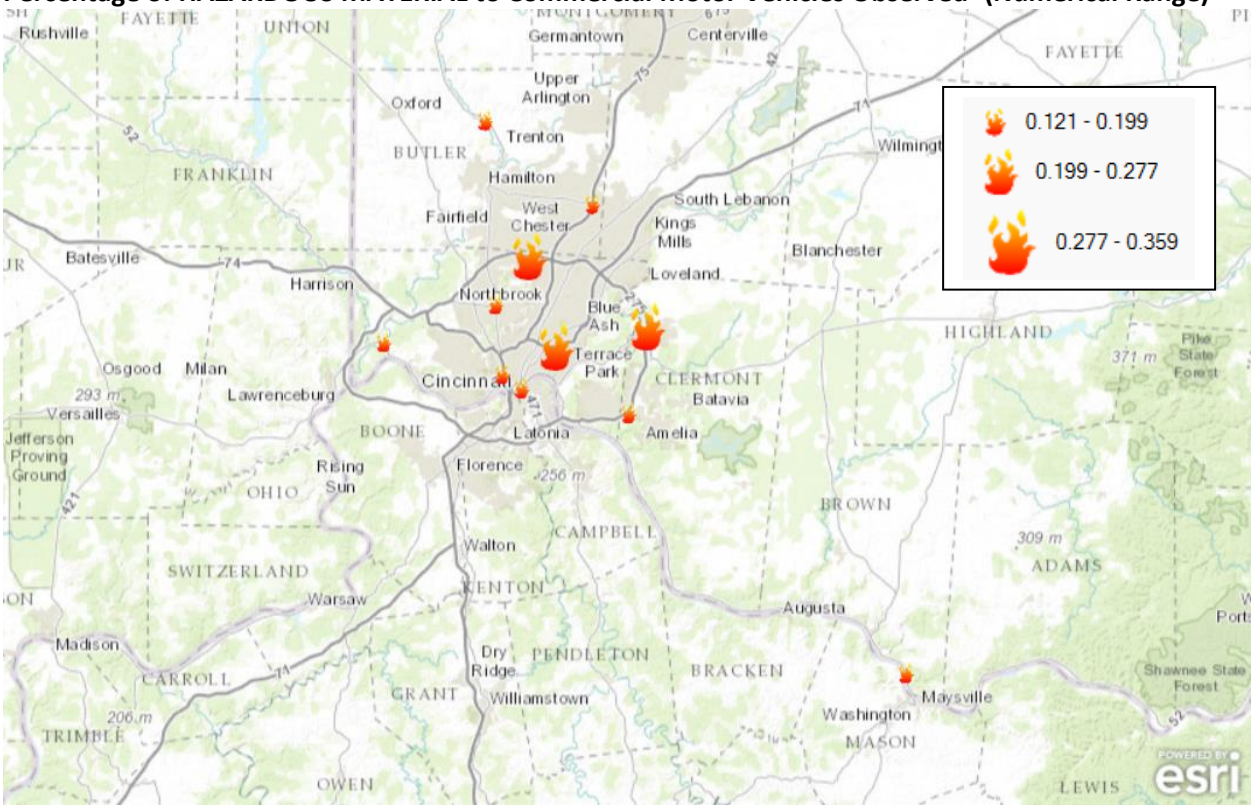
Given the set time frame for each survey, a correlation exists between placarded (hazardous material) loads and the number of loads that passed by the survey location per hour.

Number of Hazardous material Loads Observed per Hour- (Numerical Range)



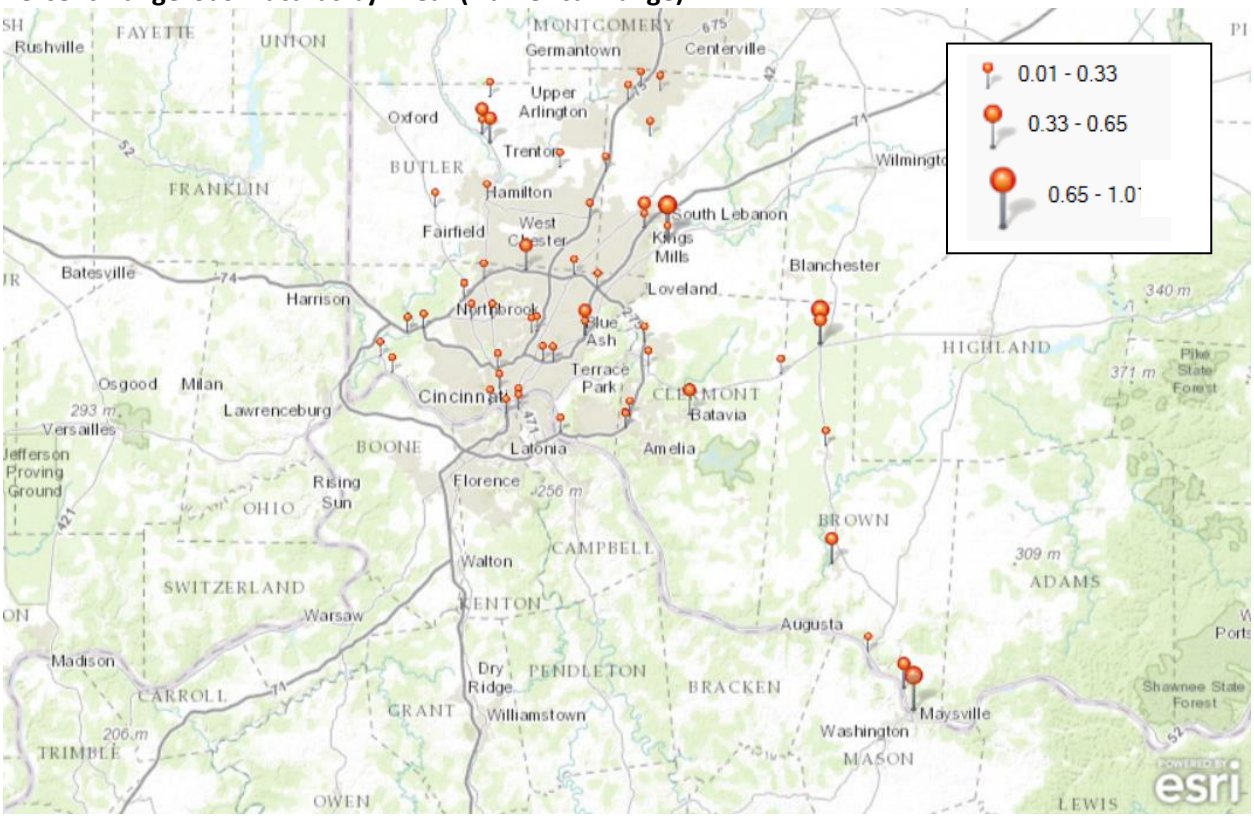
In considering the volume of all commercial motor vehicle traffic and the presence of a placarded hazardous materials load, the percentage of hazardous materials in relation to all commercial motor vehicle traffic presents an interesting statistic illustrated by the graphic and within the data collection spreadsheet. This information can be used during enforcement activities when focus on hazardous materials loads is key.

Percentage of HAZARDOUS MATERIAL to Commercial Motor Vehicles Observed- (Numerical Range)



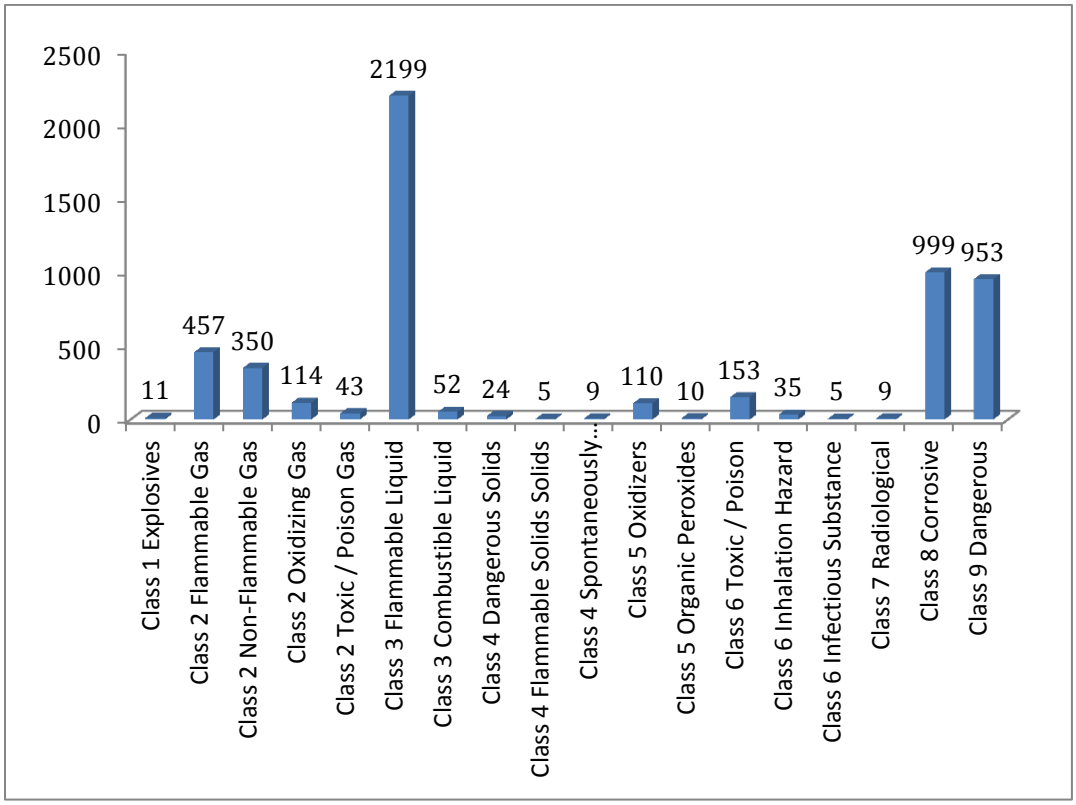
A “Dangerous” placard represents a load of 2 or more hazardous materials combined into one container/shipment (U.S. Government Printing Office, 2013). Response to these incidents is a challenge brought about by the fact that based on the placard alone, there is no way of determining the actual contents and/or the hazards presented by the cargo. Although the presence of a Dangerous placard indicates no wanton disregard for proper placarding regulations, it is unusual to see such high numbers in comparison to all placarded loads. The distribution (map) of Dangerous placards is also unusual. Rather than a metropolitan area centralization, we see a wider/decentralized percentage.

Percent Dangerous Placards by Area- (Numerical Range)



Every hazardous materials placarded vehicle that passed by the survey location was documented at a *minimum* for the hazardous materials class present as indicated by the placard. In section 'c' of the appendix, the actual products themselves (where possible) were captured, documented, and given the appropriate NFPA rating at a minimum along with the North American Emergency Response Guidebook (ERG) page referenced. The chart below indicates the numbers observed of each class and subdivision as a region.

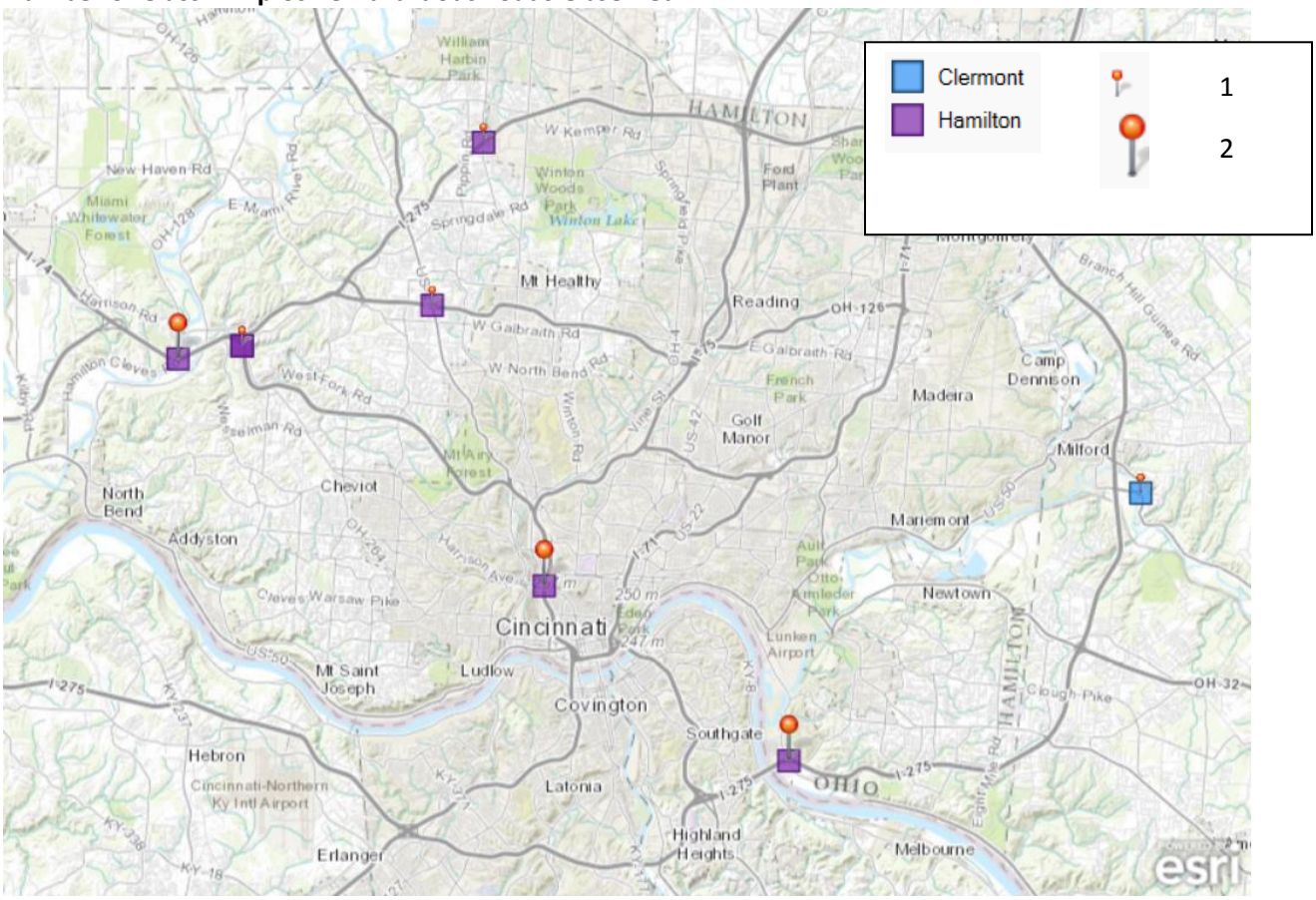
Number of loads observed by hazard class



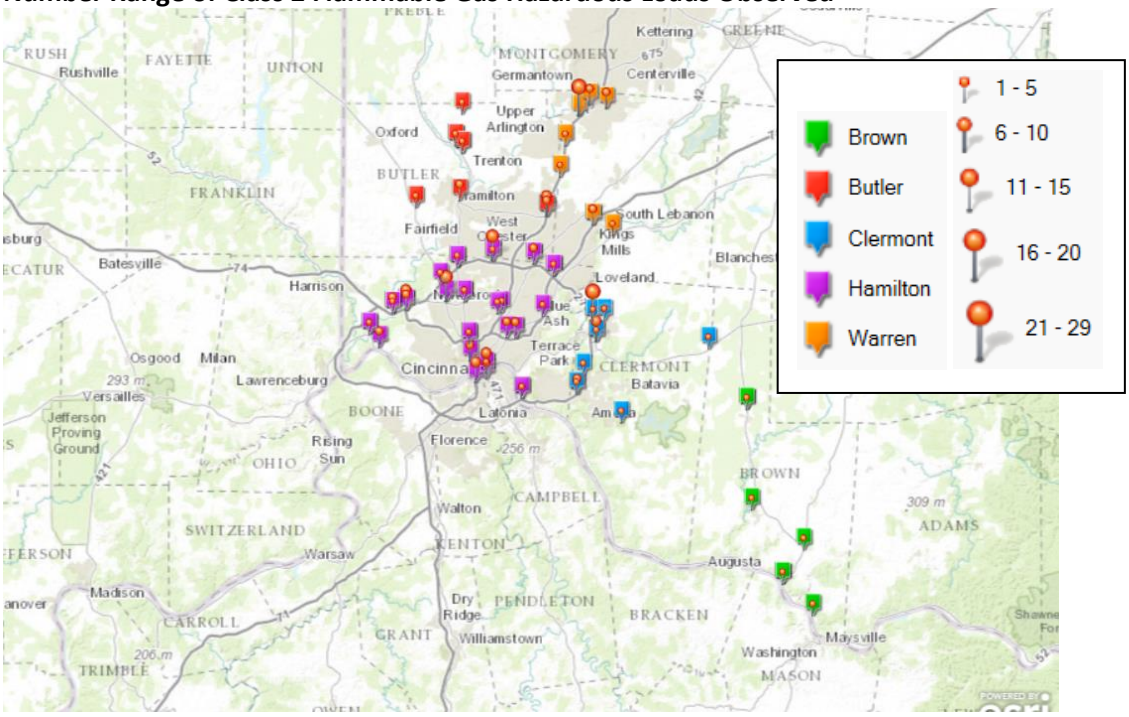
The following maps indicate the presence of a hazardous materials load by Class and Division, the number range observed, the physical location of the survey, and in the county within the region in which it was observed. Detail is available within the data collection spreadsheet and in section 'c' of the appendix.

