LEWIS-UPSHUR LOCAL EMERGENCY PLANNING COMMITTEE
COMMODITY FLOW STUDY
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LEWIS-UPSHUR LOCAL EMERGENCY PLANNING COMMITTEE COMMODITY FLOW STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendment and Reauthorization Act (SARA), was passed by Congress in 1986 and provides for the collection and availability of information regarding the use, storage, production, and release of hazardous chemicals to the public and emergency responders in local communities. Community right-to-know provisions provide education, information, and public access regarding chemical uses and releases into the environment respective to individual facilities. By doing so, states and communities, working with facilities, can improve chemical safety and protect public health and the environment.

In 1993, the West Virginia Legislature passed House Bill 2382 to implement the EPCRA in West Virginia. The State Emergency Response Commission (SERC) serves as the administrative body for the implementation of House Bill 2382 at the state level; the SERC works cooperatively with the Local Emergency Planning Committees (LEPCs) serving the counties of West Virginia. The EPCRA is indicative of the fact that Congress realizes the risk to communities posed by the use, storage, and transportation of hazardous materials. West Virginia's implementation of the EPCRA indicates the state's realization of this risk as well.

As part of the implementation of the EPCRA, LEPCs should develop and implement comprehensive emergency response plans. As part of the process of developing these plans, LEPCs conduct various hazard analyses and risk assessments, of which this commodity flow study is an example.

Utilizing funding from the West Virginia SERC, the Lewis-Upshur LEPC coordinated the completion of this flow study. A contractor, JH Consulting, LLC (JHC) of Buckhannon, West Virginia, was hired to facilitate all data collection and

analysis. Field reconnaissance was conducted over a one week period within each county in the study area. Beginning August 17, 2015, Upshur County was observed with September 21, 2015 as the starting date for Lewis County. Following the collection of data, JHC completed final analysis and assimilated the results into report format. (NOTE: Detailed methodologies are provided in the discussions below.)

The intent of this study is to provide emergency managers and responders in Lewis and Upshur Counties with information to more fully advise efforts to mitigate, prepare for, respond to, and recover from hazardous material incidents. These efforts may significantly minimize damage or harm to equipment, facilities, personnel, and to the community at large.

1.2 Description of the Study Area

The study area for this commodity flow study consists of both Lewis and Upshur Counties in West Virginia. While these counties share a boundary line, each county has its own employment aspects, weather conditions, and topography which can affect how hazardous materials can react. As a result, each county will be described individually.

Lewis County is in North Central West Virginia with six adjacent counties. Harrison County is to the north, Upshur County is to the east, Webster County is south, Braxton County is southwest, Gilmer County is west, and Doddridge County is northwest. Lewis County is a landlocked county of 390 total sq. miles that contains 4.8 sq. miles of non-navigable waterways used for mostly recreation. The remaining 385 sq. miles of land area holds the estimated population of 16,414 (U.S. Census, 2014). The largest employment industry is education, healthcare, and social assistance services (U.S. Census 2008-2012 review, 2015). This industry category is supported by 23.22% of the county's population, which is similar to national statistics. The industries of natural resources (i.e., agriculture, forestry, fishing, hunting, and mining), construction, manufacturing, transportation, warehousing, and utilities combined supports an additional 31.69% of Lewis County's employable population; thereby, nearly 55% of Lewis County's population is employed in areas that are likely to come in contact with hazardous materials.

As for weather considerations in Lewis County, the average annual temperature is 52.1°F, slightly less than the 53.1°F for the state of West Virginia (http://www.usa.com/lewis-county-wv-weather.htm) from 1980 to 2010. January usually averages between 20.5°F and 39.7°F and July averages 61.2°F and 84.2°F. The annual precipitation level of 46.74 inches is slightly more than the West Virginia state average at 44.36 inches, but in similarity with the state, highest levels of rain occur in May and July with approximately 5 inches accumulating during each of these months. Following the same pattern, snowfall is slightly more than the West Virginia annual average of 25.13 inches at 27.80 inches. Snow is likely between the months of November and April. Finally, the wind speed in Lewis County of 19.12 mph is slightly higher than the state average of 18.72 mph. A significant difference in wind speed occurs in June and September though. In June, Lewis County averages 26 mph while the state averages 31.4 mph and in September, Lewis County again peaks at 26.6 mph while West Virginia averages 19.9 mph.

The second county within this study area, Upshur County, is located east of Lewis County, sharing two of the adjacent counties, Harrison County to the north and Webster County to the south. In addition Upshur County has Barbour County to the northeast and Randolph County to the southeast. It is located in North Central West Virginia as well covering 355 sq. miles of total area. Only 0.1 sq. miles is associated with water area, all of which is non-navigable (U.S. Census, 2014). A population of 24,731 was estimated in 2014 (U.S. Census, 2014). Similar to Lewis County, the largest employment industry is education, healthcare, and social assistance services employing 28.51% of Upshur County's employable population ((U.S. Census 2008-2012 review, 2015). Additionally, the industries of natural resources (i.e., agriculture, forestry, fishing, hunting, and mining), construction, manufacturing, transportation, warehousing, and utilities support approximately 28.5% of the county's employable population, resulting in 57% of Upshur County's employable population likely coming in contact with hazardous materials.

As for weather, the average temperature in Upshur County is 52.3°F from 1980 to 2010 (http://www.usa.com/upshur-county-wv-weather.htm), similar to its neighbor, Lewis County. During January the temperature ranges from 20.8°F to 40.3°F and July usually fluctuates between 61.1°F and 83.8°F. Total precipitation

is slightly higher than Lewis County at 47.76 inches, but the peaks occur similarly during the months of May and July at 5 inches and 5.3 inches respectively. Snowfall occurs between November and April averaging 29.38 inches annually or approximately 1.5 inches more than Lewis County. Finally, the wind speed in Upshur County peaks three times during the year. In April, the wind speed is comparable to the West Virginia average at 21.2 mph, but in June while West Virginia peaks at 31.4 mph, Upshur County rises only to 24.9 mph, not reaching its peak until September at 27.8 mph which has a 19.9 mph average for West Virginia.

