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Hazardous Materials Transportation Flow Survey: An Evaluation of Hazardous Materials Transported in Washington County.

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Hazardous Materials Transportation Flow Survey: An Evaluation of Hazardous Materials Transported in Washington County, Tennessee

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the faculty of the Department of Environmental Health
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of the requirements for the degree
Master of Science in Environmental Health

by
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ABSTRACT

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This study examines the transportation of hazardous materials through Washington County, Tennessee. This study incorporates federal, state, and local data in assessing current transportation trends. Data gathering activities included local chemical inventories, hazardous materials transportation flow surveys, hazardous materials rail transportation trends, and hazardous materials incident data.

All data were compiled and then analyzed to identify hazardous materials transportation trends in Washington County, Tennessee. This information is pertinent to emergency planners for the preparation of hazardous materials transportation incidents. The data gathered further revealed the need for this type of study to identify changing trends in the transportation of hazardous materials through Washington County, Tennessee. This type of study is essential in identifying risks posed from the transportation of hazardous materials through rural communities.

DEDICATION

This thesis is dedicated to all those individuals who have supported me throughout my life. I would like to thank my mother and father for raising me to believe I can achieve anything I set my mind to. They have always encouraged and inspired me. I would also like to dedicate this to my wife, Susan, who has always encouraged me to do my best. Lastly I would like to dedicate this to my little girl, Katie. She has changed my life for the better since entering this world.

ACKNOWLEDGMENTS

I wish to especially thank Dr. Phillip Scheuerman who has served as my Committee Chairperson. His ideas and recommendations during the research and writing of this thesis were instrumental.

I would also like to express my gratitude to Dr. Carolyn Harvey and Dr. Leo Harvill for serving me as professors and committee members. Their assistance and advice was essential.

A special thanks is extended to Doug Cooper for providing me with the essential tools to perform my surveys efficiently as well as safely.

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CHAPTER 1

INTRODUCTION

Background

The United States Department of Transportation is responsible for protecting the public from the risks associated with the transportation of hazardous materials. Therefore, it is responsible for training persons involved in response to accidents involving hazardous materials. The need for training was first recognized when serious accidents that occurred in the 1970s increased the public's awareness of the risks associated with the transportation of hazardous materials. These incidents were major news stories, and as a result triggered the introduction of local and national regulations. These regulations have improved the safety of the transportation of hazardous materials. Unfortunately, due to human error, incidents continue to occur and will never be completely eliminated. In fact hazardous material transportation incidents have been increasing annually simply due to growth in the hazardous material sector. To protect the public and emergency responders, improvement in hazardous materials transportation safety must occur. Cooperation among federal, state, and local agencies could improve hazardous materials transportation safety. Currently there is a real need for improvement in this area. Communication among the agencies could improve the preparedness and mitigation that are fundamental in reducing exposure to the public and emergency responders. Rural communities in particular have little information made available to them to assess the risks posed to them from the transportation of hazardous materials. Federally there is a lack of information available for community planners to assess the risk posed to their community from the transportation of hazardous materials.

Objectives

The objectives of this study were:

1. To identify the types and distribution of hazardous materials transported in commercial vehicles through Washington County, Tennessee.
2. To identify the types and distribution of hazardous materials shipped annually by rail through Washington County, Tennessee.
3. To identify the types and distribution of hazardous materials stored in Washington County, Tennessee.
4. To identify the types and locations of hazardous material incidents from 1993 to 2000 in Washington County, Tennessee and Unicoi County, Tennessee.
5. Through collection and statistical analysis of data, provide the Washington County Emergency Management Agency with the information necessary for response preparation.

Limitations

One of the limitations of this study was the lack of information provided by the rail companies. They seemed threatened by my request for safety data. Another limitation involved the time periods of the roadside surveys. Originally, I wanted to perform a 24-hour survey at each location to survey commercial and hazardous vehicles through the nighttime hours. I settled for 2 different 12-hour survey periods during the daytime hours. Due to lack of visibility, the nighttime surveys were not possible.

Significance

This research provides transportation information used in the emergency response to hazardous materials incidents in Washington County, Tennessee. These data will prove invaluable to community planners in their preparation for hazardous material incidents. These data will also be beneficial in identifying training requirements for Washington County's emergency responders. Currently, this type of study is the only means of identifying hazardous material transportation trends in rural communities due to the lack of federal information available to community planners. This study provides the information necessary to assess the risk posed to Washington County from the transportation of hazardous materials by rail and motor carrier. This research identifies the types and amounts of hazardous materials transported through Washington County, Tennessee. Using traffic flow surveys, the number of hazardous material trucks, the type of trucks, and which routes were used most were identified. The information gathered in this study also demonstrates the necessity to perform this type of survey periodically to assess changes in the transportation trends.

CHAPTER 2

LITERATURE REVIEW

Serious accidents that occurred in the late 1970s increased the public's awareness of the risks associated with the transportation of hazardous materials (Helander and Melachrinoudis). Routing studies soon became an important research topic. Location and routing models were designed to decrease the number of hazardous material transportation accidents. Nationally these studies helped to reduce hazardous material transportation accidents by designating preferred routes for the transportation of hazardous materials. These preferred routes avoided heavily populated areas, tunnels, narrow streets, etc. Essentially, these routes were chosen based on the lower level of risk to the public. Unfortunately, hazardous material accidents still occur daily on the nation's roadways, releasing dangerous chemicals capable of harming people and the environment. Planning for the response to these incidents can be a difficult task for community planners. Developing a risk assessment model, to prepare for such incidents, is necessary for community emergency response planners.

There is a lack of information available, from federal sources, for community planners to assess the risk posed to their community from the transportation of hazardous materials by motor carrier. Current state truck inventory data can provide statewide information on hazardous material shipments but alone are not representative of regional hazardous materials transportation. Roadside commodity flow surveys provide more realistic data for the region of concern. These studies provide important data that can be extremely beneficial for assessing and planning for the risks posed by the transportation of hazardous materials in a community.

Flow surveys help to identify the number of hazardous material trucks, the type of trucks, and which routes are used most (Office of Hazardous Materials Safety, 18 Jan. 2000). This information is valuable in identifying the chemical hazards traveling through the community of concern.

Information gathered in a risk assessment study can be used to identify training needs and staffing requirements for emergency responders. These studies can also provide planners with an awareness of the hazardous chemicals transported in their district that might require specific preparedness efforts if a release should occur. Conducting risk assessment for the transportation of hazardous materials is, therefore, essential for hazardous material response preparation. Estimates of warehouse chemical storage, state truck inventory data, roadside survey counts, and accident rates are essential in assessing hazardous material incident risk for the area of concern. Releases, which could occur due to accidents involving trucks transporting hazardous materials, can range from chemical spills and toxic gases to explosives and radioactive materials. Title 40 of the Code of Federal Regulations, Part 355, defines a release as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles) of any hazardous chemical, extremely hazardous substance, or CERCLA hazardous substance (40 CFR Part 355). Traffic accidents involving releases occur with no warning, and preparing for them is essential. In fact, the actions taken during an emergency depend primarily on planning for such a situation. This type of preparation can mean the difference between a minor incident and a major disaster.

It is essential to understand certain rules and regulations associated with the transportation of hazardous materials by motor carrier when planning for response. Title 49 of the CFR (Code of Federal Regulations) contains the guidelines that all entities involved in the shipment of hazardous materials must comply with when transporting hazardous materials. Probably the most important regulations affecting emergency responders are the hazard classification and placarding system. When a responder arrives at the scene of an accident involving a hazardous materials vehicle, it is essential that he or she be aware of this communication system. The placarding system allows first responders to initially identify what types of chemicals are involved and whether a potential dangerous situation exists. First responders can then analyze this information using the North American Emergency Response Guidebook published by the U.S. Department of Transportation. This is the universal guide responders use to identify the potential hazards and the precautions that must be taken to protect the responders and the public. This information can also be valuable in preplanning. If community planners are aware of the types of hazardous materials transported on their roadways, they can identify what types of resources and training are necessary for response.

Hazardous material incidents are an ongoing problem on US roadways. Federal agencies compile annual information about the transport of hazardous materials. One agency under the Research and Special Programs division of the US Department of Transportation is the Office of Hazardous Materials Safety. This group maintains the Hazardous Materials Information System (HMIS). Their responsibilities include comprehensive information about hazardous materials incidents, exemptions, and approvals. HMIS data are used for the evaluation of current regulations and training programs. Its focus is to better understand

hazardous material transportation incidents and identify possible safety problems (Office of Hazardous Materials Safety, 18 Jan. 2000). Analysis of HMIS data allows an initial assessment of the risk that hazardous materials transportation poses to the public. If we look at data from the last couple of years, we realize that hazardous materials transportation incidents are not decreasing. In fact, the magnitude of the problem either remains constant or increases from 1 year to the next. In 1996, 13,950 hazardous materials incidents were reported. Highway incidents made up 11,911 of these total incidents. Rail accounted for 1,108 incidents. Water and air incidents made up the remaining 931 incidents. In 1997, 13,853 hazardous material incidents were reported. Highway incidents accounted for 11,750 incidents, which is a decrease in 161 incidents from 1996. Rail incidents declined by 12 to 1,096. Air and water accounted for the remaining 1007. In 1998, the number of hazardous material incidents increased 9% to15,343 and highway incidents increased to 12,848. Rail accounted for 977 incidents and water and air made up the remaining 1,518 incidents. In 1999, 17,069 hazardous material incidents were reported. Incidents in 1999 also demonstrated another 9% increase from the following year. Highway incidents increased to 14,425. Rail accounted for 1060 incidents and water and air made up the remaining 1,584 incidents (Office of Hazardous Materials Safety, 18 Jan. 2000). These numbers demonstrate the magnitude of risk associated with the transportation of hazardous materials. Probably the most compelling evidence, about the risk to rural communities, is the incident data reporting deaths and financial damages. From HMIS data figures 1 and 2 were constructed.

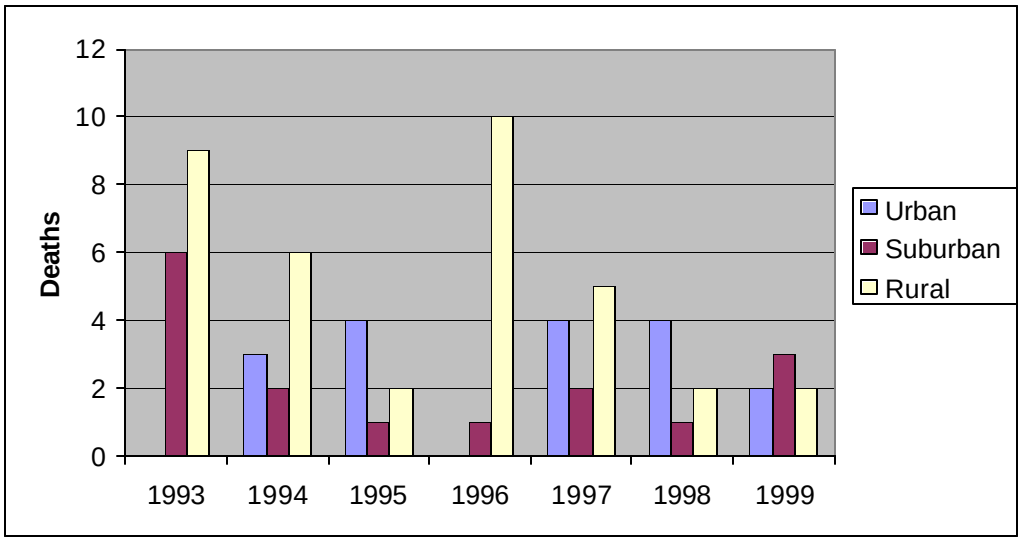

Figure 1: Hazardous Materials Incidents by Community Type (Deaths)

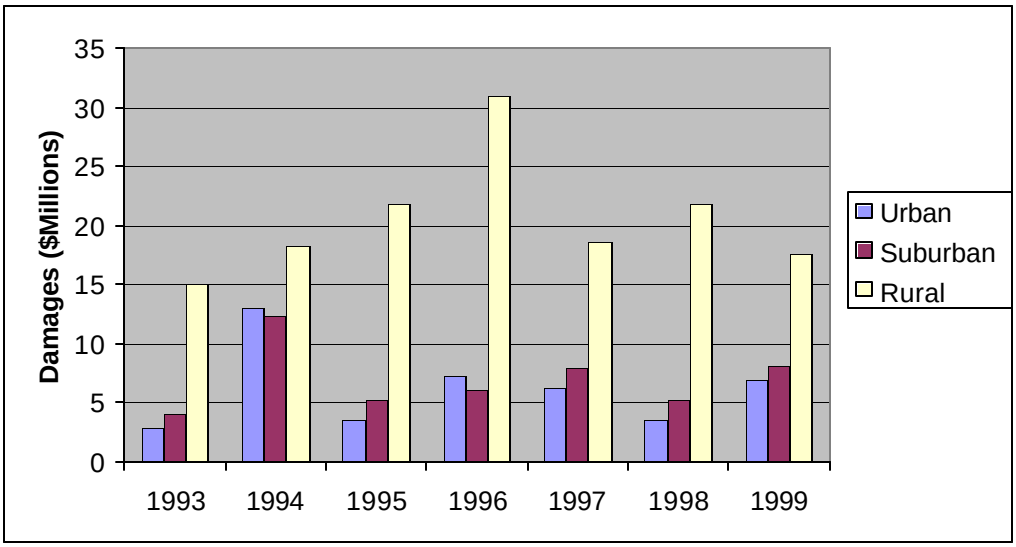

Figure 2: Hazardous Materials Incidents by Community Type ($ Damages)

These data demonstrate the magnitude of hazardous material transportation incidents occurring in rural communities. The rural community almost always has a greater loss in life and continually has greater financial damages. This could be attributed to the lack of data available to community planners in rural areas. It is difficult to prepare for the unknown. If emergency planners are unaware of the risks posed by the transportation of hazardous materials through their communities, then it is possible they lack the resources and training necessary to respond.

Planning for incidents associated with the transportation of hazardous materials is essential for emergency responders. Community planners and emergency responders must work together to assess the hazardous material transportation risks posed to their community. Unfortunately there is not enough federal data available to assess what hazardous chemicals are transported through rural communities. Historical incident data demonstrate the magnitude of damage caused to rural communities. This information points to a lack of the training and resources necessary for response to hazardous materials incidents. To save lives and the environment from hazardous materials incidents, community planners must incorporate a risk assessment study. This type of preplanning provides the basis for health and safety awareness for the public, responders, and the environment.

CHAPTER 3

MATERIALS AND METHODS

Activity One: Chemical Storage Inventories

Chemical inventory data were collected from the Washington County Emergency Management Agency. Chemical inventories were recorded to identify hazardous materials stored or transported in Washington County, Tennessee. All facilities using, storing, or processing extremely hazardous substances must submit inventories of extremely hazardous substances to local emergency planners according to Title 40 of the Code of Federal Regulations 355.30 (40 CFR Part 355). An extremely hazardous substance is defined as any substance or chemical listed in 40 CFR 355 Appendix A and B. These appendices list the chemical names in alphabetic order and the threshold quantity of each chemical that must be reported to local emergency planners if that threshold is met. The inventories provided by local industry to the Washington County Emergency Management Agency (EMA) were used to obtain data. Using these inventories, a Microsoft Excel (Microsoft Corporation, Redmond Washington) spreadsheet was created that contained the facility name, chemical name, and quantity stored daily.

Activity Two: Hazardous Material Incident Data

Hazardous material incident data were recorded to identify: date, mode, city, route, carrier, UN classification number, chemical or substance involved, hazard class, quantity released, incident, injuries, and cause. Hazardous material transportation incident data were obtained from the United States Department of Transportation Office of Hazardous Materials Safety. When a hazardous material transportation incident occurs, the regulations in 49 CFR

171.15 and 171.16 govern such situations. Section 171.15 covers immediate telephone notification of the hazardous materials incident. Section 171.16 requires written reporting procedures. These regulations are supposed to ensure the reporting of transportation incidents involving hazardous materials. The Department of Transportation enters all reported incidents into a Paradox database. Only fields applicable to this study were used. The fields used from the Paradox database for this study included the: mode of transportation (truck, rail, etc.), city, route, incident date, carrier, UN identification number, chemical name, hazard class, quantity (gallons), incident type, injuries, and cause. The data were then recorded in a Microsoft Excel spreadsheet (Microsoft Corporation, Redmond Washington). The hazardous material incident cause was assigned a numerical code. Table A2 in the appendix identifies the cause numbers and their corresponding identifications.

Activity Three: Hazardous Material Traffic Flow Survey

Hazardous material flow surveys were performed at 4 strategic locations in Washington County. These locations were chosen because they represent the main thoroughfares into and out of Washington County, Tennessee.

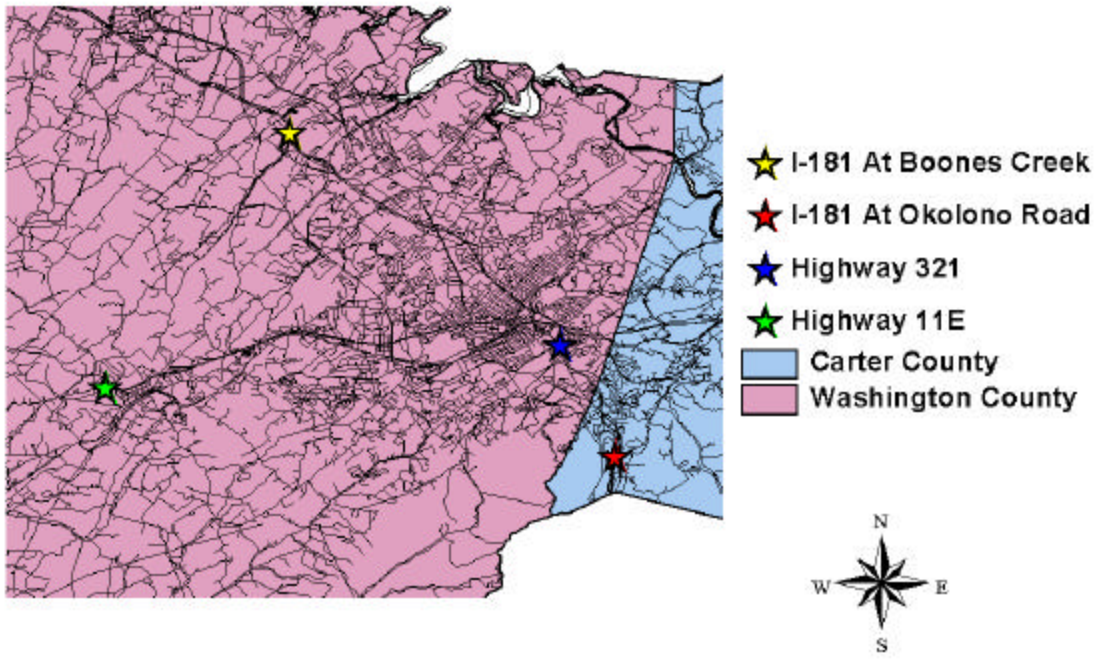

Figure 3: Map Identifying the Four Survey Locations

The roadside survey locations were: I-181 at the Boones Creek exit, I-181 at the Okolono Road exit, 11E at the old stock yard west of Jonesborough, and Highway 321 east of Johnson City. Each site was monitored for two 12-hour periods. During the 1st week each site was continuously observed from 6 AM to 6 PM. During the 2nd week each site was continuously observed from 9 AM to 9 PM. Data were recorded for both directions of traffic, northbound and southbound traffic for the surveys performed on I-181 and 11E, and eastbound and westbound traffic for the surveys on Highway 321. Unfortunately, traffic at the first survey location (I-181 at Boones Creek, 6 AM to 6 PM) was observed in only the southbound direction (entering Washington County) due to a poor visibility at the observation site. This was

corrected before the next observation period at the Boones Creek location on July 25, 2000 from 9 AM to 9 PM, with both directions of traffic surveyed. To compensate for the missing northbound traffic data from the first observation period, an additional survey was performed recording the northbound traffic at the Boones Creek location on August 3, 2000 from 6 AM to 9 AM. The data collected from 6 AM to 9 AM were then added to the July 25 data. These data then represented the northbound traffic for the 12-hour observation period from 6 AM to 6 PM. Flow surveys were performed to identify: types of hazardous material vehicles, a numerical count of commercial vehicles, a numerical count of hazardous material vehicles, hazard class number(s), and UN number classification(s). Table A1 in the appendix identifies how the truck types were recorded and defines the Department of Transportation's hazard classification system. The U.S. Department of Transportation has set guidelines for conducting hazardous material flow surveys. These surveys were performed in accordance with these guidelines. Before each survey, location, date, time interval, survey personnel, and weather conditions were recorded. Surveys were performed from inside a truck positioned approximately 20 feet from the roadway. The truck was positioned to allow visibility of both directions of traffic. A roadside survey sign and orange construction cones were used to increase visibility of surveyor. Counts were obtained using mechanical counters from Fisher Scientific (Atlanta, Georgia). Binoculars were used to identify any placards where distance was a factor.

Activity Four: Railroad Data

Rail data were obtained from safety officials of CSX (Erwin, Tennessee) and Norfolk Southern (Greenville, South Carolina) rail lines. The CSX route runs between Kingsport and

Johnson City, and the Norfolk Southern routes run between Bristol and Johnson City and Kingsport and Johnson City. Phone conversations took place between surveyor and rail personnel. Both CSX and Norfolk rail personnel sent the requested information via e-mail. CSX and Norfolk data were then recorded in a Microsoft Excel spreadsheet (Microsoft Corporation, Redmond Washington). CSX only provided the information necessary to record the total loads annually and their corresponding chemical shipping names and hazard classes. Norfolk Southern only provided the information necessary to record: total loads annually, percentage hazardous loads of total loads, hazard class, and UN identification numbers.

CHAPTER 4

RESULTS

Because of a lack of Federal data describing the transportation of hazardous materials through rural communities, 4 activities were performed to identify trends in the transportation of hazardous materials through Washington County, Tennessee.

The 1st objective of this project was to identify the types and distributions of hazardous materials traveling by commercial vehicle through Washington County, Tennessee. To identify the types of hazardous materials shipped by commercial vehicles through Washington County, Tennessee, 4 roadside survey sites were selected. The sites were: I-181 at Boones Creek, I-181 at Okolono Rd., Highway 11E south of Jonesborough, and Highway 321 west of Elizabethton. These sites are considered to be the main thoroughfares through Washington County, Tennessee.

The survey data that were collected at each location, beginning with the Interstate 181 Boones Creek location on July 17, 2000, are recorded in Table A3. Survey data were examined to gain insight into the following questions:

1. What is the distribution by percentage of hazard classes at each location and all of the locations?
2. What is the distribution by UN identification numbers at each location and all of the locations?

Hazard Class Distributions

The hazard class distributions for the 4 survey locations are described in Table A4 through A23 found in the appendix. By totaling all 4 survey sites, total HAZMAT (hazardous materials) entering and exiting the county can be determined.