Maps by County

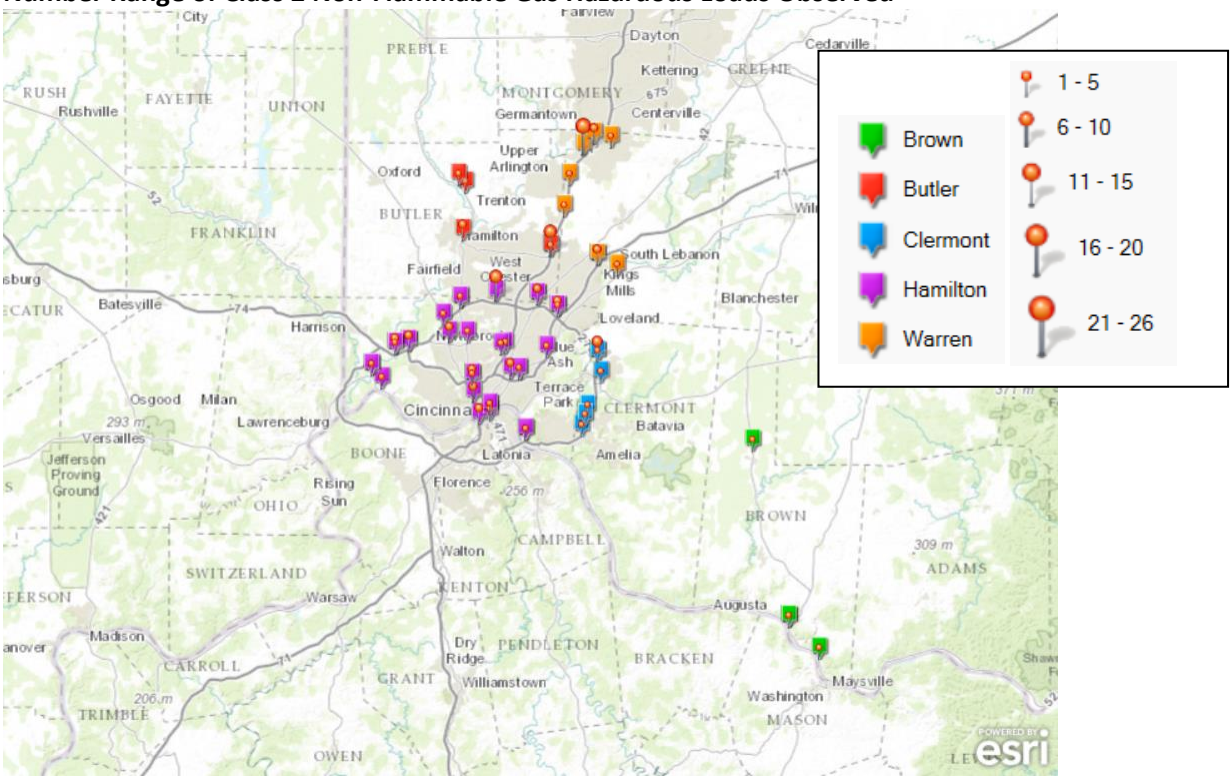
Number of Class 1 Explosive Hazardous Loads Observed



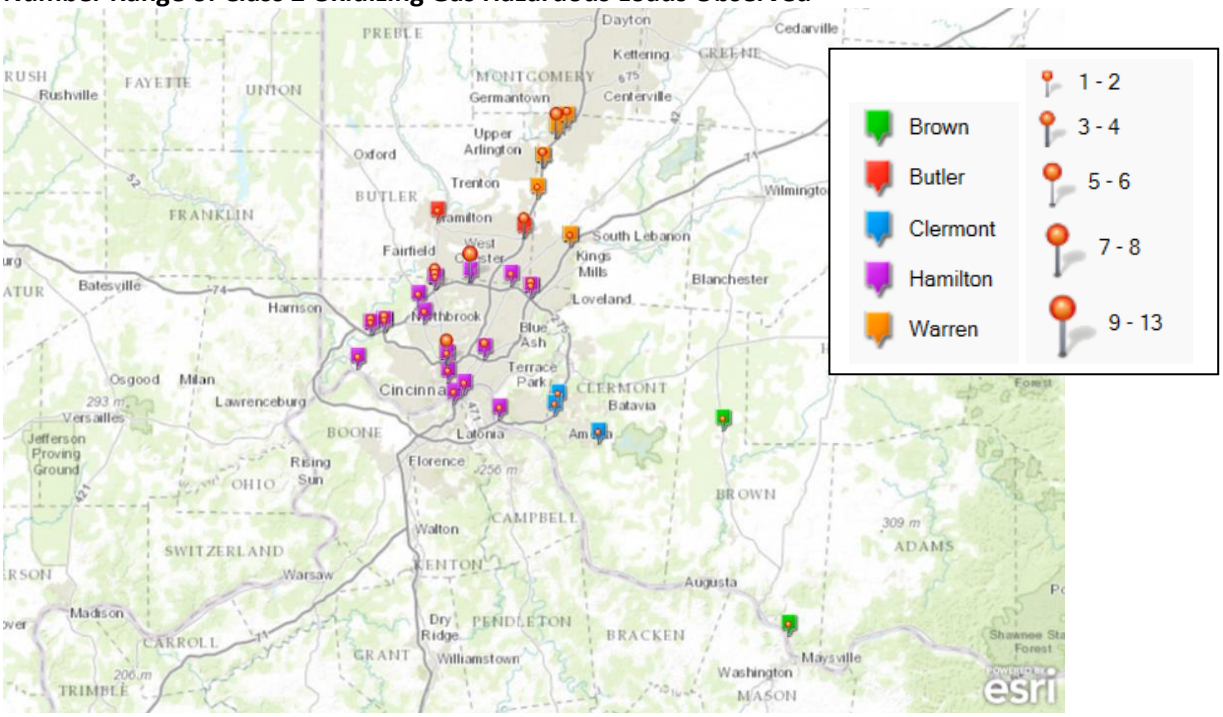
Number Range of Class 2 Flammable Gas Hazardous Loads Observed



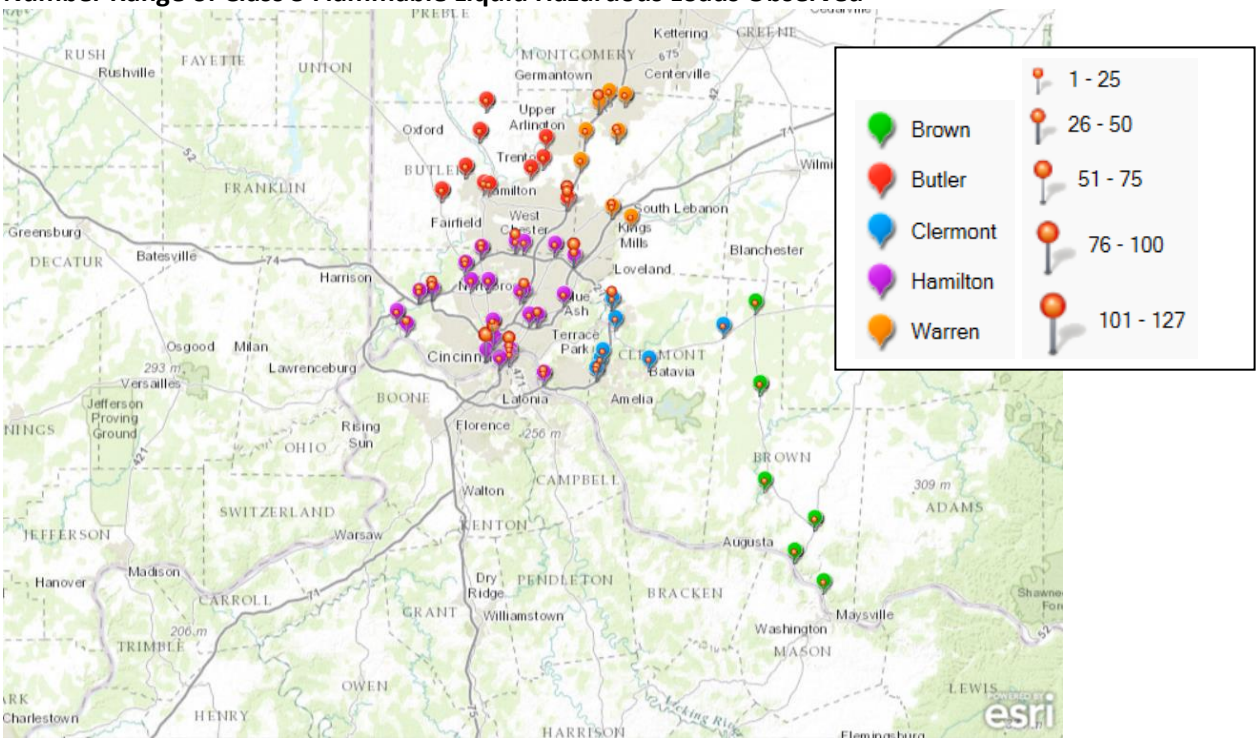
Number Range of Class 2 Non-Flammable Gas Hazardous Loads Observed



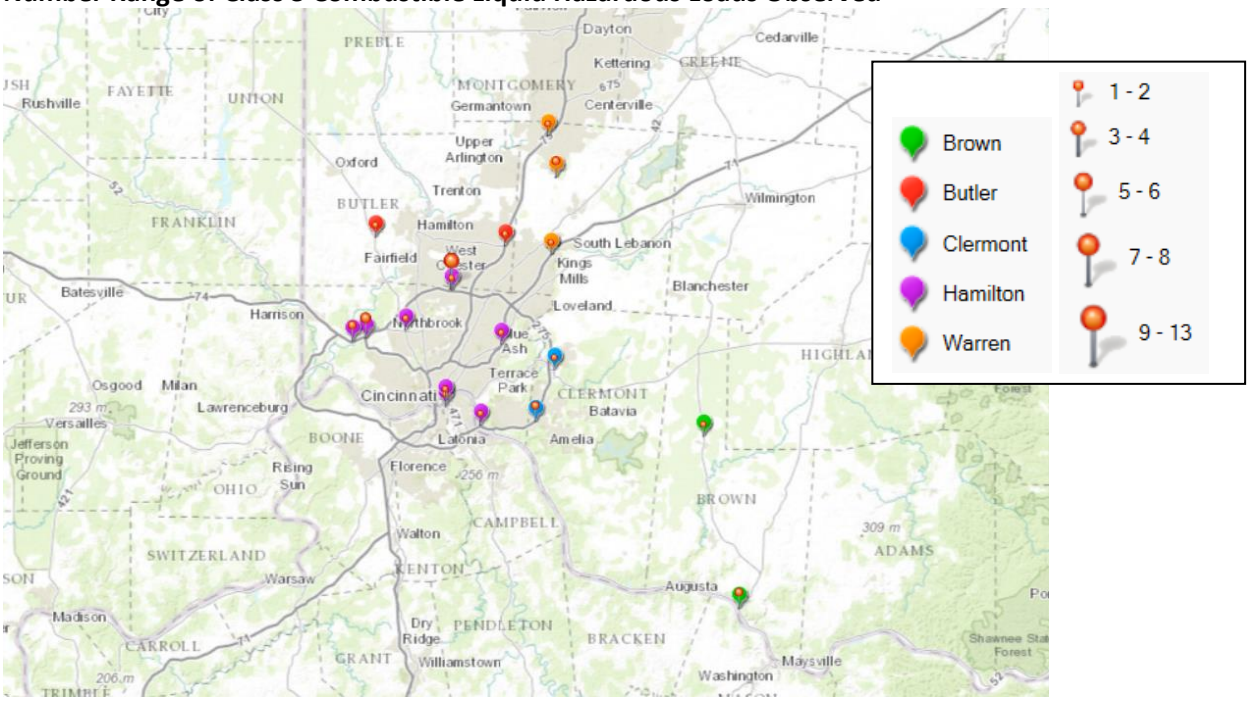
Number Range of Class 2 Oxidizing Gas Hazardous Loads Observed



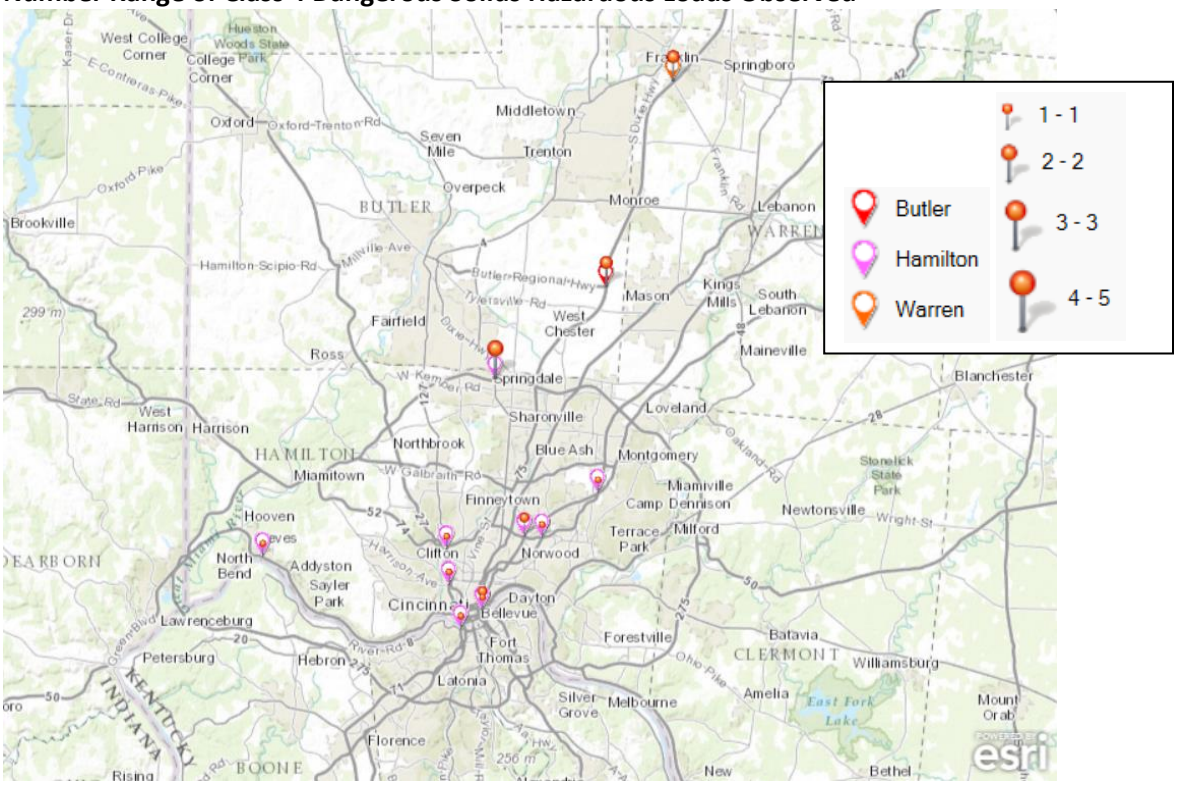
Number Range of Class 3 Flammable Liquid Hazardous Loads Observed



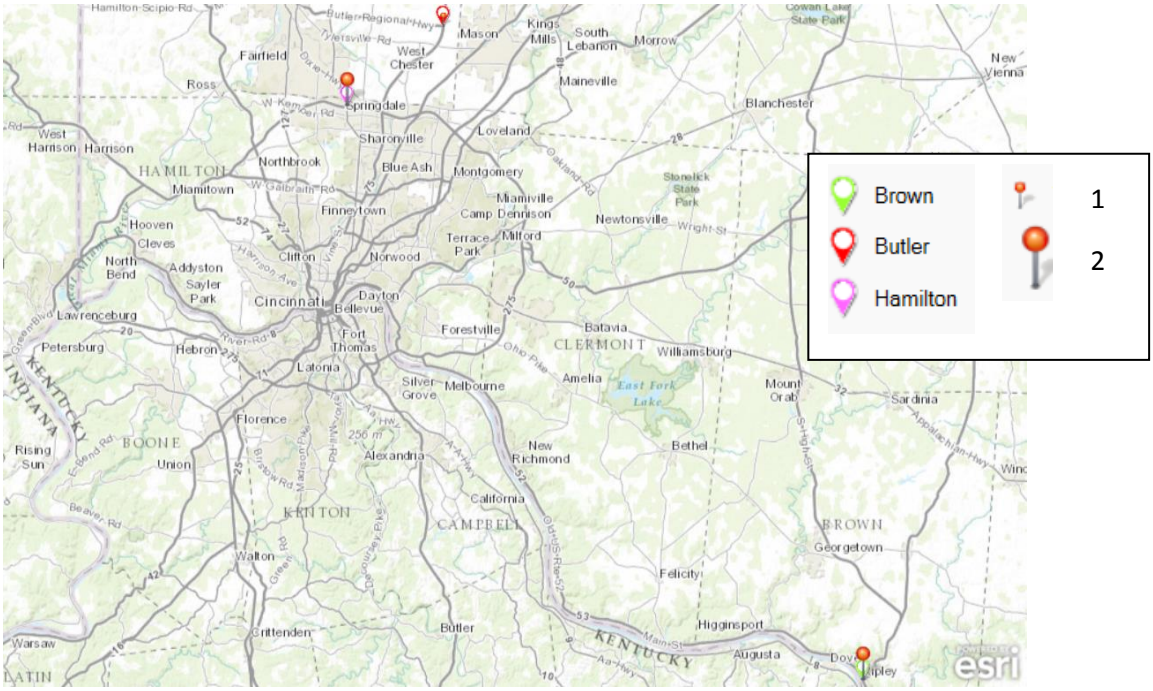
Number Range of Class 3 Combustible Liquid Hazardous Loads Observed