2.0 HIGHWAY ANALYSIS

2.1 National Statistics

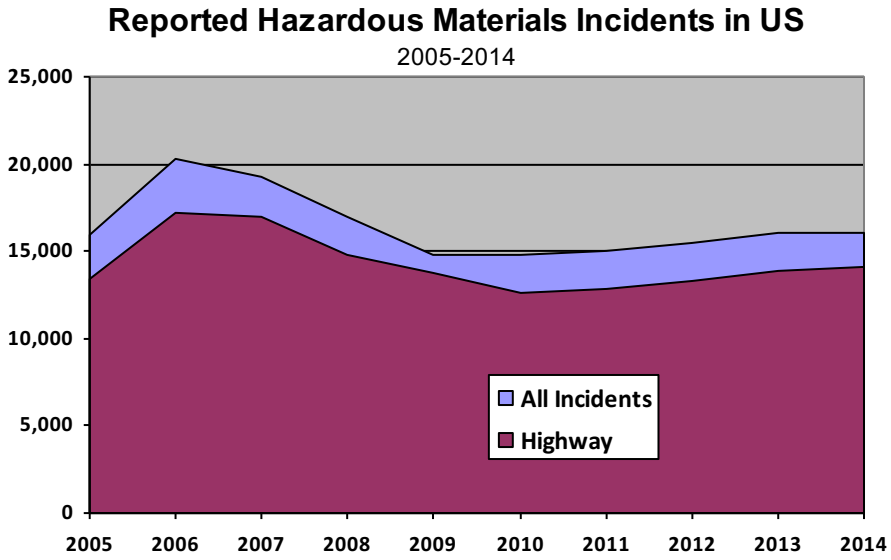


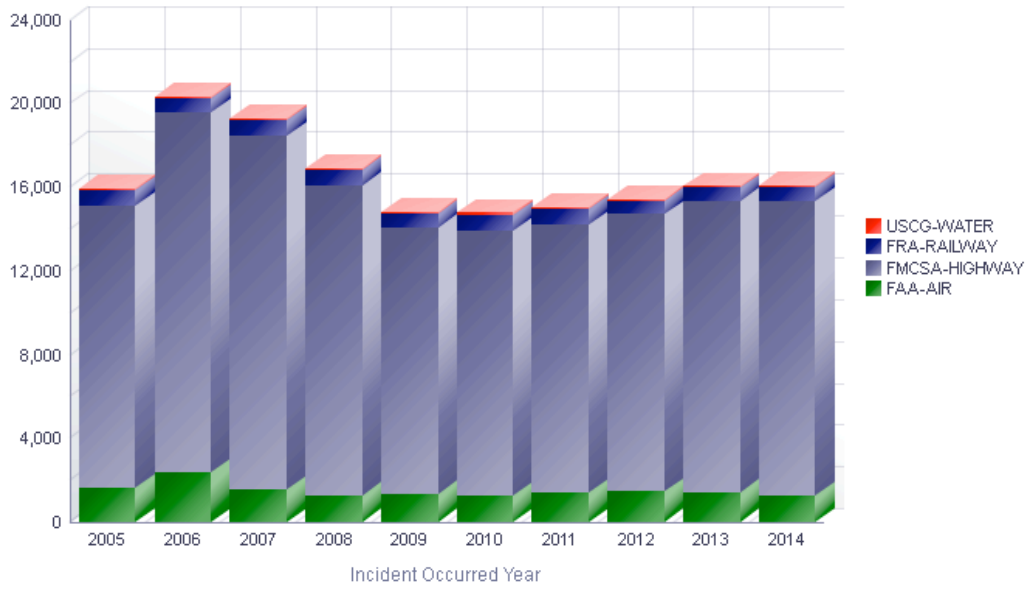
Figure 2.1.a

The annual number of reported hazardous material incidents in the United States has varied slightly since 2005. The data represents an increase in incidents in from 2005 to 2006 and reports the highest annual number of incidents through the two (2)-year period of 2006-2007. A drop occurred in both highway incidents and incidents in general with a return to approximately the 2005 values in 2014. Figure 2.1.a depicts the total number of reported hazardous material incidents in the United States between 2005 and 2014 (PHMSA, Office of Hazardous Materials Safety, 2015).

The plum-colored area above represents the highway incidents that have occurred. Data such as this has led the United States Department of Transportation (USDOT) to posit that the majority of hazardous material incidents in the United States occur on roadways. Figure 2.1.b confirms this belief (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Figure 2.1.b

Hazardous Material Incidents



The USDOT also maintains data on the cause of hazardous material incidents. According to the USDOT, the causes of the highway incidents have been as follows (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

- **2012:** See Figure 2.1.c below.

Figure 2.1.c

Cause – 2012

Abrasion	86	Inadequate Preparation for Transportation	758
Broken Component or Device	147	Inadequate Procedures	128
Commodity Self-Ignition	9	Inadequate Training	6
Commodity Polymerization	1	Incompatible Product	6
Conveyor or Material Handling Equip. Mishap	75	Incorrectly Sized Component or Device	5
Corrosion – Exterior	41	Loose Closure, Component, or Device	1,693
Corrosion – Interior	30	Misaligned Materials, Component, or Device	48
Defective Component or Device	840	Missing Component or Device	64
Derailment	25	Overfilled	155
Deterioration or Aging	208	Over-Pressurized	80
Dropped	1,448	Rollover Accident	132
Fire, Temperature, or Heat	31	Stub Sill Separation from Tank (Tank Cars)	1
Forklift Accident	1,422	Threads Worn or Cross Threaded	11
Freezing	19	Too Much Weight on Package	374
Human Error	2,202	Valve Open	236
Impact w/ Sharp or Protruding Object	827	Vandalism	4
Improper Preparation for Transportation	1,020	Vehicular Crash or Accident Damage	166
Inadequate Accident Damage Protection	47	Water Damage	10
Inadequate Block and Bracing	1,394	Cause Not Reported	1,950
Inadequate Maintenance	17		

- **2013:** See Figure 2.1.d below.

Figure 2.1.d

Cause – 2013

Abrasion	90	Inadequate Maintenance	16
Broken Component or Device	260	Inadequate Preparation for Transportation	698
Commodity Self-Ignition	11	Inadequate Procedures	94
Commodity Polymerization	2	Inadequate Training	7
Conveyor or Material Handling Equip. Mishap	57	Incompatible Product	1
Corrosion – Exterior	28	Incorrectly Sized Component or Device	9
Corrosion – Interior	45	Loose Closure, Component, or Device	1,947
Defective Component or Device	812	Misaligned Materials, Component, or Device	56
Derailment	21	Missing Component or Device	46
Deterioration or Aging	203	Overfilled	142
Dropped	1,301	Over-Pressurized	81
Fire, Temperature, or Heat	32	Rollover Accident	125
Forklift Accident	1,455	Threads Worn or Cross Threaded	12
Freezing	32	Too Much Weight on Package	315
Human Error	1,630	Valve Open	200
Impact w/ Sharp or Protruding Object	799	Vandalism	6
Improper Preparation for Transportation	986	Vehicular Crash or Accident Damage	159
Inadequate Accident Damage Protection	12	Water Damage	8
Inadequate Block and Bracing	1,685	Cause Not Reported	2,929

- **2014:** See Figure 2.1.e below.

Figure 2.1.e

Cause – 2014

Abrasion	92	Inadequate Maintenance	6
Broken Component or Device	289	Inadequate Preparation for Transportation	687
Commodity Self-Ignition	2	Inadequate Procedures	70
Commodity Polymerization	2	Inadequate Training	5
Conveyor or Material Handling Equip. Mishap	40	Incompatible Product	5
Corrosion – Exterior	10	Incorrectly Sized Component or Device	10
Corrosion – Interior	22	Loose Closure, Component, or Device	1,578
Defective Component or Device	783	Misaligned Materials, Component, or Device	22
Derailment	169	Missing Component or Device	21
Deterioration or Aging	169	Overfilled	105
Dropped	1,318	Over-Pressurized	57
Fire, Temperature, or Heat	27	Rollover Accident	101
Forklift Accident	1,706	Threads Worn or Cross Threaded	5
Freezing	30	Too Much Weight on Package	295
Human Error	1,444	Valve Open	78
Impact w/ Sharp or Protruding Object	930	Vandalism	3
Improper Preparation for Transportation	1,040	Vehicular Crash or Accident Damage	143
Inadequate Accident Damage Protection	32	Water Damage	3
Inadequate Block and Bracing	963	Cause Not Reported	2,838

There are many types of hazardous materials that are transported over roadways, each divided into "classes" that are denoted on the placards labeling shipments. Table 2.1.1 lists the hazardous material classes involved in the 2012, 2013, and 2014 incidents (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents). NOTES: Table 2.1.1 contains highway *estimates*. The USDOT estimates for all modes of transport (including the highway numbers) are listed in parentheses. Due to the possibility that multiple classes may be involved in a single incident, incident totals in Table 2.1.1 may be slightly different than

elsewhere presented.

Table 2.1.1

Hazmat Incidents by Class

Hazard Class	2012	2013	2014
1: Explosives	**33** (*38*)	**30** (*35*)	**9** (*10*)
2: Flammable, non-flammable, & poisonous gases	**776** (*905*)	**756** (*882*)	**368** (*413*)
3: Flammable liquids	**7,354** (*8,573*)	**7,606** (*8,875*)	**7,559** (*8,493*)
4: Other ignitable hazards	**75** (*87*)	**110** (*128*)	**93** (*104*)
5: Oxidizers	**610** (*711*)	**676** (*789*)	**708** (*795*)
6: Poisonous & infectious materials	**308** (*359*)	**314** (*366*)	**245** (*275*)
7: Radioactive materials	**16** (*19*)	**10** (*12*)	**9** (*10*)
8: Corrosives	**3,335** (*3,888*)	**3,537** (*4,127*)	**3,827** (*4,300*)
9: Other miscellaneous hazards	**757** (*883*)	**758** (*884*)	**357** (*401*)

The USDOT also maintains the results of the hazardous material incidents discussed above. Table 2.1.2 presents those results (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents). NOTES: Table 2.1.2 also contains highway *estimates*. The USDOT estimates for all modes of transport (including the highway numbers) are listed in parentheses. Due to the possibility of multiple results within a single incident, the totals in Table 2.1.2 may be slightly different than elsewhere presented.

Table 2.1.2

Hazmat Incident Results

Result	2012	2013	2014
Vapor (Gas) Dispersion	**355** (*414*)	**327** (*382*)	**298** (*335*)
Material Entered Waterway/Sewerway	**42** (*49*)	**57** (*66*)	**59** (*65*)
Spillage	**12,189** (*14,210*)	**12,702** (*14,822*)	**14,032** (*15,766*)
Fire	**76** (*89*)	**62** (*72*)	**61** (*69*)
Explosion	**15** (*17*)	**13** (*15*)	**12** (*13*)
Environmental Damage	**86** (*100*)	**70** (*82*)	**61** (*69*)
None	**788** (*919*)	**783** (*914*)	**765** (*859*)

2.2 Methodology

To complete the highway analysis, roadway monitoring sites were established along the primary transportation routes and at key intersections throughout the county. The following sites were monitored. (NOTE: Detailed data sheets for each of these sites are provided in Appendix 2.)