Table 1: Total HAZMAT Surveyed

Entering Washington County		**Exiting Washington County**		
Hazard Class	**Number**	**Hazard Class**	**Number**	**Difference**
1	7	1	3	4
2.1	37	2.1	30	7
2.2	37	2.2	37	0
2.3	4	2.3	1	3
3	103	3	78	25
4.1	0	4.1	0	0
4.2	0	4.2	0	0
4.3	0	4.3	2	2
5.1	61	5.1	38	23
5.2	0	5.2	0	0
6.1	4	6.1	1	3
6.2	2	6.2	3	1
7	6	7	3	3
8	36	8	28	8
9	13	9	8	5
Dangerous	6	Dangerous	5	1
Total	316	Total	237	79

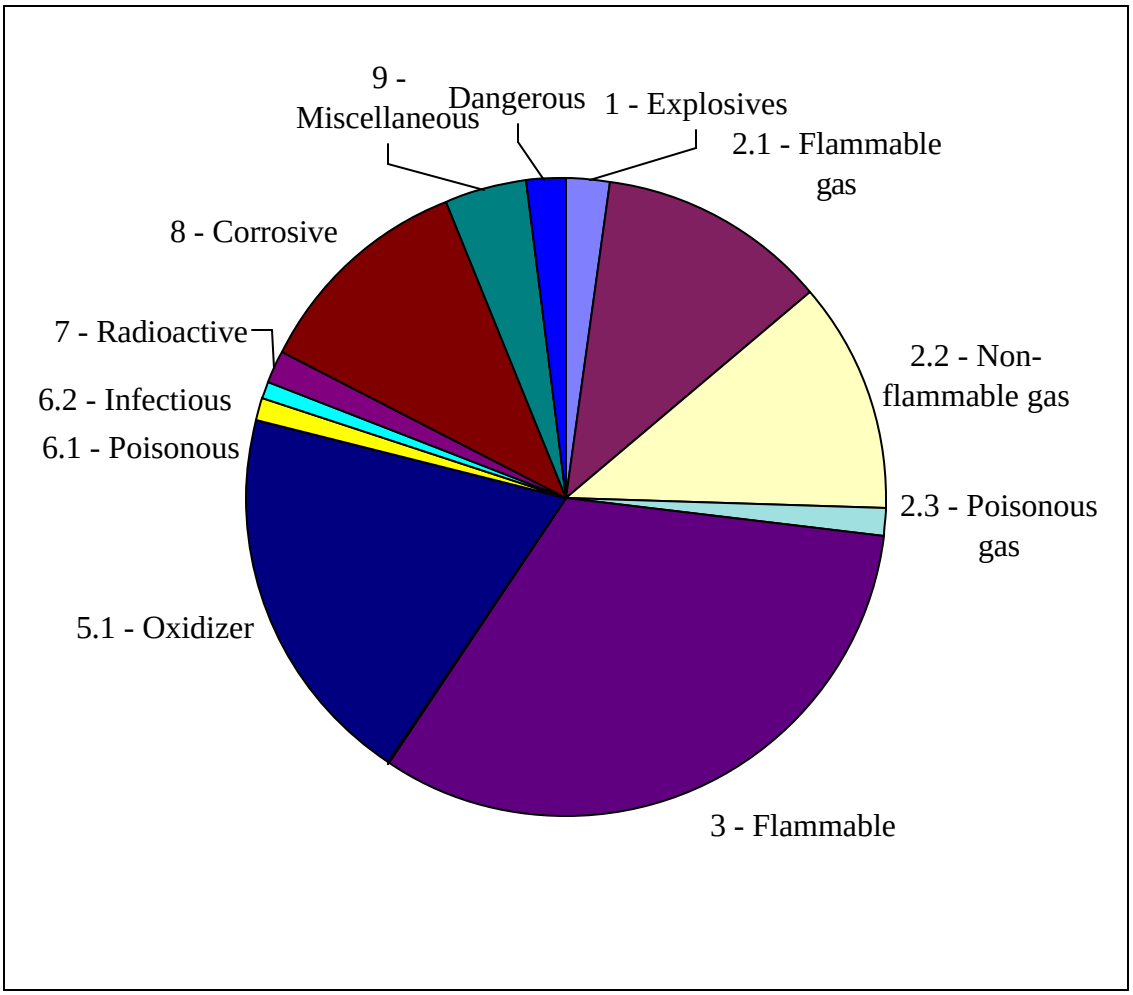

Figure 4: HAZMAT Entering Washington County

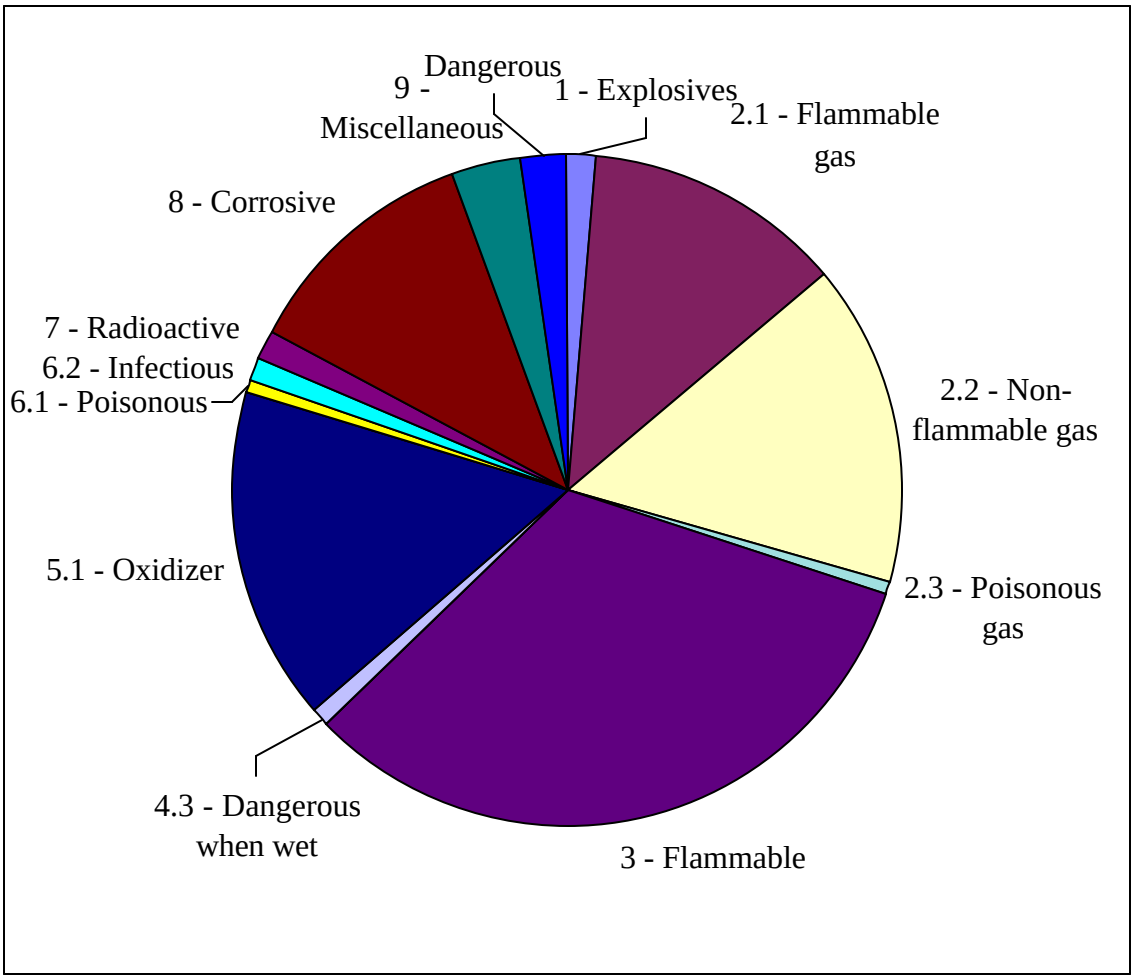

Figure 5: HAZMAT Exiting Washington County

By analyzing each location, and comparing the distribution of hazard classes at each location, differences in hazard classes surveyed can be determined. This is important for identifying what locations the different hazard classes enter and exit Washington County.

Class 1 – Explosives

Figure 6 represents the variation in explosives traffic among the 4 survey sites. No explosives were observed at the HWY 321 or HWY 11E locations. Explosives were observed at both the Boones Creek and Okolono locations.

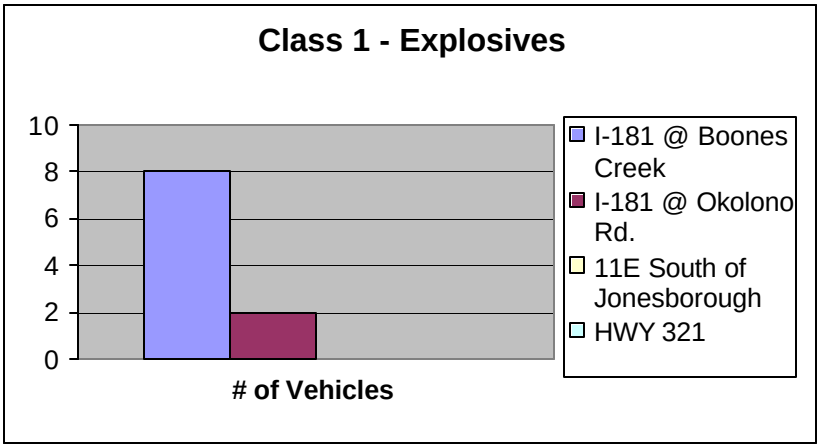

Figure 6: Explosives - Hazard Class 1

Class 2.1 – Flammable Gases

Figure 7 represents the variation in flammable gases traffic among the 4 survey sites. All 4 sites received flammable gases traffic. Boones Creek experiences the heaviest traffic based on the number of hazard class 2.1 vehicles. HWY 11E also experienced a large amount of flammable gases traffic.

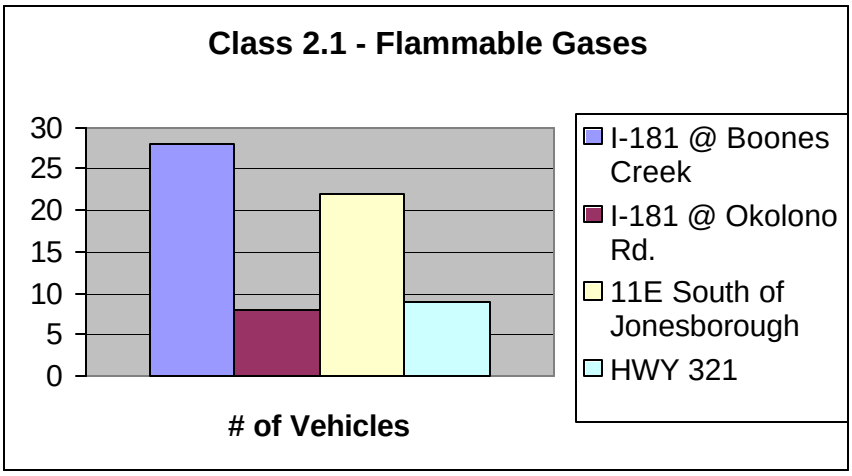

Figure 7: Flammable Gas - Hazard Class 2.1

Class 2.2 – Non-flammable Gases

Figure 8 represents the variation in non-flammable gases traffic among the 4 survey sites. All 4 sites received non-flammable gases traffic. Boones Creek experienced the heaviest traffic based on the number of hazard class 2.2 vehicles. Hwy 11E also experienced a large amount of non-flammable gases traffic.

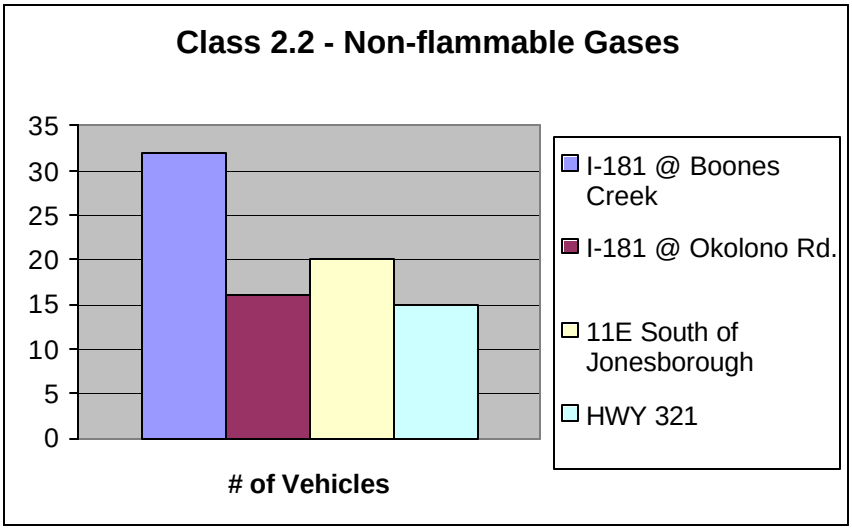

Figure 8: Non-flammable Gas - Hazard Class 2.2

Class 2.3 – Poison Gases

Figure 9 represents the variation in poison gases traffic among the 4 survey sites. No poison gases were observed at the HWY 321 or HWY 11E locations. Poison gases were observed at both the Boones Creek and Okolono locations.

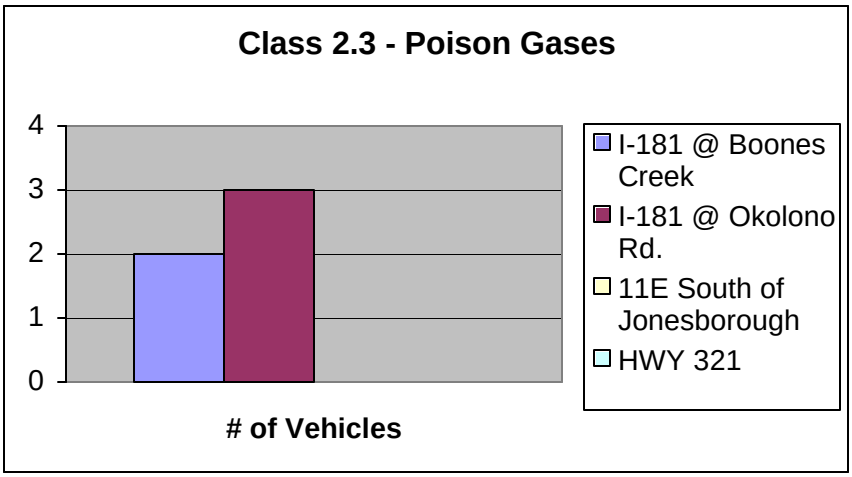

Figure 9: Poison Gas - Hazard Class 2.3

Class 3 – Flammables

Figure 10 represents the variation in flammables traffic among the 4 survey sites. From this analysis we see that I-181 at the Boones Creek location experienced the heaviest class 3 – flammables traffic and I-181 at the Okolono location experienced the least amount of class 3 traffic.

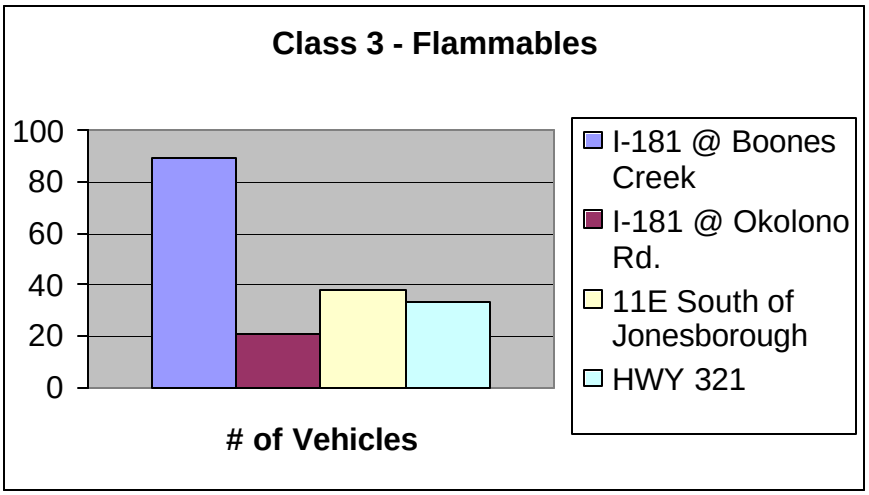

Figure 10: Flammable - Hazard Class 3

Class 4.3 – Dangerous When Wet

Figure 11 represents the variation in dangerous when wet traffic among the 4 survey sites. The only class 4.3 – dangerous when wet traffic was observed at the Boones Creek location.

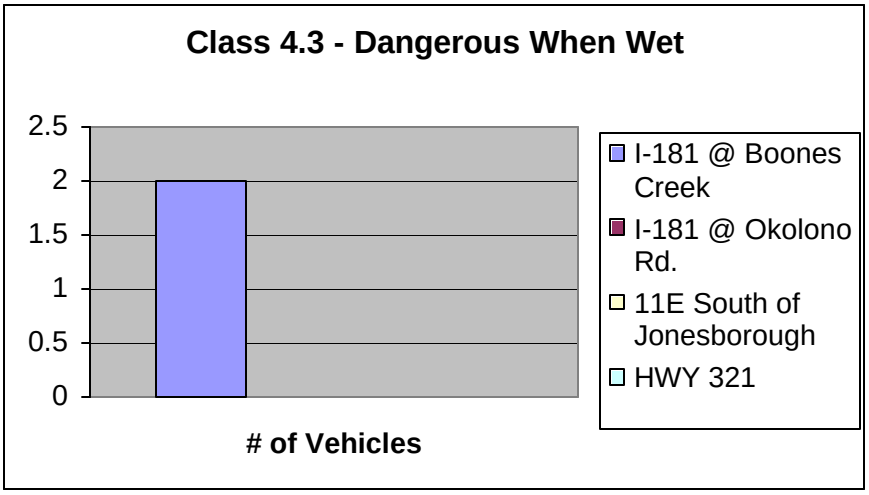

Figure 11: Dangerous When Wet - Hazard Class 4.3

Class 5.1 – Oxidizer

Figure 12 represents the variation in oxidizer traffic among the 4 survey sites. Both interstate survey locations experienced heavy class 5.1 – oxidizer traffic.

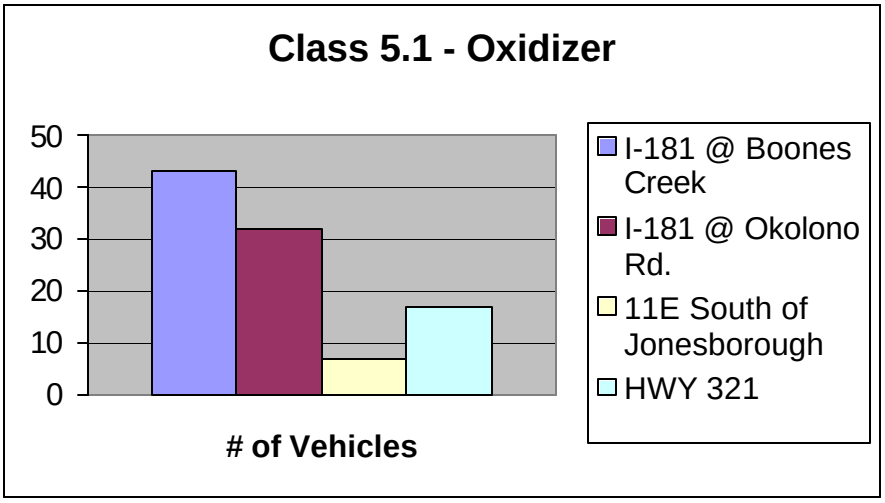

Figure 12: Oxidizer - Hazard Class 5.1

Class 6.1 – Poisonous

Figure 13 represents the variation in poisonous traffic among the 4 survey sites. All sites experienced class 6.1 – poisonous traffic except the HWY 321 site.

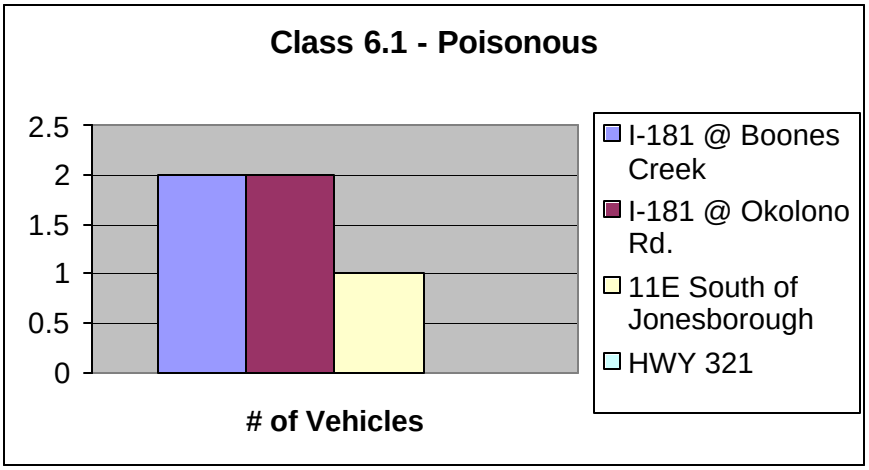

Figure 13: Poisonous - Hazard Class 6.1

Class 6.2 – Infectious

Figure 14 represents the variation in infectious traffic among the 4 survey sites. The Boones Creek and HWY 321 locations were the only sites to experience class 6.2 – infectious traffic.

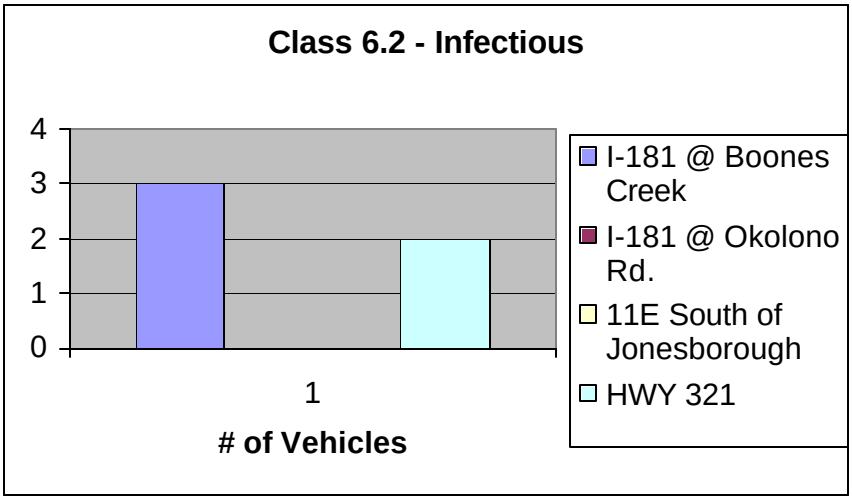

Figure 14: Infectious - Hazard Class 6.2

Class 7 – Radioactive

Figure 15 represents the variation in radioactive traffic among the 4 survey sites. All sites experienced class 7 – radioactive traffic except the HWY 321 site.

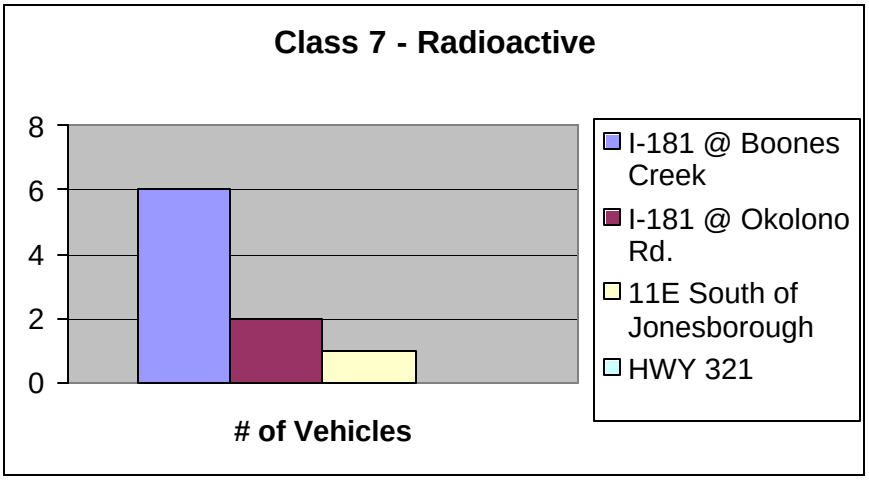

Figure 15: Radioactive - Hazard Class 7

Class 8 – Corrosive

Figure 16 represents the variation in corrosives traffic among the 4 survey sites. All sites experienced class 8 – corrosive traffic. Boones Creek experienced the heaviest traffic based on the number of hazard class 8 vehicles. I-181 at the Okolono location also experienced a large amount of corrosives traffic. The 2 highway locations, HWY 11E and HWY 321, were similar to one another in total class 8 vehicles observed.