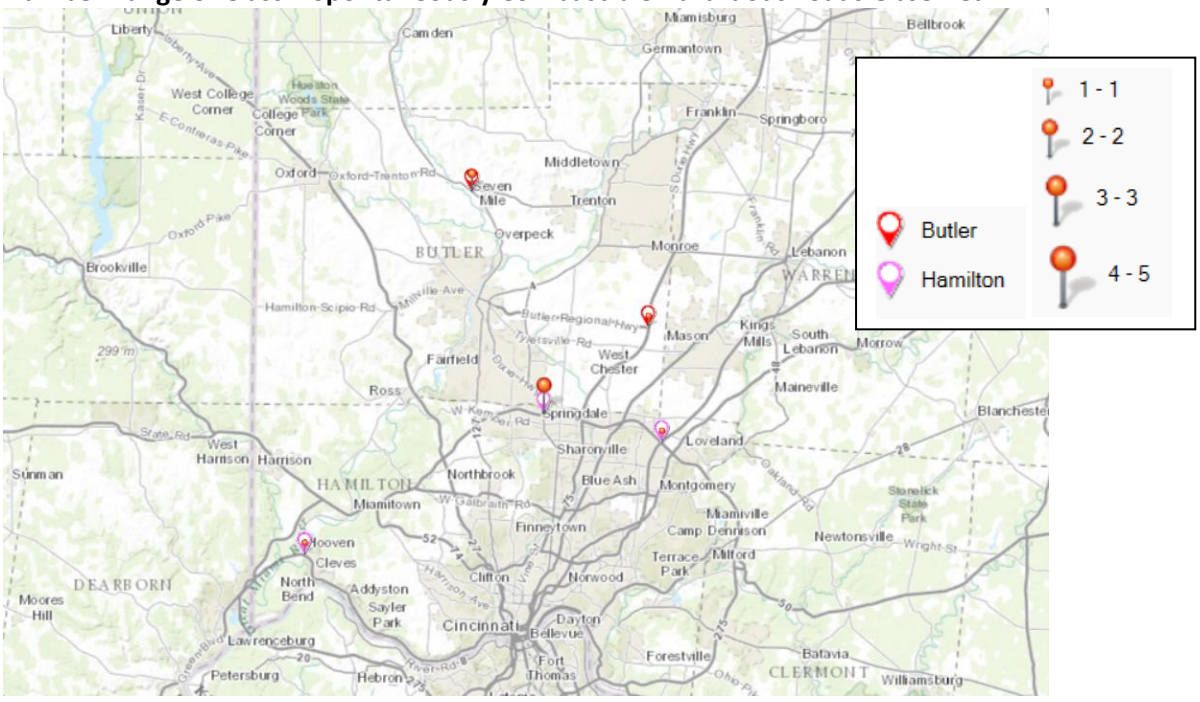
Number Range of Class 4 Dangerous Solids Hazardous Loads Observed



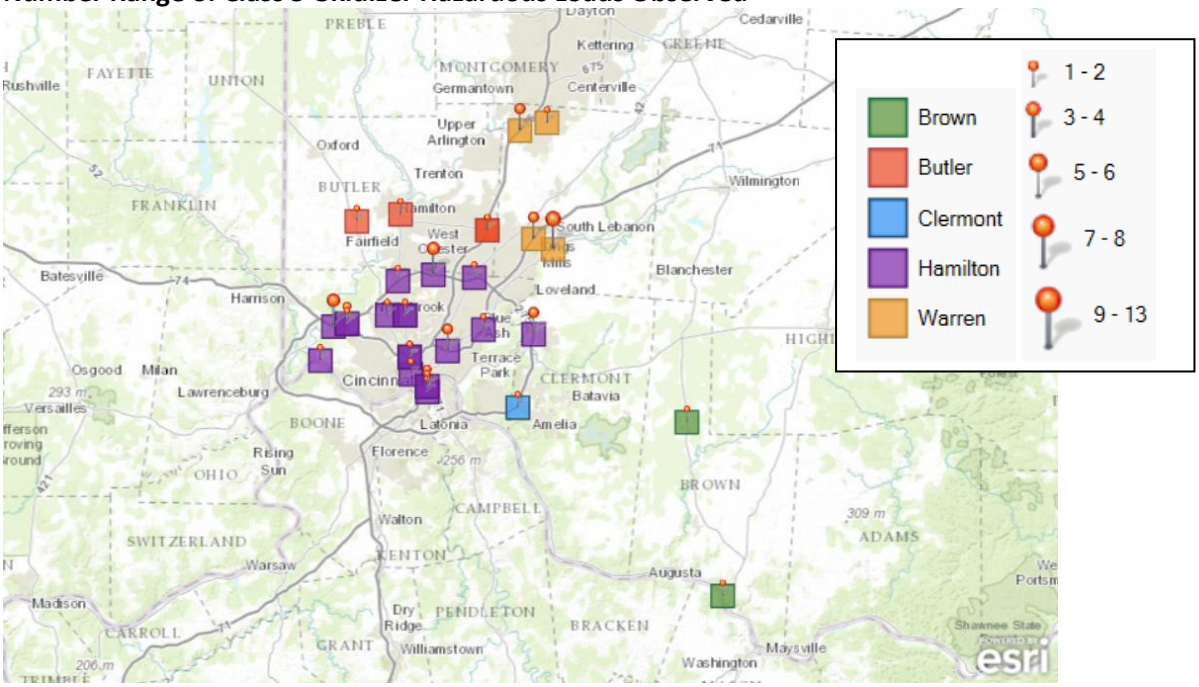
Number of Class 4 Flammable Solids Hazardous Loads Observed



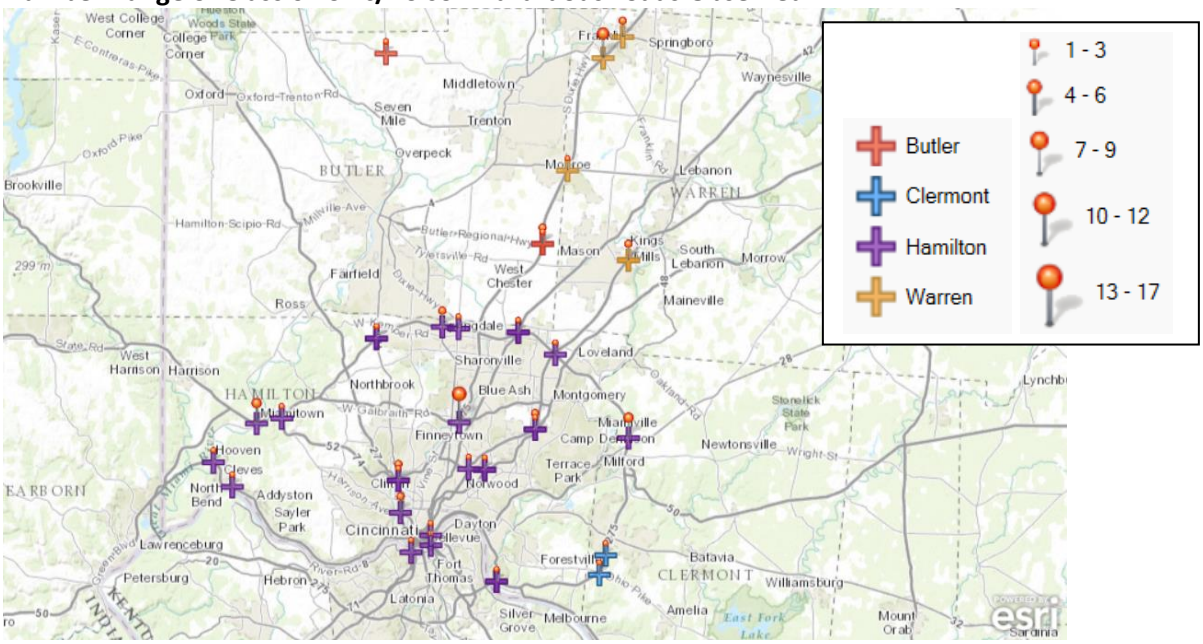
Number Range of Class 4 Spontaneously Combustible Hazardous Loads Observed



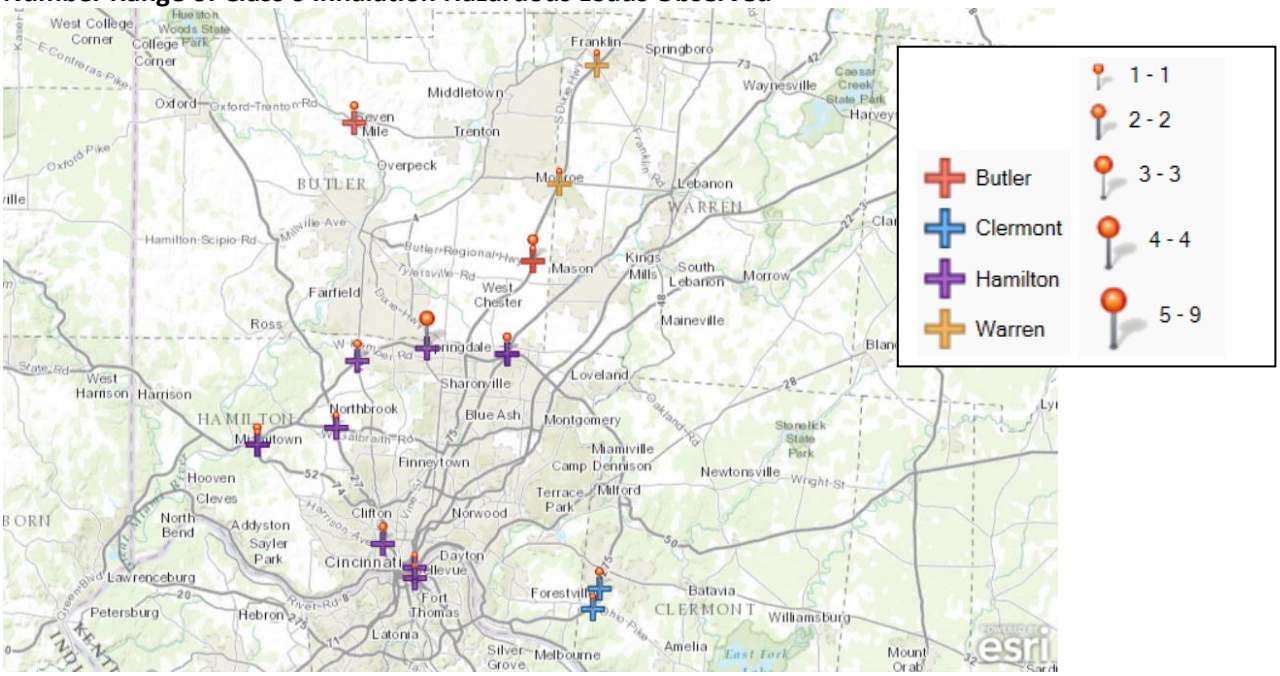
Number Range of Class 5 Oxidizer Hazardous Loads Observed



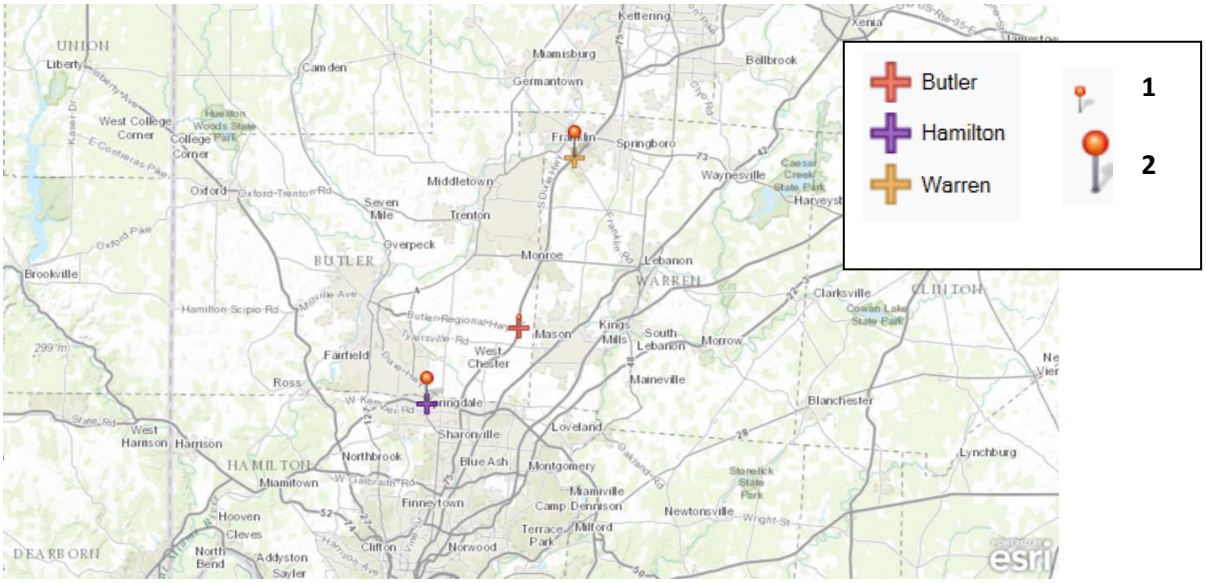
Number Range of Class 6 Toxic/Poison Hazardous Loads Observed



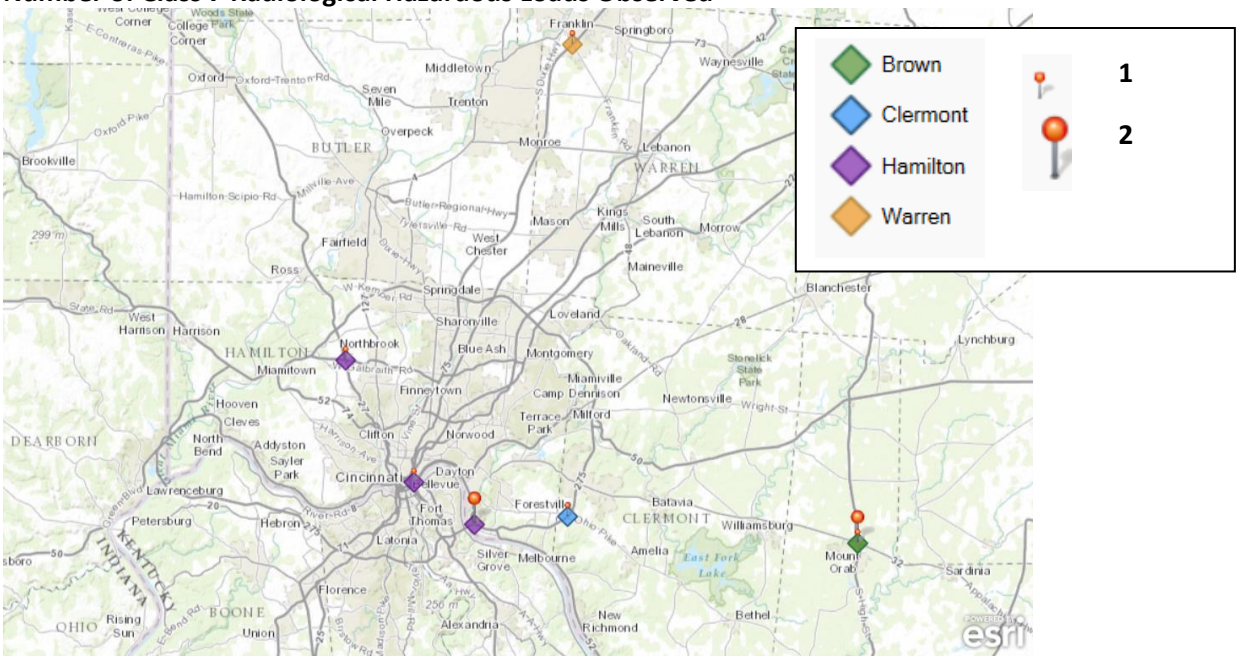
Number Range of Class 6 Inhalation Hazardous Loads Observed



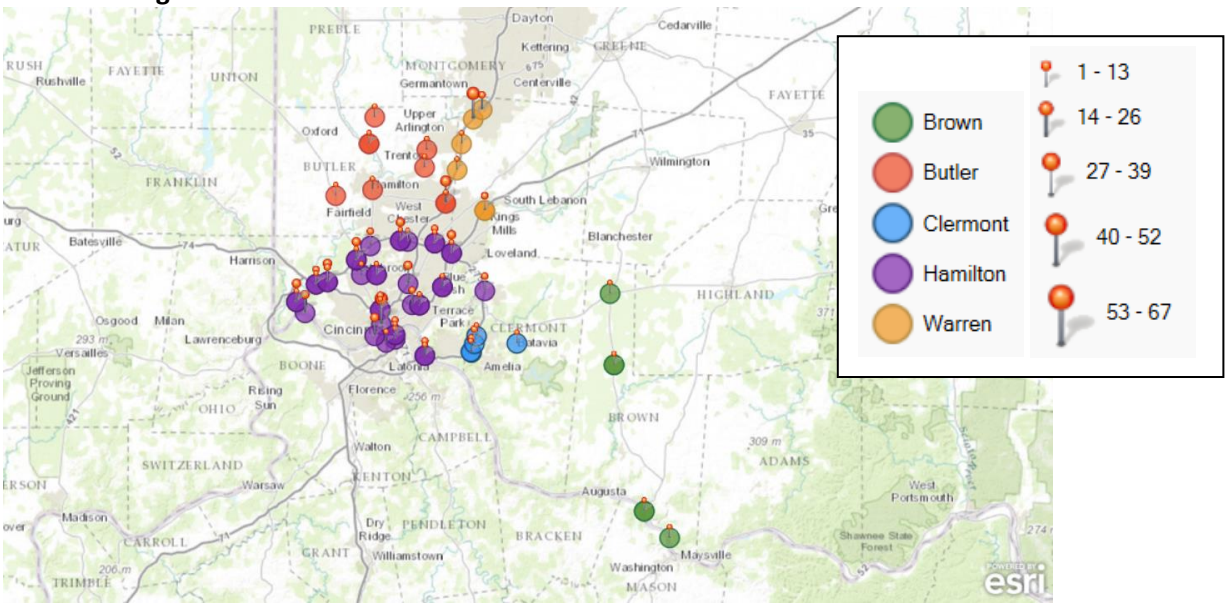
Number of Class 6 Infectious Substance Hazardous Loads Observed