- Lewis County Sites
  - Interstate 79 – Northbound at Jane Lew
  - Interstate 79 – Southbound at Southern Lewis County Rest Area
  - US Route 33 at Weston
  - US Route 19 in Jane Lew
- Upshur County Sites
  - US Route 33 at Kesling Mill Road
  - US Route 33 at Red Rock Road
  - State Route 20 at Donut Shop
  - State Route 20 at Lowes

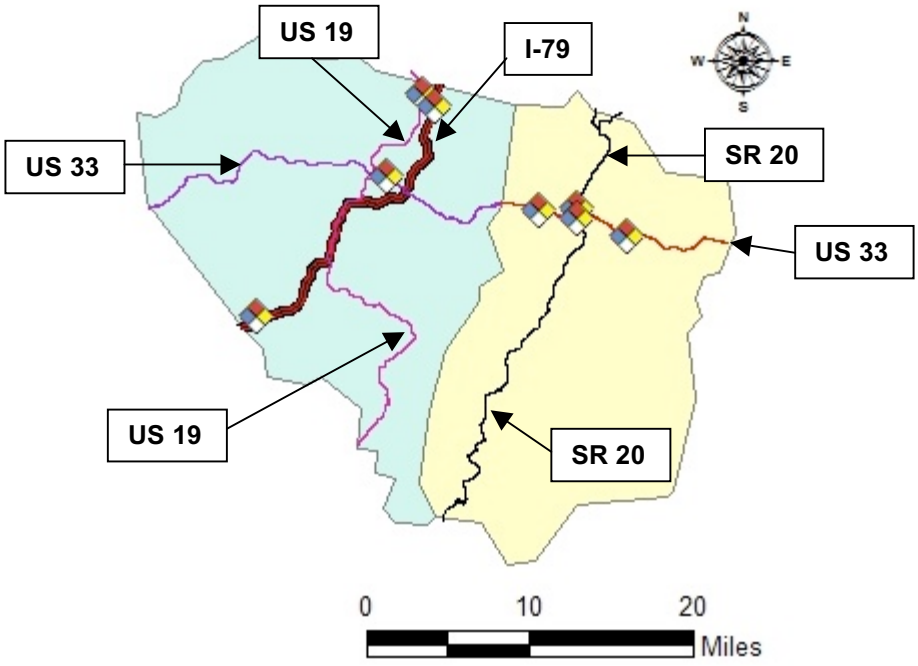


FIGURE 2.2.a

Each site was staffed by a one (1)-person crew. This individual noted the UN numbers and the hazard classes of placards at each site. The monitor also manually counted the total truck traffic through the site to allow for real-time comparisons between hazmat-carrying and non-hazmat-carrying truck traffic.

Additionally, total traffic volume data (maintained by the West Virginia Department of Transportation [WVDOT] was also researched for the study area (WVDOT, 2012). This data will allow the planning committee to compare total traffic versus total hazmat traffic.

2.3 Field Data

2.3.1 Totals

The monitoring sites were chosen because they are likely the most heavily traveled routes, especially by traffic passing through the county. These sites may also represent the most congested intersections in the

county. Lewis-Upshur LEPC personnel assisted in the selection of sites given their knowledge of facility locations and alternate routes (leading to and from facilities in neighboring counties, etc.).

A total of 1,854 trucks were counted during the monitoring periods. There were 1,012 in Lewis County and 842 in Upshur County. Monitors reported 122 (6.6%) of the total number of trucks as being placarded and carrying hazardous materials with a 7.2% placard count in Lewis and 5.8% placarded in Upshur. A total of 103 trucks labeled with UN numbers with 23 different UNs were recorded. Nineteen (19) additional placards, labeled generally with the name of the hazard class, were also sighted. In the analyses below, these trucks were counted as part of the hazard class of the placard. General placards included the following:

- Corrosive,
- Explosives,
- Flammable Liquid,
- Non-Flammable Gas, and
- Poison.

Figure 2.3.1.a depicts the placarded and un-placarded truck traffic observed at monitoring points.

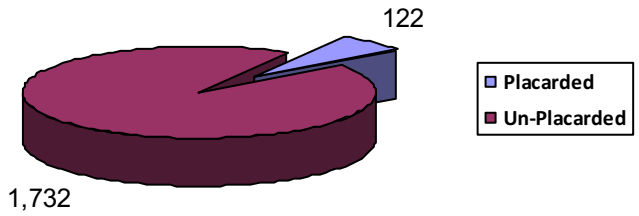


Figure 2.3.1.a

Placarded trucks were recorded by the trailer type they were pulling. Placarded trucks that did not fall into any of the trailer type categories (e.g., flatbed trucks) were considered “Other”. Trailer type 131 (non-pressure liquid tank) was the most common type of hazardous material (hazmat) carrying truck seen overall at 54.1% of the total hazmat trucks observed within the study area. Type 137 (corrosive liquid tanks, low pressure chemical tanks,

and vacuum loaded tanks) were second overall but at a significantly smaller count, reaching 25.4%. At only 8.2% of the overall placarded truck count, "Other" was the third most common. Within each county, Type 131 remained strong with 68.6% of the placarded trucks within Upshur County being this type. In Lewis County, a tie occurred between Types 131 and 137 at 43.7% of the placarded trucks observed. It is significant to note that type 137 was not observed at all in Upshur County as a placarded truck. Finally, "Other" was observed 19.6% of the time in Upshur County but was not observed in Lewis County at all. For additional information and a graphical representation of the various trailer types please refer to Appendix 3. Figure 2.3.1.b depicts the total placarded truck traffic counted by trailer type.

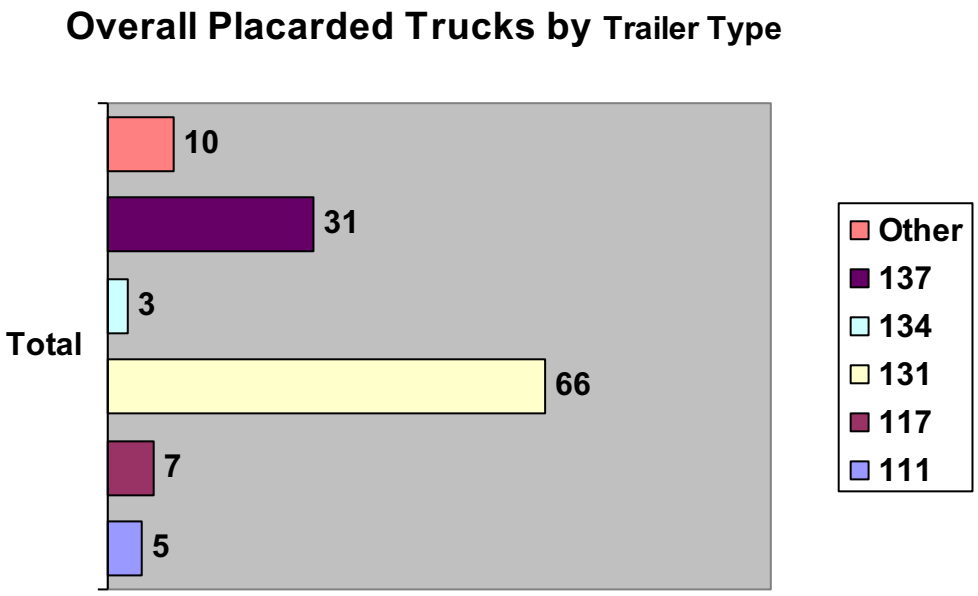


Figure 2.3.1.b

Approximately 6.6% of the 1,854 total trucks recorded were carrying hazardous materials.

Overall Placards By Hazard Class

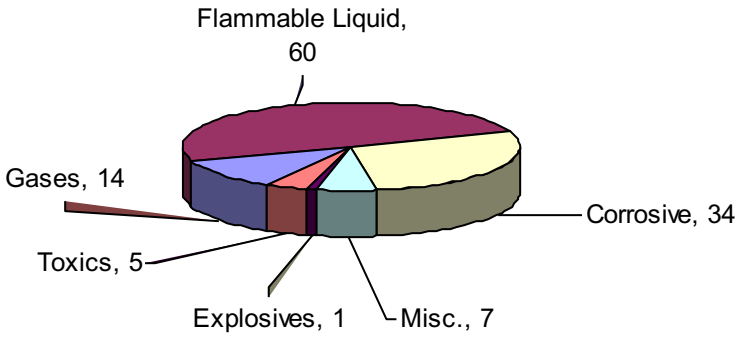


Figure 2.3.1.c

Approximately 49.6% of the total placarded vehicles recorded were carrying Class 3 (Flammable Liquids). Class 8 (Corrosives) were the second-most frequently-carried materials (28.1 %), followed by Class 2 (Gases, 11.6 %). Table 2.3.1.1 shows the percentages of hazard classes within the entire study area. Tables 2.3.1.2 and 2.3.1.3 show the percentages of hazard classes within Lewis and Upshur Counties respectively.