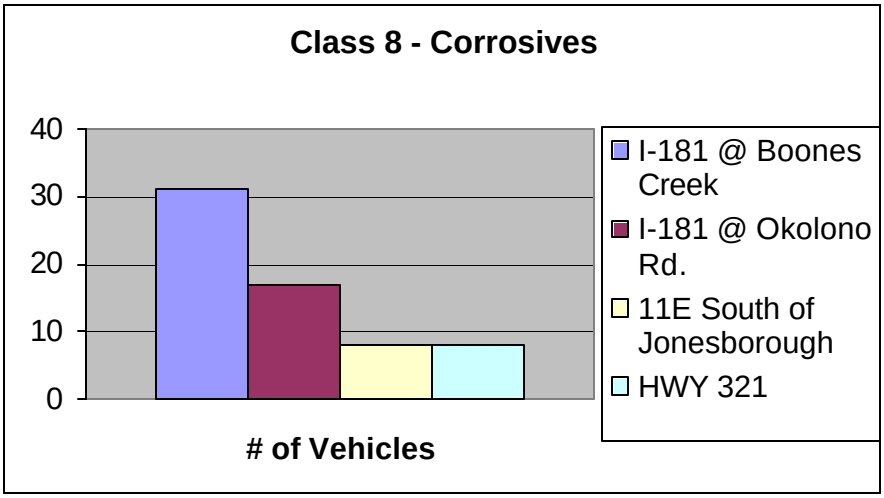

Figure 16: Corrosive -Hazard Class 8

Class 9 – Miscellaneous

Figure 17 represents the variation in miscellaneous traffic among the 4 survey sites. All sites experienced class 9 – miscellaneous traffic except the HWY 11E site.

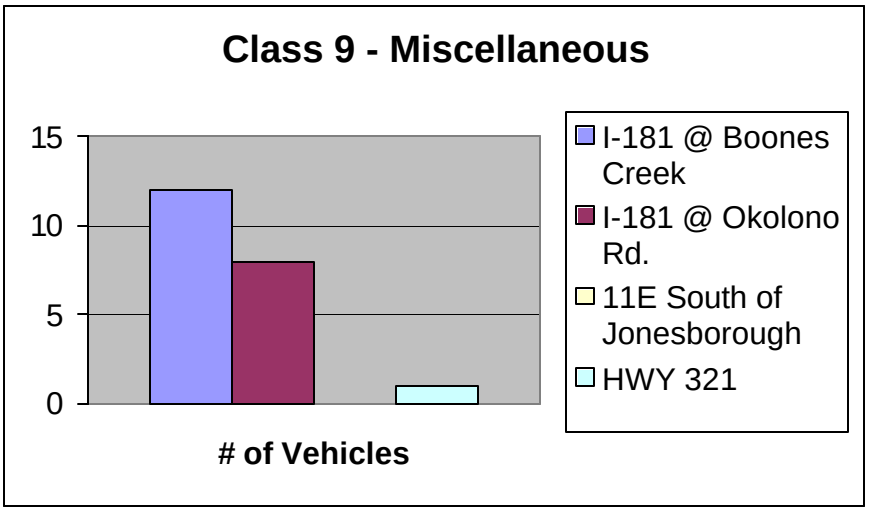

Figure 17: Miscellaneous - Hazard Class 9

Dangerous

Figure 18 represents the variation in dangerous traffic among the 4 survey sites. All sites experienced dangerous traffic.

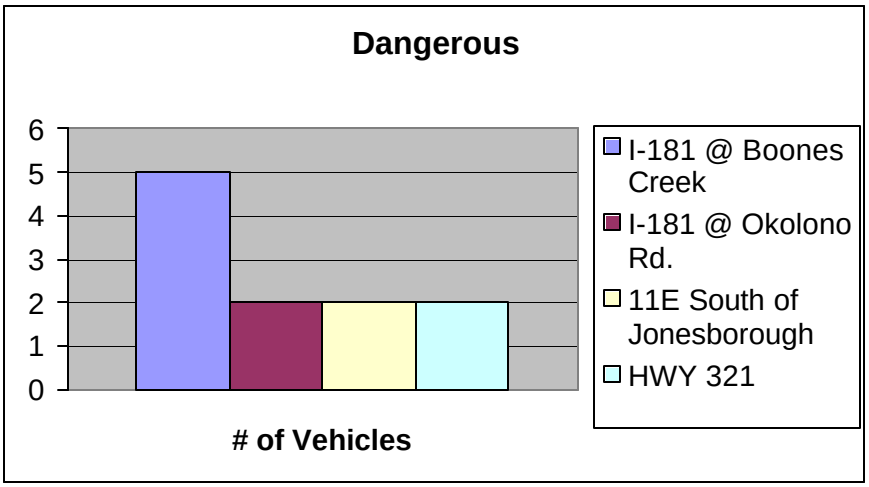

Figure 18: Dangerous - Mixed Hazard Classes

Using these data the hazard classes that are most heavily transported and which locations experience the greatest HAZMAT traffic can be identified. Which routes experience

the heaviest commercial vehicle traffic can also be identified. For each survey location the following table identifies the number of commercial vehicles, the number of hazardous material (HAZMAT) vehicles, and the most prevalent hazard classes observed.

Table 2: Roadside Survey Location Summary

Location	Commercial Vehicles	HAZMAT	Prevalent Hazard Class
Boones Creek	4719	263	Class 3 - Flammable
Okolono Road	1488	113	Class 5.1 - Oxidizer
HWY 11E	1220	99	Class 3 – Flammable
HWY 321	1521	87	Class 3 – Flammable

Flammables (Class 3) was identified as the most observed hazard class transported through Washington County at all locations except at the I-181 Okolona location. This particular location experienced Oxidizer (Class 5.1) traffic as the most observed hazard class. By examining the UN identification number distributions at the I-181 Okolono location we discover that this trend was a result of the heavy transportation of ammonium nitrate from North Carolina. By examining the UN identification number distributions at the I-181 Boones Creek location we also discover that a large amount of ammonium nitrate was observed. This identifies I-181 as a main thoroughfare for the transportation of ammonium nitrate through the county.

The data presented can be used to identify different transportation trends surveyed at the 4 locations. Because different survey locations were selected in which 2 different periods were surveyed, it is important to statistically identify differences, if any, in the locations and time periods. For example, different traffic trends surveyed from 6AM to 6PM versus 9AM to 9PM at a particular location might be identified. Chi-square analyses were performed (Tables

A49 to A59 in the appendix). Based on observation periods surveyed, no significant variations were observed. What about possible observed variations based on location? To answer this question the 2 interstate highway sites were compared to each other (Boones Creek versus Okolono Road), and then the 2 highway sites to each other (11E versus 321). Table A57 in the appendix is a chi-square test for the 2 different interstate observation sites, comparing total hazardous materials surveyed at the I-181 Boones Creek location versus the I-181 Okolono location. A chi-square analysis was performed based on a 95% confidence interval with H_0: I-181 (Boones Creek) HAZMAT observed = I-181 (Okolono Road) HAZMAT observed. The chi-square test demonstrated a statistically significant difference observed in these 2 sites. This makes sense since I-181 at Boones Creek is the nearest direct route from I-81, the main interstate for northeastern Tennessee. At the Okolono location we see less commercial traffic in general. No statistically significant variations were observed when comparing total hazardous materials surveyed for the highway 11E location versus the highway 321 location. Chi-square analysis was also performed to determine whether any statistical difference exists when comparing HAZMAT entering the county versus HAZMAT exiting the county. This might give an indication whether most of the hazardous materials transported in the county are merely traveling through or being used by local industry. No statistically significant variations were observed when comparing total hazardous materials entering and exiting Washington County. Although no statistical significant differences were observed in total HAZMAT surveyed, Table A59 in the appendix does demonstrate the differences observed in the individual hazard classes.

UN Identification Number Distributions

To answer question 2, tables and figures were constructed to analyze the distributions of HAZMAT by UN identification numbers. Tables A26 through A45, in the appendix, represent the UN identification number distributions for the 4 survey locations. Tables A46 and A47, in the appendix, represent the UN identification number distributions for all HAZMAT entering and exiting Washington County. UN identification numbers provide additional information beyond the hazard class identification. UN numbers actually identify the chemical(s) transported.

Rail Transportation

The next objective in this study was to identify the types and distributions of hazardous materials shipped annually by rail through Washington County, Tennessee. There are two rail companies that own rail lines through Washington County, Tennessee. They are Norfolk Southern and CSX. Norfolk Southern has 2 rail lines through Washington County, Tennessee. One line runs from Bristol to Johnson City, and the other runs from Johnson City to Kingsport. CSX has 1 line running through Washington County, Tennessee. It runs from Johnson City to Kingsport. The 2 lines that run from Johnson City to Kingsport support Eastman Chemical. Eastman Chemical is a large shipper of hazardous materials and is in fact one of the largest shippers of hazardous waste in the United States. Both rail companies provided little information and were not very cooperative. Norfolk Southern provided more information than CSX. They provided data identifying the top 50 hazardous materials shipped and the number of loads shipped for each. Using these data the shipments can be categorized based on hazard classes and UN identification numbers and their corresponding distributions can be identified.

Figure 19 represents hazardous materials by hazard class transported on the Norfolk line running from Bristol to Johnson City. Figure 20 represents hazardous materials, by hazard class, transported on the Norfolk line running from Kingsport to Johnson City.

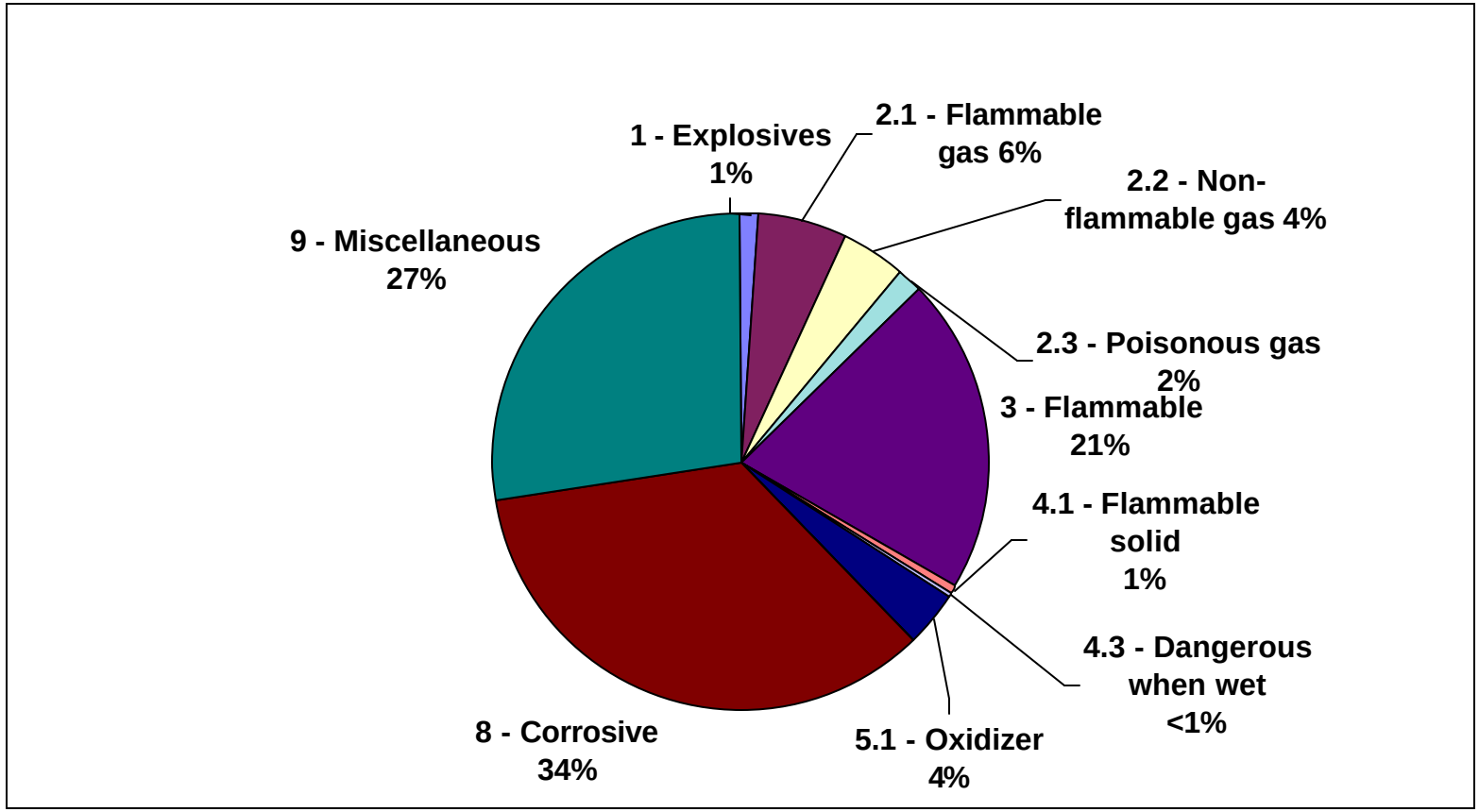

Figure 19: NS HAZMAT Loads by Hazard Class (Bristol to Johnson City)

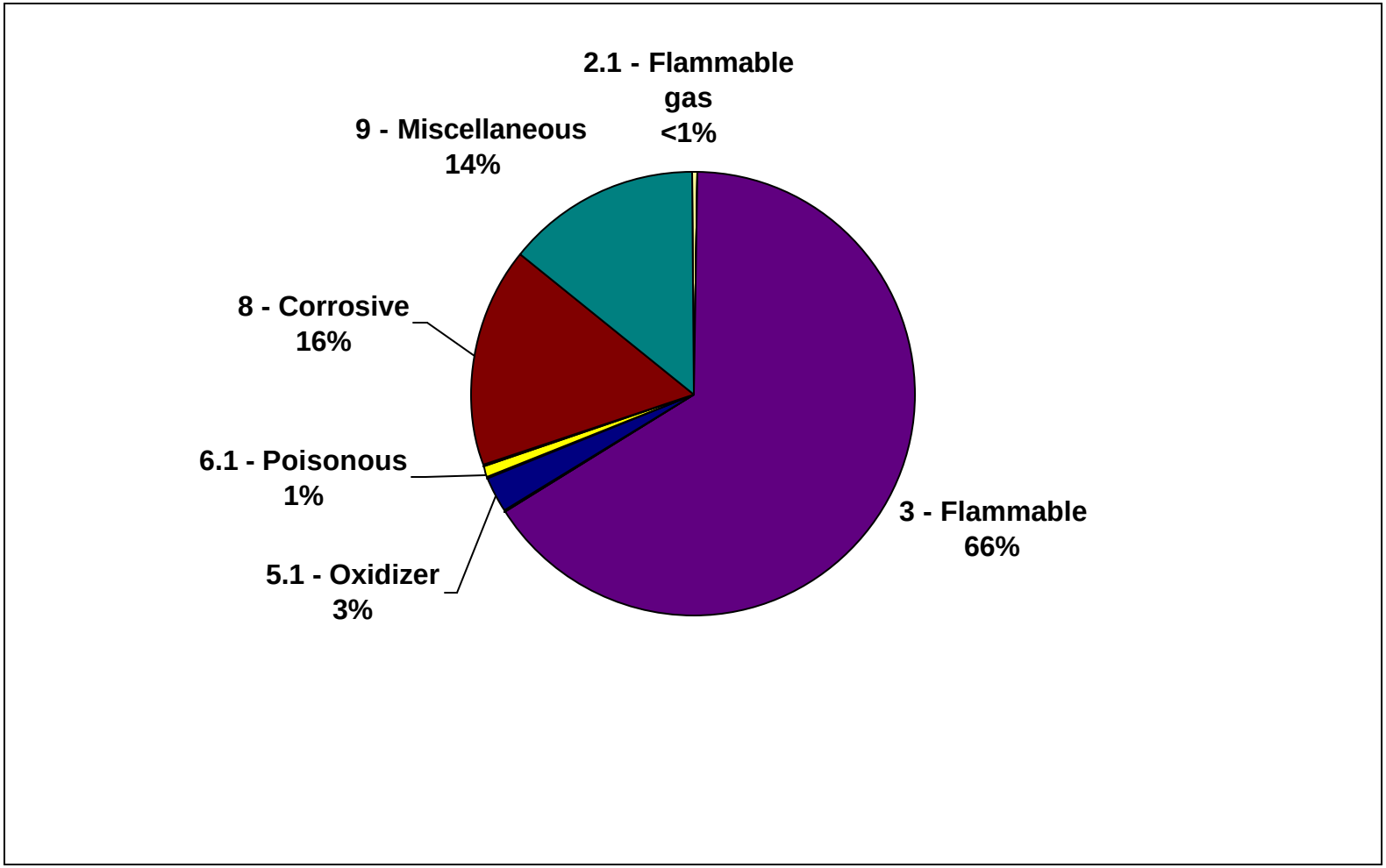

Figure 20: NS HAZMAT Loads by Hazard Class (Kingsport to Johnson City)

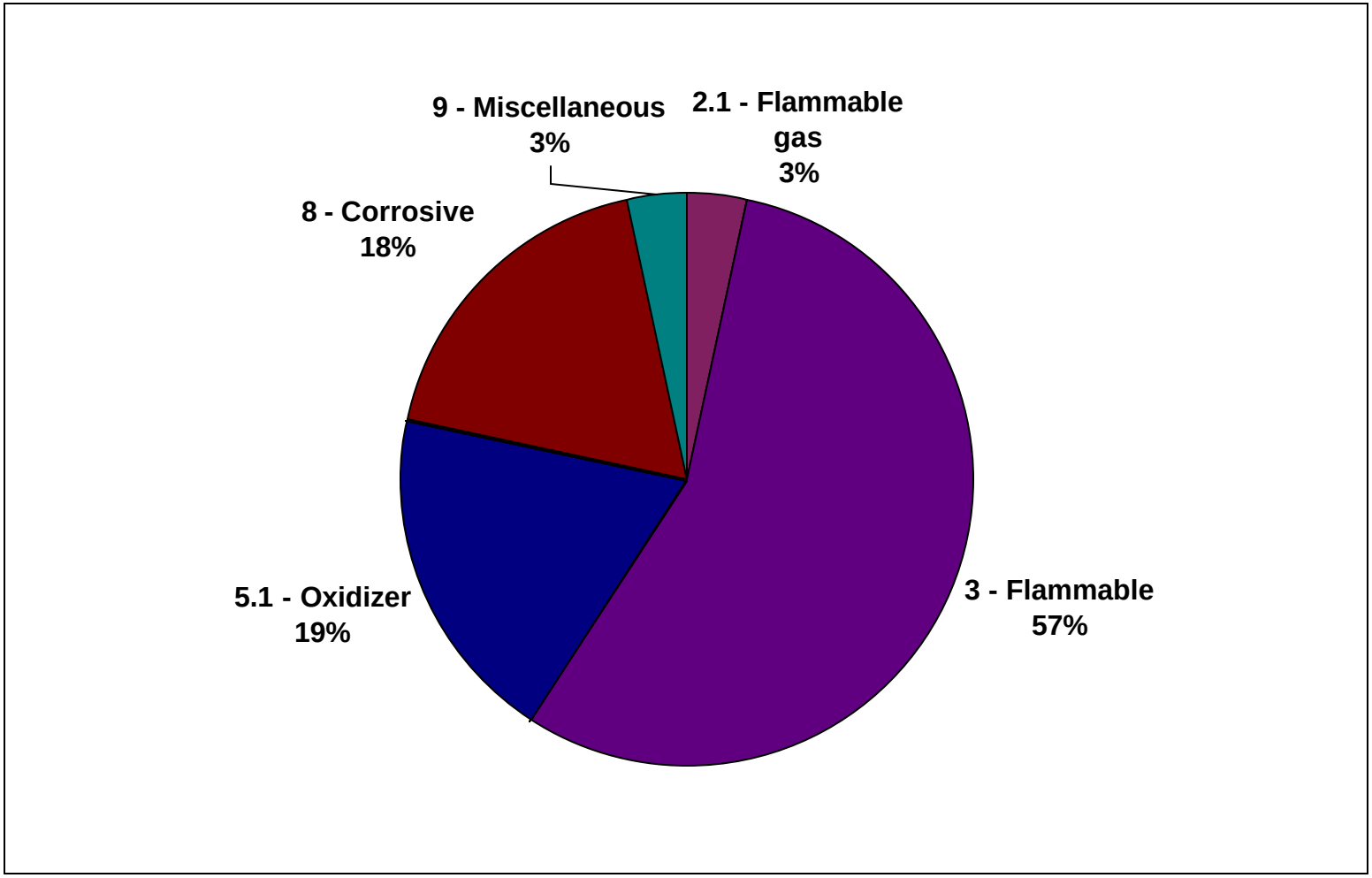

Figure 21: CSX HAZMAT Loads by Hazard Class (Kingsport to Johnson City)

CSX provided data only identifying the top 13 hazardous materials shipped and the number of loads shipped for each. From these data we are able to categorize the shipments based on hazard classes and UN numbers and identify their corresponding distributions. Figure 21 represents hazardous materials, by hazard class, transported on the CSX line running from Kingsport to Johnson City. The rail information obtained, even though scarce, provides emergency planners with important data to analyze when assessing future needs.

The next objective of this study was to identify the types and distributions of hazardous materials stored in Washington County, Tennessee. All facilities using, storing, or processing extremely hazardous substances must submit inventories of extremely hazardous substances to local emergency planners according to Title 40 of the Code of Federal Regulations 355.30 (40 CFR Part 355). The inventories, submitted to the Washington County Emergency Management Agency, allow identification of some of the hazardous materials stored in Washington County. Table 3 represents the grand total of all these chemicals, both as total chemicals counted and total lbs./day, based on hazard class distributions. Radioactive materials (class 7) accounts for nearly half of all the hazardous materials stored in Washington County based on lbs./day stored (Table 3). Aerojet is the only facility storing radioactive material in Washington County. Because we know Aerojet to be the only facility where radioactives (class 7) are present in the county, Table 3 is not a good representation of the county as a whole. Figure 22 represents the hazardous materials by hazard class stored in Washington County excluding the radioactives (class 7) at Aerojet. This figure is more representative of hazardous materials stored throughout the county.