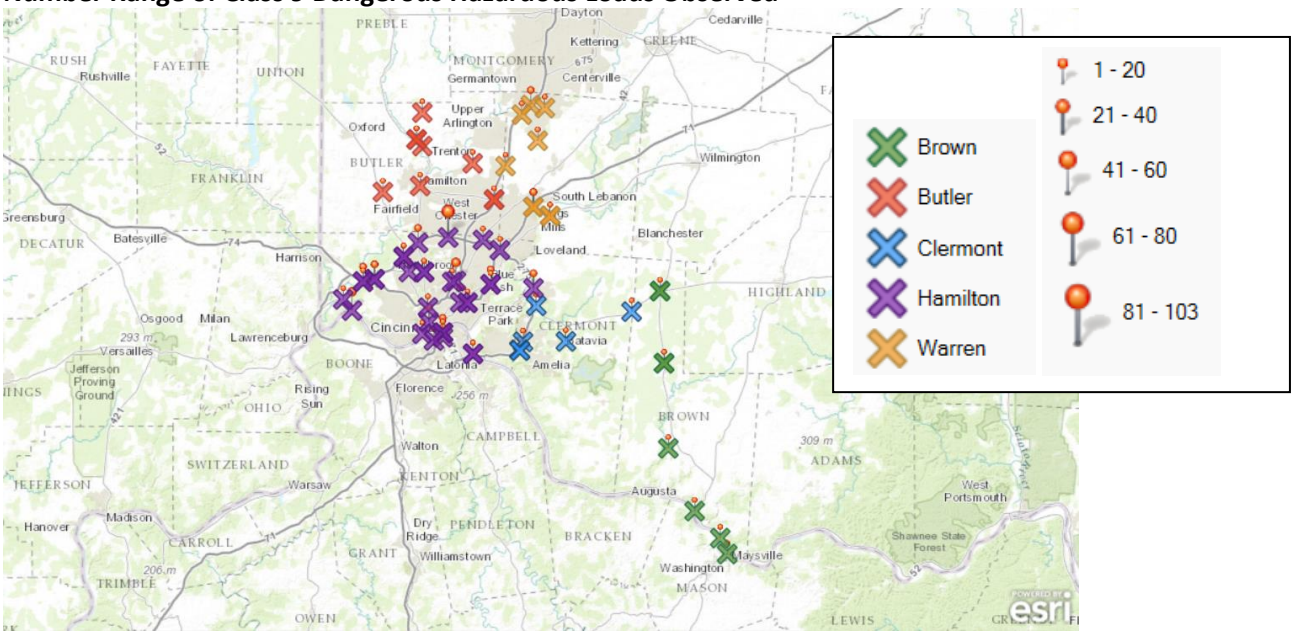
Number of Class 7 Radiological Hazardous Loads Observed



Number Range of Class 8 Corrosive Hazardous Loads Observed



Number Range of Class 9 Dangerous Hazardous Loads Observed



7. Conclusions and Recommendations

The conclusions drawn from this study must be tempered by the fact that there were data limitations in the area of pipeline, rail, and waterway. However there is an adequate amount of data collected to aid planners and better prepare responders for a release or spill within the five County region.

Tier II facilities represent the largest concentration of chemicals in fixed facilities. Tier II facilities are considered in much greater detail in other documents and plans held by the region and county representatives. However, the nexus between Tier II facilities and transportation cannot be ignored. Consider that while observing a roadway for a 4 hour period represents 0.0005% of hazardous materials in transportation observation, one can examine a Tier II document for a facility and through a combination of interviews (How much, how often, and by what method) and understanding the amounts they report on a yearly basis, one can accurately predict what would/may be travelling to the facility itself. As the facility does not move, the routes into the facility can be reasonably predicted. Thus the nexus between Tier II and transportation is created. Data collected and assembled is available within section 'b' of the appendix of this document.

- ***Recommendation – Further consider Tier II transportation analysis.***

Equipment placement and equipment capability was not considered as part of this study. If a particular response "station" has equipment designed to address highway emergencies, and is located away from locations and risk, consideration may be given to studying capabilities, equipment, and risk location.

- ***Recommendation – Consider evaluation of equipment placement.***

Many specialized containers are used to transport hazardous including the DOT MC groups. Response to these incidents requires very specialized training in order to mitigate the effects of a release. The region

should evaluate the status of specialized roadway container response technicians in the area. In addition, one may also consider personnel placement according to specialization and risk.

- ***Recommendation – Evaluate personnel training and placement.***

Roadways currently designated as authorized hazardous materials routes except for local deliveries, saw some volume of hazardous materials. Data on local versus through traffic was not evaluated.

- ***Recommendation – Evaluate effectiveness of designated hazardous materials routes. Are carriers complying with current regulations?***

Although the study did not encompass first response entities, based on the geographical size and proximity of differing authorities having jurisdiction (AHJ) in addition to the relative size and scope of a potential hazardous materials incident, it is a high likelihood that multiple jurisdictions would be pressed into service with one another. Jurisdictions commonly have mutual aid agreements that specify placement of apparatus specifically designed for hazardous materials response in order to maximize capability and increase cost-effectiveness. Not one agency typically can address these low-frequency/high-risk scenarios either with equipment or personnel in terms of personnel numbers or specialized training. Because of the potential wide-area impact associated with hazardous materials releases, working with other jurisdictions become critical.

- ***Recommendation – Train and exercise with neighboring and dependent jurisdictions, scenarios involving hazardous materials responses on a regular basis.***

Hazardous materials transportation volume amounts typically directly correlate to general traffic volume as seen in the survey results. Using the data analysis on hazardous materials volume, the region can generate a picture of the anticipated location of a hazardous materials incident. Understanding the

consequence and likelihood of a hazardous materials incident at a high volume location, the region can plan for rerouting traffic around the incident, bearing in mind as is often the case, this detour can extend for over 1 mile as entire neighborhoods can be affected, not just the roadway itself like non-hazardous materials crashes.

- ***Recommendation – Consider planning alternate routes circumventing high volume hazardous materials locations accounting for distances (circumvention) of up to one mile. For example, if a particular north-south roadway has a high concentration of hazardous materials vehicles, a jurisdiction may consider evaluating and planning alternate north-south roadways adjacent or near the area with such concentrations over 1 mile away.***

The concentration of MC-307/407 type containers is high by comparison to the MC-306/406. Mc-307/407 cargo tanks differ in construction significantly. For example, many MC-307's have double hull constructions, may have an inner liner, valves can be different, etc.

- ***Recommendation – Hold/conduct/attend specialized highway cargo container emergency training with a particular emphasis on the MC-307 cargo container in addition to the MC-306/406.***

Dangerous placards represent an extraordinary percentage makeup of hazardous materials placarded loads observed in this study based on several factors including: Percentage of observed loads in certain locations, and as a percentage of hazard classes observed in the region as a whole.

- ***Recommendation – The responsible entity may consider conducting enforcement/compliance on hazardous materials loads with a particular emphasis on Dangerous placarding to ensure proper compliance with regulations.***

Pipeline information was substantially incomplete at the time this report was published. Only a small percentage of pipeline carrier representatives had responded. Conclusions based on total representation for the region is impossible. As previously detailed although the likelihood may be low, the consequences can be very high. (Often described as a low-frequency, high-risk situation)

- ***Recommendation – Continue to develop pipeline resources, maps, quantities, locations, products, and contacts.***

There is a distinct difference between the 2 rail carriers with respect to the data provided. Rail is much like pipeline in that it is a low likelihood, high consequence event.

- ***Recommendation – Continue to develop railroad resources, maps, quantities, locations, products, and contacts. From this data, additional threat and vulnerabilities can be identified.***

Waterway transportation of hazardous materials presents substantial risk to the environment, property, and persons.

- ***Recommendation – Evaluate preparedness for waterway hazardous materials incident at the local level.***
- ***Recommendation – Work collaboratively with waterway response entities.***

In general the roadway surveys concluded that the greatest number of hazardous materials were moving on the interstate roadways such as I-75, I-275, etc. The greatest volume of commercial vehicle traffic identified was clearly traveling on I-75 through the middle of Cincinnati, rather than on I-275 around the metropolitan area. This volume coupled with the other traffic and driving speeds substantially increases the potential of hazard materials related transportation events.

As the roadway surveys indicate there were a large number of commercial vehicles capable of transporting hazardous materials such as:

- MC 306 – Flammable / Combustible Liquid transport vehicles
- MC 307 – Low Pressure Chemical Tankers
- MC 312 – Corrosive Chemical Tankers

that contained NO PLACARDS or identification of the materials being transported. These observations certainly could be substantiated by actual commercial carrier vehicle contacts that would determine the products being transported, and if placarding would be required.

Lastly, a large number of commercial Standard Cargo Tractor / Trailer vehicles were observed with NO PLACARDS. Certainly an assumption can be made that they were not transporting any hazardous cargo, but planners and responders MUST understand the DOT requirements for when placarding may be required. These Standard Commercial Carriers MAY be carrying small amounts of hazardous materials, that fall below the placarding requirements. They may also be transporting several Hazard Classes of chemicals that are below the placard requirements. These factors pose challenges to planners and responders simply due to the unknowns that they may face in any transportation related event. ***Any hazardous material can be transported at any time by any mode***.

- ***Recommendation – Treat all commercial motor vehicle incidents and crashes as potential hazardous materials events.***

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8. Appendices (raw data)

a. NFPA 704 Chemical Placarding / Labeling System

As commodities were determined they were evaluated for their impacts on the community. The NFPA 704 classification standard is a nationally recognized and approved classification system that is intended to protect the health and safety of individuals who respond to fire and chemical emergencies in facilities, transportation or locations where the hazards of materials are not readily apparent or known. The standard addresses the health, flammability, instability and related hazards that are presented by short-term, acute exposure to a material during a fire, spill or other emergency-related condition.

NFPA 704 is a simple, recognizable and easily understood marking system that provides a general idea of the severity of the hazards of a material. The standard applies to industrial, commercial and institutional facilities that manufacture, process, use or store hazardous materials.

Hazard Symbols:

A system of categories, colors and numbers was created to provide basic hazard information. It enables personnel to easily decide whether or not to evacuate an area or proceed with operations. The three principal categories of identification are:

- Health, Flammability and Reactivity (Instability).
- A numerical range of "0 to 4" indicates the severity of the hazard.
    - "4" indicates the MOST severe and
    - "0" indicates a MINIMAL hazard.
- The information is presented in a color and spatial arrangement of the numerical ratings:
    - Health Hazard, **BLUE**, at the 9 o'clock position;
    - Flammability Rating, **RED**, at the 12 o'clock position;
    - Reactivity (Instability) Rating, **YELLOW**, at the 3 o'clock position.
    - Special Information Rating, **WHITE**, at the 6 o'clock position is reserved for indicating special information such as:
        - If the product is water reactive it will contain the letter "W" with a line through the center.
        - If the chemical possesses oxidizing concern it would be identified by the letters "OX" or "OXY".

Throughout this report one will find that all the chemicals identified have been classified into the NFPA 704 system to aid planners and responders in quickly identifying the hazards associated with the chemicals.

NFPA 704 Chemical Information

Health Hazard	
4	Very short exposure could cause death or serious residual injury even though prompt medical attention was given.
3	Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
2	Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.
1	Exposure could cause irritation but only minor residual injury even if no treatment is given.
0	Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.

Flammability	
4	Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.
3	Liquids and solids that can be ignited under almost all ambient conditions.
2	Must be moderately heated or exposed to relatively high temperature before ignition can occur.
1	Must be preheated before ignition can occur.
0	Materials that will not burn.

Reactivity	
4	Readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.
3	Capable of detonation or explosive reaction, but requires a strong initiating source or must be heated under confinement before initiation, or reacts explosively with water.
2	Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water
1	Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.
0	Normally stable, even under fire exposure conditions, and are not reactive with water.

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b. Tier II Facility Data

Roadway observation during this study represents 0.0005% of yearly potential. Tier II data represents average and maximum daily amounts at any given facility. Assuming accurate data is reported, potential transportation by modes described is reasonably predictable. The following represents data collected during the study from the detailed county reports. (# of LOC indicates the number of locations that the specified chemical was observed)

Brown

Blue Rock noted 22 facilities with 49 chemicals.

- Of the 49 chemicals reported, 11 were identified as Extremely Hazardous Substances (EHS).
- The reported chemicals were broken down into the following forms:
  - 6 were indicated as being in the SOLID form
  - 43 were identified as being in the LIQUID form
  - 9 were identified as being in the GAS form
  - 16 chemicals were listed as PURE, while 35 were listed as MIXTURES.
  - 44 chemicals were identified as having an ACUTE hazard potential.
  - 17 were identified as posing a CHRONIC health risk.

- Of the 11 EHS chemicals identified the following summary was developed, based on the most common or large amount chemicals existing in reportable amounts:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	1
1942	Ammonium Nitrate	Oxidizer	0	0	3	140	1
1017	Chlorine	Toxic / Corrosive	4	0	0	124	1
3016	Paraquat Dichloride	Toxic	4	0	0	151	1
1830	Sulfuric Acid	Corrosive	3	0	2	137	8

Butler

Blue Rock found 224 facilities with 1670 chemicals. Of the 1670 chemicals reported, 267 were identified as Extremely Hazardous Substances (EHS).

- The reported chemicals were broken down into the following forms:
  - 349 were indicated as being in the SOLID form
  - 1318 were identified as being in the LIQUID form
  - 72 were identified as being in the GAS form
  - 650 chemicals were listed as PURE, while 1002 were listed as MIXTURES.
  - 1441 chemicals were identified as having an ACUTE hazard potential.
  - 587 were identified as posing a CHRONIC health risk.
- Of the 267 EHS chemicals identified the following summary was developed, based on the most common or large amount chemicals existing in reportable amounts:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
2078	Toulene (Spelling was incorrect and should have been) Toluene Diisocyanate	Toxic	3	1	0	156	1
1090	Acetone	Flammable	1	3	0	127	1
1093	Acrylonitrile	Flammable / Poison	4	3	2	131	1
1005	Ammonia	Corrosive Gas	3	1	0	125	33
2672	Ammonium Hydroxide	Corrosive	2	0	0	154	1
1006	Argon	Compressed Gas	3	0	0	121	1
2794	Battery Acid	Toxic / Corrosive	3	0	2	153	11
1017	Chlorine	Toxic /	4	0	0	124	9

		Corrosive Gas					
1883	Chloroform	Toxic / Poison	2	0	0	151	3
2357	Cyclohexylamine	Corrosive / Flammable	3	3	0	132	3
1773	Ferric Chloride	Toxic / Corrosive	3	0	2	157	1
1198	Formaldehyde (improper spelling in Tier II “Formal Dehyde”)	Flammable / Corrosive	3	2	0	132	3
2029	Hydrazine	Flammable / Corrosive	3	3	2	132	3
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	6
1790	Hydrofluoric Acid	Poisonous / Corrosive	4	0	1	157	1
1052	Hydrogen Fluoride	Corrosive / Poison	4	0	1	125	7
2014	Hydrogen Peroxide	Corrosive	2	0	1	140	3
2031	Nitric Acid	Toxic / Corrosive	4	0	0	157	17
1662	Nitrobenzene	Toxic / Combustible	3	2	1	152	1
1680	Potassium Cyanide	Toxic Corrosive	3	0	0	157	2
1077	Propylene	Flammable	1	4	0	115	1
1689	Sodium Cyanide	Toxic / Corrosive	3	0	0	157	3
1791	Sodium Hypochlorite	Corrosive	1	0	0	154	3
1079	Sulfur Dioxide	Corrosive	3	0	0	125	2
1830	Sulfuric Acid	Corrosive	3	0	2	137	98
2078	Toluene Diisocyanate	Toxic / Corrosive	3	1	2	156	1
1301	Vinyl Acetate	Flammable	2	3	2	129	1

Clermont

Blue Rock noted 84 facilities with 237 chemicals.

- Of the 237 chemicals reported, 48 were identified as Extremely Hazardous Substances (EHS).
- The reported chemicals were broken down into the following forms:
  - 40 were indicated as being in the SOLID form
  - 194 were identified as being in the LIQUID form
  - 11 were identified as being in the GAS form
  - 77 chemicals were listed as PURE, while 147 were listed as MIXTURES.
  - 187 chemicals were identified as having an ACUTE hazard potential.
  - 107 were identified as posing a CHRONIC health risk.
- Of the 48 EHS chemicals identified the following summary was developed, based on the most common or large amount chemicals existing in reportable amounts:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1017	Chlorine	Oxidizer, Toxic Gas	4	0	0	124	1
1830	Sulfuric Acid	Corrosive	3	0	2	137	35

Hamilton

Blue Rock noted 483 facilities with 3586 chemicals.

- Of the 3586 chemicals reported, 279 were identified as Extremely Hazardous Substances (EHS).
- The reported chemicals were broken down into the following forms:
  - 909 were indicated as being in the SOLID form
  - 2652 were identified as being in the LIQUID form
  - 170 were identified as being in the GAS form
  - 1550 chemicals were listed as PURE, while 2073 were listed as MIXTURES.
  - 3052 chemicals were identified as having an ACUTE hazard potential.
  - 1400 were identified as posing a CHRONIC health risk.
- Of the 279 EHS chemicals identified the following summary was developed, based on the most common or large amount chemicals existing in reportable amounts:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	51
2794	Battery Acid	Toxic / Corrosive	3	0	2	153	25
1738	Benzyl Chloride	Corrosive	3	2	1	156	1
1017	Chlorine	Toxic Corrosive Gas	4	0	0	124	3
1883	Chloroform	Toxic / Poison	2	0	0	151	2
2357	Cyclohexylamine	Corrosive / Flammable	3	3	0	132	3
2023	Epichloohydrin	Flammable / Toxic	3	3	2	131	1
1040	Ethylene Oxide	Gas / Toxic /	3	4	3	119	2

		Flammable					
1604	Ethylenediamin	Flammable / Corrosive	3	3	0	132	2
1198	Formaldehyde	Flammable / Corrosive	3	2	0	132	10
2029	Hydrazine	Flammable / Corrosive	3	3	2	132	2
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	5
1790	Hydrofluoric Acid	Poisonous / Corrosive	4	0	1	157	8
1052	Hydrogen Fluoride	Corrosive / Poison	4	0	1	125	3
2014	Hydrogen Peroxide	Corrosive	2	0	1	140	2
2662	Hydroquinone	Toxic / Corrosive	2	1	0	153	1
2290	Isophorone Diisocyanate	Toxic / Corrosive	4	1	1	156	1
2031	Nitric Acid	Toxic / Corrosive	4	0	0	157	32
2821	Phenol	Toxic / Corrosive	4	2	0	153	5
1805	Phosphoric Acid	Toxic / Corrosive	3	0	0	154	1
1680	Potassium Cyanide	Toxic / Corrosive	3	0	0	157	9
1689	Sodium Cyanide	Toxic / Corrosive	3	0	0	157	4
1502	Sodium Perchlorate	Oxidizer	2	0	1	140	2
1079	Sulfur Dioxide	Gas / Corrosive	3	0	0	125	3
1829	Sulfur Trioxide	Water Reactive / Corrosive	3	0	2	137	2
1830	Sulfuric Acid	Corrosive	3	0	2	137	226
2869	Titanium Tetrachloride	Toxic / Corrosive	3	0	2	157	1

Warren

Blue Rock noted 96 facilities with 375 chemicals.