Table 2.3.1.1

Placards by Hazard Class in Study Area

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1 *0.8%*	**14** *11.6%*	**60** *49.6%*	**0** *0.0%*	**0** *0.0%*	**5** *4.1%*	**0** *0.0%*	**34** *28.1%*	**7** *5.8%*

Table 2.3.1.2

Placards by Hazard Class in Lewis County

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1 *1.4%*	**6** *8.2%*	**30** *41.1%*	**0** *0.0%*	**0** *0.0%*	**4** *5.5%*	**0** *0.0%*	**31** *42.5%*	**1** *1.4%*

Table 2.3.1.3

Placards by Hazard Class in Upshur County

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
0 *0.0%*	**8** *16.7%*	**30** *62.5%*	**0** *0.0%*	**0** *0.0%*	**1** *2.1%*	**0** *0.0%*	**3** *6.3%*	**6** *12.5%*

As for the separation between the two counties within the study area, Upshur County had Class 3 (Flammable Liquids) appear 62.5% of the time; a dominant presence, but it actually came in a slight second at 41.1% to Class 8 (Corrosives) in Lewis County. In Lewis County, corrosives were the most often class observed at 42.5% of the time. Upshur County, corrosives were fourth at 6.3% behind Gases (Class 2) and Miscellaneous (Class 9) at 12.5%. Class 2 gases were seen more than twofold in Upshur County at 16.7% of the time to Lewis County's 8.2% placing it second (Upshur) and third (Lewis) respectively.

Within Class 3, Gasoline (UN 1203) was the most frequently-cited material, contributing 50.0% of all Class 3 placards sighted within the study area. It was seen slightly more often in Upshur County at 56.7% of the Class 3 placards seen within that county while only 43.3% in Lewis County. Combustible Liquids (UN 1993) was the second-most cited material (comprising 25.0% of the Class 3 placards) within the study area having been observed 26.7% (Upshur) and 23.3% (Lewis) respectively. Third place was taken by liquid hydrocarbons (UN 3295) at 10% of the study area's Class 3 placards but they were only observed in Lewis County only at the US Route 19 monitoring site.

There were four (4) materials sighted at the monitoring points that appear on the United States Environmental Protection Agency's (USEPA's) list of "Extremely Hazardous Substances" (EHSs).

Table 2.3.1.4

Trucks Carrying EHSs

EHS	Total Trucks
Hydrochloric Acid	3
Phenol, molten	2
Phosgene	2
Sulfur trioxide	2
TOTAL	**9**

EHS vs Total Hazmat Traffic

Figure 2.3.1.d

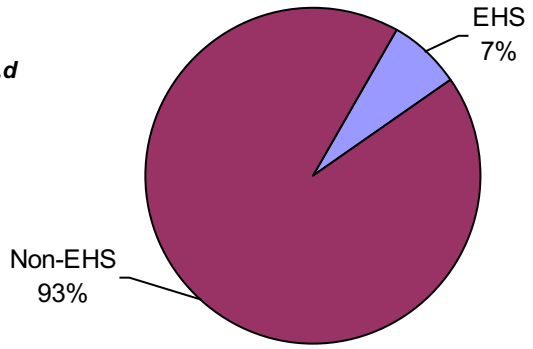


Figure 2.3.1.d depicts the EHS hazardous material traffic in relationship with the total hazardous material traffic within the entire study area. The only EHS observed outside of Interstate 79 was hydrochloric acid.

2.3.2 Site Specific Data

Detailed information for each of the monitoring sites is located in Appendix 2.

2.4 Highway Risk Analysis

Transcaer provides a methodology to calculate the probability of a hazardous material transportation incident on roadways within the boundaries of a specific study area based upon a number of criteria, including:

- The number of placarded vehicles observed in the study area,
- The highway road miles within the study area, and

- The national hazardous material accident frequency rate.

The following data can be used for planning purposes, but should always be compared to historical data.

As for a note on the risk analysis methodology, consider the following. All monitoring sites along a given route were combined to obtain the total placard vehicles and survey time along that route. Roadway miles in Lewis and Upshur Counties were taken from Census Tiger Data (2012). Further, the figures 1,000,000 and 0.608 were constants in the Transcear formula. Table 2.4.1 shows the results of the highway risk analysis.

Table 2.4.1

Highway Risk Analysis Summary

Roadway Name	Miles in Study Area	Accidents with Placarded Loads per Year
Interstate 79 (I 79) (Lewis)	32.1	1.24
US Route 33 (US 33)	39.8	0.501
• Lewis County	19.9	0.088
• Upshur County	19.9	0.311
US Route 19 (US 19) (Lewis)	11.4	0.190
State Route 20 (SR 20) (Upshur)	34.1	0.023
AVERAGES	**117.4**	**0.435**

2.4.1 Interstate 79 (I 79)

- A total of 32.1 miles of I 79 passes through Lewis County
- A total of 58 placarded vehicles were observed
- 32.1 miles x 58 placarded vehicles = 1861.8 miles traveled by placarded vehicles in the study area on I 79
- 1861.8 miles / 1,000,000 = 0.0018618 million miles
- 0.0018618 x 0.608 = 0.001131974 accidents with placarded loads
- 8 hours of survey time/24 hours = 0.333 days
- (0.001131974 / 0.333 days) x 365 days = 1.24 estimated number of accidents with placarded loads per year

2.4.2 US Route 33 (US 33) – Study Area

- A total of 39.8 miles of US 33 passes through the study area
- A total of 52 placarded vehicles were observed
- 39.8 miles x 52 placarded vehicles = 2069.6 miles traveled by placarded vehicles in the study area on US 33
- 2069.6 miles / 1,000,000 = 0.0020696 million miles
- 0.0020696 x 0.608 = 0.001258317 accidents with placarded loads
- 22 hours of survey time/24 hours = 0.9167 days
- (0.001258317 / 0.9167 days) x 365 days = 0.501 estimated number of accidents with placarded loads per year

2.4.3 US Route 33 (US 33) – Lewis County

- A total of 19.9 miles of US 33 passes through Lewis County
- A total of 5 placarded vehicles were observed
- 19.9 miles x 5 placarded vehicles = 99.5 miles traveled by placarded vehicles in Lewis County on US 33
- 99.5 miles / 1,000,000 = 0.0000995 million miles
- 0.0000995 x 0.608 = 0.000060496 accidents with placarded loads
- 6 hours of survey time/24 hours = 0.25 days
- (0.000060496 / 0.25 days) x 365 days = 0.088 estimated number of accidents with placarded loads per year

2.4.4 US Route 33 (US 33) – Upshur County

- A total of 19.9 miles of US 33 passes through Upshur County
- A total of 47 placarded vehicles were observed
- 19.9 miles x 47 placarded vehicles = 935.3 miles traveled by placarded vehicles in Upshur County on US 33
- 935.3 miles / 1,000,000 = 0.0009353 million miles
- 0.0009353 x 0.608 = 0.000568662 accidents with placarded loads
- 16 hours of survey time/24 hours = 0.667 days
- (0.000568662 / 0.667 days) x 365 days = 0.311 estimated number of accidents with placarded loads per year

2.4.5 US Route 19 (US 19)

- A total of 11.4 miles of US 19 passes through Lewis County
- A total of 10 placarded vehicles were observed
- 11.4 miles x 10 placarded vehicles = 114 miles traveled by placarded vehicles in the study area on US 19
- 114 miles / 1,000,000 = 0.000114 million miles
- 0.000114 x 0.608 = 0.000069312 accidents with placarded loads
- 3.2 hours of survey time/24 hours = 0.133 days
- (0.000069312 / 0.133 days) x 365 days = 0.190 estimated number of accidents with placarded loads per year

2.4.6 State Route 20 (SR 20)

- A total of 34.1 miles of SR 20 passes through Upshur County
- A total of 2 placarded vehicles were observed
- 34.1 miles x 2 placarded vehicles = 68.2 miles traveled by placarded vehicles in the study area on SR 20
- 68.2 miles / 1,000,000 = 0.0000682 million miles
- 0.0000682 x 0.608 = 0.0000414656 accidents with placarded loads
- 16 hours of survey time/24 hours = 0.667 days
- (0.0000414656 / 0.667 days) x 365 days = 0.023 estimated number of accidents with placarded loads per year

2.5 Conclusions

The following conclusions can be made using the highway analysis data. Recommendations regarding the overall nature of the hazardous material risk in Lewis and Upshur Counties are presented elsewhere.