Table 3: HAZMAT Storage in Washington County

Hazard Class	Number of Chemicals	Lbs./day Stored	% of Total HAZMAT Stored (lbs.)
1 – Explosives	1	5000	0.04%
2.1 – Flammable gas	26	1640600	14.02%
2.2 - Non-flam. gas	43	640740	5.48%
2.3 – Poisonous gas	11	12100	0.10%
3 - Flammable	112	1846250	15.78%
4.1 – Flammable solid	9	115700	0.99%
4.2 – Spont. Comb.	1	100	0.00%
4.3 – Dang. when wet	3	700	0.01%
5.1 – Oxidizer	9	1055900	9.02%
5.2 - Organic peroxide	2	600	0.01%
6.1 – Poisonous	32	88400	0.76%
6.2 – Infectious	0	0	0.00%
7 – Radioactive	3	5500100	47.01%
8 – Corrosive	71	793600	6.78%
9 – Miscellaneous	0	0	0.00%
Total	323	11699790	100.00%

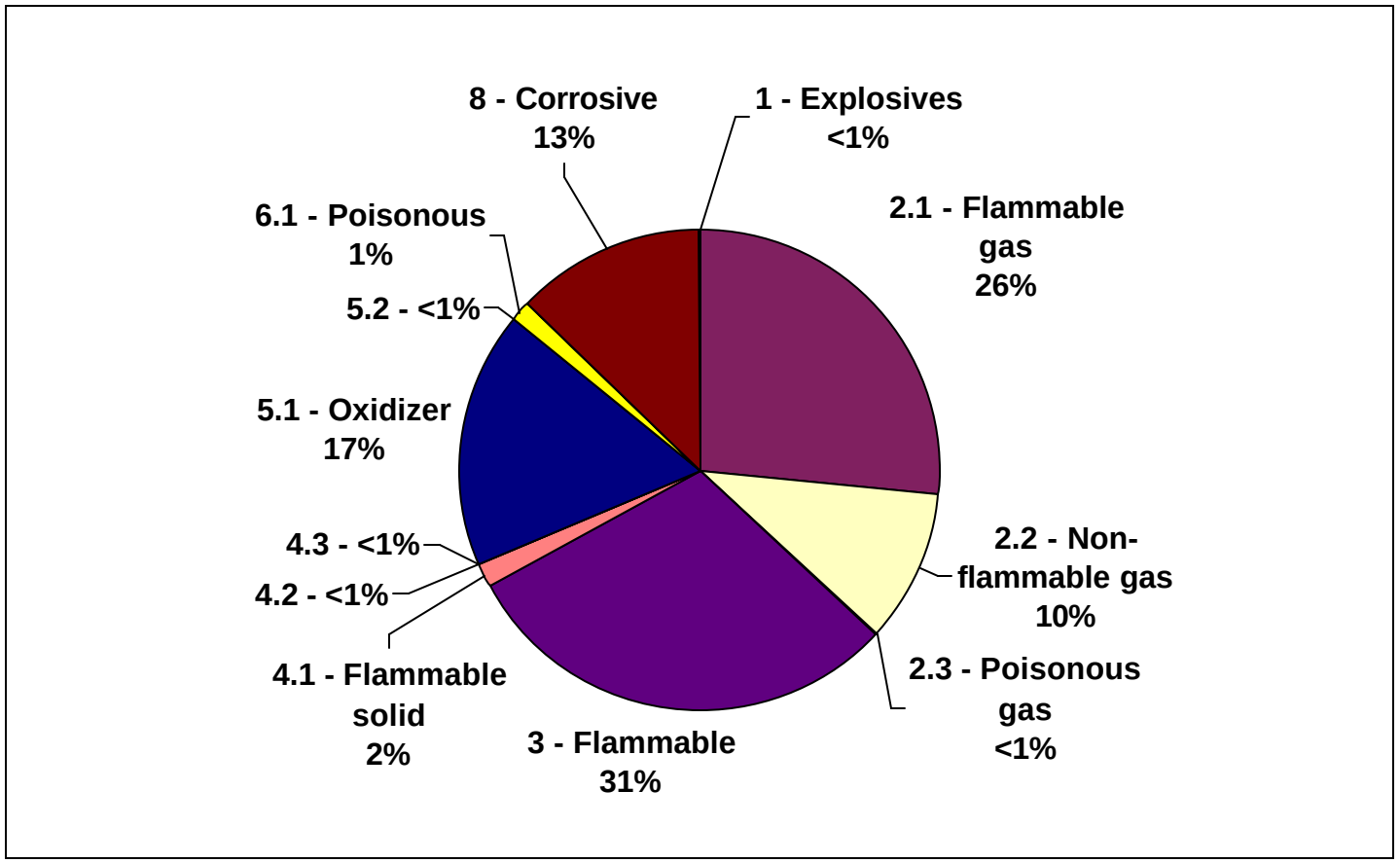

Figure 22: Washington County HAZMAT Storage (lbs./day)

Storage data compared with rail and roadway data help us to interpret transportation trends in Washington County. The distributions of hazardous materials passing through the county compared to hazardous materials being used at facilities within the county is illustrated in Table 4.

Table 4: Storage Versus Transportation

Description	Mode	Top Three Hazard Classes
Entering County	Road	3, 5.1, 2.1 / 2.2
Exiting County	Road	3, 5.1 / 2.2
Washington County	Storage	3, 2.1, 5.1
CSX	Rail	3, 5.1, 8
Norfolk	Rail	3, 8, 9

The next objective was to identify the types and locations of hazardous material incidents in Washington and Unicoi Counties from 1993 to 2000. Table A48 in the appendix represents incident data obtained from the Department of Transportation Office of Hazardous Materials Safety (Washington, D.C.). When a hazardous material transportation incident occurs, the regulations in 49 CFR 171.15 and 171.16 govern such situations. Section 171.15 covers immediate telephone notification of a hazardous material incident. Section 171.16 requires written reporting procedures. Theses regulations are supposed to ensure the reporting of transportation incidents involving hazardous materials. This database reported the years 1993 to 2000. In 8 years only 6 roadway hazardous material incidents were recorded. 25 rail incidents were recorded. All 25 rail incidents were from CSX.

The final objective of this study is to offer this collection and statistical analysis of data to the Washington County Emergency Management Agency in the hopes that it will provide them with the information necessary for response preparation.

CHAPTER 5

DISCUSSION

Due to the lack of federal data concerning the transportation of hazardous materials through rural communities, 4 activities were performed in this study to identify trends in the transportation of hazardous materials through Washington County, Tennessee.

The 1st objective of this project was to identify the types and distributions of hazardous materials traveling by commercial vehicle through Washington County, Tennessee. To identify the types of hazardous materials shipped by commercial vehicles through Washington County, Tennessee, 4 roadside survey sites were selected. The sites were: I-181 at Boones Creek, I-181 at Okolono Rd., Highway 11E south of Jonesborough, and Highway 321 west of Elizabethton. These sites are considered to be the main thoroughfares through Washington County, Tennessee.

Flammables (Class 3) were identified as the most observed hazard class transported through Washington County at all locations except at the I-181 Okolono location. This particular location experienced oxidizer (Class 5.1) traffic as the most observed hazard class. This is an unusual trend, because gasoline is so heavily transported through the county and accounts for the majority of flammables at all locations. The variation observed at the Okolono location could be due to the decrease in demand for gasoline as we experience a decrease in industry and population size heading south on Interstate 181. When UN classification data, at the Okolono location, were analyzed, there was a large amount ammonium nitrate identified. This ammonium nitrate was transported in open dump trailers with covers. Some of the vehicles

observed displayed no side oxidizer placards. All commercial vehicles transporting hazardous materials must display the appropriate placards on all 4 sides of the vehicle. This observation is disturbing. If 1of these open dump trailers was involved in an accident resulting in a fire, and responders were not aware of the oxidizing material being transported due to lack of placards, an explosive situation could threaten the safety of the responders.

A fair amount of explosives was observed traveling on Interstate 181 at both the Boones Creek and Okolono locations. This is an important trend to be aware of due to the potential dangers that could occur if one of these vehicles were involved in an accident. The construction of Interstate 26 in North Carolina might account for the majority of these explosives, especially since more vehicles were surveyed in the southbound direction on Interstate 181.

Some interesting trends were identified at the Highway 11E location. This location experienced heavy transportation of flammable gases and non-flammable gases. Several propane distributors are located on HWY 11E that may account for the heavy flammable gases traffic observed. As far as non-flammable gases, there were a large number of home medical vehicles surveyed at this location. These vehicles were all observed displaying the oxygen placard. One could possibly attribute this trend to a large amount of home patients located in the Jonesborough area receiving oxygen refills.

An interesting trend observed on Interstate 181 was that most of the hazard class 9 – miscellaneous vehicles observed were transporting elevated temperature liquids. Road construction companies owned all these vehicles. They were more than likely carrying asphalt, tar, or other road construction materials. There was quite a bit of road construction occurring

on Interstate 181 during this survey. Road construction on Interstate 181 will not be completed anytime soon. Look for this trend to continue.

When comparing storage data to transportation data, HAZMAT trends can be identified (Table 7). The top 3 hazardous materials were the same for materials stored versus materials entering and exiting the county by roadway. The only variation between storage versus roadway transportation involves oxidizers (class 5.1). Oxidizers (class 5.1) is ranked 2nd for hazardous materials entering and exiting the county, but ranked 3rd for hazardous materials stored in the county. This is another indication that the large amount of ammonium nitrate (class 5.1) seen at both locations on Interstate 181 is just being transported through the county. When comparing the storage data versus rail data we see that Flammables (Class 3) ranks first for all, but the remaining ranks all differ. This could be an indication that facilities in Washington County depend mainly on roadway transportation for their daily commerce. Also it is important to keep in mind that 2 of the 3 rail lines in the county support Eastman Chemical Company in Kingsport, Tennessee. Eastman Chemical is a large shipper of hazardous materials and is in fact 1 of the largest shippers of hazardous waste in the United States. Therefore, a lot of the rail commodities recorded are not going to be representative of the commodities used by Washington County's industries.

In future surveys it will be very interesting to analyze storage data versus roadway transportation data, especially after the completion of Interstate 26 in North Carolina. As a result of the completion of Interstate 26, it is expected that there will be a large increase in the number of hazardous materials trucks simply using the county as a main thoroughfare to Interstate 81. As a result, present trends observed when comparing storage data versus

roadway data may change. Because no transportation studies of this nature have been performed in Washington County, it will be very interesting to compare these baseline data with future survey data, especially after the opening of Interstate 26. It is safe to assume that the number of commercial and hazardous material vehicles presently experienced will increase. The Washington County Emergency Management Agency estimates 150,000 vehicles traveling through Johnson City daily after the opening of I-26. This figure is approximately 3 times the current traffic load. It can be assumed that commercial vehicle traffic and HAZMAT vehicle traffic will triple as well.

The recorded incident data in this study were used to develop a historical record of HAZMAT incidents in Washington County. From 1993 to 2000 only 6 roadway hazardous material incidents were recorded. It is hard to believe that there have only been 6 incidents involving hazardous materials on roadways in Washington County and Unicoi County in the past 8 years. I think this points to inadequate reporting. As far as the roadway data are concerned, there was no indication that there are excessive hazardous material incidents associated with a specific problem location or carrier. The rail incident data identified the CSX yard in Erwin as a location where hazardous material incidents occur most frequently. From Table A48 in the appendix we see that from these frequent incidents they identified 8 of their 25 incident locations as other. This could mean that these "other" locations occurred anywhere on the rail line in Unicoi County. This lack of reporting is disturbing.

The survey data recorded in this survey provide real numbers for emergency responders to analyze when assessing future needs. In addition to hazard class data, UN number identification data recorded in this survey can prove to be invaluable when assessing future

resource and training needs. The UN number identification data may identify hazardous materials that require specific preparedness efforts if an accident should occur. This type of real world data is essential to protect emergency responders.

CHAPTER 6

CONCLUSIONS

This study is important to the public, emergency responders, and the environment of Washington County, Tennessee. This type of study is essential in identifying risks posed from the transportation of hazardous materials through rural communities. This type of study is currently the only realistic means off gathering hazardous material transportation data pertinent to preplanning efforts. This type of preplanning provides the basis for health and safety awareness for the public, responders, and the environment. This type of study actually identifies hazardous material transportation trends in the area of concern. These types of data are not available from federal sources.

An examination of the type and amount of data available on the federal level explains the large amount of guesswork in progress in identifying hazardous material shipments in the state of concern. No data exist that identifies the types of hazardous materials shipped through a community. If we look at commercial motor vehicle data, we discover that weigh stations do not record any data concerning hazardous material transportation. Weigh stations basically perform 2 activities. They weigh commercial vehicles and pull in 10% of commercial vehicles for inspection. So if there are no observations performed on the roadways, then how does one identify hazardous material shipments in an area of concern? Actual hazardous material transportation data available from federal sources is, in a lot of cases, assumptions based on different types of reports required by the Department of Transportation. One such report is the US Department of Transportation's truck inventory use survey. This survey tries to provide a statewide perspective of motor carrier hazardous materials shipments. This report is the result

of a questionnaire in which truck owners, identified by state registration records, must identify the nature of hazardous cargo shipped by their trucks. This type of reporting can in no way identify actual shipments through actual areas. The only way a rural community can identify what actually is transported through their county is to perform roadside surveys.

This study incorporated 4 activities that identified hazardous material transportation trends in Washington County, Tennessee. The 1st activity, chemical inventories, identified hazardous materials stored at facilities in Washington County. This data began to give an indication of what types of hazardous materials are transported to and from these facilities. The 2nd activity, incident data, identified hazardous material incidents that occurred while in transport by rail or motor carrier in the last 8 yeas. These data give an indication of any problematic routes or carriers. If used properly, this data can possibly prevent future incidents. The 3rd activity, roadside surveys, identified actual hazardous material shipments by motor carrier. This is the most important activity in this study. The roadside surveys identified what a typical day of hazardous materials shipments look like in Washington County. From these data emergency responders can assess the preparation necessary to respond to an incident involving any of the hazardous materials observed. The 4th and final activity, rail data, identifies the hazardous materials shipped by the two rail companies through Washington County. From these data emergency responders can assess the preparation necessary to respond to a rail incident involving any of the hazardous materials identified.

A study of this nature performed annually would identify changing transportation trends that Washington County might experience. With the growth of the chemical sector continuing and the addition of Interstate 26 to the east of Washington County, hazardous materials

transportation trends are bound to increase drastically. It is essential that emergency planners are aware of these changing trends in order to prepare for any unexpected hazardous material incidents. This study has provided emergency management officials in Washington County, Tennessee with a guide on how to conduct a hazardous material flow survey. The framework has been created to make future data gathering activities easy. It is essential for a study of this nature to be continually revised based on current hazardous material transportation trends in Washington County. This is the only way to ensure proper preparation measures in the event of hazardous materials transportation incidents.

Some recommendations for future research activities would be to perform the roadside surveys annually, preferably quarterly. This would identify any changing transportation trends as well as seasonal differences in the transportation of hazardous materials through Washington County. Another suggestion would be to have several observers survey all locations at the same time. This will help identify the vehicles passing through the county versus vehicles dropping loads within the county. A last suggestion would be for the Washington County Emergency Management Agency to record its own historical incident data. I think there is a lack of reporting in federal incident database.

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APPENDICES

Appendix A1: Roadside Survey Classification System

TRUCK TYPES:

FLATBED = F
STRAIGHT BOX TRUCK = S
LIQUID TANKER = T
BOX TRAILER = B
TUBE TRAILER (CYLINDERS) = TT
FLATBED TRAILER = FT
LIQUID GAS TANKER = LGT
PICKUP TRUCK = PU
BULK TANKER (SOLIDS) = BT

HAZARD CLASSIFICATION SYSTEM:

HAZARD CLASS NUMBER	CLASSIFICATION
1.1	Explosives (mass explosion hazard)
1.2	Explosives (projection hazard)
1.3	Explosives (predominately a fire hazard)
1.4	Explosives (no significant blast hazard)
1.5	Very insensitive explosives: blasting agents
1.6	Extremely insensitive detonating substances
2.1	Flammable gas
2.2	Non-flammable compressed gas
2.3	Poisonous gas
3	Flammable and combustible liquid
4.1	Flammable solid
4.2	Spontaneously combustible material
4.3	Dangerous when wet material
5.1	Oxidizer
5.2	Organic peroxide
6.1	Poisonous material
6.2	Infectious substance (Etiologic agent)
7	Radioactive material
8	Corrosive material
9	Miscellaneous hazardous material

Appendix A2: Causes of HAZMAT Incidents

CAUSE NUMBER	IDENTIFICATION
10	Human Error
20	Package Failure
30	Vehicular Accident / Derailment
40	Other

Appendix A3: Hazardous Materials Flow Survey							
Date	**Time**	**Survey Site**	**Lane**	**Hazard Class**	**UN ID Number**	**Vehicle Type**	**Description**
07/17/2000	6:18 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	6:38 AM	I-181(Boones Creek)	S	8	1760	LT	Corrosive liquid, n.o.s.
07/17/2000	7:21 AM	I-181(Boones Creek)	S	7	NA	B	Radioactive
07/17/2000	7:21 AM	I-181(Boones Creek)	S	9	2211	B	Polystyrene beads, expandable
07/17/2000	7:27 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	7:32 AM	I-181(Boones Creek)	S	5.1	2880	B	Calcium hypochlorite, hydrated
07/17/2000	7:43 AM	I-181(Boones Creek)	S	3	2302	LT	5-methylhexan-2-one
07/17/2000	7:47 AM	I-181(Boones Creek)	S	3	1267	LT	Petroleum crude oil
07/17/2000	8:02 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	8:05 AM	I-181(Boones Creek)	S	8	NA	B	Corrosive
07/17/2000	8:13 AM	I-181(Boones Creek)	S	5.1, 2.2	NA	S	Oxygen
07/17/2000	8:21 AM	I-181(Boones Creek)	S	1.1D	NA	B	Explosive (mass explosion hazard)
07/17/2000	8:21 AM	I-181(Boones Creek)	S	1.5	NA	BT	Blasting agents
07/17/2000	8:26 AM	I-181(Boones Creek)	S	2.1, 2.2	NA	F	Compressed gases (flam. and non-flam.)
07/17/2000	8:32 AM	I-181(Boones Creek)	S	8, Dangerous	NA	B	Corrosive and mixed hazard classes
07/17/2000	8:34 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	8:36 AM	I-181(Boones Creek)	S	2.1, 2.2, 2.3	NA	F	Comp. gases (flam., non-flam., poisonous)
07/17/2000	8:41 AM	I-181(Boones Creek)	S	8	NA	B	Corrosive
07/17/2000	8:54 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	9:04 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline

07/17/2000	9:08 AM	I-181(Boones Creek)	S	3	1133	B	Adhesives, n.o.s
07/17/2000	9:15 AM	I-181(Boones Creek)	S	8	2794	B	Batteries, wet, filled w/ acid
07/17/2000	9:20 AM	I-181(Boones Creek)	S	1.1D, 1.5	NA	S	Explosives and blasting agents
07/17/2000	9:23 AM	I-181(Boones Creek)	S	1.5	NA	BT	Blasting agents
07/17/2000	9:39 AM	I-181(Boones Creek)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/17/2000	9:41 AM	I-181(Boones Creek)	S	8	2031	LT	Nitric acid, other than red fuming
07/17/2000	9:50 AM	I-181(Boones Creek)	S	3	1993	LT	Flammble liquid, n.o.s.
07/17/2000	9:53 AM	I-181(Boones Creek)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/17/2000	10:08 AM	I-181(Boones Creek)	S	2.1	1075	LGT	Propane
07/17/2000	10:19 AM	I-181(Boones Creek)	S	2.1	1075	F	Propane cylinders
07/17/2000	10:22 AM	I-181(Boones Creek)	S	5.1, 2.2	1073	VAN	Oxygen
07/17/2000	10:27 AM	I-181(Boones Creek)	S	8	2834	B	Phosphorous acid
07/17/2000	10:29 AM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/17/2000	10:33 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	10:46 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	10:56 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	11:00 AM	I-181(Boones Creek)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/17/2000	11:03 AM	I-181(Boones Creek)	S	5.1, 2.2	1075	S	Oxygen
07/17/2000	11:15 AM	I-181(Boones Creek)	S	2.1	1075	F	Propane
07/17/2000	11:24 AM	I-181(Boones Creek)	S	5.1, 2.2	1073	S	Oxygen
07/17/2000	11:34 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	11:35 AM	I-181(Boones Creek)	S	6.2	3291	S	(Bio) medical waste, n.o.s.
07/17/2000	11:38 AM	I-181(Boones Creek)	S	8	NA	B	Corrosive
07/17/2000	11:52 AM	I-181(Boones Creek)	S	6.1	1680	B	Potassium cyanide
07/17/2000	12:14 PM	I-181(Boones Creek)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/17/2000	12:21 PM	I-181(Boones Creek)	S	2.3	NA	PU	Poison gas cylinders - inhalation hazard

07/17/2000	12:46 PM	I-181(Boones Creek)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/17/2000	12:47 PM	I-181(Boones Creek)	S	5.1, 2.2	1073	LGT	Oxygen
07/17/2000	12:58 PM	I-181(Boones Creek)	S	5.1, 2.2	1073	VAN	Oxygen
07/17/2000	1:20 PM	I-181(Boones Creek)	S	2.1, 2.2	NA	F	Compressed gases (flam. and non-flam.)
07/17/2000	1:43 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	1:50 PM	I-181(Boones Creek)	S	2.2, 5.1	1073	PU	Oxygen
07/17/2000	2:01 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	2:28 PM	I-181(Boones Creek)	S	7	NA	B	Radioactive
07/17/2000	2:31 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	2:34 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	2:53 PM	I-181(Boones Creek)	S	2.1	1075	LGT	Propane
07/17/2000	3:15 PM	I-181(Boones Creek)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/17/2000	3:31 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	3:32 PM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/17/2000	3:53 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	4:11 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	4:16 PM	I-181(Boones Creek)	S	8	NA	S	Corrosive
07/17/2000	4:24 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	4:45 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/17/2000	4:50 PM	I-181(Boones Creek)	S	5.1	NA	B	Oxidizer
07/17/2000	5:15 PM	I-181(Boones Creek)	S	8, 3	NA	B	Corrosive and flammable
07/17/2000	5:27 PM	I-181(Boones Creek)	S	8	NA	B	Corrosive
07/17/2000	5:57 PM	I-181(Boones Creek)	S	3	1993, 1123	LT	Flam. liquid, n.o.s. and Butyl acetates
07/18/2000	6:07 AM	11E (old stockyard)	N	8	NA	S	Corrosive
07/18/2000	6:53 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/18/2000	7:00 AM	11E (old stockyard)	S	3	NA	B	Flammable

07/18/2000	7:07 AM	11E (old stockyard)	N	2.1	1075	LGT	Propane
07/18/2000	7:19 AM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/18/2000	8:13 AM	11E (old stockyard)	S	3	NA	S	Flammable and combustible liquid
07/18/2000	8:20 AM	11E (old stockyard)	S	3, 8	NA	S	Flammable and combustible liquid, corrosive
07/18/2000	8:24 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/18/2000	8:30 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/18/2000	9:02 AM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/18/2000	9:46 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/18/2000	9:54 AM	11E (old stockyard)	S	8	1791, 1830	B	Hypochlorite soln, Sulfuric acid
07/18/2000	10:04 AM	11E (old stockyard)	N	5.1, 2.2	1073	PU	Oxygen
07/18/2000	10:07 AM	11E (old stockyard)	N	8	2215	B	Maleic acid
07/18/2000	10:16 AM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/18/2000	10:27 AM	11E (old stockyard)	S	2.1	1075	LGT	Propane
07/18/2000	10:46 AM	11E (old stockyard)	N	2.1, 2.2	NA	F	Compressed gases (flam. and non-flam.)
07/18/2000	11:05 AM	11E (old stockyard)	N	2.1, 2.2	NA	F	Compressed gases (flam. and non-flam.)
07/18/2000	11:31 AM	11E (old stockyard)	N	2.1, 2.2	NA	F	Compressed gases (flam. and non-flam.)
07/18/2000	11:41 AM	11E (old stockyard)	S	5.1, 2.2	1073	S	Oxygen
07/18/2000	11:42 AM	11E (old stockyard)	N	8	1791, 1830	B	Hypochlorite soln, Sulfuric acid
07/18/2000	11:58 AM	11E (old stockyard)	S	3	NA	PU	Flammable and combustible liquid
07/18/2000	12:08 PM	11E (old stockyard)	N	2.1	1075	LGT	Propane
07/18/2000	12:17 PM	11E (old stockyard)	N	6.1	NA	B	Poisonous
07/18/2000	12:41 PM	11E (old stockyard)	S	5.1, 2.2	1073	VAN	Oxygen
07/18/2000	1:31 PM	11E (old stockyard)	S	3	1203	LT	Gasoline

07/18/2000	2:00 PM	11E (old stockyard)	S	2.1	1075	LGT	Propane
07/18/2000	2:37 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/18/2000	2:58 PM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/18/2000	3:29 PM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/18/2000	3:42 PM	11E (old stockyard)	S	3	1203	PU	Gasoline
07/18/2000	4:17 PM	11E (old stockyard)	N	5.1, 2.2	1073	S	Oxygen
07/18/2000	4:18 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/18/2000	5:13 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/18/2000	5:38 PM	11E (old stockyard)	S	3, 5.1, 8	NA	B	Flammable, Oxidizer, Corrosive
07/19/2000	6:30 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	6:33 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	6:33 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	6:42 AM	I-181 (Okolono Rd.)	N	5.1	2428	LT	Sodium chlorate, aqueous solution
07/19/2000	6:51 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	7:05 AM	I-181 (Okolono Rd.)	N	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/19/2000	7:27 AM	I-181 (Okolono Rd.)	N	5.1	2428	LT	Sodium chlorate, aqueous solution
07/19/2000	7:29 AM	I-181 (Okolono Rd.)	S	8	NA	S	Corrosive
07/19/2000	7:50 AM	I-181 (Okolono Rd.)	S	3	1993	LT	Flammable liquid, n.o.s.
07/19/2000	8:34 AM	I-181 (Okolono Rd.)	N	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/19/2000	8:39 AM	I-181 (Okolono Rd.)	N	3	1993	LT	Flammable liquid, n.o.s.
07/19/2000	8:42 AM	I-181 (Okolono Rd.)	N	3	1203	LT	Gasoline
07/19/2000	8:59 AM	I-181 (Okolono Rd.)	S	8	NA	S	Corrosive
07/19/2000	9:12 AM	I-181 (Okolono Rd.)	S	2.1	1075	PU	Propane