- Of the 375 chemicals reported, 35 were identified as Extremely Hazardous Substances (EHS).
- The reported chemicals were broken down into the following forms:
  - 85 were indicated as being in the SOLID form
  - 277 were identified as being in the LIQUID form
  - 9 were identified as being in the GAS form
  - 114 chemicals were listed as PURE, while 249 were listed as MIXTURES.
  - 319 chemicals were identified as having an ACUTE hazard potential.
  - 158 were identified as posing a CHRONIC health risk.
- Of the 35 EHS chemicals identified the following summary was developed, based on the most common chemicals existing in reportable amounts:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	1
1017	Chlorine	Toxic / Corrosive Gas	4	0	0	124	3
2810	Endosulfan	Toxic / Poison	3	1	1	153	1
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	1
2290	Isophorone Diisocyanate	Toxic / Corrosive	4	1	1	156	1
3016	Paraquat Dichloride	Toxic	4	0	0	151	1
3107	Peracetic Acid	Organic Acid	3	2	4	145	1
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	1
1079	Sulfur Dioxide	Corrosive	3	0	0	125	1
1830	Sulfuric Acid	Corrosive	3	0	2	137	31

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c. Supporting Data

Waterway

During an actual 10-Hour survey of the Ohio River, EAST of Cincinnati, the following information was determined:

CARRIER TYPE	COMMENTS
Tug pushing a barge	Barge contained COAL and SCRAP • No visible hazardous material
Tug pushing barges	Barges contained COAL, SCRAP and GRAVEL • No visible Hazardous material
Tug pushing multiple barges	Barge contained COAL • No visible Hazardous material
Tug pushing 10 barges	Barges contained COAL • No visible Hazardous material
Marathon Oil tug pushing three tanker barges	Barges contained suspected Flammable / Combustible Liquids • No specific placarding was present, however the container type and information concluded product identification.

During another actual 10-Hour survey of the Ohio River, WEST of Cincinnati, the following information was determined:

CARRIER TYPE	COMMENTS
Tug pushing a barge	Tanker barge with no labeling or placards • No visible Hazardous material placarding
Tug pushing barges	The barge and Tug were NOT identified on the Marine Traffic WEB Site as being in operation in the area. • No visible Hazardous material placarding
Tug pushing barges	Tug pushing TWO tanker barges. • No visible Hazardous material placarding
Tug pushing 6 barges	Barges were as follows: • 1 tanker barge • 3 coal barges • 2 iron pipe barges • No visible Hazardous material placarding

During a third actual 10-Hour survey of the Ohio River, EAST of Cleves along Highway 50 (River Road), the following information was determined:

CARRIER TYPE	COMMENTS
Tug pushing 3 barges	Marathon Tug pushing 3 tanker barges with no labeling or placards

	• No visible Hazardous material placarding
Tug pushing barge	Barge only contained Dirt and Coal • No visible Hazardous material or placards

Tonnage reports were provided for the Markland and Captain Anthony Meldahl Locks. An analysis of the data was completed and revealed the following PRIMARY hazardous materials.

Markland Lock (January 2013 through August 1, 2013):

PRODUCT	YTD Upbound Tonnage	YTD Downbound Tonnage	YTD TOTAL	UN NUMBER
Gasoline / Aviation Fuel	68.6	671.43	740.03	1203 1863
Lube Oil and Greases	475.65	154.84	630.49	1993
Fertilizers, Urea & Ammonium Nitrate	560.47	12.43	572.9	3375
Distillate Fuel Oil	31.6	421.25	452.85	1993
Alcohols	349.35	3.53	352.88	1987
Petro, Bitumen, Petro, Coke, Asphalt	117.31	222.7	340.01	2924
Crude Petroleum	7	322.26	329.26	1270
Other Hydrocarbons	291.9	1.8	293.7	2924
Sodium Hydroxide	220.18	9.4	229.58	1824
Oils, Pitch and Tar	11.9	159.57	171.47	1270
Phosphatic Fertilizer	112.9	0	112.9	1805
Petrol products NOS	75.85	29.5	105.35	2924
Ammonia	98.92	1.8	100.72	1005
Residual Fuel Oil	3.05	96.19	99.24	1203
Chlorine	70.65	5.78	76.44	1017
Potassic Fertilizer, Potash	73.4	3	76.4	1814
Benzene and Toluene	41.25	29.39	70.64	1114
Naphtha and Solvents	7.65	55.3	62.95	2924
Acyclic Hydrocarbons	61.01	0	61.01	2924
Hydrocarbon and Petrol Gases (Butane, Propylene, Propane, Isobutane)	40	5.4	45.4	2924
Kerosene	9.3	21	30.3	1223
Carboxylic Acids	8.5	14.4	22.9	1760
Nitrile – Function Comp, Amino Acids and Esters	3.85	0	3.85	3273
Sulphur, (liquid)	0	1.75	1.75	2448

Capt Ant Captain Anthony Meldahl Lock (January 2013 through August 1, 2013):

PRODUCT	YTD Upbound Tonnage	YTD Downbound Tonnage	YTD TOTAL	UN NUMBER
Gasoline / Aviation Fuel	35.01	1484.41	1519.51	1203 1863
Distillate Fuel Oil	39.85	855.95	895.8	1993
Lube Oil and Greases	438.37	177.3	615.67	1993
Petro, Bitumen, Petro, Coke, Asphalt	115.56	426.4	541.96	2924
Crude Petroleum	12	469.04	481.04	1270
Alcohols	274.25	0	274.25	1987
Other Hydrocarbons	252.99	1.8	254.79	2924
Fertilizers, Urea & Ammonium Nitrate	252.3	1.93	254.23	3375
Oils, Pitch and Tar	19.1	203.92	223.02	1270
Sodium Hydroxide	91	19.63	110.63	1824
Residual Fuel Oil	16.3	83.69	99.99	1203
Kerosene	9.3	78	87.3	1223
Hydrocarbon and Petrol Gases (Butane, Propylene, Propane, Isobutane)	55.4	30.9	86.3	2924
Petrol products NOS	51.49	29.5	80.99	2924
Naphtha and Solvents	16.2	60.71	76.91	2924
Ammonia	65.8	1.6	67.4	1005
Chlorine	58.8	5.78	64.58	1017
Benzene and Toluene	52.61	0	52.61	1114
Acyclic Hydrocarbons	52.61	0	52.61	2924
Phosphatic Fertilizer	52.5	0	52.5	1805
Potassic Fertilizer, Potash	29.3	3	32.3	1814
Carboxylic Acids	3.25	14.4	17.65	1760
Nitrile – Function Comp, Amino Acids and Esters	5	1.5	6.5	3273

Chemical Assessment of the chemicals identified (DOT, Transport Canada, & Secretariat of Transport and Communications, 2012)**:**

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	X
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Toxic Gas	3	1	0	125	X
1017	Chlorine	Toxic / Corrosive Gas	4	0	0	124	X
1114	Benzene	Flammable	2	3	0	130	X
1120	Butanols	Flammable Gas	1	3	0	129	
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	X
1270	Petroleum oil	Combustible	2	3	0	128	X
1760	Corrosive Liquid NOS	Toxic / Corrosive	3	1	2	154	X
1805	Phosphoric Acid	Toxic / Corrosive	3	0	0	154	X
1814	Potassium Hydroxide	Toxic / Corrosive	3	0	1	154	X
1823	Caustic	Corrosive	2	1	1	154	
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	X
1863	Aviation Fuel	Flammable	1	2	0	128	X
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	X
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	X
2014	Hydrogen Peroxide	Corrosive	2	0	1	140	
2448	Molten Sulfur	Flammable Solids	4	0	4	133	X
2924	Flammable Liquids	Flammable	1	4	1	132	X

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Rail

During a 10-hour on-site assessments of the rail lines extending through the community of Hamilton the following information was determined:

CARRIER TYPE	COMMENTS
0722 hrs – CSX TRAIN	South bound train • 81 cars with NO HAZARDOUS MATERIAL • 8 cars with Anhydrous Ammonia – UN 1005
0735 hrs – CSX TRAIN	North bound train • 31 cars with NO HAZARDOUS MATERIAL • 4 cars with Molten Sulfur – UN 2448 • 2 cars with Sulfuric Acid – UN 1830 • 2 cars with Styrene Monomer, Stabilized
0738 hrs – CSX TRAIN	West bound train • 57 cars with NO HAZARDOUS MATERIAL • 9 cars with Sulfuric Acid – UN 1830
0833 hrs – CSX TRAIN	South bound train • 25 cars with NO HAZARDOUS MATERIAL • 105 cars (vehicle transport cars) - empty
0847 hrs – NS TRAIN	North bound train • 87 cars with NO HAZARDOUS MATERIAL • 6 cars with Refrigerated Liquid (Cryogenic) NOS (Not Otherwise Specified) – UN 3158
0900 hrs – CSX TRAIN	South bound train • 113 cars with NO HAZARDOUS MATERIAL ○ 82 cars had semi-trailers, double high with no placards • 4 cars with Anhydrous Ammonia – UN 1005
0924 hrs – NS TRAIN	South bound train • 39 cars with NO HAZARDOUS MATERIAL • 31 cars had FedEx semi-trailers double with no placards • 1 car had a semi-trailer had a CORROSIVE PLACARD – UN 1760 • 13 cars has semi-trailers, double stacked with FLAMMABLE LIQUID PLACARDS – UN 1993
0942 hrs – NS TRAIN	South bound train • 67 cars (vehicle transport cars) with NO HAZARDOUS MATERIAL
1009 hrs – CSX TRAIN	South bound train • 24 cars with NO HAZARDOUS MATERIAL • 18 cars with Refrigerated Liquids NOS – UN 3158 • 16 cars with CAUSTIC LABELING – no other information • 2 cars with Hydrochloric Acid – UN 1789
1024 hrs – CSX TRAIN	South bound train • 62 cars (vehicle transport cars) – empty • Train contained NO VISIBLE HAZARDOUS MATERIAL

1050 hrs – CSX TRAIN	North bound train • 57 cars with NO HAZARDOUS MATERIAL • 9 cars with Hydrochloric Acid – UN 1789 • 5 cars with Chlorine – UN 1017 • 19 cars with LPG (Propane) – UN 1075 • 2 cars with Elevated Temperature Liquids – UN 3257
1058 hrs – NS TRAIN	South bound train • 66 cars (vehicle transport cars) – empty • Train contained NO VISIBLE HAZARDOUS MATERIAL
1118 hrs – CSX TRAIN	North bound train • 2 cars with Inhalation Hazard / Toxic by Inhalation – UN 3492 • 78 cars with Alcohols NOS – UN 1987
1124 hrs – NS TRAIN	South bound train • 35 cars with NO HAZARDOUS MATERIAL • 11 low pressure cars with NO PLACARDS • 5 cars with Phosphoric Acid – UN 1805 • 5 cars with LPG (Propane) – UN 1075
1134 hrs – UP TRAIN	Union Pacific Train – South bound train • 35 cars with NO HAZARDOUS MATERIAL • 40 cars with Alcohols NOS – UN 1987 • 13 Low Pressure cars with NO PLACARDS • 2 cars with stenciled “CORN SYRUP
1204 hrs – CSX TRAIN	South bound train • 25 cars with NO HAZARDOUS MATERIAL • 65 cars (vehicle transport cars) – empty • Train contained NO VISIBLE HAZARDOUS MATERIAL
1213 hrs – CSX TRAIN	North bound train • 60 cars with NO HAZARDOUS MATERIAL • 4 Low Pressure cars with NO PLACARDS • 1 car with Sodium Hydroxide – UN 1824 • 1 car with a FLAMMABLE / CORROSIVE Placard – Sodium Methylated, Solution in Alcohol – UN 1269
1318 hrs – CSX TRAIN	North bound train • 12 cars with NO HAZARDOUS MATERIAL • 14 Low Pressure cars with NO PLACARDS • 20 Refrigerated cars with NO PLACARDS • 2 cars with Hydrochloric Acid – UN 1789
1329 hrs – UP TRAIN	Union Pacific Train – South bound train • 108 rail cars with semi-trailers on dollies with NO PLACARDS
1354 hrs – CSX TRAIN	South bound train • 42 cars with NO HAZARDOUS MATERIAL • 42 coal cars – EMPTY

1420 hrs – CSX TRAIN	North bound train • 135 cars with NO HAZARDOUS MATERIAL • NO HAZARDOUS MATERIAL IDENTIFIED
1433 hrs – NS TRAIN	South bound train • 13 cars with semi-trailer with NO HAZARDOUS MATERIAL • 16 flat cars – EMPTY • 2 cars with Intermodel Containers with CORROSIVE PLACARDS – UN 3266 • 1 car with a DANGEROUS PLACARD
1449 hrs – CSX TRAIN	South bound train • 51 cars with NO HAZARDOUS MATERIAL • 3 cars with Sulfuric Acid – UN 1830 • 4 Low Pressure cars with NO PLACARDS • 1 car with LPG (Propane) – UN 1075 • 1 car with Caustic Soda – UN 1824
1507 hrs – CSX TRAIN	South bound train • 76 cars with (vehicle transport cars) – empty • 9 box cars with NO PLACARDS • NO VISIBLE HAZARDOUS MATERIAL
1530 hrs – CSX TRAIN	North bound train • 23 box cars with NO PLACARDS • 5 cars with Anhydrous Ammonia – UN 1005 • 6 cars with FLAMMABLE Benzene – UN 1114 • 5 cars with Molten Sulfur - DANGEROUS – UN 2448 • 3 cars with FLAMMABLE.- Propylene Oxide – UN 1280 • 4 cars with LPG (Propane) – UN 1075 • 17 Low Pressure cars with NO PLACARDS • 1 car with FLAMMABLE - Styrene Monomer, Stabilized – UN 2055 • 4 cars with HOT load - Elevated Temperature Load – UN 3257 • 1 car with CORROSIVE - Potassium Hydroxide - UN 1814 • 3 cars with Carbon Dioxide – UN 2187 • 5 cars with Gasoline – UN 1203 • 1 car with Ethylene, Refrigerated Liquid – UN 1038 • 2 cars with Benzyl Bromide – UN 1737 • 8 cars with Alcohols, NOS – UN 1987 • 5 cars with DANGEROUS - Environmentally Hazardous Substance, Liquid, NOS – UN 3082
1551 hrs – NS TRAIN	North bound train • 75 flat cars with NO HAZARDOUS MATERIAL
1559 hrs – CSX TRAIN	South bound train • 61 flat cars with no load and NO HAZARDOUS MATERIAL • 39 shallow dump cars with NO LOAD • 27 shielded cars – EMPTY

1627 hrs – CSX TRAIN	North bound train • 52 cars (vehicle transport cars) – empty • NO HAZARDOUS MATERIAL
1628 hrs – NS TRAIN	North bound train • 57 cars with semi-trailers, double high – NO PLACARDS • 1 Intermodel car with a FLAMMABLE PLACARD – UN 1993
1738 hrs – CSX TRAIN	North bound train • 28 cars with semi-trailers, double high – NO PLACARDS • 9 cars with Sulfuric Acid – UN 1830 • 2 cars with LPG (Propane) – UN 1075

Rail Chemical Analysis:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF RAIL CARS
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Toxic Gas	3	1	0	125	17
2448	Molten Sulfur	Flammable Solids	4	0	4	133	4
1830	Sulfuric Acid	Corrosive	3	0	2	137	23
1992	Styrene Monomer	Flammable	2	3	2	131	3
3158	Refrigerated Liquid (Cryogenic	Refrigerated Gases	3	0	0	120	44
1760	Corrosive Liquid	Corrosive	2	0	1	154	20
1993	Flammable Liquid	Combustible Liquid	1	2	0	128	14
1789	Hydrochloric Acid	Corrosive	3	0	1	157	13
1017	Chlorine Gas	Oxidizer, Toxic Gas	4	0	0	124	5
1075	LPG (Propane)	Flammable Gas	1	4	0	115	31
3257	Elevated Temperature	Flammable	1	2	1	128	6
3492	Inhalation Hazard	Toxic / Poisonous	3	1	1	131	2
1987	Alcohol NOS	Flammable	1	3	0	127	126
1805	Phosphoric Acid	Corrosive	3	0	0	154	5
1824	Sodium Hydroxide	Corrosive	3	0	1	154	1
1269	Methylated solution in Alcohol	Flammable	2	3	0	128	1
1114	Benzene	Flammable	2	3	0	130	6
1280	Propylene Oxide	Flammable / Toxic	3	4	2	127	3
1814	Potassium Hydroxide	Corrosive	3	0	1	154	1
2187	Carbon Dioxide	Refrigerated Gases	3	0	0	120	3
1203	Gasoline	Flammable	1	3	0	128	5
1038	Ethylene	Refrigerated Liquid	1	4	2	115	1
1737	Benzyl Bromide	Toxic, Corrosive, Combustible	3	2	1	156	2
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	5