- National hazardous material incident trends *generally* predicted the hazardous materials that would be seen locally.
  - Confirmations
    - Class 3 Flammables are involved in the most incidents nationally and were the most frequently recorded materials in both Lewis

and Upshur Counties.

- Class 2, which includes non-flammable gases (including refrigerated nitrogen) ranks third nationally in incidents and were ranked third within Upshur County and the entire study area but were second in Lewis County.
- Class 8 Corrosives were involved in the second most incidents nationally and noted frequently locally.

- **Deviation:**
  - Class 2 and Class 8 were opposite within Upshur County locally versus national statistic predicts.
  - Within Lewis County, Class 2 matched the national predictions but Class 8 was fourth behind Miscellaneous materials (Class 9).

- Gasoline (UN 1203) was the single-most recorded material in the study. Though a multitude of materials were observed during the study, the highway analysis alone suggests that local responders should primarily prepare for incidents involving flammable liquids, gases, and corrosive materials. This stands true for Lewis County but Upshur County should prepare for Class 9 Miscellaneous materials as well.
- Commodity flow studies are significantly affected by the time of day, week, and even year in which they are conducted (i.e., monitoring the study area one week earlier or later could yield different results based on the shipping schedules and needs of covered facilities). To account for this fact and attempt to standardize data, highway data should be considered collectively with the hazardous material studies.

3.0 RECOMMENDATIONS

3.1 Update this flow study on a regular basis.

With Interstate 79 passing through Lewis County, US 33 being a major thoroughfare that is expanding further into other counties, and the changing presence of the oil and gas industry, the presence and types of hazardous materials can change drastically. As such, the nature of the counties' other

industries are likely to change as well in both Lewis and Upshur Counties. In order for this document to remain an accurate, viable basis for hazardous material planning and training efforts, these continual changes should be reflected. The document should be updated every three (3) to five (5) years.

3.2 Vary the time of year that data is collected during future flow studies.

Covered facilities receive shipments at all times of year but some materials are only shipped one (1) to five (5) times per year. As such, it is extremely difficult to capture these infrequent shipments by monitoring roadways only once throughout a calendar year. As this study is updated, planners should make an effort to vary data collection times in an effort to show shipping trends.

3.3 Conduct an in-depth hazardous material vulnerability assessment based on covered facilities and the areas surrounding them.

This study presents a brief list of materials transported through Lewis and Upshur Counties. It does not allow for a comparison to what is currently in place within these counties. A detailed vulnerability assessment would characterize not only material presence, but also material quantities, at-risk populations, potential protective measures, etc. A detailed vulnerability assessment would be a companion to this document and thereby allow for a comparison of materials within the counties and those simply passing through.

3.4 Ensure that responders are properly trained in the response to incidents involving Class 3 (flammable liquids) products.

In general, gasoline and other flammable liquids are the most frequently transported products in the study area (as part of Class 3). As such, they are the hazardous materials most likely to be involved in an incident. Responders should seek training to properly prepare themselves for such an incident.

3.5 Ensure that responders are properly trained in the response to incidents involving Hydrochloric Acid, Phenol, Phosgene, and Sulfur trioxide.

While there are several other types of "Extremely Hazardous Substances" (EHSs) being transported through the county, these four materials were the most observed EHSs in the study. Consequently, they are the EHS materials most likely to be involved in an incident and responders should thus properly prepare for their release. Additionally, Hydrochloric Acid was observed within both Lewis and Upshur Counties. It was the only EHS observed in Upshur County.

3.6 Design emergency exercises that include the materials recorded by this study.

Earlier recommendations in this report call for the need to properly train local responders. A significant aspect of this preparedness is designing realistic exercises involving the materials they are likely to encounter. Training efforts are misspent if involving materials that responders are highly unlikely to see in a local incident.

4.0 REFERENCES

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Transcaer. (2012). Online. http://www.transcaer.com/. Washington, D.C.

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APPENDIX 1

HAZARDOUS MATERIALS IN LEWIS AND UPSHUR COUNTIES

MATERIALS LIST (w/ Corresponding UN Number)

1017: Chlorine
1023: Coal Gas
1057: Cigarette Lighters
1075: Propane
1076: Phosgene
1203: Gasoline
1268: Petroleum Distillates, n.o.s.
1649: Motor fuel anti-knock mixture
1760: Corrosive Liquids, n.o.s.
1788: Hydrobromic Acid
1789: Hydrochloric Acid
1824:Sodium hydroxide
1829: Sulfur trioxide, stabilized
1977: Nitrogen, Liquid refrigerated
1983: Chlorotrifluoroethane
1993: Combustible Liquids
2215: Maleic anhydride
2312: Phenol, molten
2924: Flammable liquids, corrosive
3009: Copper-based pesticide, liquid
3257: Elevated Temperature Liquid
3267: Corrosive Liquid, organic
3295: Hydrocarbons, liquid, n.o.s.

**** EHS Materials***

MATERIALS LIST (w/ Unknown Corresponding UN Number)

None Observed

MATERIALS LIST (Labeled by General Placard)

- **Corrosive:** Toxic; inhalation, ingestion, or skin contact may cause severe injury or death.
- **Explosives:** Explosives without a significant blast hazard.
- **Flammable Liquid:** Highly flammable; easily ignited by sparks or flame.
- **Flammable:** Highly flammable; easily ignited by heat, sparks, or flame; may form explosive mixtures with air.
- **Miscellaneous:** Generic placard representing Hazard Class 9.
- **Non-Flammable Gas:** Vapors may cause dizziness or asphyxiation without warning; vapors are heavier than air and likely to spread along the ground.

- **Poison:** Toxic; inhalation, ingestion, or skin contact may cause severe injury or death.

COMPLETE EXTREMELY HAZARDOUS SUBSTANCES LIST

Chemical Name	*CAS No.*
ACETONE THIOSEMICARBAZIDE	1752-30-3
ACROLEIN	107-02-8
ACRYLAMIDE	79-06-1
ACRYLONITRILE	107-13-1
ACRYLYL CHLORIDE	814-68-6
ADIPONITRILE	111-69-3
ALDICARB	116-06-3
ALDRIN	309-00-2
ALLYL ALCOHOL	107-18-6
ALLYL AMINE	107-11-9
ALUMINUM PHOSPHIDE	20859-73-8
5-(AMINOMETHYL)-3-ISOXAZOLOL	2763-96-4
AMINOPTERIN	54-62-6
AMITON	78-53-5
AMITON OXALATE	3734-97-2
AMMONIA	7664-41-7
AMPHETAMINE	300-62-9
ANILINE	62-53-3
ANILINE, 2,4,6-TRIMETHYL-	88-05-1
ANTIMONY PENTAFLUORIDE	7783-70-2
ANTIMYCIN A	1397-94-0
ANTU	86-88-4
ARSENIC OXIDE (3)	1327-53-3
ARSENIC PENTOXIDE	1303-28-2
ARSENOUS TRICHLORIDE	7784-34-1
ARSINE	7784-42-1

AZINPHOS-ETHYL	2642-71-9
AZINPHOS-METHYL	86-50-0
AZODRIN	6923-22-4
BENZAL CHLORIDE	98-87-3
BENZENAMINE, 3-(TRIFLUOROMETHYL)-	98-16-8
BENZENE, 1-(CHLOROMETHYL)-4-NITRO-	100-14-1
BENZENEARSONIC ACID	98-05-5
BENZENETHIOL	108-98-5
BENZIMIDAZOL,4,5-DICHLORO-2-(TRIFLUOROMETHYL)-	3615-21-2
BENZOIC TRICHLORIDE	98-07-7
BENZYL CHLORIDE	100-44-7
BENZYL CYANIDE	140-29-4
BETA-PROPIOLACTONE	57-57-8
1,1'-BI(ETHYLENE OXIDE)	1464-53-5
BIDRIN	141-66-2
BIS(2,3-EPOXYPROPYL)ETHER	2238-07-5
BIS(2-CHLOROETHYL) ETHER	111-44-4
BIS(CHLOROMETHYL) ETHER	542-88-1
BIS(CHLOROMETHYL) KETONE	534-07-6
10,10'-BIS(PHENOXYARSINYL) OXIDE	58-36-6
BITOSCANATE	4044-65-9
BORON TRICHLORIDE	10294-34-5
BORON TRIFLUORIDE	7637-07-2
BORON TRIFLUORIDE COMPOUND WITH METHYL ETHER (1:1)	353-42-4
BROMADIOLONE	28772-56-7
BROMINE	7726-95-6
CADMIUM OXIDE	1306-19-0
CADMIUM STEARATE	2223-93-0
CALCIUM ARSENATE [2ASH3O4.2CA]	7778-44-1