07/19/2000	9:23 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	9:23 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	9:23 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	9:28 AM	I-181 (Okolono Rd.)	N	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/19/2000	9:29 AM	I-181 (Okolono Rd.)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/19/2000	9:29 AM	I-181 (Okolono Rd.)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/19/2000	9:44 AM	I-181 (Okolono Rd.)	S	1.1D	NA	B	Explosive (mass explosion hazard)
07/19/2000	9:45 AM	I-181 (Okolono Rd.)	N	8	NA	S	Corrosive
07/19/2000	9:57 AM	I-181 (Okolono Rd.)	S	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/19/2000	10:30 AM	I-181 (Okolono Rd.)	S	8	2209	LT	Formaldehyde, solutions
07/19/2000	10:32 AM	I-181 (Okolono Rd.)	S	3	1203	LT	Gasoline
07/19/2000	10:49 AM	I-181 (Okolono Rd.)	N	7	2982	FT	Radioactive material, n.o.s.
07/19/2000	11:03 AM	I-181 (Okolono Rd.)	S	8, 2.3	NA	S	Corrosive, Poison gas
07/19/2000	11:05 AM	I-181 (Okolono Rd.)	S	5.1	1486	B	Potassium nitrate
07/19/2000	11:07 AM	I-181 (Okolono Rd.)	N	2.3, 8	1050	TT	Hydrogen chloride, anhydrous
07/19/2000	11:23 AM	I-181 (Okolono Rd.)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/19/2000	11:32 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	11:32 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	11:32 AM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	11:41 AM	I-181 (Okolono Rd.)	S	3	NA	B	Flammable and combustible liquid
07/19/2000	12:41 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% CM

07/19/2000	12:48 PM	I-181 (Okolono Rd.)	S	3, 6.1, 9	NA	B	Flam., Poison, Misc. hazardous material
07/19/2000	1:35 PM	I-181 (Okolono Rd.)	S	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/19/2000	1:36 PM	I-181 (Okolono Rd.)	S	5.1, 2.2	1073	S	Oxygen
07/19/2000	1:39 PM	I-181 (Okolono Rd.)	N	2.1	1075	LGT	Propane
07/19/2000	1:50 PM	I-181 (Okolono Rd.)	S	8	2693	LT	Bisulfites, aqeous solution, n.o.s.
07/19/2000	2:03 PM	I-181 (Okolono Rd.)	N	3	1294	LT	Toluene
07/19/2000	2:17 PM	I-181 (Okolono Rd.)	S	5.1, 2.2	1073	S	Oxygen
07/19/2000	2:22 PM	I-181 (Okolono Rd.)	N	3	1993	LT	Flammable liquid, n.o.s.
07/19/2000	2:44 PM	I-181 (Okolono Rd.)	N	HOT	9259	LT	Elevated temperature material,liquid,n.o.s.
07/19/2000	3:21 PM	I-181 (Okolono Rd.)	S	3	1220	LT	Isopropyl acetate
07/19/2000	3:29 PM	I-181 (Okolono Rd.)	N	3	1203	LT	Gasoline
07/19/2000	3:40 PM	I-181 (Okolono Rd.)	S	2.1	1075	LGT	Propane
07/19/2000	4:04 PM	I-181 (Okolono Rd.)	N	3	1203	LT	Gasoline
07/19/2000	4:38 PM	I-181 (Okolono Rd.)	N	7	NA	B	Radioactive
07/19/2000	4:39 PM	I-181 (Okolono Rd.)	N	8, 2.3	NA	S	Corrosive, Poison gas
07/19/2000	4:49 PM	I-181 (Okolono Rd.)	N	2.1	1075	LGT	Propane
07/19/2000	4:49 PM	I-181 (Okolono Rd.)	N	8	1715	LT	Acetic anhydride
07/19/2000	5:16 PM	I-181 (Okolono Rd.)	N	8	NA	S	Corrosive
07/19/2000	5:35 PM	I-181 (Okolono Rd.)	S	8	2215	LT	Maleic acid
07/19/2000	5:37 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/19/2000	5:57 PM	I-181 (Okolono Rd.)	N	HOT	9259	LT	Elevated temperature material,liquid,n.o.s.
07/19/2000	5:57 PM	I-181 (Okolono Rd.)	N	3	1993	LT	Flammable liquid, n.o.s.
07/19/2000	5:58 PM	I-181 (Okolono Rd.)	N	5.1, 2.2	1073	S	Oxygen

07/20/2000	6:11 AM	HWY 321(Milligan)	E	5.1	2427	B	Potassium chlorate, solution
07/20/2000	6:27 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	6:30 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	6:31 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	6:56 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	7:11 AM	HWY 321(Milligan)	E	3	1267	LT	Petroleum crude oil
07/20/2000	7:47 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	7:59 AM	HWY 321(Milligan)	W	5.1, 2.2	1073	VAN	Oxygen
07/20/2000	8:04 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	8:06 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	8:24 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	8:41 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	8:49 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	9:14 AM	HWY 321(Milligan)	E	8, Dang.	NA	B	Corrosive, Mixed hazardous material
07/20/2000	9:32 AM	HWY 321(Milligan)	E	2.2	NA	S	Compressed gas (non-flammable)
07/20/2000	10:13 AM	HWY 321(Milligan)	E	6.2	3291	S	(Bio) medical wastes, n.o.s.
07/20/2000	11:04 AM	HWY 321(Milligan)	W	3	1993	PU	Flammable liquid, n.o.s.
07/20/2000	11:09 AM	HWY 321(Milligan)	W	2.1	1075	F	Propane
07/20/2000	11:22 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	11:31 AM	HWY 321(Milligan)	W	3	1267	LT	Petroleum crude oil
07/20/2000	11:32 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	12:08 PM	HWY 321(Milligan)	W	6.2	3291	S	(Bio) medical wastes, n.o.s.
07/20/2000	12:09 PM	HWY 321(Milligan)	E	2.1	1075	LGT	Propane
07/20/2000	12:41 PM	HWY 321(Milligan)	W	8, Dang	NA	B	Corrosive, Mixed hazardous material
07/20/2000	12:57 AM	HWY 321(Milligan)	E	3	1993	LT	Flammable liquid, n.o.s.
07/20/2000	1:16 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	S	Oxygen
07/20/2000	1:49 PM	HWY 321(Milligan)	E	8	1824	LT	Sodium hydoxide, solution

07/20/2000	2:00 PM	HWY 321(Milligan)	E	5.1, 2.2	1073	S	Oxygen
07/20/2000	2:21 PM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/20/2000	3:05 PM	HWY 321(Milligan)	W	5.1	NA	B	Oxidizer
07/20/2000	3:07 PM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	3:42 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	S	Oxygen
07/20/2000	3:52 PM	HWY 321(Milligan)	W	8	3264	LT	Corrosive liquid, acidic, inorganic, n.o.s.
07/20/2000	3:54 PM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/20/2000	4:07 PM	HWY 321(Milligan)	W	5.1	NA	B	Oxidizer
07/20/2000	4:11 PM	HWY 321(Milligan)	W	8	1824	LT	Sodium hydoxide, solution
07/20/2000	5:35 PM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/24/2000	9:08 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/24/2000	9:14 AM	HWY 321(Milligan)	W	2.1	1075	LGT	Propane
07/24/2000	9:20 AM	HWY 321(Milligan)	W	3	1993	LT	Flammable liquid, n.o.s.
07/24/2000	9:26 AM	HWY 321(Milligan)	W	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/24/2000	9:37 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/24/2000	10:05 AM	HWY 321(Milligan)	W	8	1824	LT	Sodium hydoxide, solution
07/24/2000	10:46 AM	HWY 321(Milligan)	W	3	1993	LT	Flammable liquid, n.o.s.
07/24/2000	11:02 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/24/2000	11:16 AM	HWY 321(Milligan)	E	2.1	1075	LGT	Propane
07/24/2000	11:32 AM	HWY 321(Milligan)	E	5.1, 2.2	1073	LGT	Oxygen, refrigerated liquid
07/24/2000	11:34 AM	HWY 321(Milligan)	W	2.1	1075	LGT	Propane
07/24/2000	11:40 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/24/2000	11:44 AM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/24/2000	11:50 AM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/24/2000	12:12 PM	HWY 321(Milligan)	E	5.1, 2.2	1073	S	Oxygen
07/24/2000	12:20 PM	HWY 321(Milligan)	W	3	1203	LT	Gasoline

07/24/2000	12:24 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	LGT	Oxygen, refrigerated liquid
07/24/2000	12:44 PM	HWY 321(Milligan)	E	5.1, 2.2	1073	S	Oxygen
07/24/2000	1:07 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	S	Oxygen
07/24/2000	1:42 PM	HWY 321(Milligan)	W	2.1	1075	LGT	Propane
07/24/2000	2:40 PM	HWY 321(Milligan)	W	5.1	NA	B	Oxidizer
07/24/2000	2:42 PM	HWY 321(Milligan)	W	3	1203	LT	Gasoline
07/24/2000	2:55 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	VAN	Oxygen
07/24/2000	3:24 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	S	Oxygen
07/24/2000	3:26 PM	HWY 321(Milligan)	E	8	NA	S	Corrosive
07/24/2000	3:39 PM	HWY 321(Milligan)	W	5.1, 2.2	1073	S	Oxygen
07/24/2000	4:38 PM	HWY 321(Milligan)	E	2.1	1075	LGT	Propane
07/24/2000	5:24 PM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/24/2000	6:39 PM	HWY 321(Milligan)	W	3, 9, 8	1912, 3082, 3264	LT	
07/24/2000	7:08 PM	HWY 321(Milligan)	E	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/24/2000	8:06 PM	HWY 321(Milligan)	W	5.1	NA	B	Oxidizer
07/24/2000	8:10 PM	HWY 321(Milligan)	E	3	1203	LT	Gasoline
07/25/2000	9:00 AM	I-181 (Okolono Rd.)	N	5.1	2428	LT	Sodium chlorate, aqueous solution
07/25/2000	9:00 AM	I-181 (Okolono Rd.)	N	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/25/2000	9:01 AM	I-181 (Okolono Rd.)	N	Dangero us	NA	B	Mixed hazardous materials
07/25/2000	9:02 AM	I-181 (Okolono Rd.)	S	8	NA	B	Corrosive
07/25/2000	9:02 AM	I-181 (Okolono Rd.)	S	Dang.	NA	B	Mixed hazardous materials
07/25/2000	9:10 AM	I-181 (Okolono Rd.)	S	7	NA	S	Radioactive
07/25/2000	9:19 AM	I-181 (Okolono Rd.)	N	3	1210	B	Printing ink related material
07/25/2000	9:24 AM	I-181 (Okolono Rd.)	N	2.2	1977	LGT	Nitrogen, refrigerated liquid
07/25/2000	9:25 AM	I-181 (Okolono Rd.)	N	8	NA	B	Corrosive
07/25/2000	9:34 AM	I-181 (Okolono Rd.)	N	1.5D	NA	BT	Blasting agents

07/25/2000	9:41 AM	I-181 (Okolono Rd.)	S	3	1203	LT	Gasoline
07/25/2000	9:54 AM	I-181 (Okolono Rd.)	N	5.1	2428	LT	Sodium chlorate, aqueous solution
07/25/2000	10:08 AM	I-181 (Okolono Rd.)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/25/2000	10:30 AM	I-181 (Okolono Rd.)	S	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/25/2000	10:47 AM	I-181 (Okolono Rd.)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/25/2000	10:59 AM	I-181 (Okolono Rd.)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/25/2000	11:34 AM	I-181 (Okolono Rd.)	N	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/25/2000	11:35 AM	I-181 (Okolono Rd.)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/25/2000	11:40 AM	I-181 (Okolono Rd.)	N	6.1	NA	B	Poisonous material
07/25/2000	11:49 AM	I-181 (Okolono Rd.)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/25/2000	12:18 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/25/2000	12:41 PM	I-181 (Okolono Rd.)	N	7	2982	FT	Radioactive material, n.o.s.
07/25/2000	12:46 PM	I-181 (Okolono Rd.)	N	3	1268	LT	Petroleum distillates, n.o.s.
07/25/2000	12:53 PM	I-181 (Okolono Rd.)	N	3	1987, 1220, 1993	LT	Denatured alcohol, Isopropyl acetate, Flam. liq., n.o.s.
07/25/2000	1:03 PM	I-181 (Okolono Rd.)	N	2.2	1977	LGT	Nitrogen, refrigerated liquid
07/25/2000	1:20 PM	I-181 (Okolono Rd.)	S	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/25/2000	1:21 PM	I-181 (Okolono Rd.)	N	8	NA	B	Corrosive
07/25/2000	1:57 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/25/2000	2:05 PM	I-181 (Okolono Rd.)	N	8	1715	LT	Acetic anhydride
07/25/2000	2:14 PM	I-181 (Okolono Rd.)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/25/2000	2:40 PM	I-181 (Okolono Rd.)	N	3	1993, 1123	LT	Flammable liq., n.o.s., Butyl acetates
07/25/2000	2:50 PM	I-181 (Okolono Rd.)	N	3	1224	LT	Ketones, liquid, n.o.s.
07/25/2000	3:15 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material

07/25/2000	3:15 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/25/2000	4:19 PM	I-181 (Okolono Rd.)	N	2.1	1075	LGT	Propane
07/25/2000	4:34 PM	I-181 (Okolono Rd.)	N	8	3265	LT	Corrosive liquid, acidic, organic, n.o.s.
07/25/2000	4:53 PM	I-181 (Okolono Rd.)	N	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/25/2000	5:26 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/25/2000	5:46 PM	I-181 (Okolono Rd.)	S	3	1203	LT	Gasoline
07/25/2000	6:35 PM	I-181 (Okolono Rd.)	N	3	1203	LT	Gasoline
07/25/2000	6:55 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/25/2000	7:30 PM	I-181 (Okolono Rd.)	S	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/25/2000	8:38 PM	I-181 (Okolono Rd.)	N	8, 3	2789	LT	Acetic acid, glacial
07/25/2000	8:44 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/25/2000	8:46 PM	I-181 (Okolono Rd.)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/26/2000	9:01 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/26/2000	9:05 AM	11E (old stockyard)	S	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/26/2000	9:20 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/26/2000	9:36 AM	11E (old stockyard)	S	2.1	1075	F	Propane
07/26/2000	9:52 AM	11E (old stockyard)	N	2.1	1075	LGT	Propane
07/26/2000	9:59 AM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	10:54 AM	11E (old stockyard)	N	2.1	1075	LGT	Propane
07/26/2000	11:20 AM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/26/2000	11:30 AM	11E (old stockyard)	S	3	NA	B	Flammable and combustible liquid
07/26/2000	11:32 AM	11E (old stockyard)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)

07/26/2000	11:44 AM	11E (old stockyard)	S	2.1	1075	LGT	Propane
07/26/2000	11:48 AM	11E (old stockyard)	N	Dangerous	NA	B	Mixed hazardous materials
07/26/2000	11:58 AM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	12:07 PM	11E (old stockyard)	N	2.1	1075	F	Propane
07/26/2000	1:11 PM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/26/2000	1:19 PM	11E (old stockyard)	S	2.1	1075	LGT	Propane
07/26/2000	1:41 PM	11E (old stockyard)	S	5.1, 2.2	1073	S	Oxygen
07/26/2000	1:50 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	2:15 PM	11E (old stockyard)	N	2.1	1075	LGT	Propane
07/26/2000	2:22 PM	11E (old stockyard)	N	8	NA	S	Corrosive
07/26/2000	2:40 PM	11E (old stockyard)	S	2.1	1075	LGT	Propane
07/26/2000	3:33 PM	11E (old stockyard)	S	3	NA	B	Flammable and combustible liquid
07/26/2000	3:52 PM	11E (old stockyard)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/26/2000	3:58 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	4:12 PM	11E (old stockyard)	S	2.1	1075	LGT	Propane
07/26/2000	4:17 PM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/26/2000	4:20 PM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/26/2000	4:23 PM	11E (old stockyard)	N	5.1, 2.2	1073	S	Oxygen
07/26/2000	4:45 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	4:46 PM	11E (old stockyard)	N	2.1	1075	LGT	Propane
07/26/2000	4:47 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	4:53 PM	11E (old stockyard)	N	3, 2.1	1999, 1075	LT/LGT	Asphalt, Propane
07/26/2000	5:30 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	5:33 PM	11E (old stockyard)	N	2.1	1966	LGT	Hydrogen, refrigerated liquid
07/26/2000	5:42 PM	11E (old stockyard)	S	3	1203	LT	Gasoline
07/26/2000	5:43 PM	11E (old stockyard)	N	3	1203	LT	Gasoline

07/26/2000	5:46 PM	11E (old stockyard)	S	Dangerous	NA	B	Mixed hazardous materials
07/26/2000	6:12 PM	11E (old stockyard)	N	8, Dangerous	3264	B	Corrosive liquid, acidic, inorganic, n.o.s., Mixed
07/26/2000	6:49 PM	11E (old stockyard)	N	7	NA	B	Radioactive
07/26/2000	7:41 PM	11E (old stockyard)	N	3	1203	LT	Gasoline
07/27/2000	9:06 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	9:13 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	9:14 AM	I-181(Boones Creek)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/27/2000	9:14 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	9:29 AM	I-181(Boones Creek)	S	2.2	2187	LGT	Carbon dioxide, refrigerated liquid
07/27/2000	9:43 AM	I-181(Boones Creek)	S	5.1	2428	LT	Sodium chlorate, aqueous solution
07/27/2000	9:46 AM	I-181(Boones Creek)	S	3	2302	LT	5-Methylhexan-2-one
07/27/2000	9:50 AM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/27/2000	9:50 AM	I-181(Boones Creek)	S	3	1993	LT	Flammable liquid, n.o.s.
07/27/2000	9:51 AM	I-181(Boones Creek)	N	8	3264	LT	Corrosive liquid, acidic, inorganic, n.o.s.
07/27/2000	9:54 AM	I-181(Boones Creek)	N	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/27/2000	10:01 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	10:05 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	10:11 AM	I-181(Boones Creek)	N	2.1	1075	LGT	Propane
07/27/2000	10:13 AM	I-181(Boones Creek)	N	2.2	1951	LGT	Argon, refrigerated liquid
07/27/2000	10:18 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	10:21 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	10:35 AM	I-181(Boones Creek)	S	2.2	1977	LGT	Nitrogen, refrigerated liquid
07/27/2000	10:36 AM	I-181(Boones Creek)	N	6.2	3291	S	(Bio) medical waste

07/27/2000	10:38 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	10:49 AM	I-181(Boones Creek)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/27/2000	10:53 AM	I-181(Boones Creek)	N	5.1, 2.2	1073	S	Oxygen
07/27/2000	10:55 AM	I-181(Boones Creek)	S	7	NA	FT	Radioactive
07/27/2000	10:59 AM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/27/2000	11:11 AM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	11:17 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	11:22 AM	I-181(Boones Creek)	S	1.4	NA	B	Explosives (no significant blast hazard)
07/27/2000	11:33 AM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/27/2000	11:38 AM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/27/2000	11:47 AM	I-181(Boones Creek)	S	5.1, 2.2	1073	S	Oxygen
07/27/2000	11:56 AM	I-181(Boones Creek)	N	8, 3	NA	B	Corrosive, Flammable and combustible liquid
07/27/2000	12:02 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	12:04 PM	I-181(Boones Creek)	S	8	NA	B	Corrosive
07/27/2000	12:04 PM	I-181(Boones Creek)	N	3	1267	LT	Petroleum crude oil
07/27/2000	12:05 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	12:12 PM	I-181(Boones Creek)	S	5.1, 2.2	1073	S	Oxygen
07/27/2000	12:29 PM	I-181(Boones Creek)	N	8	1824	LT	Sodium hydroxide, solution
07/27/2000	12:32 PM	I-181(Boones Creek)	S	2.1	1075	LGT	Propane
07/27/2000	12:33 PM	I-181(Boones Creek)	S	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/27/2000	12:43 PM	I-181(Boones Creek)	S	3	NA	S	Flammable and combustible liquid
07/27/2000	12:45 PM	I-181(Boones Creek)	S	3	1267	LT	Petroleum crude oil
07/27/2000	12:48 PM	I-181(Boones Creek)	S	6.1	1017	B	Chlorine
07/27/2000	12:52 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	12:59 PM	I-181(Boones Creek)	S	8	1791	B	Hypochlorite solution
07/27/2000	1:08 PM	I-181(Boones Creek)	S	5.1	NA	B	Oxidizer

07/27/2000	1:10 PM	I-181(Boones Creek)	S	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/27/2000	1:11 PM	I-181(Boones Creek)	N	3	1993	LT	Flammable liquid, n.o.s.
07/27/2000	1:28 PM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/27/2000	1:46 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	1:47 PM	I-181(Boones Creek)	N	3	1268	LT	Petroleum distillates, n.o.s.
07/27/2000	1:58 PM	I-181(Boones Creek)	N	2.1	1075	LGT	Propane
07/27/2000	2:02 PM	I-181(Boones Creek)	N	8	1715	LT	Acetic anhydride
07/27/2000	2:09 PM	I-181(Boones Creek)	N	3, 9	1110, 3082, 1993	LT	Methyl amyl ketone, Haz. waste, liquid. n.o.s., Flam. liq., n.o.s.
07/27/2000	2:09 PM	I-181(Boones Creek)	S	Dangero us	NA	B	Mixed hazardous materials
07/27/2000	2:16 PM	I-181(Boones Creek)	S	5.1	NA	B	Oxidizer
07/27/2000	2:18 PM	I-181(Boones Creek)	N	2.1	1075	LGT	Propane
07/27/2000	2:25 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	2:43 PM	I-181(Boones Creek)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/27/2000	2:45 PM	I-181(Boones Creek)	N	7	2982	FT	Radioactive material, n.o.s.
07/27/2000	2:45 PM	I-181(Boones Creek)	N	3	NA	S	Flammable and combustible liquid
07/27/2000	2:47 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	3:07 PM	I-181(Boones Creek)	S	2.1, 2.2, 5.1	NA	F	Compressed gas (flam., non-flam., oxidizer)
07/27/2000	3:09 PM	I-181(Boones Creek)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/27/2000	3:11 PM	I-181(Boones Creek)	N	4.3	3170	ODT	Aluminum processing by-products
07/27/2000	3:17 PM	I-181(Boones Creek)	N	5.1, 2.2	1073	S	Oxygen
07/27/2000	3:27 PM	I-181(Boones Creek)	S	NA	3077	B	Hazardous waste, solid, n.o.s.
07/27/2000	3:44 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	3:53 PM	I-181(Boones Creek)	S	3, Dang.	1866	B	Resin solution, Mixed hazardous materials

07/27/2000	3:57 PM	I-181(Boones Creek)	N	2.1, 2.2, 5.1	NA	F	Compressed gas (flam., non-flam., oxidizer)
07/27/2000	4:06 PM	I-181(Boones Creek)	S	5.1, 2.2	1073	VAN	Oxygen
07/27/2000	4:09 PM	I-181(Boones Creek)	S	1.5D, 3, 5.1	1942, 1993	BT/LT	Blast. agents, NH3NO2 w/ NMT 0.2% comb. mat., Flam. liq., n.o.s.
07/27/2000	4:20 PM	I-181(Boones Creek)	S	5.1, 2.2	1073	LGT	Oxygen
07/27/2000	4:29 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	4:39 PM	I-181(Boones Creek)	S	2.1	1075	LGT	Propane
07/27/2000	4:39 PM	I-181(Boones Creek)	N	3, Dang.	1866	B	Resin solution, Mixed hazardous materials
07/27/2000	4:45 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	5:01 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/27/2000	5:10 PM	I-181(Boones Creek)	N	5.1	NA	B	Oxidizer
07/27/2000	5:19 PM	I-181(Boones Creek)	N	2.1	1075	B	Propane
07/27/2000	5:32 PM	I-181(Boones Creek)	S	3	NA	B	Flammable and combustible liquid
07/27/2000	5:33 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/27/2000	5:41 PM	I-181(Boones Creek)	N	8	2491	LT	Ethanolamine
07/27/2000	5:44 PM	I-181(Boones Creek)	N	1.4	NA	B	Explosives (no significant blast hazard)
07/27/2000	5:52 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	6:00 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	6:23 PM	I-181(Boones Creek)	S	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/27/2000	6:34 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/27/2000	6:37 PM	I-181(Boones Creek)	N	8	2218	LT	Acrylic acid, inhibited
07/27/2000	6:37 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% CM