During a 10 – Hour on-site survey period along US 50 (River Road), East of Cleves, the following rail traffic was observed:

CARRIER TYPE	COMMENTS
0952 hrs – CSX TRAIN	East bound train • 46 cars with NO HAZARDOUS MATERIAL • 1 tanker car with Sulfuric Acid stenciled on the side

Norfolk Southern Rail Chemical Analysis:

In review of the information provided by the Norfolk Southern Railroad on the top 25 commodities they transport the following analysis was completed, which is consistent with the on-site surveys:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF RAIL CARS
			HEALTH	FLAM.	REACT.		
1987	Alcohol NOS	Flammable	1	3	0	127	N/R
2924	Flammable Liquids	Flammable				132	N/R
3363	HAZARDOUS MATERIALS • Not otherwise specified	All Hazard				111	N/R
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	N/R
3257	Elevated Temperature	Flammable	1	2	1	128	N/R
1114	Benzene	Flammable	2	3	0	130	N/R
1789	Hydrochloric Acid	Corrosive	3	0	1	157	N/R
1830	Sulfuric Acid	Corrosive	3	0	2	137	N/R
1824	Sodium Hydroxide	Corrosive	3	0	1	154	N/R
1993	Combustible Liquid • Fuel Oil	Combustible Liquid	1	2	0	128	N/R
2312	Phenol, Molten	Toxic, Corrosive, Combustible	4	2	0	153	N/R
3077	Waste	Low to Moderate Hazards	2	2	2	171	N/R
2448	Molten Sulfur	Flammable Solids	4	0	4	133	N/R
1814	Potassium Hydroxide	Corrosive	3	0	1	154	N/R
1170	Ethanol	Flammable	2	3	0	127	N/R

		• Water miscible					
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	N/R
1247	METHYL METHACRYLATE	Flammable • Water miscible	2	3	2	129	N/R
1805	Phosphoric Acid	Corrosive	3	0	0	154	N/R
1805 1760 3266	Corrosive Liquid	Corrosive	2	0	1	154	N/R
3256	Elevated Temperature	Flammable	1	2	1	128	N/R
1402	Calcium Carbide	Water Reactive	3	3	2	138	N/R
3065	Alcoholic Beverages	Flammable • Water miscible	1	3	0	127	N/R

N/R – Indicates NOT REPORTED (Number of Rail Cars)

CSX Chemical Analysis:

In review of the 2012 commodity flow information provided by the CSX Railroad (CSX Corporation, 2012) on the top 25 shipments of hazardous commodities they transport through the 5 County region. An analysis was completed, which was consistent with the on-site survey results:

CSX transported a total of 25,155 shipments of the following top 25 chemicals through Butler County:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF RAIL CARS
			HEALTH	FLAM.	REACT.		
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	3,514
1987	Alcohol NOS	Flammable	1	3	0	127	2,020
1824	Sodium Hydroxide	Corrosive	3	0	1	154	1,818
1830	Sulfuric Acid	Corrosive	3	0	2	137	1,608
1093	Acrylonitrile, Stabilized	Flammable / Poison	4	3	2	131	1,297
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	1,214
1789	Hydrochloric Acid	Corrosive	3	0	1	157	1,018

3257	Elevated Temperature	Flammable	1	2	1	128	868
1010	Butadienes, Stabilized	Gases, Flammable / Unstable	3	4	3	116	717
1280	Propylene Oxide	Flammable / Toxic	3	4	2	127	668
2448	Molten Sulfur	Flammable Solids	4	0	4	133	666
1956	Compressed Liquidfied Gases	Compressed or Liquefied	3	0	0	126	573
1992	Styrene Monomer, Stabilized	Flammable	2	3	2	131	507
1114	Benzene	Flammable	2	3	0	130	486
1265	Pentanes, Isoprene, Pentadiene	Flammable • Water miscible	2	3	1	128	483
1063	Methyl Chloride	Gases Flammable	2	4	2	115	443
1170	Ethanol	Flammable • Water miscible	2	3	0	127	442
1805	Phosphoric acid	Toxic / Corrosive	3	0	0	154	399
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	380
1250	Methyltrichlorosilane	Toxic / Corrosive / Water Sensitive	4	2	2	155	370
1219	Isopropanol	Flammable Water miscible	1	3	0	129	325
1773	Ferrous Chloride Solution	Toxic / Corrosive	3	0	2	157	302
1495	Sodium Chlorate	Oxidizer	2	0	0	140	265
3065	Alcoholic Beverages	Flammable • Water miscible	1	3	0	127	263
2187	Carbon Dioxide, Refrigerated Liquid	Inert Gas	3	0	0	120	262

CSX transported a total of 37,088 shipments of the following top 25 chemicals through Hamilton County:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF RAIL CARS
			HEALTH	FLAM.	REACT.		
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	3,573
1987	Alcohol NOS	Flammable	1	3	0	127	3,546
1824	Sodium Hydroxide	Corrosive	3	0	1	154	3,348
1830	Sulfuric Acid	Corrosive	3	0	2	137	2,024
3257	Elevated Temperature	Flammable	1	2	1	128	1,926
1093	Acrylonitrile, Stabilized	Flammable / Poison	4	3	2	131	1,526
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	1,291
1789	Hydrochloric Acid	Corrosive	3	0	1	157	1,248
2448	Molten Sulfur	Flammable Solids	4	0	4	133	1,144
1017	Chlorine	Toxic / Corrosive Gas	4	0	0	124	930
3375	Ammonium Nitrate	Oxidizer	0	0	3	140	748
1974	CHLORODIFLUOROMETHANE	Compressed Gas	1	0	0	126	651
1280	Propylene Oxide	Flammable / Toxic	3	4	2	127	646
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	587
1831	Sulfuric Acid - FUMING	Corrosive	4	0	2	137	584
1992	Styrene Monomer, Stabilized	Flammable	2	3	2	131	573
1010	Butadienes, Stabilized	Gases, Flammable / Unstable	3	4	3	116	542
1170	Ethanol	Flammable • Water miscible	2	3	0	127	493
1773	Ferrous Chloride Solution	Toxic / Corrosive	3	0	2	157	468
1114	Benzene	Flammable	2	3	0	130	446
1993	Combustible Liquid • Fuel Oil	Combustible Liquid	1	2	0	128	432
2187	Carbon Dioxide, Refrigerated Liquid	Inert Gas	3	0	0	120	429
1063	Methyl Chloride	Gases Flammable	2	4	2	115	417
2312	Phenol, Molten	Toxic, Corrosive,	4	2	0	153	395

		Combustible					
3363	HAZARDOUS MATERIALS • Not otherwise specified	All Hazard				111	378

CSX transported a total of 21,564 shipments of the following top 25 chemicals through Warren County:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF RAIL CARS
			HEALTH	FLAM.	REACT.		
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	3,416
1824	Sodium Hydroxide	Corrosive	3	0	1	154	1,732
1830	Sulfuric Acid	Corrosive	3	0	2	137	1,581
1987	Alcohol NOS	Flammable	1	3	0	127	1,339
1093	Acrylonitrile, Stabilized	Flammable / Poison	4	3	2	131	1,297
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	1,169
3257	Elevated Temperature	Flammable	1	2	1	128	820
1789	Hydrochloric Acid	Corrosive	3	0	1	157	711
1010	Butadienes, Stabilized	Gases, Flammable / Unstable	3	4	3	116	628
2448	Molten Sulfur	Flammable Solids	4	0	4	133	591
1114	Benzene	Flammable	2	3	0	130	483
1265	Pentanes, Isoprene, Pentadiene	Flammable • Water miscible	2	3	1	128	483
1805	Phosphoric acid	Toxic / Corrosive	3	0	0	154	395
1992	Styrene Monomer, Stabilized	Flammable	2	3	2	131	391
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	342
1219	Isopropanol	Flammable Water miscible	1	3	0	129	289
2187	Carbon Dioxide, Refrigerated Liquid	Inert Gas	3	0	0	120	262
1773	Ferrous Chloride Solution	Toxic / Corrosive	3	0	2	157	253
1831	Sulfuric Acid - FUMING	Corrosive	4	0	2	137	253
1495	Sodium Chlorate	Oxidizer	2	0	0	140	241
1170	Ethanol	Flammable	2	3	0	127	212

		• Water miscible					
1298	Trimethylchlorosilane	Toxic / Corrosive / Water Sensitive	3	1	3	155	212
1017	Chlorine	Toxic / Corrosive Gas	4	0	0	124	200
1814	Potassium Hydroxide	Corrosive	3	0	1	154	199
1250	Methyltrichlorosilane	Toxic / Corrosive / Water Sensitive	4	2	2	155	197

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Pipeline

Enterprise Products:

LINE SIZE	LOCATION	PRODUCT(s)	MAXIMUM CAPACITY	TYPICAL CAPACITY
6 inch	Todd Hunter facility to the Airport	Jet Fuel (Only)	21,105 Gallons Per Hr	N/R
20 inch	Siemore Facility (Gulf) to Todd Hunter, to Lebanon	Jet Fuel, Propane, Butane, Gas	315,000 Gallons Per Hr	N/R
8 inch	Todd Hunter to New York	Propane, Butane	78,750 Gallons Per Hr	N/R
10 inch	Todd Hunter to Lima Facility	Jet Fuel, Propane, Butane, Gas	63,000 Gallons Per Hr	N/R
8 inch	Todd Hunter to Duke Woodsdale Power Plant (only in peak season)	Propane	44,100 Gallons Per Hr	N/R
6 inch	Short Line to Dicks Creek Duke Facility	Propane	9,450 Gallons Per Hr	9,450 Gallons Per Hr

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE
			HEALTH	FLAM.	REACT.	
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115
1863	Aviation Fuel (Jet Fuel)	Flammable	1	2	0	128

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Roadway

STATE ROUTES

SR 4:
Summary of ALL chemicals observed on the routes:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1057	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	4
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	6
3286	FLAMMABLE LIQUIDS – Hazard Class 3	Flammable	1	4	0	128	25
3363	DANGEROUS MIXED LOADS Hazard Class 9	Mixed Loads / UNKNOWN	4	4	4	111	1

SR 63:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1057	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	4
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	8
1760	Corrosive Liquid NOS	Toxic / Corrosive	3	1	2	154	2
1778	Fluorosilicic Acid	Toxic / Corrosive	3	0	0	154	1
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	1
1824	Sodium Hydroxide/ Caustic Soda	Toxic / Corrosive	3	0	1	154	1
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	2
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	2

3286	FLAMMABLE LIQUIDS – Hazard Class 3	Flammable	1	4	0	128	27
3363	DANGEROUS MIXED LOADS Hazard Class 9	Mixed Loads / UNKNOWN	4	4	4	111	1
3363	DANGEROUS Mixed Load - Hazard Class 9	Mixed Load / UNKNOWN	4	4	4	111	1
3382	INHALATION HAZARD - Hazard Class 6	Toxic / Corrosive	3	0	2	153	1

SR 73:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	2
1006	Argon	Flammable Gas	3	0	0	121	2
1057	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	4
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	1
1072	Oxygen	Oxidizer Gas	3	0	0	122	1
1075	Propane	Flammable Gas	2	4	0	115	4
1079	Sulfur Dioxide	Gasses / Corrosive	3	0	0	125	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	13
1830	Sulfuric Acid	Corrosive	3	0	2	137	2
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	2
1987	Alcohols	Flammable	1	3	0	127	2
1993	Diesel Fuel	Combustible	1	2	0	128	6
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	1
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	2
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	2
3286	FLAMMABLE LIQUIDS – Hazard Class 3	Flammable	1	4	0	128	3
3363	DANGEROUS Mixed Load - Hazard Class 9	Mixed Load / UNKNOWN	4	4	4	111	1
3382	INHALATION HAZARD - Hazard Class 6	Toxic / Corrosive	3	0	2	153	1

SR 128:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	28
1805	Phosphoric Acid	Corrosive				154	1
1823	Caustic	Corrosive	2	1	1	154	1
1824	Sodium Hydroxide	Corrosive	3	0	1	154	4
1977	Nitrogen, Refrigerated	Cryogenic	3	0	0	120	1
1987	Alcohols	Flammable	1	3	0	127	3
2586	Alkyl Sulfonic Acid	Corrosive				153	1
3257	Elevated Temperature Product	HOT	1	2	1	128	16
3363	DANGEROUS Mixed Load - Hazard Class 9	Mixed Load / UNKNOWN	4	4	4	111	13

SR 129:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	2
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	3
1072	Oxygen	Oxidizer Gas	3	0	0	122	3
1075	Propane	Flammable Gas	2	4	0	115	5
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	10
1830	Sulfuric Acid	Corrosive	3	0	2	137	4
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	1
1993	Diesel Fuel	Combustible	1	2	0	128	1
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	2
3087	Oxidizing Solid, Toxic	Toxic / Oxidizer	4	2	3	141	2
3257	Elevated Temperature Product	HOT / Flamm	1	2	1	128	4
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	4
3312	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	3

SR 177:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	3
3363	DANGEROUS Mixed Load - Hazard Class 9	Mixed Load / UNKNOWN	4	4	4	111	2

SR 503:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1075	Propane	Flammable Gas	2	4	0	115	5
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	4
1830	Sulfuric Acid	Corrosive	3	0	2	137	2
3363	DANGEROUS Mixed Load - Hazard Class 9	Mixed Load / UNKNOWN	4	4	4	111	1

SR 744:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1075	Propane	Flammable Gas	2	4	0	115	2

SR 747:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	7
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	1
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	1

SR 122:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1046	Helium	Inert	3	0	0	121	1
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	10
1073	Oxygen, Refrigerated	Oxidizer / Cryogenic	3	0	0	122	2
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	10
1264	Paraldehyde	Flammable Liquid	2	3	1	129	1
1791	Hypochlorite Solution	Toxic or Corrosive	3	0	1	154	2
1863	Fuel, Aviation	Flammable	1	2	0	128	1
1951	Argon, Refrigerated Liquid	Inert	3	0	0	120	2
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	7
1993	Diesel Fuel	Combustible	1	2	0	128	3
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	3
3257	Elevated Temperature Product	HOT / Flamm	1	2	1	128	1
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	4
3312	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	4
3336	Mercaptan Mixture Liquid	Flammable	1	4	1	130	1

SR 32:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	2
1072	Oxygen (Non-Flam Gas)	Oxidizer	3	0	0	122	1
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	5
1090	Acetone	Flammable	1	3	0	127	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	34
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	2
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	1
3257	Elevated Temperature Product	HOT / Flammable	1	2	1	128	4

SR 125:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1046	Helium	Inert	3	0	0	121	1
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	5
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	30
1268	Petroleum Distillates, NOS	Flammable	1	2	0	128	1
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	1
1863	Aviation Fuel	Flammable	1	2	0	128	1
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	1
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	1
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	1

SR 28:
SR 28 Chemical Analysis:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	6
1993	Combustible Liquids, Diesel Fuel, etc.	Combustible Liquids	1	2	0	128	6
1072	Oxygen	Non-Flammable Gas	3	0	0	122	4
1073	Oxygen, Refrigerated	Cryogenic, Refrigerated Liquid	3	0	0	122	2
1075	Butane, Isobutane, LPG, Propane, Flammable Gases	Flammable Gas	1	4	0	115	2
1975	Dinitrigen Tetroxide and Nitric Oxide Mixtures	Poisonous Gases	3	0	0	124	2

SR 353:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
NONE	NONE	NONE					

SR 48:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	4

SR 123:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	4

1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	

SR 741:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	2
1006	Argon	Flammable Gas	3	0	0	121	2
1072	Oxygen (Non-Flam Gas)	Oxidizer	3	0	0	122	1
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	13
1830	Sulfuric Acid	Corrosive	3	0	2	137	2
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	2
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	6

SR 3:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1006	Argon	Flammable Gas	3	0	0	121	1
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	3
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	26
1270	Petroleum oil	Combustible	2	3	0	128	1
1830	Sulfuric Acid	Corrosive	3	0	2	137	1
1866	Resin solution	Flammable	1	2	0	127	
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	

1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	
2757	Carbamate pesticide, solid, poisonous	Toxic / Poison	2	3	1	151	

SR 126:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1046	Helium	Inert	3	0	0	121	1
1075	LPG, Propane	Flammable Gas	2	4	0	115	13
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	24
1270	Petroleum oil	Combustible	2	3	0	128	1
1760	Corrosive Liquids	Toxic / Corrosive	3	0	1	157	1
1789	Hydrochloric acid	Corrosive	3	0	1	157	1
1863	Aviation Fuel	Flammable	1	2	0	128	
1866	Resin solution	Flammable	1	2	0	127	1
1977	Nitrogen, Refrigerated	Cryogenic	3	0	0	120	1
1993	Diesel Fuel	Combustible	1	2	0	128	4
3257	Elevated Temperature	HOT	1	2	1	128	3

SR 562:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1075	LPG, Propane	Flammable Gas	2	4	0	115	3
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	26
1789	Hydrochloric acid	Corrosive	3	0	1	157	2
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	2
1866	Resin solution	Flammable	1	2	0	127	2

1977	Nitrogen, Refrigerated	Cryogenic	3	0	0	120	2
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	7
1993	Diesel Fuel	Combustible	1	2	0	128	8
2693	Bisulfites	Toxic / Corrosive	2	0	0	154	2
3077	Waste	Low to Moderate Hazards	2	2	2	171	2
3257	Elevated Temperature	HOT	1	2	1	128	2
1648	Acetonitrile	Flammable • Water miscible	2	3	1	127	2