CAMPHECHLOR	8001-35-2
CANTHARIDIN	56-25-7
CARBACHOL CHLORIDE	51-83-2
CARBAMIC ACID, METHYL-, O-(((2,4-DIMETHYL-1, 3-DITHIOLAN-2-Y-METHYLENE)AMINO)-	26419-73-8
CARBOFURAN	1563-66-2
CARBON DISULFIDE	75-15-0
CARBONOCHLORIDIC ACID, PROPYLESTER	109-61-5
CARBOPHENOTHION	786-19-6
CHLORDANE	57-74-9
CHLORFENVINFOS	470-90-6
CHLORINE	7782-50-5
CHLORMEPHOS	24934-91-6
CHLORMEQUAT CHLORIDE	999-81-5
5-CHLORO-6-[[[(METHYLAMINO)CARBONYL]OXY]IMINO]BICYCLO[2.2.1]HEPTANE-2-CARBONITRILE	15271-41-7
CHLOROACETIC ACID	79-11-8
CHLOROETHANOL	107-07-3
CHLOROETHYL CHLOROFORMATE	627-11-2
CHLOROFORM	67-66-3
CHLOROMETHYL METHYL ETHER	107-30-2
CHLOROPHACINONE	3691-35-8
3-CHLOROPROPIONITRILE	542-76-7
CHLOROXURON	1982-47-4
CHLORTHIOPHOS	21923-23-9
CHROMIUM CHLORIDE (3)	10025-73-7
COBALT CARBONYL	10210-68-1
COLCHICINE	64-86-8
COUMAPHOS	56-72-4
COUMATETRALYL	5836-29-3

CRIMIDINE	535-89-7
CROTONALDEHYDE	4170-30-3
CROTONALDEHYDE, (E)-	123-73-9
CUPRIC ACETOARSENITE	12002-03-8
CYANOGEN BROMIDE	506-68-3
CYANOGEN IODIDE	506-78-5
CYANOPHOS	2636-26-2
CYANURIC FLUORIDE	675-14-9
CYCLOHEXIMIDE	66-81-9
CYCLOHEXYLAMINE	108-91-8
DASANIT	115-90-2
DECABORANE(14)	17702-41-9
DEMETON	8065-48-3
DEMETON-S-METHY	919-86-8
DIBORANE	19287-45-7
DICHLOROMETHYLPHENYLSILANE	149-74-6
DICHLOROPHENYLARSINE	696-28-6
DICHLORVOS	62-73-7
DIETHYL CHLOROPHOSPHATE	814-49-3
DIETHYLCARBAMAZINE CITRATE	1642-54-2
DIGITOXIN	71-63-6
DIGOXIN	20830-75-5
2,2'-DIHYDROXY-3,3'-DIMETHYL-5,5'-DICHLORODIPHENYL SULFIDE	4418-66-0
DIISOPROPYLFLUOROPHOSPHATE	55-91-4
DIMEFOX	115-26-4
DIMETHOATE	60-51-5
DIMETHYL CHLOROTHIOPHOSPHATE	2524-03-0
1,1-DIMETHYL HYDRAZINE	57-14-7
DIMETHYL SULFATE	77-78-1

DIMETHYL-P-PHENYLENEDIAMINE	99-98-9
DIMETHYLDICHLOROSILANE	75-78-5
DIMETILAN	644-64-4
4,6-DINITRO-O-CRESOL	534-52-1
DINITROBUTYL PHENOL	88-85-7
DINOTERB	1420-07-1
DIPHACINONE	82-66-6
DISULFOTON	298-04-4
DITHIAZANINE IODIDE	514-73-8
DITHIOBIURET	541-53-7
EMETINE, DIHYDROCHLORIDE	316-42-7
ENDOSULFAN	115-29-7
ENDOTHION	2778-04-3
ENDRIN	72-20-8
EPICHLOROHYDRIN	106-89-8
EPN	2104-64-5
ERGOCALCIFEROL	50-14-6
ERGOTAMINE TARTRATE	379-79-3
((2,2'-(1,2-ETHANEDIYLBIS(NITRILOMETHYLIDYNE))BIS(6-FLUOROPHENOLA- TO))(2-)-N,N'O,O')-COBALT	62207-76-5
ETHANESULFONYL CHLORIDE, 2-CHLORO-	1622-32-8
ETHANOL, 1,2-DICHLORO-, ACETATE	10140-87-1
ETHION	563-12-2
ETHOPROP	13194-48-4
ETHYL BIS(2-CHLOROETHYL)AMINE	538-07-8
ETHYL CYANIDE	107-12-0
ETHYL THIOCYANATE	542-90-5
ETHYLENE FLUOROHYDRIN	371-62-0
ETHYLENE OXIDE	75-21-8
ETHYLENEDIAMINE	107-15-3

ETHYLENEIMINE	151-56-4
FENAMIPHOS	22224-92-6
FENITROTHION	122-14-5
FLUENETIL	4301-50-2
FLUORINE	7782-41-4
FLUOROACETAMIDE	640-19-7
FLUOROACETIC ACID	144-49-0
FLUOROACETIC ACID, SODIUM SALT	62-74-8
FLUOROACETYL CHLORIDE	359-06-8
FLUOROURACIL	51-21-8
FONOFOS	944-22-9
FORMALDEHYDE	50-00-0
FORMALDEHYDE CYANOHYDRIN	107-16-4
FORMETANATE HYDROCHLORIDE	23422-53-9
FORMOTHION	2540-82-1
FORMPARANATE	17702-57-7
FOSTHIETAN	21548-32-3
FUBERIDAZOLE	3878-19-1
FURAN	110-00-9
GALLIUM TRICHLORIDE	13450-90-3
GAMMA-LINDANE	58-89-9
HEXACHLOROCYCLOPENTADIENE	77-47-4
1,6-HEXANEDIAMINE, N,N'-DIBUTYL-	4835-11-4
HYDRAZINE	302-01-2
HYDROCHLORIC ACID	7647-01-0
HYDROFLUORIC ACID	7664-39-3
HYDROGEN CYANIDE	74-90-8
HYDROGEN PEROXIDE (CONC > 52%)	7722-84-1
HYDROGEN SELENIDE	7783-07-5

HYDROGEN SULFIDE	7783-06-4
HYDROQUINONE	123-31-9
IMIDAN	732-11-6
IRON PENTACARBONYL	13463-40-6
ISOBENZAN	297-78-9
ISOBUTYRONITRILE	78-82-0
ISOCYANIC ACID, 3,4-DICHLOROPHENYL ESTER	102-36-3
ISODRIN	465-73-6
ISOPHORONE DIISOCYANATE	4098-71-9
ISOPROPYL CHLOROFORMATE	108-23-6
ISOPROPYLMETHYLPYRAZOLYL DIMETHYLCARBAMATE	119-38-0
LACTONITRILE	78-97-7
LEPTOPHOS	21609-90-5
LEWISITE (ARSENIC COMPOUND)	541-25-3
LITHIUM HYDRIDE	7580-67-8
MALONONITRILE	109-77-3
MANGANESE, TRICARBONYL METHYLCYCLOPENTADIENYL	12108-13-3
MECHLORETHAMINE	51-75-2
MEPHOSFOLAN	950-10-7
MERCAPTODIMETHUR	2032-65-7
MERCURIC ACETATE	1600-27-7
MERCURIC OXIDE	21908-53-2
MERCURY CHLORIDE (2)	7487-94-7
METHACROLEIN DIACETATE	10476-95-6
METHACRYLIC ANHYDRIDE	760-93-0
METHACRYLONITRILE	126-98-7
METHACRYLOYL CHLORIDE	920-46-7
METHACRYLOYLOXYETHYL ISOCYANATE	30674-80-7
METHAMIDOPHOS	10265-92-6