07/27/2000	6:44 PM	I-181(Boones Creek)	S	2.1	1075	LGT	Propane
07/27/2000	6:48 PM	I-181(Boones Creek)	S	3	1203	LT	Gasoline
07/27/2000	6:58 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/27/2000	7:08 PM	I-181(Boones Creek)	S	8	1848	LT	Propionic acid
07/27/2000	7:29 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	7:40 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	7:54 PM	I-181(Boones Creek)	S	8	2794	B	Batteries, wet, filled with acid
07/27/2000	8:22 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	8:36 PM	I-181(Boones Creek)	N	3	1193	LT	Ethyl methyl ketone
07/27/2000	8:48 PM	I-181(Boones Creek)	S	8	1715	LT	Acetic anhydride
07/27/2000	8:50 PM	I-181(Boones Creek)	N	3, 8	1993, 3264	LT	Flam. liq., n.o.s., Corrosive liquid, acidic, inorganic, n.o.s.
08/03/2000	6:04 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
08/03/2000	6:37 AM	I-181(Boones Creek)	N	8	1715	LT	Acetic anhydride
08/03/2000	6:48 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
08/03/2000	6:49 AM	I-181(Boones Creek)	N	5.1, 2.2	1073	S	Oxygen
08/03/2000	7:16 AM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
08/03/2000	7:28 AM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
08/03/2000	7:28 AM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
08/03/2000	8:14 AM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
08/03/2000	8:15 AM	I-181(Boones Creek)	N	8	NA	S	Corrosive
08/03/2000	8:23 AM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% CM

08/03/2000	8:24 AM	I-181(Boones Creek)	N	5.1	2428	LT	Sodium chlorate, aqueous solution
08/03/2000	8:30 AM	I-181(Boones Creek)	N	5.1	2428	LT	Sodium chlorate, aqueous solution
08/03/2000	8:33 AM	I-181(Boones Creek)	N	7	NA	FT	Radioactive
08/03/2000	8:40 AM	I-181(Boones Creek)	N	8, 3	NA	S	Corrosive, Flammable and combustible liquid
08/03/2000	8:43 AM	I-181(Boones Creek)	N	2.1	1075	F	Propane
08/03/2000	8:54 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	9:13 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	9:51 AM	I-181(Boones Creek)	N	8	3264	LT	Corrosive liquid, acidic, inorganic, n.o.s.
07/27/2000	9:54 AM	I-181(Boones Creek)	N	HOT	3257	LT	Elevated temperature liquid, n.o.s.
07/27/2000	10:11 AM	I-181(Boones Creek)	N	2.1	1075	LGT	Propane
07/27/2000	10:13 AM	I-181(Boones Creek)	N	2.2	1951	LGT	Argon, refrigerated liquid
07/27/2000	10:21 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	10:36 AM	I-181(Boones Creek)	N	6.2	3291	S	(Bio) medical waste
07/27/2000	10:49 AM	I-181(Boones Creek)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/27/2000	10:53 AM	I-181(Boones Creek)	N	5.1, 2.2	1073	S	Oxygen
07/27/2000	11:17 AM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	11:56 AM	I-181(Boones Creek)	N	8, 3	NA	B	Corrosive, Flammable and combustible liquid
07/27/2000	12:04 PM	I-181(Boones Creek)	N	3	1267	LT	Petroleum crude oil
07/27/2000	12:29 PM	I-181(Boones Creek)	N	8	1824	LT	Sodium hydroxide, solution
07/27/2000	1:11 PM	I-181(Boones Creek)	N	3	1993	LT	Flammable liquid, n.o.s.
07/27/2000	1:46 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	1:47 PM	I-181(Boones Creek)	N	3	1268	LT	Petroleum distillates, n.o.s.
07/27/2000	1:58 PM	I-181(Boones Creek)	N	2.1	1075	LGT	Propane
07/27/2000	2:02 PM	I-181(Boones Creek)	N	8	1715	LT	Acetic anhydride

07/27/2000	2:09 PM	I-181(Boones Creek)	N	3, 9	1110, 3082, 1993	LT	Methyl amyl ketone, Haz. waste, liquid, Flam. liq.
07/27/2000	2:18 PM	I-181(Boones Creek)	N	2.1	1075	LGT	Propane
07/27/2000	2:43 PM	I-181(Boones Creek)	N	2.1, 2.2	NA	F	Compressed gas (flam., and non-flam.)
07/27/2000	2:45 PM	I-181(Boones Creek)	N	7	2982	FT	Radioactive material, n.o.s.
07/27/2000	2:45 PM	I-181(Boones Creek)	N	3	NA	S	Flammable and combustible liquid
07/27/2000	3:11 PM	I-181(Boones Creek)	N	4.3	3170	ODT	Aluminum processing by-products
07/27/2000	3:17 PM	I-181(Boones Creek)	N	5.1, 2.2	1073	S	Oxygen
07/27/2000	3:44 PM	I-181(Boones Creek)	N	3	1203	LT	Gasoline
07/27/2000	3:57 PM	I-181(Boones Creek)	N	2.1, 2.2, 5.1	NA	F	Compressed gas (flam., non-flam., oxidizer)
07/27/2000	4:39 PM	I-181(Boones Creek)	N	3, Dangerous	1866	B	Resin solution, Mixed hazardous materials
07/27/2000	5:01 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/27/2000	5:10 PM	I-181(Boones Creek)	N	5.1	NA	B	Oxidizer
07/27/2000	5:19 PM	I-181(Boones Creek)	N	2.1	1075	B	Propane
07/27/2000	5:33 PM	I-181(Boones Creek)	N	5.1	1942	ODT	Ammonium nitrate w/ NMT 0.2% comb. material
07/27/2000	5:41 PM	I-181(Boones Creek)	N	8	2491	LT	Ethanolamine
07/27/2000	5:44 PM	I-181(Boones Creek)	N	1.4	NA	B	Explosives (no significant blast hazard)

Appendix A4: I-181 @ Boones Creek / Southbound (6AM to 6PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 – Explosives	4	5%	0.31%
2.1 - Flammable gas	7	9%	0.55%
2.2 - Non-flammable gas	10	12%	0.78%
2.3 - Poisonous gas	2	2%	0.16%
3 - Flammable	27	33%	2.10%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	12	15%	0.93%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	1	1%	0.08%
6.2 - Infectious	1	1%	0.08%
7 - Radioactive	2	2%	0.16%
8 - Corrosive	11	13%	0.86%
9 - Miscellaneous	4	5%	0.31%
Dangerous	1	1%	0.08%
Total	82	100%	6.39%

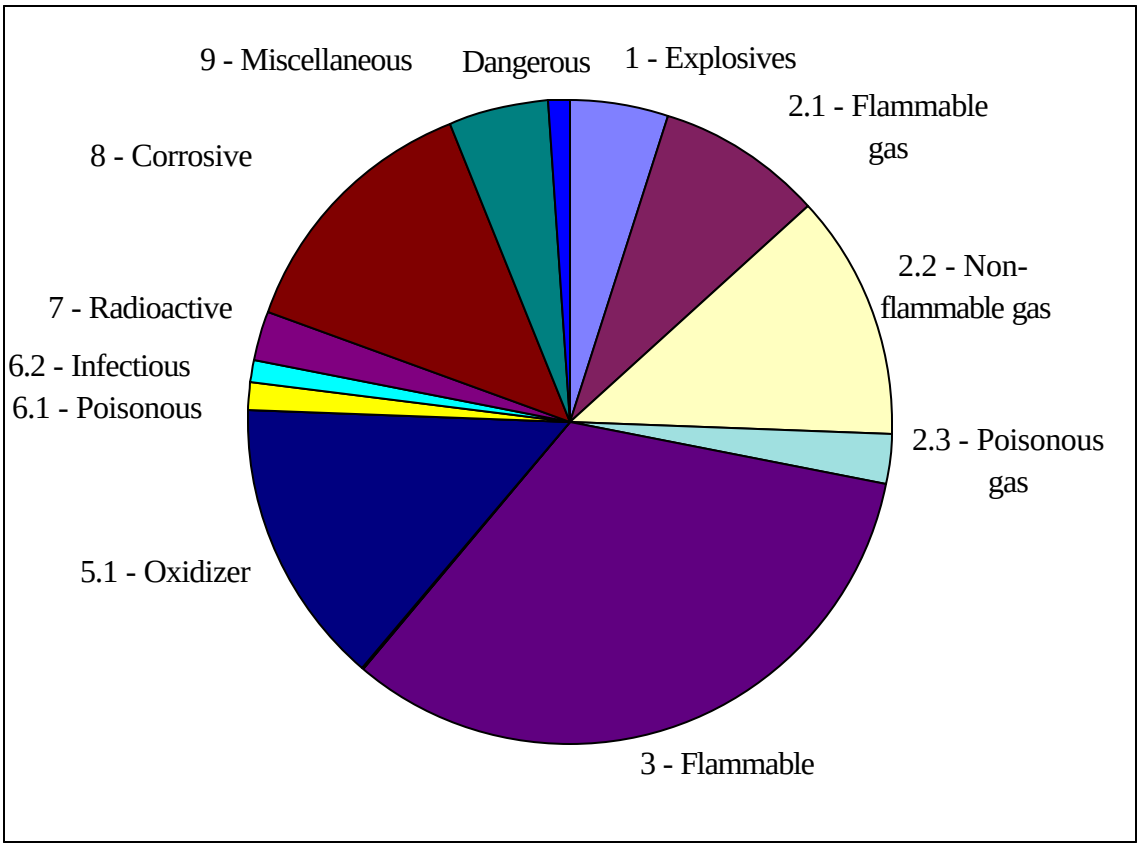

Figure A1: I-181 @ Boones Creek / Southbound (6AM to 6PM)

Appendix A5: I-181 @ Boones Creek / Northbound (6 AM to 6 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	1	2%	0.08%
2.1 - Flammable gas	8	13%	0.64%
2.2 - Non-flammable gas	7	11%	0.56%
2.3 – Poison gas	0	0%	0.00%
3 - Flammable	16	26%	1.27%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	1	2%	0.08%
5.1 - Oxidizer	14	23%	1.11%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	1	2%	0.08%
7 - Radioactive	2	3%	0.16%
8 - Corrosive	8	13%	0.64%
9 - Miscellaneous	2	3%	0.16%
Dangerous	1	2%	0.08%
Total	61	100%	4.85%

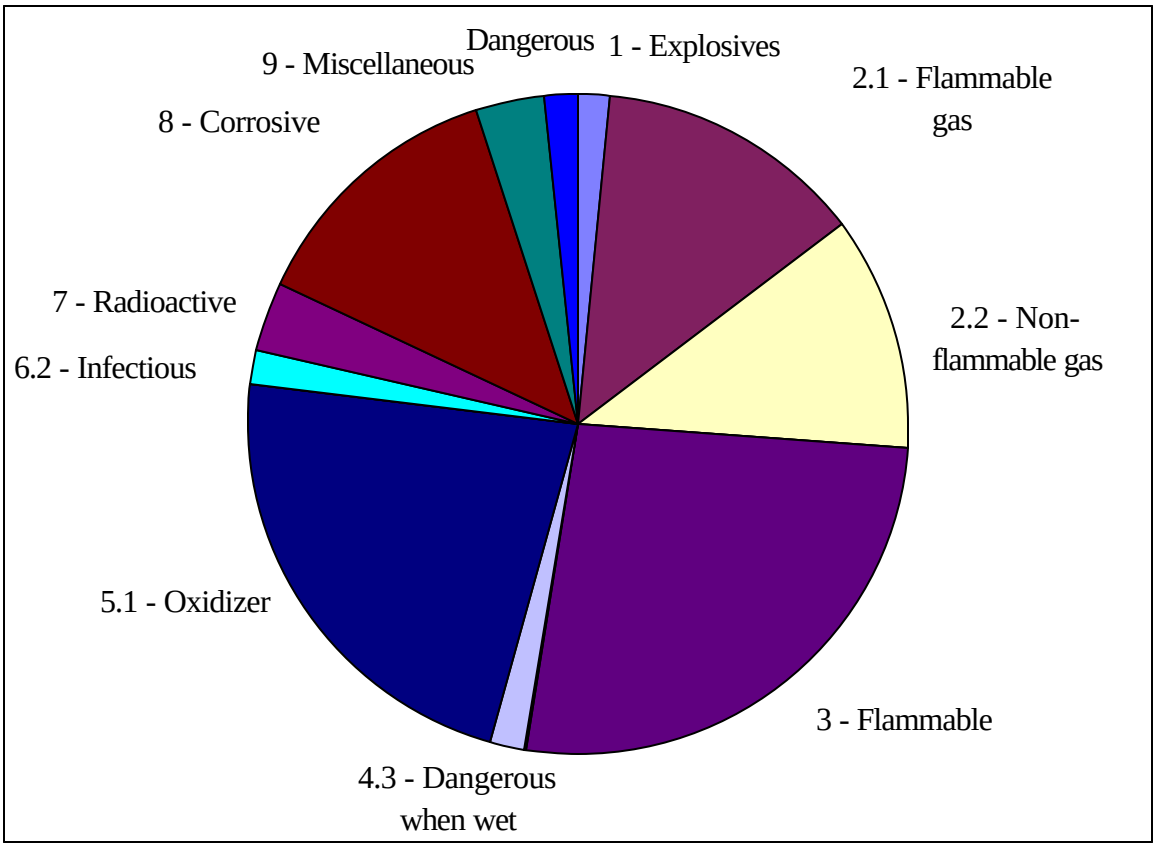

Figure A2: I-181 @ Boones Creek / Northbound (6 AM to 6 PM)

Appendix A6: I-181 @ Boones Creek / Southbound (9 AM to 9 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	2	3%	0.19%
2.1 - Flammable gas	6	9%	0.56%
2.2 - Non-flammable gas	9	13%	0.84%
2.3 – Poison gas	0	0%	0.00%
3 - Flammable	29	43%	2.70%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	8	12%	0.75%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	1	1%	0.09%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	1	1%	0.09%
8 - Corrosive	5	7%	0.47%
9 - Miscellaneous	4	6%	0.37%
Dangerous	2	3%	0.19%
Total	67	100%	6.24%

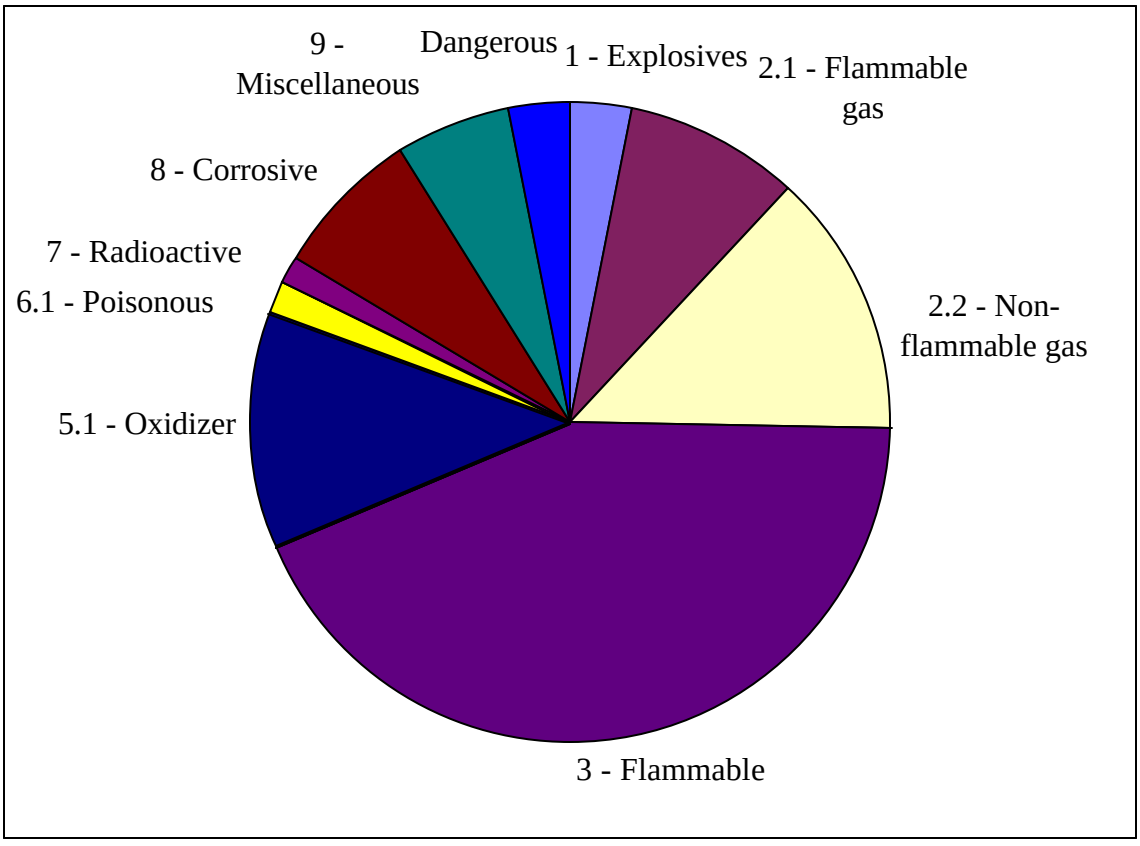

Figure A3: I-181 @ Boones Creek / Southbound (9 AM to 9 PM)

Appendix A7: I-181 @ Boones Creek / Northbound (9 AM to 9 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	1	2%	0.09%
2.1 - Flammable gas	7	13%	0.63%
2.2 - Non-flammable gas	6	11%	0.54%
2.3 – Poison gas	0	0%	0.00%
3 - Flammable	17	32%	1.54%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	1	2%	0.09%
5.1 - Oxidizer	9	17%	0.81%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	1	2%	0.09%
7 - Radioactive	1	2%	0.09%
8 – Corrosive	7	13%	0.63%
9 – Miscellaneous	2	4%	0.18%
Dangerous	1	2%	0.09%
Total	53	100%	4.80%

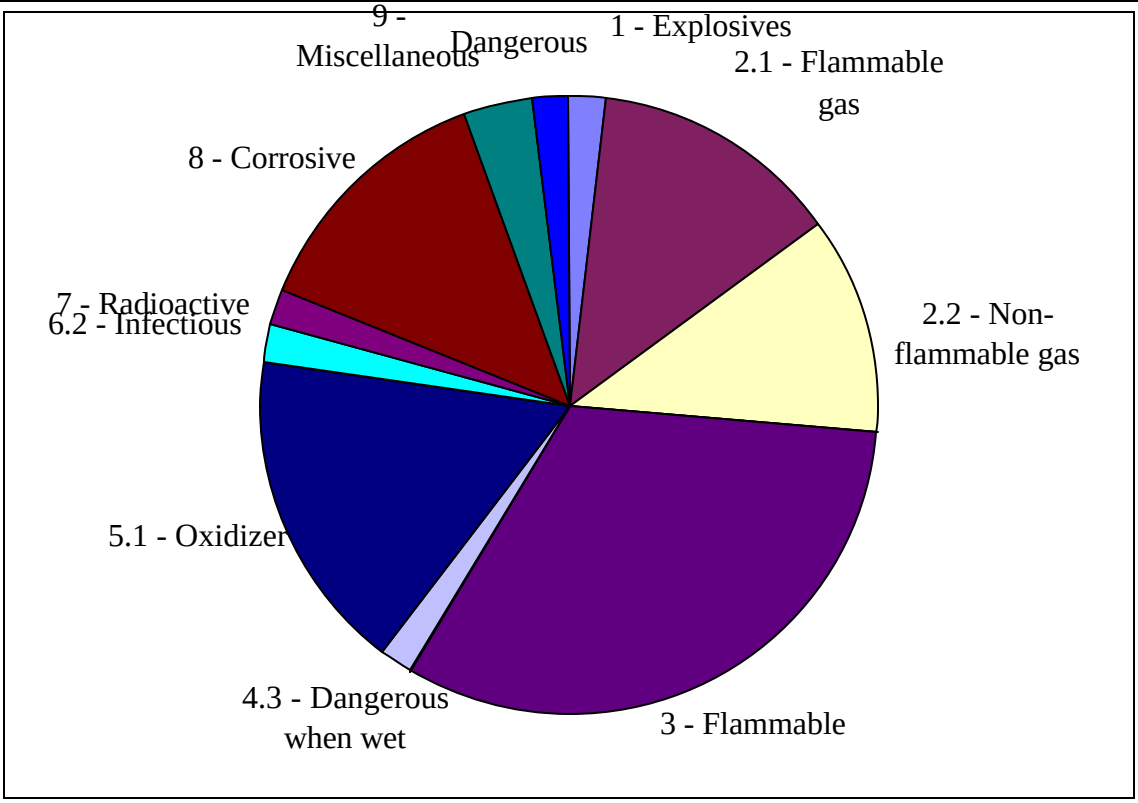

Figure A4: I-181 @ Boones Creek / Northbound (9 AM to 9 PM)

Appendix A8: I-181 @ Boones Creek / Total HAZMAT Surveyed			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	8	3%	0.17%
2.1 - Flammable gas	28	11%	0.59%
2.2 - Non-flammable gas	32	12%	0.68%
2.3 – Poison gas	2	1%	0.04%
3 - Flammable	89	34%	1.89%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	2	1%	0.04%
5.1 - Oxidizer	43	16%	0.91%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	2	1%	0.04%
6.2 - Infectious	3	1%	0.06%
7 - Radioactive	6	2%	0.13%
8 - Corrosive	31	12%	0.66%
9 - Miscellaneous	12	5%	0.25%
Dangerous	5	2%	0.11%
Total	263	100%	5.57%

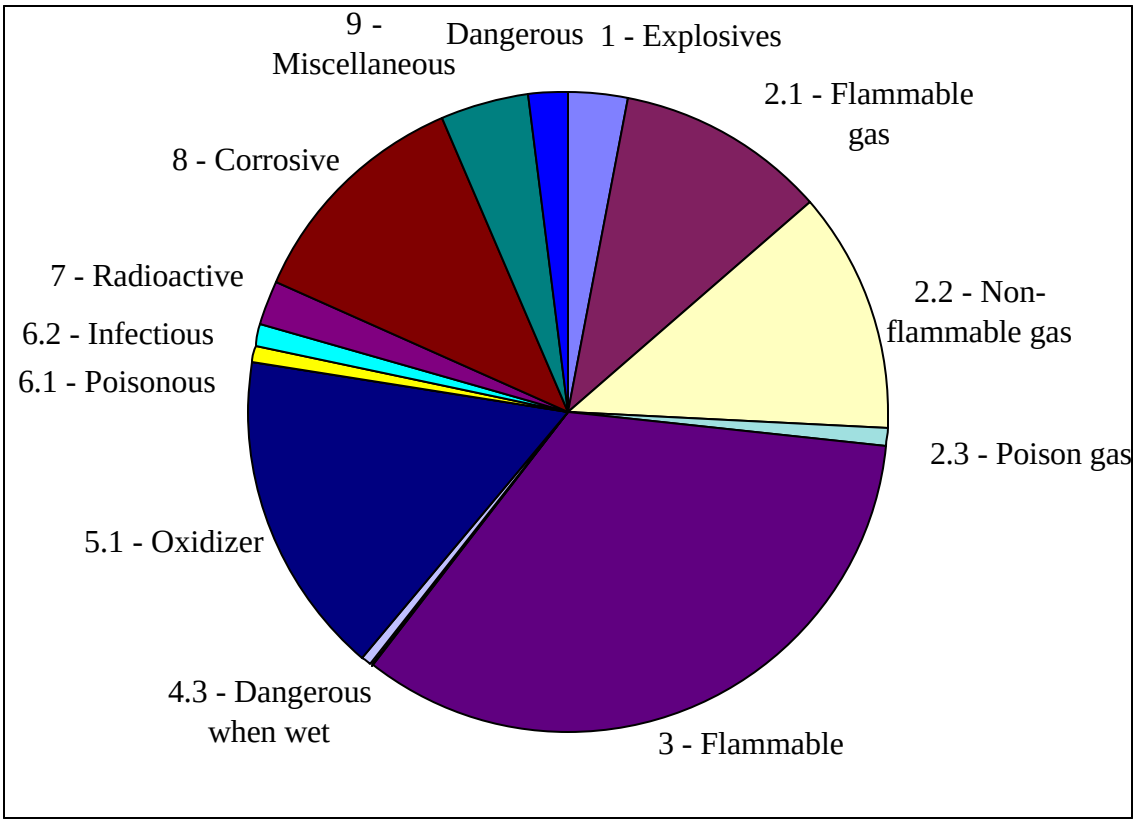

Figure A5: I-181 @ Boones Creek / Total HAZMAT Surveyed

Appendix A9: 11E South of Jonesborough / Northbound (6 AM to 6 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	5	23%	1.51%
2.2 - Non-flammable gas	5	23%	1.51%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	6	27%	1.81%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	2	9%	0.60%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	1	5%	0.30%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	3	14%	0.90%
9 - Miscellaneous	0	0%	0.00%
Dangerous	0	0%	0.00%
Total	22	100%	6.63%