INTERSTATES

I-75:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	2
1073	Oxygen, Refrigerated	Oxidizer / Cryogenic	3	0	0	122	3
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	17
1093	Acrylonitrile	Flammable / Poison	4	3	2	131	1
1114	Benzene	Flammable	2	3	0	130	
1120	Butanols	Flammable Gas	1	3	0	129	1
1134	Chlorobenzene	Flammable • Water miscible	2	3	0	130	1
1160	Dimethylamine, aqueous solution	Flammable / Corrosive	3	4	0	132	1
1170	Ethanol	Flammable • Water miscible	2	3	0	127	6
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	166
1210	Printers Ink	Flammable	2	3	0	129	1
1230	Methanol	Flammable	1	3	0	131	3
1247	METHYL METHACRYLATE	Flammable • Water miscible	2	3	2	129	1
1263	Paint Related Material	Flammable	1	3	0	128	1
1268	Petroleum Distillates, NOS	Flammable	1	2	0	128	1
1274	Propyl Alcohol, normal	Flammable • Water miscible	1	3	0	129	1
1294	Toluene	Flammable	2	3	0	130	1
1307	Xylenes	Flammable	2	3	0	130	2
1402	Calcium Carbide	Water Reactive	3	3	2	138	1
1500	Sodium Nitrite	Oxidizer	3	0	1	140	1
1604	Ethylenediamine	Flammable / Corrosive	3	3	0	132	1
1649	Motor fuel anti-knock mixture	Flammable / Toxic	1	3	1	131	2
1733	Antimony Trichloride	Toxic /	3	0	1	157	1

		Corrosive					
1760	Corrosive Liquid NOS	Toxic / Corrosive	3	1	2	154	11
1770	Diphenylmethyl Bromide	Toxic / Corrosive	3	1	2	153	1
1780	Fumaryl Chloride	Toxic / Corrosive	3	2	2	156	1
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	8
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	13
1803	Phenolsufonic Acid	Toxic / Corrosive	3	1	0	153	1
1805	Phosphoric Acid	Toxic / Corrosive	3	0	0	154	1
1814	Potassium Hydroxide	Toxic / Corrosive	3	0	1	154	1
1823	Caustic	Corrosive	2	1	1	154	
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	49
1825	Sodium Monoxide	Toxic / Corrosive / Water Sensitive	2	1	2	157	1
1826	Nitrating Acid Mixture	Toxic / Corrosive / Water Sensitive	3	0	1	157	1
1829	Sulfur Trioxide	Water Reactive / Corrosive	3	0	2	137	2
1830	Sulfuric Acid	Corrosive	3	0	2	137	4
1832	Sulfuric Acid	Water Reactive	3	0	2	137	1
1838	Titanium Tetrachloride	Corrosive	3	0	2	137	2
1845	Carbon Dioxide, Solid	Cryogenic	3	0	0	120	2
1863	Aviation Fuel	Flammable	1	2	0	128	3
1866	Resin solution	Flammable	1	2	0	127	2
1903	Disinfectants, corrosive, liquid NOS	Toxic / Corrosive	2	0	0	153	1
1907	Soda Lime	Toxic / Corrosive	2	0	2	154	1
1951	Argon, Refrigerated Liquid	Inert	3	0	0	120	1
1956	Compressed Gas	Compressed or Liquified	3	0	0	126	1
1975	Dinitrogen Tetroxide & Nitric Oxide Mixture	Toxic / Corrosive	3	0	0	124	1
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	9
1983	Chlorotrifluoroethane	Gas,	2	4	0	126	4

		Compressed or Liquified					
1986	Alcohols, Flammable	Flammable • Water miscible	1	3	0	131	1
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	18
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	36
2031	Nitric Acid	Toxic / Corrosive	4	0	0	157	3
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	7
2448	Molten Sulfur	Flammable Solids	4	0	4	133	2
2491	Ethanolamine	Toxic / Corrosive	3	2	0	153	1
2582	Ferric Chloride	Flammable	3	0	2	154	1
2790	Acetic Acid	Toxic / Corrosive	3	2	0	153	2
2924	Flammable Liquids	Flammable				132	1
3016	Paraquat Dichloride	Toxic	4	0	0	151	
3065	Alcoholic Beverages	Flammable • Water miscible	1	3	0	127	4
3077	Waste	Low to Moderate Hazards	2	2	2	171	1
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	12
3083	Perchloryl Fluoride	Toxic / Corrosive / Oxidizing	2	3	0	124	1
3163	Liquefied Gas NOS	Refrigerated Gas	3	0	1	126	1
3170	Aluminum dross	Water reactive / Flammable gas	1	1	1	138	2
3252	Difluoromethane	Flammable	1	4	1	115	1
3257	Elevated Temperature Product	HOT / Flammable	1	2	1	128	75
3258	Elevated Temperature Product	HOT / Flammable	1	2	1	171	4
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	3
3265	Corrosive Liquid	Corrosive	3	1	2	153	1

3266	Corrosive Liquid NOS	Corrosive	3	1	2	154	1
3268	Air Bag Inflators	Low to Moderate Hazard	1	2	3	171	1
3291	(Bio) Medical Waste	Infectious Substance	2	1	0	158	4
3475	Ethanol and Gasoline Mixture (E-85)	Flammable • Water miscible	2	3	0	127	1

I-275:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	3
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	2
1006	Argon	Flammable Gas	3	0	0	121	
1046	Helium	Inert	3	0	0	121	3
1049	Hydrogen	Gases / Flammable	3	4	0	115	1
1057	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	12
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	12
1073	Oxygen, Refrigerated	Oxidizer / Cryogenic	3	0	0	122	7
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	35
1090	Acetone	Flammable	1	3	0	127	3
1093	Acrylonitrile	Flammable / Poison	4	3	2	131	1
1149	Butyl Ethers	Flammable	2	3	1	128	2
1163	Dimethylidichlorosilane	Toxic / Corrosive	3	3	2	155	2
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	255
1210	Printers Ink	Flammable	2	3	0	129	1
1230	Methanol	Flammable	1	3	0	131	1
1231	Methyl acetate	Flammable	1	3	0	129	1
1239	Methyl Chloroformate	Toxic / Corrosive / Water Sensitive	3	3	1	155	1
1247	METHYL METHACRYLATE	Flammable • Water	2	3	2	129	3

		miscible					
1263	Paint Related Material	Flammable	1	3	0	128	2
1276	N-Butyl Acetate	Flammable	1	3	0	153	1
1663	Nitrophenols	Toxic / Corrosive	3	1	2	153	1
1686	Sodium Arsenate	Toxic / Corrosive	3	0	0	154	1
1760	Corrosive Liquid NOS	Toxic / Corrosive	3	1	2	154	7
1770	Diphenylmethyl Bromide	Toxic / Corrosive	3	1	2	153	2
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	5
1790	Hydrofluoric Acid	Poisonous / Corrosive	4	0	1	157	1
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	6
1805	Phosphoric Acid	Toxic / Corrosive	3	0	0	154	5
1814	Potassium Hydroxide	Toxic / Corrosive	3	0	1	154	3
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	21
1829	Sulfur Trioxide	Water Reactive / Corrosive	3	0	2	137	2
1830	Sulfuric Acid	Corrosive	3	0	2	137	6
1832	Sulfuric Acid	Water Reactive	3	0	2	137	2
1863	Aviation Fuel	Flammable	1	2	0	128	7
1866	Resin solution	Flammable	1	2	0	127	9
1951	Argon, Refrigerated Liquid	Inert	3	0	0	120	1
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	34
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	21
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	54
2031	Nitric Acid	Toxic / Corrosive	4	0	0	157	4
2074	Acrylamide	Toxic / Corrosive	3	2	2	153	1
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	15
2215	Maleic Anhydride	Toxic / Corrosive	3	1	1	156	1

2427	Potassium Chlorate	Oxidizer	3	0	0	140	1
2448	Molten Sulfur	Flammable Solids	4	0	4	133	13
2586	Alkyl Sulfonic Acid	Corrosive	1	1	1	153	3
2672	Ammonium Hydroxide	Corrosive	2	0	0	154	3
2796	Sulfuric Acid - 51%, Battery Acid	Corrosive	3	0	2	157	1
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	9
2924	Flammable Liquids	Flammable				132	1
3016	Paraquat Dichloride	Toxic	4	0	0	151	
3065	Alcoholic Beverages	Flammable • Water miscible	1	3	0	127	1
3077	Waste	Low to Moderate Hazards	2	2	2	171	3
3082	Dangerous, Environmental Hazard	Toxic	2	1	1	171	8
3161	Liquefied Gas	Flammable	1	4	1	115	3
3287	Poisonous Liquid – Inorganic NOS	Toxic	3	1	0	151	1
3257	Elevated Temperature Product	HOT / Flammable	1	2	1	128	69
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	8
3265	Corrosive Liquid	Corrosive	3	1	2	153	1
3286	FLAMMABLE LIQUIDS – Hazard Class 3	Flammable	1	4	0	128	14
3363	DANGEROUS MIXED LOADS Hazard Class 9	Mixed Loads / UNKNOWN	4	4	4	111	36
3475	Ethanol and Gasoline Mixture (E-85)	Flammable • Water miscible	2	3	0	127	7

I-71:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	2
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	
1006	Argon	Flammable Gas	3	0	0	121	1
1073	Oxygen, Refrigerated	Oxidizer / Cryogenic	3	0	0	122	1

1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	7
1149	Butyl Ethers	Flammable	2	3	1	128	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	80
1210	Printers Ink	Flammable	2	3	0	129	
1230	Methanol	Flammable	1	3	0	131	2
1263	Paint Related Material	Flammable	1	3	0	128	2
1267	Petrol Crude Oil	Flammable	1	2	0	128	1
1760	Corrosive Liquid NOS	Toxic / Corrosive	3	1	2	154	2
1761	Cupriethylenediamine	Toxic / Corrosive	2	2	1	154	1
1763	Cyclohexyltrichlorosilane	Toxic / Corrosive	2	2	0	156	1
1770	Diphenylmethyl Bromide	Toxic / Corrosive	3	1	2	153	1
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	3
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	1
1814	Potassium Hydroxide	Toxic / Corrosive	3	0	1	154	1
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	6
1830	Sulfuric Acid	Corrosive	3	0	2	137	1
1863	Aviation Fuel	Flammable	1	2	0	128	1
1866	Resin solution	Flammable	1	2	0	127	1
1975	Dinitrogen Tetroxide & Nitric Oxide Mixture	Toxic / Corrosive	3	0	0	124	2
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	1
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	7
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	18
2014	Hydrogen Peroxide	Corrosive	2	0	1	140	1
2031	Nitric Acid	Toxic / Corrosive	4	0	0	157	2
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	1
2607	Acrolein Dimer	Flammable	4	3	3	129	1
2734	Alkylamines NOS	Flammable	2	3	1	132	1

3082	Other Regulated Materials	Low to Moderate Hazard	1	1	0	171	2
3145	Alkyl Phenois	Toxic / Corrosive	2	1	1	153	1
3161	Liquefied Gas	Flammable	1	4	1	115	1
3257	Elevated Temperature Product	HOT / Flammable	1	2	1	128	2
3315	Chemical Sample, Poison	Toxic / non-corrosive	3	0	2	151	1
3475	Ethanol and Gasoline Mixture (E-85)	Flammable • Water miscible	2	3	0	127	1

I-74:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1046	Helium	Inert	3	0	0	121	1
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	9
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	48
1210	Printers Ink	Flammable	2	3	0	129	1
1264	Paraldehyde	Flammable Liquid	2	3	1	129	1
1268	Petroleum Distillates, NOS	Flammable	1	2	0	128	1
1686	Sodium Arsenate	Toxic / Corrosive	3	0	0	154	1
1780	Fumaryl Chloride	Toxic / Corrosive	3	2	2	156	1
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	1
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	2
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	1
1829	Sulfur Trioxide	Water Reactive / Corrosive	3	0	2	137	2
1830	Sulfuric Acid	Corrosive	3	0	2	137	1
1832	Sulfuric Acid	Water Reactive	3	0	2	137	1
1863	Aviation Fuel	Flammable	1	2	0	128	2

1866	Resin solution	Flammable	1	2	0	127	2
1951	Argon, Refrigerated Liquid	Inert	3	0	0	120	1
1977	Nitrogen, Refrigerated	Inert / Cryogenic	3	0	0	120	1
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	2
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	17
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	4
2672	Ammonium Hydroxide	Corrosive	2	0	0	154	1
3065	Alcoholic Beverages	Flammable • Water miscible	1	3	0	127	1
3257	Elevated Temperature Product	HOT / Flammable	1	2	1	128	8
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	2
3286	FLAMMABLE LIQUIDS – Hazard Class 3	Flammable	1	4	0	128	57
3287	Poisonous Liquid – Inorganic NOS	Toxic	3	1	0	151	1
3363	DANGEROUS MIXED LOADS Hazard Class 9	Mixed Loads / UNKNOWN	4	4	4	111	46
3475	Ethanol and Gasoline Mixture (E-85)	Flammable • Water miscible	2	3	0	127	1

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US HIGHWAYS

US 27:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1073	Oxygen, Refrigerated Liquid	Oxidizing	3	0	0	122	3
1075	LPG, Propane	Flammable Gas	2	4	0	115	2
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	15
1760	Corrosive Liquids	Corrosive	3	1	2	154	2
1805	Phosphoric Acid	Corrosive	3	0	0	154	1
2187	Carbon Dioxide – Refrigerated	Inert Gas, Cryogenic	3	0	0	120	2

US 42:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	7
1075	LPG, Propane	Flammable Gas	2	4	0	115	1
1075	Propane	Flammable Gas	2	4	0	115	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	4
1263	Paint Related Material	Flammable	1	3	0	128	1
1791	Hypochlorite Solution	Toxic / Corrosive	1	0	0	154	2
1814	Potassium Hydroxide	Toxic / Corrosive	3	0	1	154	1
1993	Diesel Fuel	Combustible	1	2	0	128	2
2074	Acrylamide	Toxic / Corrosive	3	2	2	153	1
2796	Sulfuric Acid - 51%, Battery Acid	Corrosive	3	0	2	157	1
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	4
3082	Hazardous Waste	Low to Moderate Hazard	1	2	1	171	1

3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	12
3312	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	8
3383	INHALATION HAZARD – Hazard Class 8	Corrosive	3	1	2	154	2

US 127:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOADS
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	2
1046	Helium	Inert	3	0	0	121	1
1058	NON-FLAMMABLE GASES – Hazard Class 2	Inert / Oxidizing	2	0	2	120	19
1072	Oxygen (Non-Flam Gas)	Oxidizer	3	0	0	122	2
1073	Oxygen Refrigerated	Cryogenic, Oxidizer	3	0	0	122	4
1075	LPG, Propane	Flammable Gas	2	4	0	115	3
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	13
1264	Paraldehyde	Flammable Liquid	2	3	1	129	1
1270	Petroleum oil	Combustible	2	3	0	128	2
1760	Corrosive Liquids	Toxic / Corrosive	3	0	1	157	1
1789	Hydrochloric acid	Corrosive	3	0	1	157	1
1863	Aviation Fuel	Flammable	1	2	0	128	1
1866	Resin solution	Flammable	1	2	0	127	2
1951	Argon, Refrigerated Liquid	Inert	3	0	0	120	1
1977	Nitrogen, Refrigerated	Cryogenic	3	0	0	120	8
1993	Diesel Fuel	Combustible	1	2	0	128	9
2187	Carbon dioxide, refrigerated liquid	Inert	3	0	0	120	1
2757	Carbamate pesticide, solid, poisonous	Toxic / Poison	2	3	1	151	2
2810	TOXIC / POISONS - Hazard Class 6	Toxic / Corrosive	4	0	2	153	7
3257	Elevated Temperature	HOT	1	2	1	128	4
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	1
3264	CORROSIVE - Hazard Class 8	Corrosive	3	1	2	154	20

3312	FLAMMABLE GASES – Hazard Class 2	Flammable	1	4	1	115	23
3363	DANGEROUS Mixed Load - Hazard Class 9	Mixed Load / UNKNOWN	4	4	4	111	48
3383	INHALATION HAZARD – Hazard Class 8	Corrosive	3	1	2	154	2

US 22:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	4

US 50:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1073	Oxygen, Refrigerated	Oxidizer / Cryogenic	3	0	0	122	1
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	17
1090	Acetone	Flammable	1	3	0	127	1
1163	Dimethylidichlorosilane	Toxic / Corrosive	3	3	2	155	4
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	187
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	1
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	2
1823	Caustic	Corrosive	2	1	1	154	1
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	50
1829	Sulfur Trioxide	Water Reactive / Corrosive	3	0	2	137	1
1830	Sulfuric Acid	Corrosive	3	0	2	137	8
1832	Sulfuric Acid	Water Reactive	3	0	2	137	1
1863	Aviation Fuel	Flammable	1	2	0	128	1
1977	Nitrogen, Refrigerated	Inert /	3	0	0	120	1

		Cryogenic					
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	16
1992	Styrene Monomer	Flammable	2	3	2	131	1
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	11
2031	Nitric Acid	Toxic / Corrosive	4	0	0	157	4
2187	Carbon Dioxide – Refrigerated	Inert Gas / Cryogenic	3	0	0	120	2
3257	Elevated Temperature Product	HOT / Flammable	1	2	1	128	54

US 52:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	2
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	12
1093	Acrylonitrile	Flammable / Poison	4	3	2	131	1
1120	Butanols	Flammable Gas	1	3	0	129	2
1134	Chlorobenzene	Flammable • Water miscible	2	3	0	130	1
1170	Ethanol	Flammable • Water miscible	2	3	0	127	7
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	143
1230	Methanol	Flammable	1	3	0	131	3
1263	Paint Related Material	Flammable	1	3	0	128	4
1268	Petroleum Distillates, NOS	Flammable	1	2	0	128	7
1390	Alkali Metals Amides	Water Reactive	2	1	2	139	1
1402	Calcium Carbide	Water Reactive	3	3	2	138	1
1648	Acetonitrile	Flammable • Water miscible				127	1
1760	Corrosive Liquid NOS	Toxic /	3	1	2	154	6

		Corrosive					
1761	Cupriethylenediamine	Toxic / Corrosive	2	2	1	154	1
1763	Cyclohexyltrichlorosilane	Toxic / Corrosive	2	2	0	156	3
1770	Diphenylmethyl Bromide	Toxic / Corrosive	3	1	2	153	2
1789	Hydrochloric Acid	Toxic / Corrosive	3	0	1	157	4
1790	Hydrofluoric Acid	Poisonous / Corrosive	4	0	1	157	1
1791	Hypochlorite Solution	Toxic / Corrosive	3	0	0	154	7
1824	Sodium Hydroxide	Toxic / Corrosive	3	0	1	154	31
1830	Sulfuric Acid	Corrosive	3	0	2	137	8
1863	Aviation Fuel	Flammable	1	2	0	128	2
1986	Alcohols, Flammable	Flammable • Water miscible	1	3	0	131	1
1987	Alcohol NOS	Flammable • Water miscible	1	3	0	127	7
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	11
3145	Alkyl Phenois	Toxic / Corrosive	2	1	1	153	1

US 68:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1001	Acetylene	Flammable Gas	0	4	3	116	1
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	2
1075	PETROLEUM GASES • Butane • Propane (LPG)	Flammable	1	4	0	115	6
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	11
1830	Sulfuric Acid	Corrosive	3	0	2	137	1
1863	Aviation Fuel	Flammable	1	2	0	128	
1993	Combustible Liquid • Fuel Oil • Diesel Fuel	Combustible Liquid	1	2	0	128	2

US 62:
Summary of ALL chemicals observed at the locations:

UN NUMBER	CHEMICAL NAME	HAZARD	NFPA 704 RATING			ERG GUIDE	# OF LOC
			HEALTH	FLAM.	REACT.		
1005	Anhydrous Ammonia	Corrosive Gas	3	1	0	125	1
1203	Gasohol, Gasoline, etc.	Flammable Liquid	1	3	0	128	10

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d. Glossary

1. **Authorities having jurisdiction** – Political subdivision such as a city, town, county or special district granted authority by legislative action that governs certain activities
2. **Hazard Class**: The hazard class designation for the material as found in the DOT regulations, 49 CFR. There are currently 9 DOT hazard classes which are divided into 22 divisions.
3. **Hazardous Material**: Any substance or material in any form or quantity that poses an unreasonable risk to safety and health and property when transported in commerce (Source: DOT, 49 Code of Federal Regulations (CFR 171).
4. **Hazardous Materials Load Class and Division**

Class 1 Explosives: An explosive is any substance or article, including a device, which is designed to function by explosion, i.e. an extremely rapid release of gas and heat, or which, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion, unless it is otherwise classified under the provision of the regulations.