METHANAMINE, N-METHYL-N-NITROSO	62-75-9
METHANESULFONYL FLUORIDE	558-25-8
METHANETHIOL	74-93-1
METHIDATHION	950-37-8
METHOMYL	16752-77-5
METHOXYETHYLMERCURIC ACETATE	151-38-2
METHYL 2-CHLOROACRYLATE	80-63-7
METHYL BROMIDE	74-83-9
METHYL CHLOROCARBONATE	79-22-1
METHYL HYDRAZINE	60-34-4
METHYL ISOCYANATE	624-83-9
METHYL ISOTHIOCYANATE	556-61-6
METHYL PARATHION	298-00-0
METHYL PHENKAPTON	3735-23-7
METHYL PHOSPHONIC DICHLORIDE	676-97-1
METHYL THIOCYANATE	556-64-9
METHYL VINYL KETONE	78-94-4
2-METHYLLACTONITRILE	75-86-5
METHYLMERCURIC DICYANAMIDE	502-39-6
METHYLTRICHLOROSILANE	75-79-6
METOLCARB	1129-41-5
MEVINPHOS	7786-34-7
MEXACARBATE	315-18-4
MITOMYCIN C	50-07-7
MUSTARD GAS	505-60-2
NICKEL CARBONYL	13463-39-3
NICOTINE AND SALTS	54-11-5
NICOTINE SULFATE	65-30-5
NITRIC ACID	7697-37-2

NITRIC OXIDE	10102-43-9
NITROBENZENE	98-95-3
NITROCYCLOHEXANE	1122-60-7
NITROGEN DIOXIDE	10102-44-0
NORBORMIDE	991-42-4
O,O-DIETHYL O-PYRAZINYL PHOSPHOROTHIOATE	297-97-2
O-CRESOL	95-48-7
OCTAMETHYLDIPHOSPHORAMIDE	152-16-9
ORGANORHODIUM COMPLEX	EDF-043
OUABAIN	630-60-4
OXAMYL	23135-22-0
OXETANE, 3,3-BIS(CHLOROMETHYL)-	78-71-7
OXYDISULFOTON	2497-07-6
OZONE	10028-15-6
2,3-P-DIOXANEDITHIOL S,S-BIS(O,O-DIETHYL PHOSPHORODITHIOATE)	78-34-2
PARAQUAT	1910-42-5
PARAQUAT METHOSULFATE	2074-50-2
PARATHION	56-38-2
PENTABORANE	19624-22-7
PENTADECYLAMINE	2570-26-5
PERACETIC ACID	79-21-0
PERCHLOROMETHYL MERCAPTAN	594-42-3
PHENOL	108-95-2
PHENOL, 3-(1-METHYLETHYL)-, METHYLCARBAMATE	64-00-6
PHENYLHYDRAZINE HYDROCHLORIDE	59-88-1
PHENYLMERCURIC ACETATE	62-38-4
PHENYLSILATRANE	2097-19-0
PHENYLTHIOUREA	103-85-5
PHENYLTRICHLOROSILENE	98-13-5

PHORATE	298-02-2
PHOSACETIM	4104-14-7
PHOSFOLAN	947-02-4
PHOSGENE	75-44-5
PHOSPHAMIDON	13171-21-6
PHOSPHINE	7803-51-2
PHOSPHONOTHIOIC ACID, METHYL-, O-ETHYL O-(4-(METHYLTHIO)PHENYL)	2703-13-1
PHOSPHONOTHIOIC ACID, METHYL-, S-(2-(BIS(1-METHYLETHYL)AMINO)ETHYL)O-ETHYL ESTER	50782-69-9
PHOSPHONOTHIOIC ACID, METHYL-,O-(4-NITROPHENYL) O-PHENYL ESTER	2665-30-7
PHOSPHORIC ACID, DIMETHYL 4-(METHYLTHIO) P	3254-63-5
PHOSPHOROTHIOIC ACID, 0,0-DIMETHYL-5-(2-(M	2587-90-8
PHOSPHORUS (YELLOW OR WHITE)	7723-14-0
PHOSPHORUS OXYCHLORIDE	10025-87-3
PHOSPHORUS PENTACHLORIDE	10026-13-8
PHOSPHORUS PENTOXIDE	1314-56-3
PHOSPHORUS TRICHLORIDE	7719-12-2
PHYSOSTIGMINE	57-47-6
PHYSOSTIGMINE, SALICYLATE (1:1)	57-64-7
PICROTOXIN	124-87-8
PIPERIDINE	110-89-4
PIRIMIFOS-ETHYL	23505-41-1
POTASSIUM ARSENITE (ASH3O4.XK)	10124-50-2
POTASSIUM CYANIDE	151-50-8
POTASSIUM SILVER CYANIDE	506-61-6
PROMECARB	2631-37-0
PROPARGYL BROMIDE	106-96-7
PROPIOPHENONE, 4-AMINO-	70-69-9
PROPYLENE OXIDE	75-56-9

PROPYLENEIMINE	75-55-8
PROTHOATE	2275-18-5
PYRENE	129-00-0
PYRIDINE, 2-METHYL-5-VINYL-	140-76-1
PYRIDINE, 4-AMINO-	504-24-5
PYRIDINE, 4-NITRO-, 1-OXIDE	1124-33-0
PYRIMINIL	53558-25-1
SALCOMINE	14167-18-1
SARIN	107-44-8
SELENIOUS ACID	7783-00-8
SELENIUM OXYCHLORIDE	7791-23-3
SEMICARBAZIDE HYDROCHLORIDE	563-41-7
SILANE, (4-AMINOBUTYL)DIETHOXYMETHYL-	3037-72-7
SODIUM ARSENATE (ASH3O4.XNA)	7631-89-2
SODIUM ARSENITE	7784-46-5
SODIUM AZIDE	26628-22-8
SODIUM CACODYLATE	124-65-2
SODIUM CYANIDE	143-33-9
SODIUM SELENATE (H2O4SE.2NA)	13410-01-0
SODIUM SELENITE (H2O3SE.2NA)	10102-18-8
SODIUM TELLURITE	10102-20-2
STANNANE, ACETOXYTRIPHENYL	900-95-8
STRYCHNINE	57-24-9
STRYCHNINE, SULFATE	60-41-3
SULFOTEP	3689-24-5
SULFOXIDE, 3-CHLOROPROPYL OCTYL	3569-57-1
SULFUR DIOXIDE	7446-09-5
SULFUR FLUORIDE (SF4), (T-4)-	7783-60-0
SULFUR TRIOXIDE	7446-11-9

SULFURIC ACID	7664-93-9
TABUN	77-81-6
TELLURIUM	13494-80-9
TELLURIUM HEXAFLUORIDE	7783-80-4
TEPP	107-49-3
TERBUFOS	13071-79-9
TETRAETHYLLEAD	78-00-2
TETRAETHYLTIN	597-64-8
TETRAMETHYL LEAD	75-74-1
TETRANITROMETHANE	509-14-8
THALLIUM CHLORIDE TLCL	7791-12-0
THALLIUM(I) CARBONATE	6533-73-9
THALLIUM(I) SULFATE	7446-18-6
THALLOUS MALONATE	2757-18-8
THIOCARBAZIDE	2231-57-4
THIOFANOX	39196-18-4
THIOSEMICARBAZIDE	79-19-6
THIOUREA, (2-CHLOROPHENYL)-	5344-82-1
THIOUREA, (2-METHYLPHENYL)-	614-78-8
TITANIUM TETRACHLORIDE	7550-45-0
TOLUENE-2,4-DIISOCYANATE	584-84-9
TOLUENE-2,6-DIISOCYANATE	91-08-7
TORAK	10311-84-9
TRANS-1,4-DICHLORO-2-BUTENE	110-57-6
TRIAMIPHOS	1031-47-6
TRIAZOFOS	24017-47-8
TRICHLORO(CHLOROMETHYL)SILANE	1558-25-4
TRICHLORO(DICHLOROPHENYL)SILANE	27137-85-5
TRICHLOROACETYL CHLORIDE	76-02-8

TRICHLOROETHYLSILANE	115-21-9
TRICHLORONATE	327-98-0
TRIETHOXYSILANE	998-30-1
TRIMETHYLCHLOROSILANE	75-77-4
TRIMETHYLOLPROPANE PHOSPHITE	824-11-3
TRIMETHYLTIN CHLORIDE	1066-45-1
TRIPHENYLTIN CHLORIDE	639-58-7
TRIS(2-CHLOROETHYL)AMINE	555-77-1
VALINOMYCIN	2001-95-8
VANADIUM OXIDE (5)	1314-62-1
VINYL ACETATE	108-05-4
WARFARIN AND SALTS	81-81-2
WARFARIN SODIUM	129-06-6
XYLYLENE DICHLORIDE	28347-13-9
ZINC PHOSPHIDE	1314-84-7
ZINC, DICHLORO(4,4-DIMETHYL-5((((METHYLAMINO) CARBONYL)OXY)IMINO)PENTANENITRILE)-	58270-08-9

APPENDIX 2
HIGHWAY MONITORING SITE DATA

This appendix contains detailed information regarding the individual monitoring sites observed as part of this project.