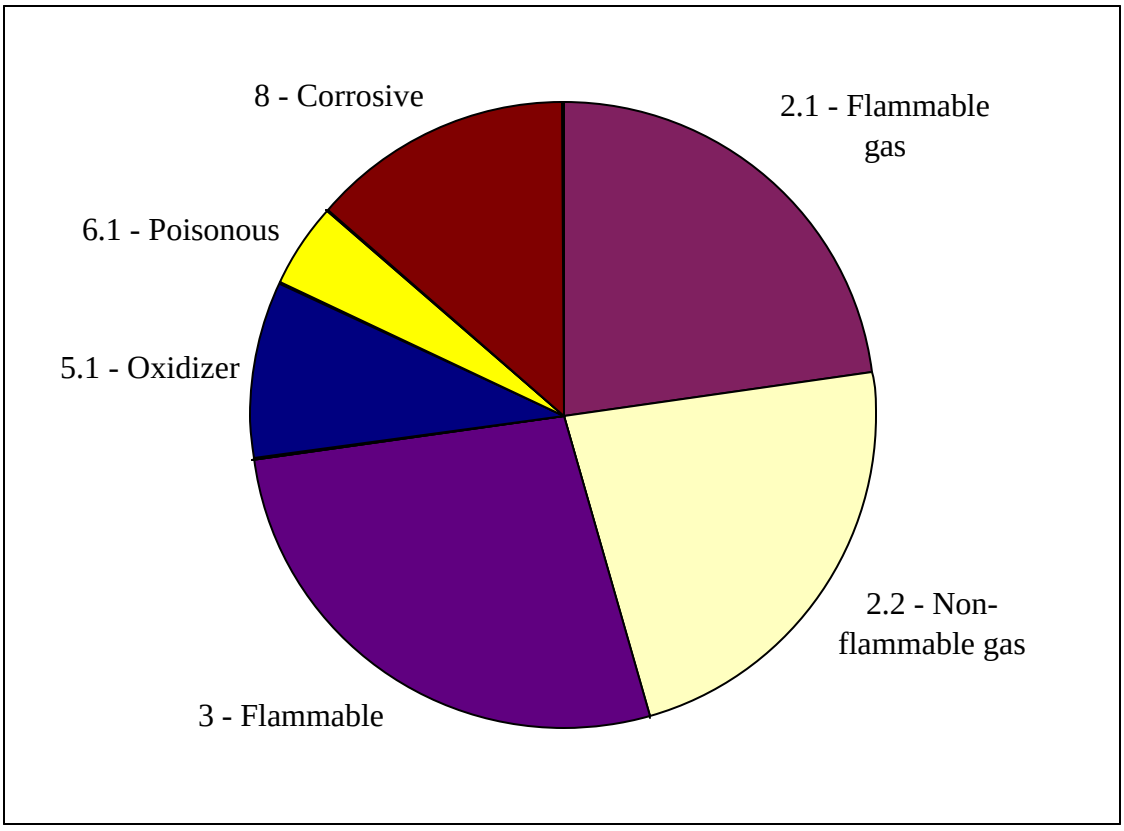

Figure A6: 11E South of Jonesborough / Northbound (6 AM to 6 PM)

Appendix A10: 11E South of Jonesborough / Southbound (6 AM to 6 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	2	6%	0.58%
2.2 - Non-flammable gas	10	32%	2.92%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	13	42%	3.79%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	3	10%	0.87%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	3	10%	0.87%
9 - Miscellaneous	0	0%	0.00%
Dangerous	0	0%	0.00%
Total	31	100%	9.04%

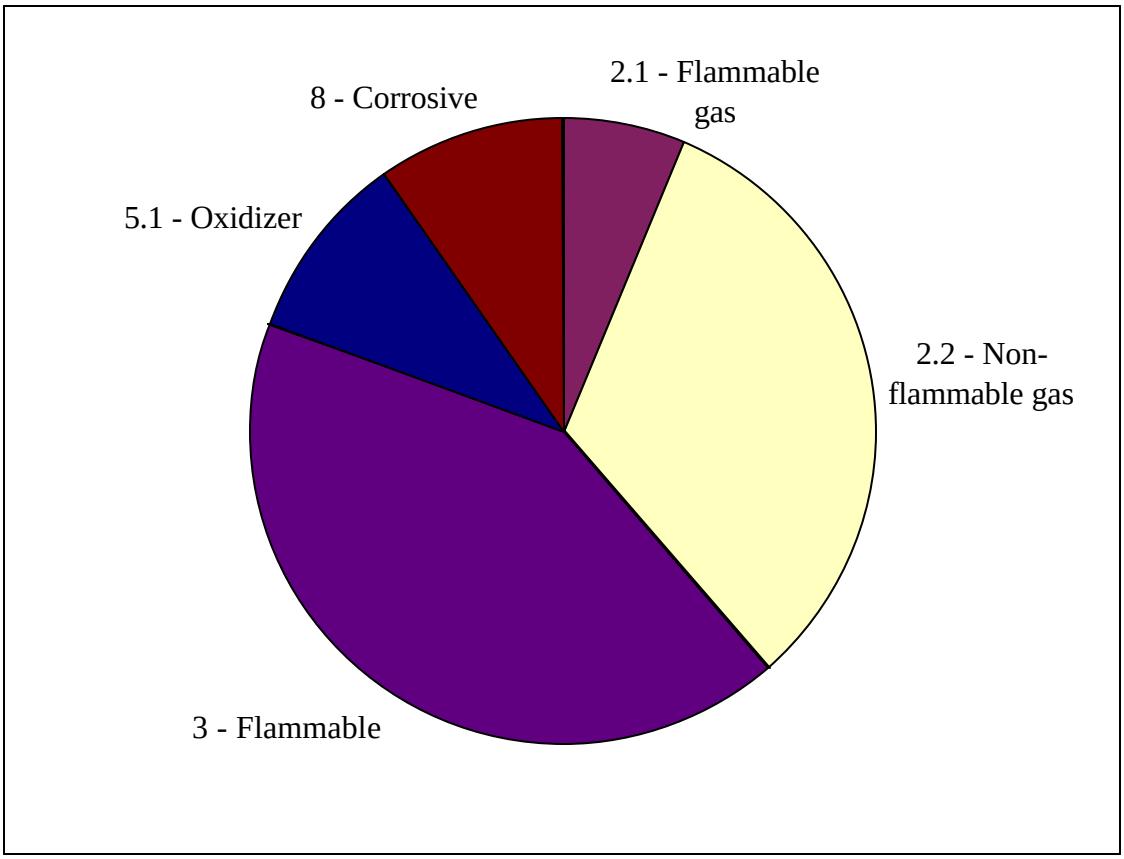

Figure A7: 11E South of Jonesborough / Southbound (6 AM to 6 PM)

Appendix A11: 11E South of Jonesborough / Northbound (9 AM to 9 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	9	35%	2.99%
2.2 - Non-flammable gas	3	12%	1.00%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	9	35%	2.99%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	1	4%	0.33%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	1	4%	0.33%
8 - Corrosive	2	8%	0.66%
9 - Miscellaneous	0	0%	0.00%
Dangerous	1	4%	0.33%
Total	26	100%	8.64%

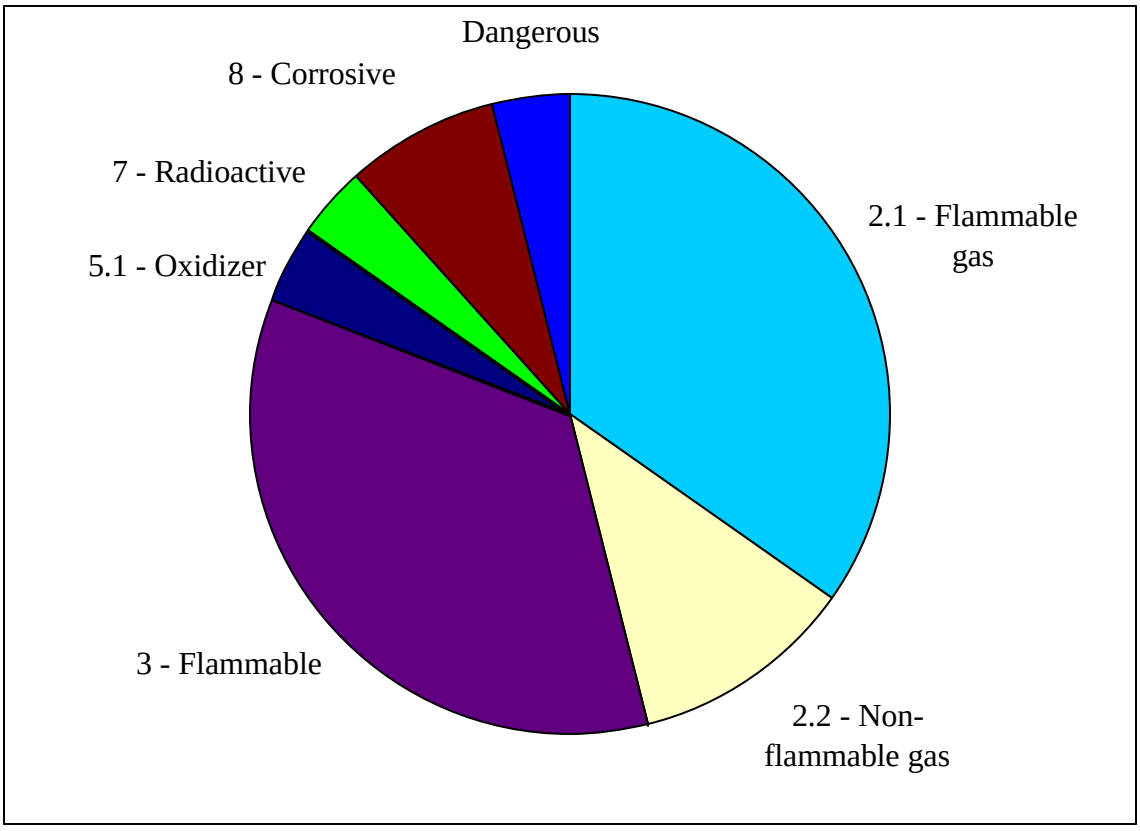

Figure A8: 11E South of Jonesborough / Northbound (9 AM to 9 PM)

Appendix A12: 11E South of Jonesborough / Southbound (9 AM to 9 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	6	30%	2.46%
2.2 - Non-flammable gas	2	10%	0.82%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	10	50%	4.10%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	1	5%	0.41%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	0	0%	0.00%
9 - Miscellaneous	0	0%	0.00%
Dangerous	1	5%	0.41%
Total	20	100%	8.20%

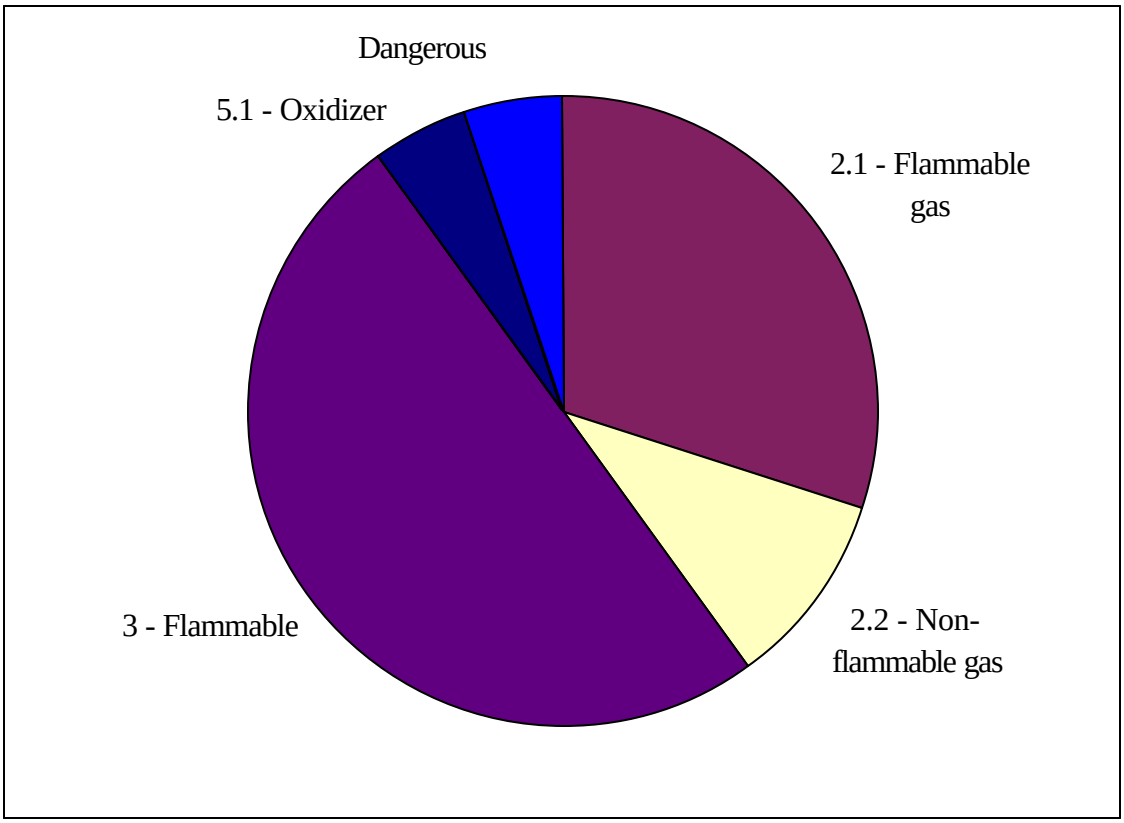

Figure A9: 11E South of Jonesborough / Southbound (9 AM to 9 PM)

Appendix A13: 11 E South of Jonesborough / Total HAZMAT Surveyed			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	22	22%	1.80%
2.2 - Non-flammable gas	20	20%	1.64%
2.3 - Poison gas	0	0%	0.00%
3 - Flammable	38	38%	3.11%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	7	7%	0.57%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	1	1%	0.08%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	1	1%	0.08%
8 - Corrosive	8	8%	0.66%
9 - Miscellaneous	0	0%	0.00%
Dangerous	2	2%	0.16%
Total	99	100%	8.11%

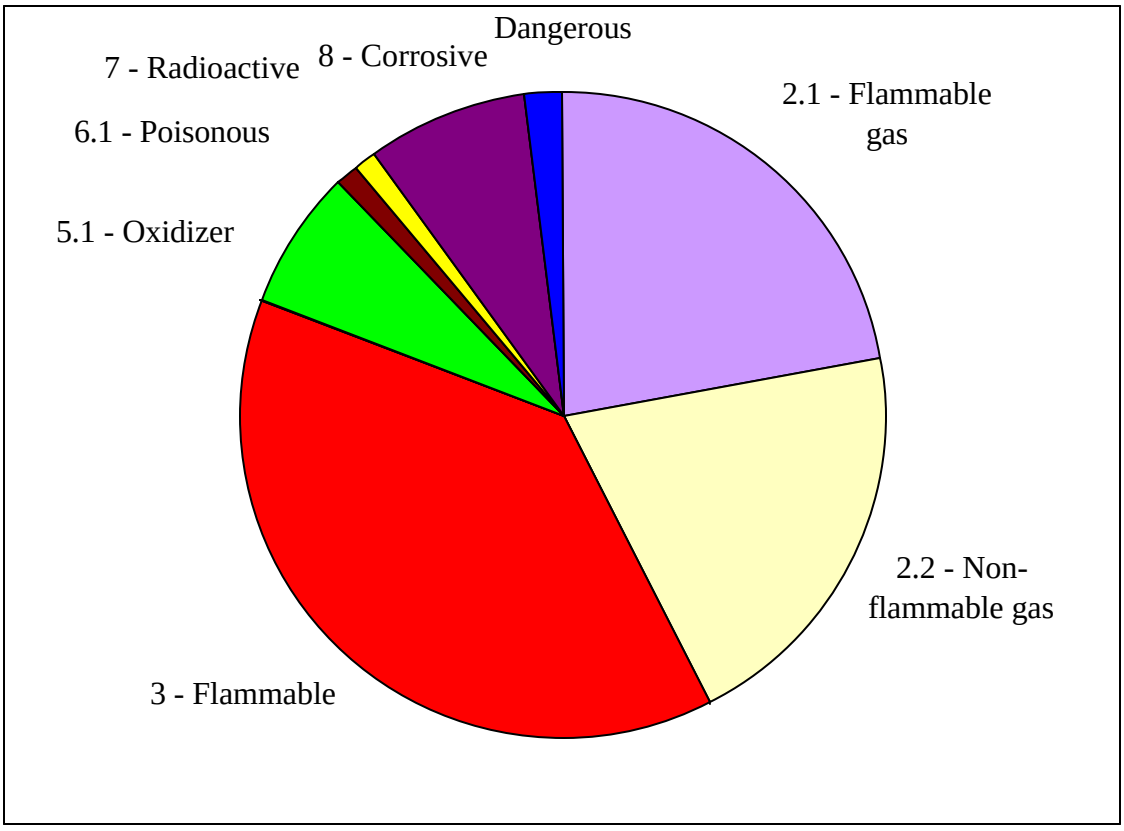

Figure A10: 11 E South of Jonesborough / Total HAZMAT Surveyed

Appendix A14: I-181 @ Okolono Rd. / Northbound (6 AM to 6 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	2	5%	0.50%
2.2 - Non-flammable gas	4	10%	0.99%
2.3 - Poisonous gas	2	5%	0.50%
3 - Flammable	7	17%	1.73%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	16	39%	3.96%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	2	5%	0.50%
8 - Corrosive	5	12%	1.24%
9 - Miscellaneous	3	7%	0.74%
Dangerous	0	0%	0.00%
Total	41	100%	10.15%

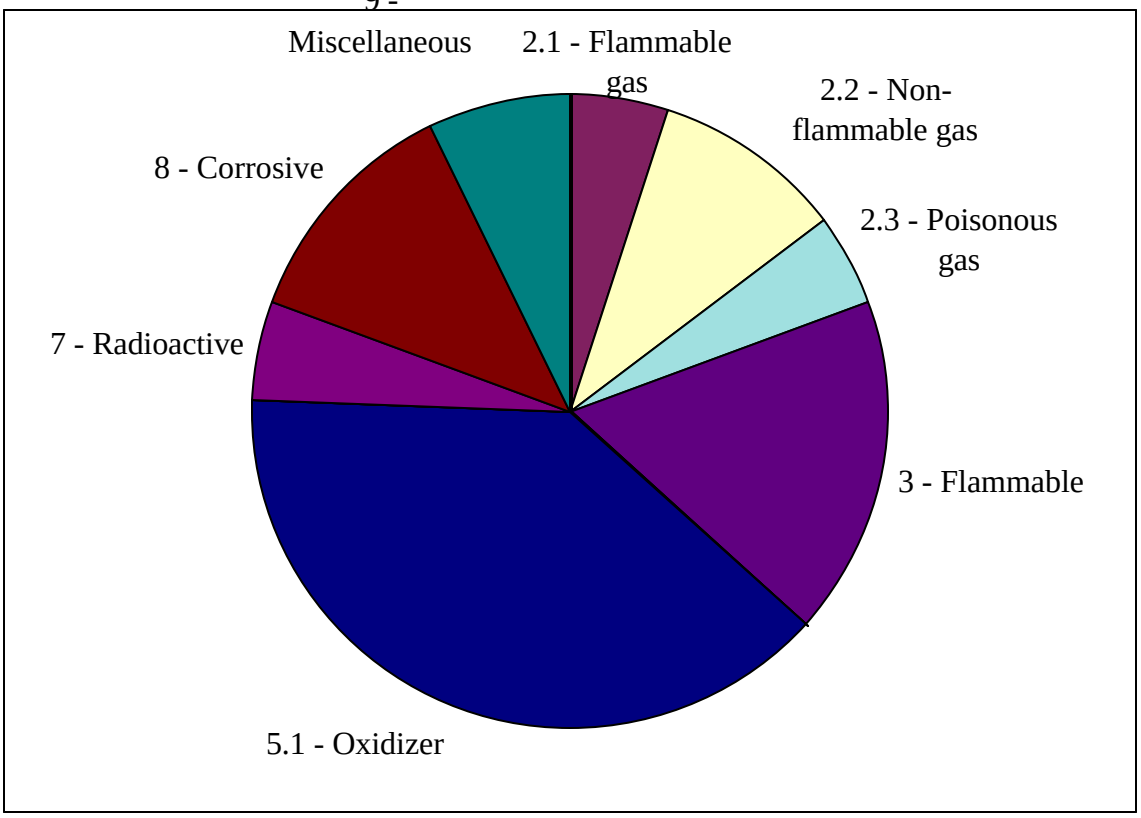

Figure A11: I-181 @ Okolono Rd. / Northbound (6 AM to 6 PM)

Appendix A15: I-181 @ Okolono Rd. / Southbound (6 AM to 6 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	1	4%	0.27%
2.1 - Flammable gas	2	8%	0.54%
2.2 - Non-flammable gas	3	12%	0.82%
2.3 - Poisonous gas	1	4%	0.27%
3 - Flammable	5	20%	1.36%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	4	16%	1.09%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	1	4%	0.27%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	6	24%	1.63%
9 - Miscellaneous	2	8%	0.54%
Dangerous	0	0%	0.00%
Total	25	100%	6.79%