Division 1.1 – Explosives that have a mass explosion hazard, i.e. a mass explosion affects the entire load instantaneously.

Division 1.2 – Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3 – Explosives that have a fire hazard and either a minor blast hazard or minor projection hazard or both, but not a mass explosion hazard.

Division 1.4 – Explosives that present minor explosion hazard. The explosive effects are largely confined to the package and no projection or fragments of appreciable size or

range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5 – Very insensitive explosives that have a mass explosion hazard but are so insensitive that there is little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6 – Extremely insensitive articles that do not have a mass explosive hazard and that contain only extremely insensitive detonating substances and demonstrate a negligible probability of accidental initiation or propagation.

Class 2 Gases: includes all gases which are compressed and stored for transportation.

Division 2.1 - Flammable Gas – A material that is a gas at 20º C or below and 101.3 kPa of pressure (ambient temperature and pressure), i.e. the material has a boiling point of 20º C at sea level and is ignitable when in a mixture of 13 percent or less by volume with air. Or has a flammability range with air of at least 12% regardless of the lower limit.

Division 2.2 - Non-Flammable/Non-Poisonous Compressed Gas – A material or mixture that exerts in the packaging an absolute pressure of 280 kPa (40.6 psi) or greater at 20º C and does not meet the definition of Division 2.1 or 2.3. This includes compressed gas, liquefied gas, pressurized cryogenic gas, compressed gas in solution, asphyxiant gas and oxidizing gas.

Division 2.3 – Gas Poisonous by Inhalation – A material that is a gas at 20º C or below and 101.3 kPa of pressure (ambient temperature and pressure), i.e. the material has a

boiling point of 20º C at sea level and is known to be so toxic to humans as to pose a hazard during transportation.

Class 3 Flammable and Combustible Liquids: Any material in a liquid phase with a flash point ≤ 37.8º C (100º F) that is intentionally heated and offered for transport or transported at or above its flash point in bulk packaging.

Class 3 Combustible liquids are a liquid that does not meet the definition of any other hazard class and has a flash point of > 60.5º C (141º F) and ≤ 93º C (200º F).

Class 4 Flammable Solids: Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances.

Division 4.1 – Flammable Solids

Division 4.2 – Spontaneously combustible

Division 4.3 – Dangerous When Wet materials are materials that, when in contact with water, are liable to become spontaneously flammable or to give off flammable or toxic gas at a rate of > 1L/kg of material/hr.

Class 5 Oxidizers: Oxidizing and Agents and Organic Peroxides

Division 5.1 - Oxidizers are materials that can, generally by yielding oxygen, cause or enhance the combustion of other materials.

Division 5.2 – Organic Peroxides are any organic compounds containing oxygen in a bivalent –O-O- structure and which may be considered derivatives of hydrogen peroxide, where one or more of the hydrogen atoms have been replaced by organic radicals.

Class 6 Toxic and Infections substances: Poisonous materials are materials, other than gases, known to be so toxic to humans that it presents a health hazard during transportation.

Division 6.1 – Toxic substances

Division 6.2 – Infections substances

Class 7: Radioactive materials: substances that emit radiation.

Class 8 – Corrosive substances - Corrosive materials are liquids or solids that cause full thickness destruction of human skin at the site of contact within a specified period of time; or a liquid that has a severe corrosion rate on steel or aluminum based on criteria in §173.137(c)(2). A liquid is considered to have a severe corrosion rate if it corrodes steel (SAE 1020) or aluminum (non-clad 7075-T6) faster than 6.25 mm (0.246 in.) a year at a temperature of 55º C (131º F).

Class 9 – Miscellaneous hazardous materials Products, substances or Organisms - Hazardous Materials are materials that present a hazard during transportation but don't meet the definitions of hazard classes 1 – 8.

5. **Local Emergency Planning Committees**: A committee appointed by a state emergency response commission, as required by SARA Title III to formulate a comprehensive emergency plan for its corresponding local government or mutual aid region. HMMI
6. **MC – 306**: Non (low) pressure bulk liquid cargo tank
7. **MC – 307**: Low pressure bulk liquid cargo tank

8. **MC – 312**: Corrosives Cargo Tank
9. **MC – 331**: Hi Pressure Cargo Tank
10. **MC – 338**: Insulated Cargo Tank
11. **North American Emergency Response Guidebook (ERG)**: A nationally recognized guidebook provided by PHMSA that provides first responders with a go-to manual to help deal with hazardous material accidents during the critical first 30 minutes.
12. **Placard:** Approximately 10.75 inch square markings required under DOT regulations and applied to both ends and each side of freight containers, cargo tanks, and portable tank containers. Factors such as the individual package labels, the size of individual packages and the total quantity of the product will determine the correct placard to be used.
13. **Poisonous or Toxic Materials** are materials, other than a gas, known to be so toxic to humans as to pose a health hazard during transportation, or which, in the absence of adequate human toxicity data: Is presumed to be toxic to humans because it is within one of the following when tested on lab animals:
    a. Oral toxicity: a material with an LD50 of ≤300 mg/kg.
    b. Dermal toxicity: a material with an LD50 of ≤1000 mg/kg
    c. Inhalation toxicity: a dust or mist with an LC50 for acute toxicity on inhalation of ≤4.0 mg/L; or a material with a saturated vapor conc. in air at 20ºC of more than 1/5 of the LC50 for acute toxicity on inhalation of vapors and with an LC50 for acute toxicity on inhalation of vapors of < 5000 mL/m3

Is a material with properties similar to tear gas that causes extreme irritation, especially in confined spaces.

Toxins that are extracted from a living source like plant, animal, or bacteria are called biotoxins and could be considered toxic if the LD50 meets the criteria stated above.

14. **UN/NA number**: UN numbers or UN IDs are four-digit numbers that identify hazardous substances, and articles (such as explosives, flammable liquids, toxic substances, etc.) in the framework of international transport. NA numbers (North America), also known as DOT numbers are issued by the United States DOT and are identical to UN numbers, except that some substances without a UN number may have an NA number. These additional NA numbers use the range NA8000 - NA9999.
15. **Water miscible:** forming a homogeneous mixture when added with water.
16. **Water Reactive:** A water reactive substance is one that undergoes a chemical reaction with water.

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e. Curriculum Vitae

Curriculum Vitae

Kenneth C. Rost, CHMP, ABCP
ken@bluerockone.com
720-389-9410

Professional Profile

Kenneth C. Rost is a Business Continuity professional with extensive experience in emergency management, environmental compliance, incident management, public safety and hazardous materials.

Professional Experience

President and Owner, Blue Rock Enterprises, LLC
International business venture focused on the protection and preservation of life, the environment and property.
Specialize: business continuity consulting, emergency response consulting, hazardous materials training, incident command system training
Provide: custom programs and solutions for focused on people, plans and preparedness including disaster readiness, exercise design and evaluation.
Plan: Alternative Fuel Response Considerations, 3AM Chem, Incident Readiness Immersion System, Incident Readiness Immersion for Schools, Practical Rad Response, Resource Roundup for Responders, Hazardous Materials Safety Officer and Site Operations.

Co-Owner, TK Hazards Mitigation Group, LLC/ Signet North America
International business venture providing hazardous materials training, incident command system training, business continuity and emergency response consulting.
Specialize: Disaster exercise design and evaluation
Provide: Emergency Response training of personnel globally.
Plan: Develop emergency response plans for global entities. E85 and Alternative Fuels curriculum creation and training of thousands of responders nationally and internationally

Consultant, Signet North America (Saskatoon, SK, Canada)
Environmental incident response and remediation company.
Specialize: Hazardous Materials training, incident command system training
Provide: Business continuity consulting, emergency response consulting.
Plan: Disaster exercise design and evaluation and training of response personnel

Douglas County Sheriff's Office, Castle Rock, CO.
Local and regional emergency management.
Specialize: Hazardous materials response team command. 100+ HazMat Technicians, 250+ HazMat Operations, and all first responder awareness.
Provide: Emergency Management services to metropolitan, suburban and rural populations. Disaster exercise design and evaluation, responsible for hazardous materials response and cleanup within all unincorporated areas of the county.

Plan: Local Emergency Planning Committee chairman, regional effort in school chemical remediation.

Education
Certified Hazardous Materials Practitioner (CHMP), Institute of Hazardous Materials Management (IHMM)
Associate Business Continuity Professional (ABCP), DRI International, New York
Hazardous Materials Site Operations, National Fire Academy
Hazardous Materials Incident Command, National Fire Academy
Hazardous Materials Chemistry, National Fire Academy
Hazardous Materials Technician, State of Colorado
Environmental Protection Agency (Inspector course)
Modular Emergency Radiological Response Trainer, Department of Energy
Emergency Management Courses; Incident Command System, Decisions Making in a Crisis, Emergency Operations Center, National Incident Management System, Emergency Manager, Multi-Hazard Planning for Schools, Homeland Security Planning for Local Governments
Hazardous Materials: Hazardous Materials Technician, Operations, and Awareness. Hazardous Materials Safety Officer and Site Operations, Alternative Fuels Response Considerations. IATA, IMO, IMDG, DOT Transportation Instructor. Department of Energy Modular Emergency Radiological Response Instructor. Incident Command System: ICS-100 through ICS-400, Multi-Agency Command System, National Incident Management System.

Accomplishments
Hazardous Materials Voluntary Certification Board, State of Colorado. Appointed by Governor Bill Owens.
Certified Hazardous Materials Practitioner (CHMP) recertification board chairman, Institute for Hazardous Materials Management.
Operations Committee Chairman, Regional Hazardous Materials Board of Arapahoe and Douglas County, 2006
Deputy of the Year, Douglas County Sheriff's Office, Castle Rock, Colorado 2000
Meritorious Conduct Award, Douglas County Sheriff's Office, Castle Rock, Colorado 2006

Presentations/Publications
Flex Fuel Perks and Perils, Carolina Fire Rescue EMS Journal, Fall 2007
Incident Management Guidelines and Standards, Hazardous Materials Annex, Douglas County Government 2006
Emergency Preparedness and Prevention Guide, co-authorship, Douglas County 2006
Journal of Hurricane Katrina Strike Team, International Association of Emergency Managers, www.iaem.com 2005
Incident Debriefing, Critiques and Hotwashing, Western Canadian HazMat Symposium, Saskatoon, Saskatchewan, October 2009
Alternative Fuels, Western Canadian HazMat Conference, Saskatoon, Saskatchewan, October 2008, Cold Zone HazMat Conference, Minneapolis, Minnesota May 2009/ May 2011. Industrial Fire Safety and Security, February 2008.
Steve Spangler KUSA 9 News "Mad about Science", Denver, Colorado October, 2008

Affiliations
Disaster Recovery Institute International
American National Standards Institute
National Fire Protection Association

International Association of Emergency Managers
Institute of Hazardous Materials Management
Colorado Emergency Managers Association
National Association of SARA III Program Officials
Douglas County Type IV Incident Management Team

Community Service
Public Safety Advisory Board, Castle Rock, Colorado 2004
School Accountability Committee, Douglas County Schools, Castle Rock, Colorado
Local Emergency Planning Committee, Douglas County, Colorado

Curriculum Vitae
Rick Lawrence Young
rick@bluerockone.com
720-389-9410

Professional Profile
Rick Lawrence Young is an emergency management professional with extensive experience planning for, responding to and recovering from emergency situations. Rick is an experienced code compliance professional with specialties in fire, building and environmental code.

Professional Experience
Consultant, Blue Rock Enterprises, LLC
International business focused on the protection and preservation of life, the environment and property.
Specialization: Emergency planning and management
Provide emergency responder and emergency management education and training
Fire and life safety code compliance, audits/evaluations
Develop Emergency Management Plans and programs
Develop Site Safety Operations Manuals/guides for the operations of facilities manufacturing, storing or using hazardous materials
Develop hazardous materials management plans including training programs, audits, reporting

Fire Marshall, City of Sheridan
Fire and Life Safety Code Enforcement, Planning and Development
Specialization: Coordinating the S.A.R.A. Title III - Hazardous Materials chemical reporting program
Building construction, fire suppression, and life safety systems plans
Fire and Life Safety Code compliance
Provide public education and training programs to aid in addressing the requirements of the fire code;
Fire Arson Investigation

Deputy Fire Marshal, Littleton Fire Rescue
Fire and Life Safety Code Enforcement, Planning and Development
Specialization: Fire / Arson Investigations, Code Enforcement, Planning and Development. Hazardous Materials response and investigation
Canine Handler: SWAT Explosive Entry Technician
Coordinating the S.A.R.A. Title III – Hazardous Materials chemical reporting program and the Hazardous Materials Emergency Response program
Conduct Fire, Explosion and Hazardous Materials scene investigations
Develop and deliver public education and training programs to aid in addressing the requirements of the fire code
Develop and maintain a computer database management program to track the S.A.R.A. Title III data and make the information available to emergency responders when an incident occurs

Fire Marshall/Sergeant/Criminal Investigator, Arapahoe County Sheriff's Office
Fire and Life Safety Code Enforcement, Planning and Development
Specialization: Hazardous Materials Emergency Response program
Fire, Explosion and Hazardous Materials scene investigations

Fire protection and construction plan reviews
Conduct building construction, fire suppression, and life safety systems plan reviews and public education for facilities where fire departments had limited resources.
Maintain S.A.R.A. Title III Hazardous Materials Compliance program

Fire Marshal, Cunningham Fire Protection District
Fire and Life Safety Code Enforcement, Planning and Development
Specialization: Incident Commander: Fire, Medical and Hazardous Materials. Hazardous Materials Team member and instructor.
Establish and manage Fire Prevention related activities of the Fire Prevention Bureau
Conduct Fire, Hazardous Materials and Life Safety related inspections to ensure compliance with adopted codes and regulations
Develop and implement public fire education programs
Building Inspection program management
Develop and implement pre-fire plans for businesses in the district
Conduct Fire and Explosion scene and internal investigations
Function as relief Battalion Chief and served as the Communications Division manager and Public Information Officer (PIO)
Budget preparation and management for the operation of the Fire Prevention Bureau

Education
Western State College, Oregon: Bachelor's Degree in Business
Red Rocks College, Colorado: Associates Degree in Applied Science in Fire Science Technology
Red Rocks College, Colorado: Associates Degree in Applied Science in Criminal Justice
Numerous other college related courses in Law Enforcement, Fire and Emergency Management
Over 3,000 hours of continued education and professional training in the areas of Code Enforcement, Fire Investigations, Hazardous Materials and P.O.S.T: Explosives, Explosive Entry operations, Incident Management

Accomplishments
2008 Service Commendation for SWAT involvement
1993 Service Commendation for World Youth Day activities/visit of Pope John Paul

Medal of Valor award for Columbine High School incident response: 1999
(3 separate medals awarded)
Medal of Valor award for Explosive hazardous materials response: 1992
Medal of Valor award for hostage response/S.W.A.T: 2002
S.A.R.A. Title III Hazardous Materials reporting program creation

Presentations/Publications
Created the publically released final report on the Columbine High School shooting incident. Over 70,000 copies of this report have been released.

Affiliations
Colorado Association of Arson Investigators
International Association of Fire Chiefs
South Metro Fire Explosion Task Force
National Association of Emergency Medical Technicians

National Sheriff's Association
Colorado State Firefighters Association
International Association of Arson Investigators
Fire Marshals Association of Colorado
International Conference of Building Officials
Western Fire Chiefs Association International Association of Fire Service Instructors
International Association of Bomb Technicians and Investigators
National Fire Protection Association - Standards Development Committee
Colorado Hazardous Materials Association
National Association of Hazardous Materials Instructors

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