- Lewis County Sites
  - Interstate 79 – Northbound at Jane Lew
  - Interstate 79 – Southbound at Southern Lewis County Rest Area
  - US Route 33 at Weston
  - US Route 19 in Jane Lew
- Upshur County Sites
  - US Route 33 at Kesling Mill Road
  - US Route 33 at Red Rock Road
  - State Route 20 at Donut Shop
  - State Route 20 at Lowes

Where applicable, the site profiles below contain the most recent West Virginia Department of Transportation (WVDOT) traffic count information (2012) for that highway. The figure presented represents the total traffic through that site in an average 24-hour period. For comparison, the hazardous material figures for each site are mathematically estimated for 24-hour intervals. An estimated percentage of traffic carrying hazardous materials through a site in an average 24-hour period is then presented for planning purposes. Being that US Route 33 in Upshur County and Interstate 79 in Lewis County have been previously monitored in 2006 and 2011, these placarded truck counts by hazard class have been included as well.

Create and include a MS Excel sheet for all sites

Date: August 17, 2008
Time: 6:00 p.m.
Interval: 3 hours

Trucks	Totals	% of Total
Box	48	70.6%
Tank	7	10.3%
Flat	8	11.8%
Dump	5	7.4%
Cement	0	0.0%
Utility	0	0.0%
Stake	0	0.0%
Wrecker	0	0.0%
	68	

Materials	Name	Totals	% of All Haz
1203	Gasoline	2	40.0%
1866	Resin solution	1	20.0%
3082	Environmentally hazardous substances	1	20.0%
3256	Elevated temperature liquid, flammable	1	20.0%
		5	

General Placards	Totals	% of All Haz
N/A	0	0.0%

Total Haz Traffic:	5
% at Site w/ Placard:	7.4%

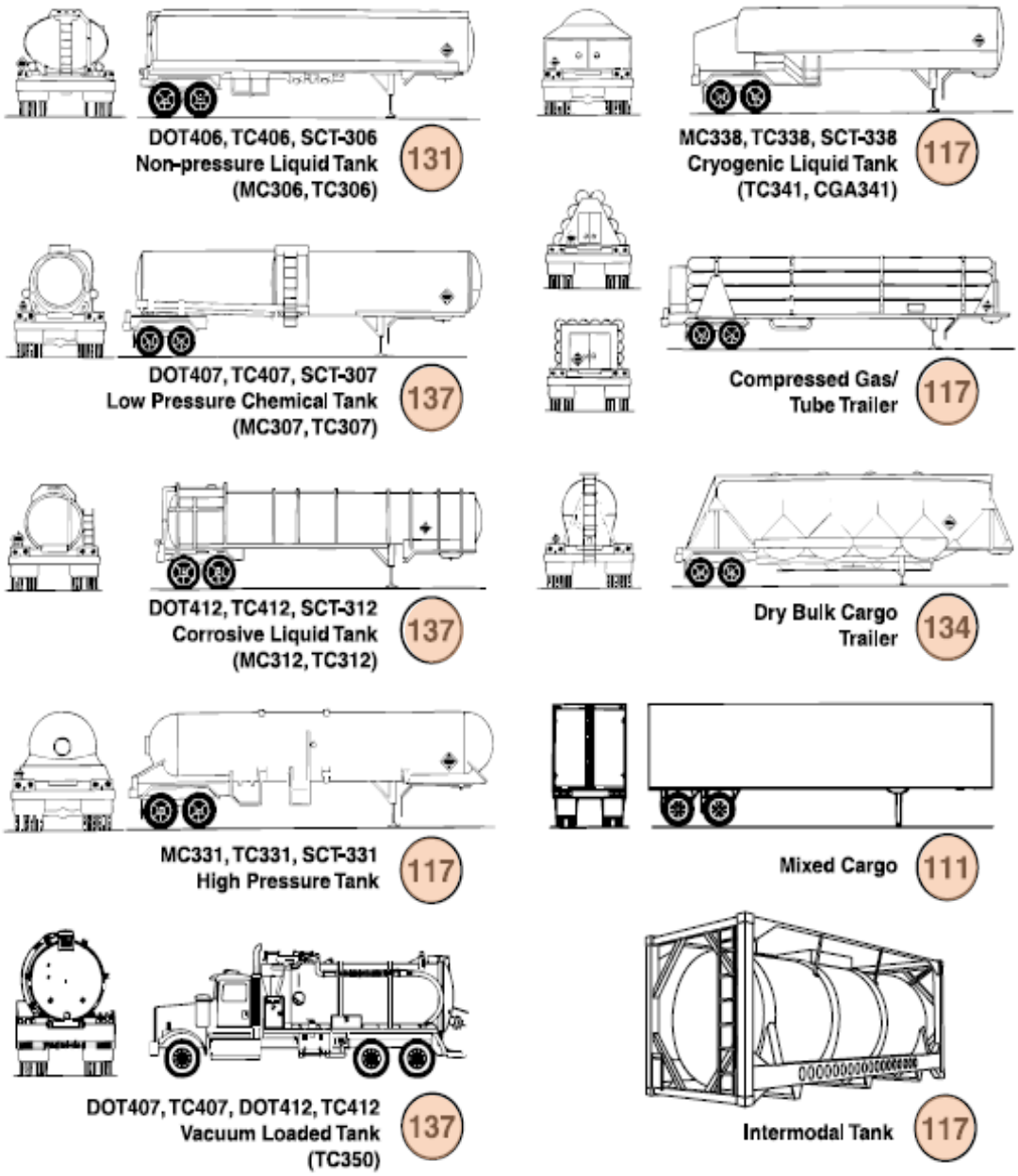
Site Looking East

Site Looking West

APPENDIX 3

TRAILER TYPE REFERENCE SHEET

This appendix contains the reference sheet used for determining trailer types during field reconnaissance.



APPENDIX 4
GLOSSARY

This appendix contains a glossary of key terms as well as a list of acronyms used throughout this report. Definitions presented in this appendix may differ slightly from the common definitions of the terms; these definitions correspond to how the term is used (and its meaning) as part of this study.

LIST OF TERMS

Commodity Flow Study: A study undertaken to identify the types of hazardous materials transported on a variety of transportation systems (e.g., highway, railway, waterway, airway, pipeline, or at covered facilities).

Covered Facility: A facility that reports to a Local Emergency Planning Committee as part of Tier II reporting requirements under Title III of the Superfund Amendment and Reauthorization Act of 1986.

Covered Facility Analysis: An analysis of the hazardous materials used and/or stored by covered facilities. The analysis includes an identification of shipping routes, quantities shipped, and frequency of shipments.

Emergency: Any incident, whether natural or man-made, that requires responsive action to protect life or property. Under the Robert T. Stafford Act, an "emergency" is an incident for which federal assistance is needed to supplement state and local efforts and capabilities to save lives and to protect property.

Extremely Hazardous Substance: A hazardous material recognized by the United States Environmental Protection Agency has having extremely toxic properties and thus necessitates additional safety measures during handling and transport.

Hazard Class: A system utilized by the United States Department of Transportation to classify the type of hazardous material in transport. There are nine (9) hazard classes: Explosives (Class 1), Gases (Class 2), Flammable Liquids (Class 3), Flammable Solids (Class 4), Oxidizers (Class 5), Toxics (Class 6), Radioactives (Class 7), Corrosives (Class 8), and Miscellaneous (Class 9).

Hazardous Material: A material that is (or can be) harmful to human health and the environment.

Highway Analysis: An analysis of hazardous materials transported along roadways in a study area. The analysis is usually completed by visually monitoring select sites along the roadways and recording the hazardous materials that pass through the site. An analysis can also be conducted remotely through the use of weigh bills, shipping company reporting, etc.

Incident: An occurrence, natural or man-made, that requires a response to protect life or property.

Placard: A sign or notice for display in a public place. For the purposes of this document, the sign is the diamond or rectangular-shaped card attached to a truck and/or trailer labeling hazardous material shipments.

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers notification by facilities to the State Emergency Response Commission that such facilities are subject to emergency planning requirements under SARA Title III.

LIST OF ACRONYMS

EHS	Extremely Hazardous Substance
EPCRA	Emergency Planning & Community Right-to-Know Act
^{o}F	Degree Fahrenheit
I	Interstate
JHC	JH Consulting, LLC
LEPC	Local Emergency Planning Committee
MPH	Miles Per Hour
SARA	Superfund Amendment and Reauthorization Act
SERC	State Emergency Response Commission
SR	State Route
US	United States
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
WV	West Virginia
WVDOT	West Virginia Department of Transportation