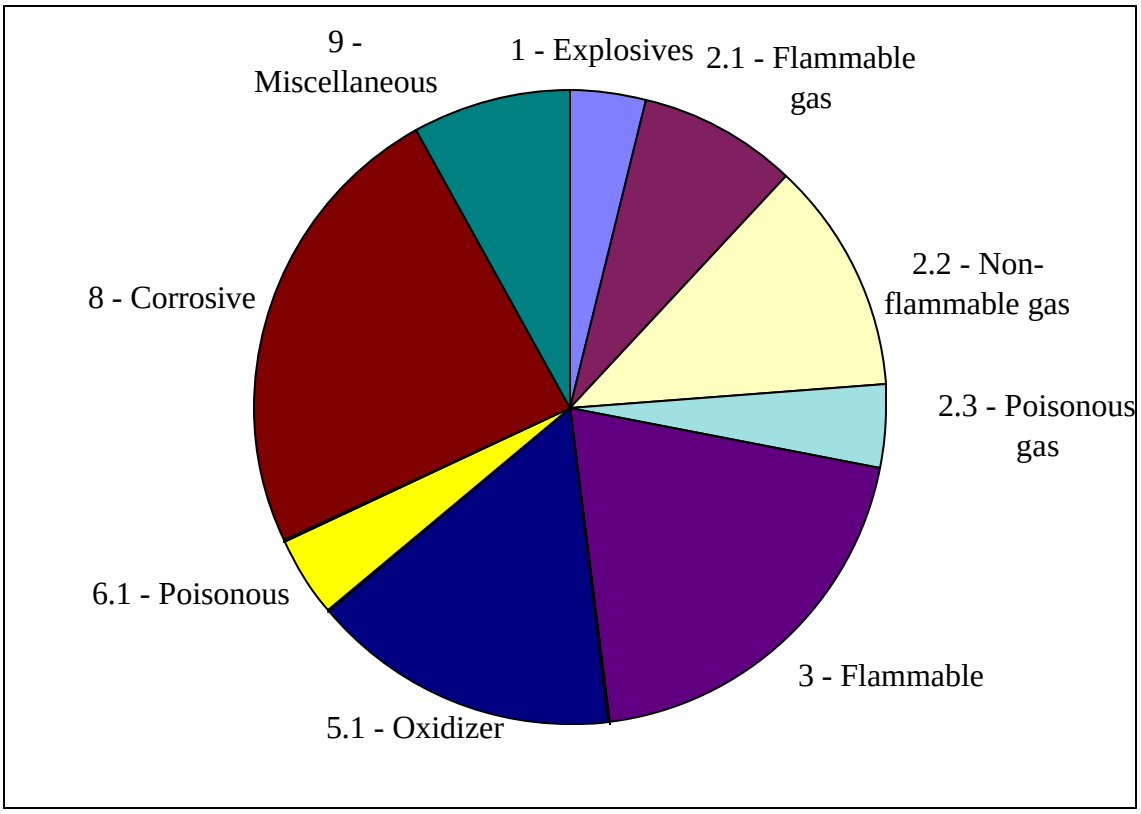

Figure A12: I-181 @ Okolono Rd. / Southbound (6 AM to 6 PM)

Appendix A16: I-181 @ Okolono Rd. / Northbound (9 AM to 9 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	1	3%	0.26%
2.1 - Flammable gas	3	9%	0.77%
2.2 - Non-flammable gas	6	17%	1.53%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	7	20%	1.79%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	10	29%	2.55%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	1	3%	0.26%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	5	14%	1.28%
9 - Miscellaneous	1	3%	0.26%
Dangerous	1	3%	0.26%
Total	35	100%	8.93%

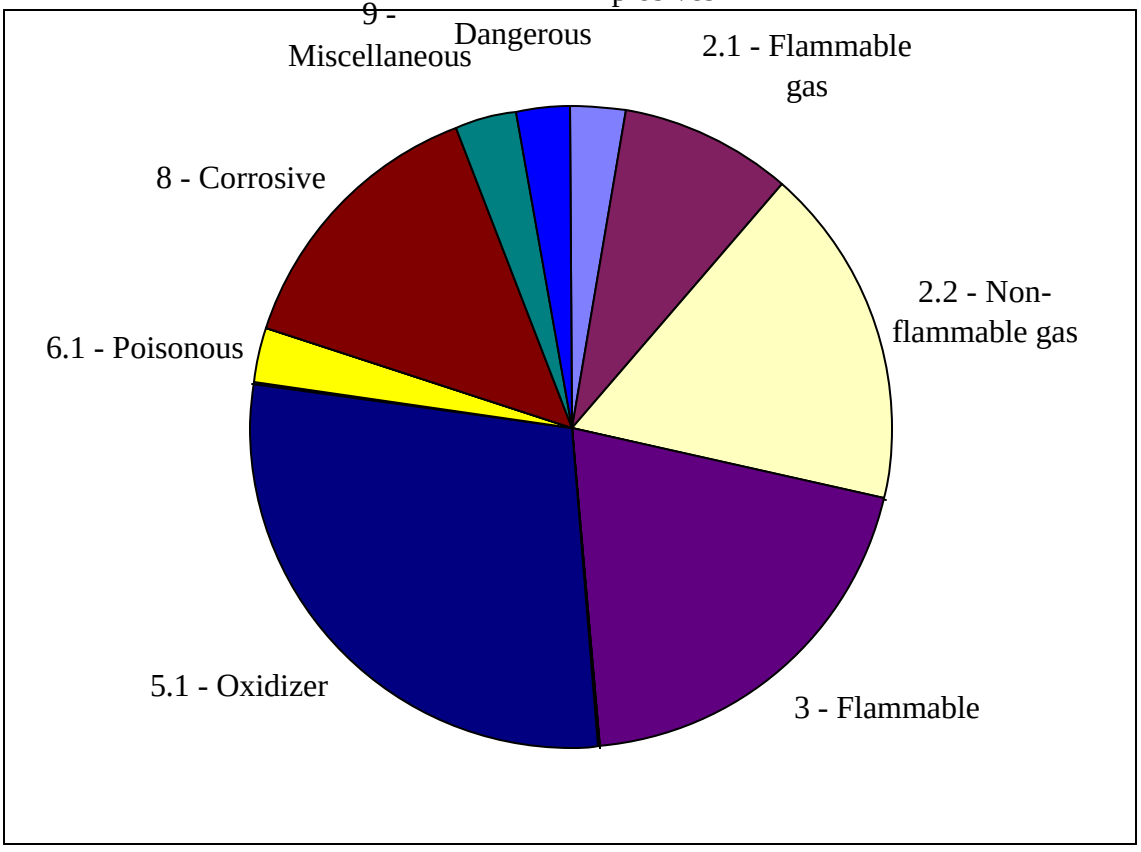

Figure A13: I-181 @ Okolono Rd. / Northbound (9 AM to 9 PM)

Appendix A17: I-181 @ Okolono Rd. / Southbound (9 AM to 9 PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	1	8%	0.31%
2.2 - Non-flammable gas	3	25%	0.93%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	2	17%	0.62%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	2	17%	0.62%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	1	8%	0.31%
9 - Miscellaneous	2	17%	0.62%
Dangerous	1	8%	0.31%
Total	12	100%	3.70%

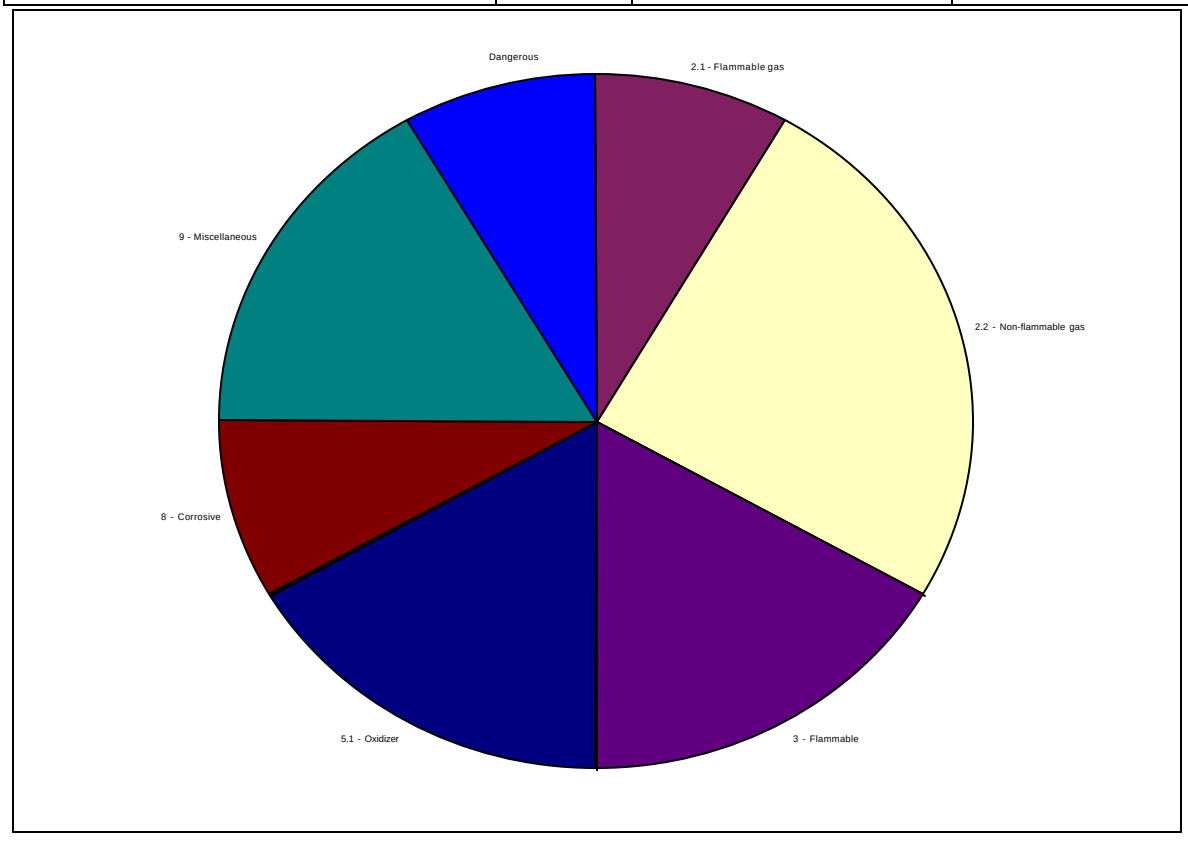

Figure A14: I-181 @ Okolono Rd. / Southbound (9 AM to 9 PM)

Appendix A18: I-181 Okolono Rd. / Total HAZMAT Surveyed			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	2	2%	0.13%
2.1 - Flammable gas	8	7%	0.54%
2.2 - Non-flammable gas	16	14%	1.08%
2.3 - Poison gas	3	3%	0.20%
3 - Flammable	21	19%	1.41%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	32	28%	2.15%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	2	2%	0.13%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	2	2%	0.13%
8 - Corrosive	17	15%	1.14%
9 - Miscellaneous	8	7%	0.54%
Dangerous	2	2%	0.13%
Total	113	100%	7.59%

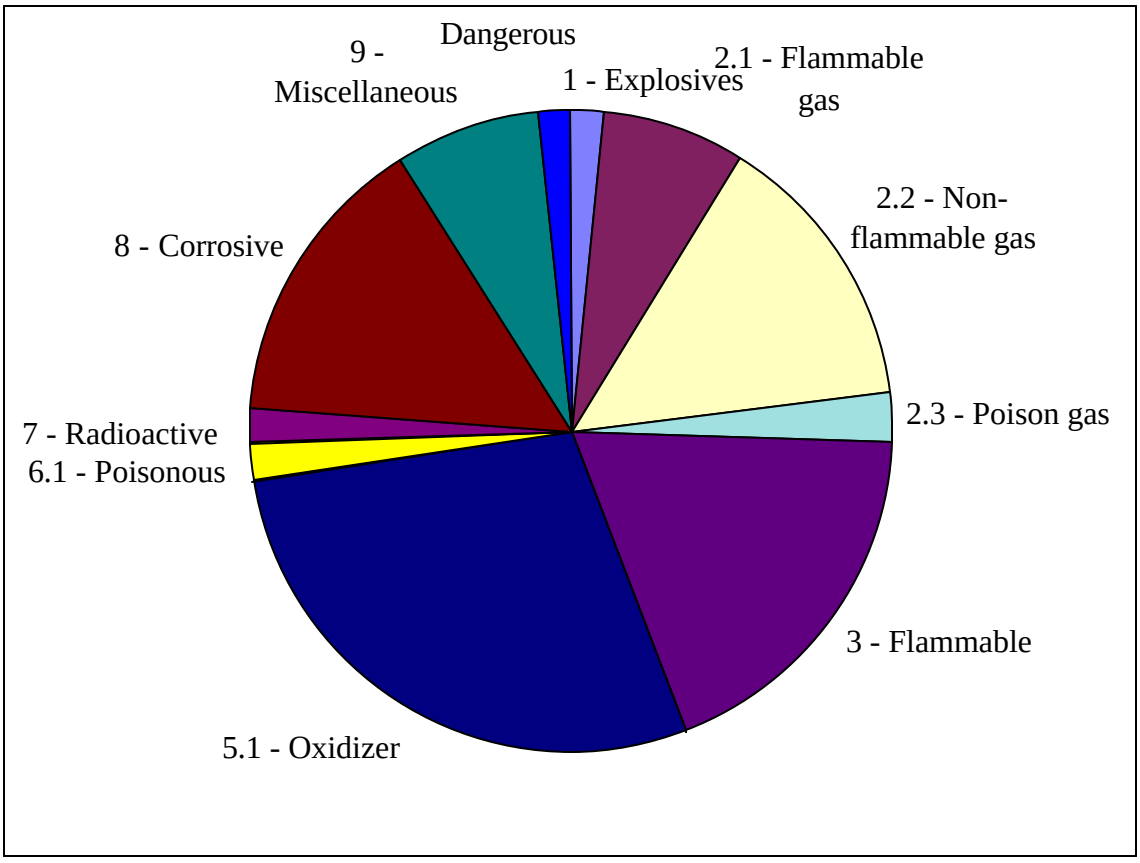

Figure A15: I-181 Okolono Rd. / Total HAZMAT Surveyed

Appendix A19: HWY 321 / Westbound (6AM to 6PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	1	4%	0.22%
2.2 - Non-flammable gas	3	13%	0.66%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	10	42%	2.19%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	5	21%	1.10%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	1	4%	0.22%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	3	13%	0.66%
9 - Miscellaneous	0	0%	0.00%
Dangerous	1	4%	0.22%
Total	24	100%	5.26%

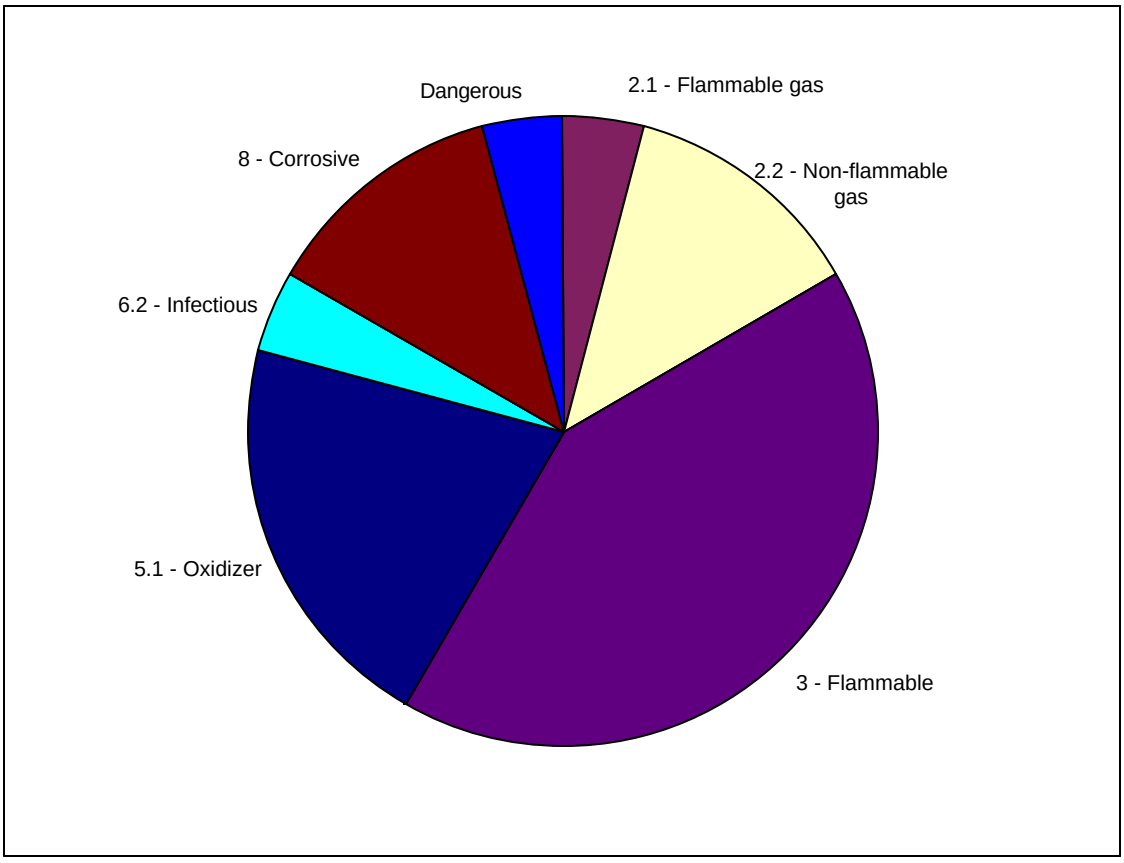

Figure A16: HWY 321 / Westbound (6AM to 6PM)

Appendix A20: HWY 321 / Eastbound (6AM to 6PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	1	5%	0.24%
2.2 - Non-flammable gas	2	11%	0.47%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	10	53%	2.36%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	2	11%	0.47%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	1	5%	0.24%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	2	11%	0.47%
9 - Miscellaneous	0	0%	0.00%
Dangerous	1	5%	0.24%
Total	19	100%	4.49%

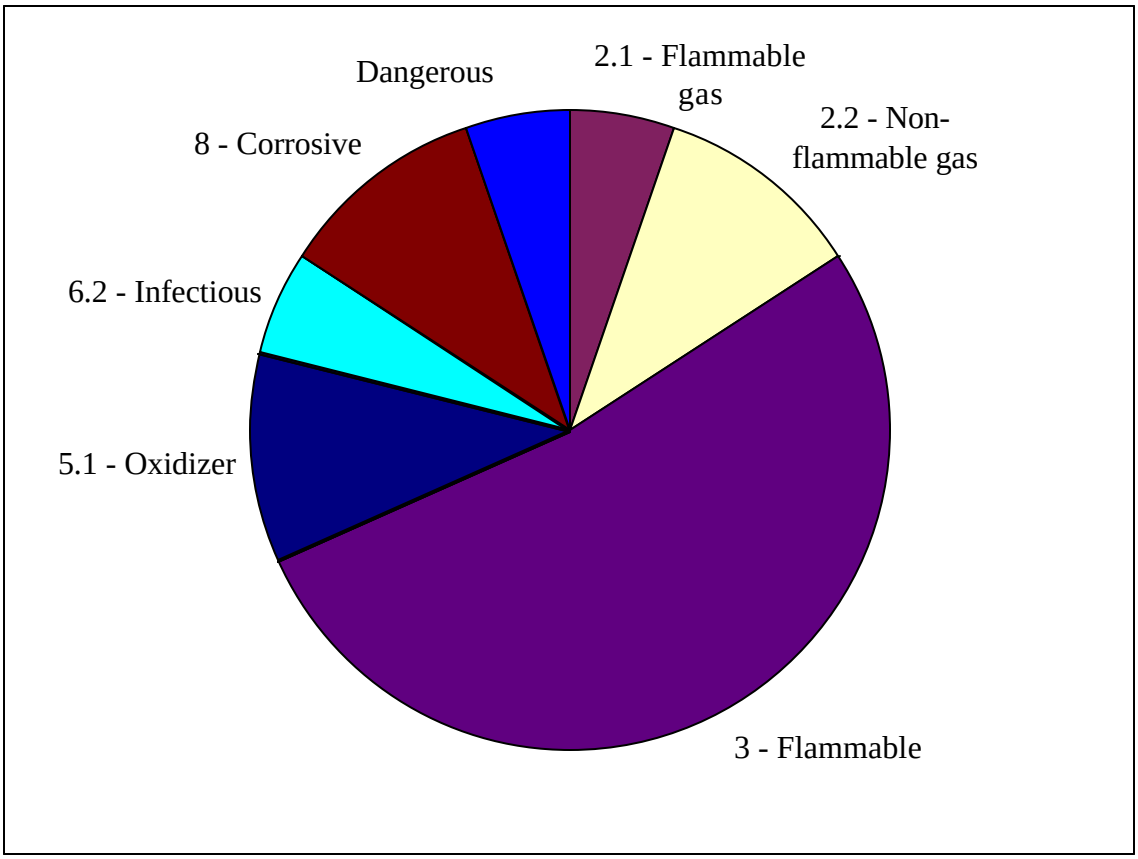

Figure A17: HWY 321 / Eastbound (6AM to 6PM)

Appendix A21: HWY 321 / Westbound (9AM to 9PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	4	14%	1.06%
2.2 - Non-flammable gas	6	21%	1.59%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	8	29%	2.12%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	7	25%	1.85%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	2	7%	0.53%
9 - Miscellaneous	1	4%	0.26%
Dangerous	0	0%	0.00%
Total	28	100%	7.41%

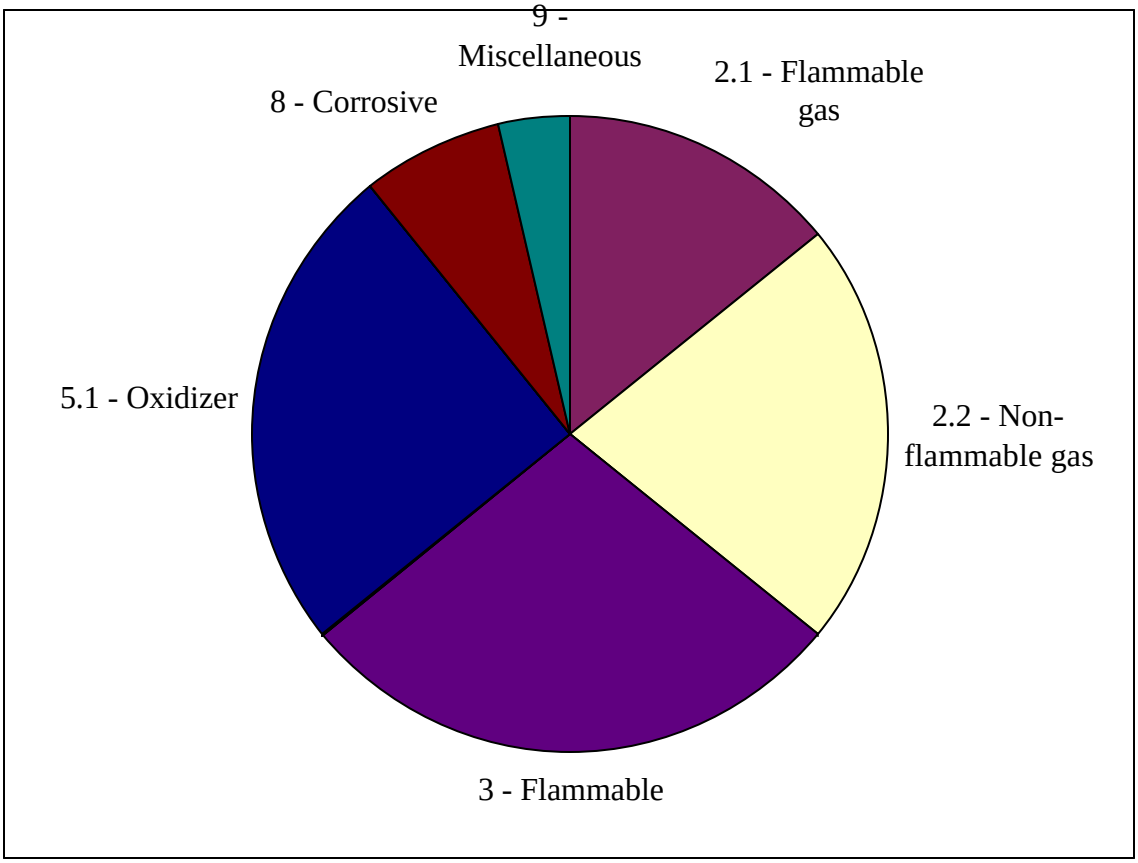

Figure A18: HWY 321 / Westbound (9AM to 9PM)

Appendix A22: HWY 321 / Eastbound (9AM to 9PM)			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	3	19%	1.14%
2.2 - Non-flammable gas	4	25%	1.52%
2.3 - Poisonous gas	0	0%	0.00%
3 - Flammable	5	31%	1.89%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	3	19%	1.14%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	0	0%	0.00%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	1	6%	0.38%
9 - Miscellaneous	0	0%	0.00%
Dangerous	0	0%	0.00%
Total	16	100%	6.06%

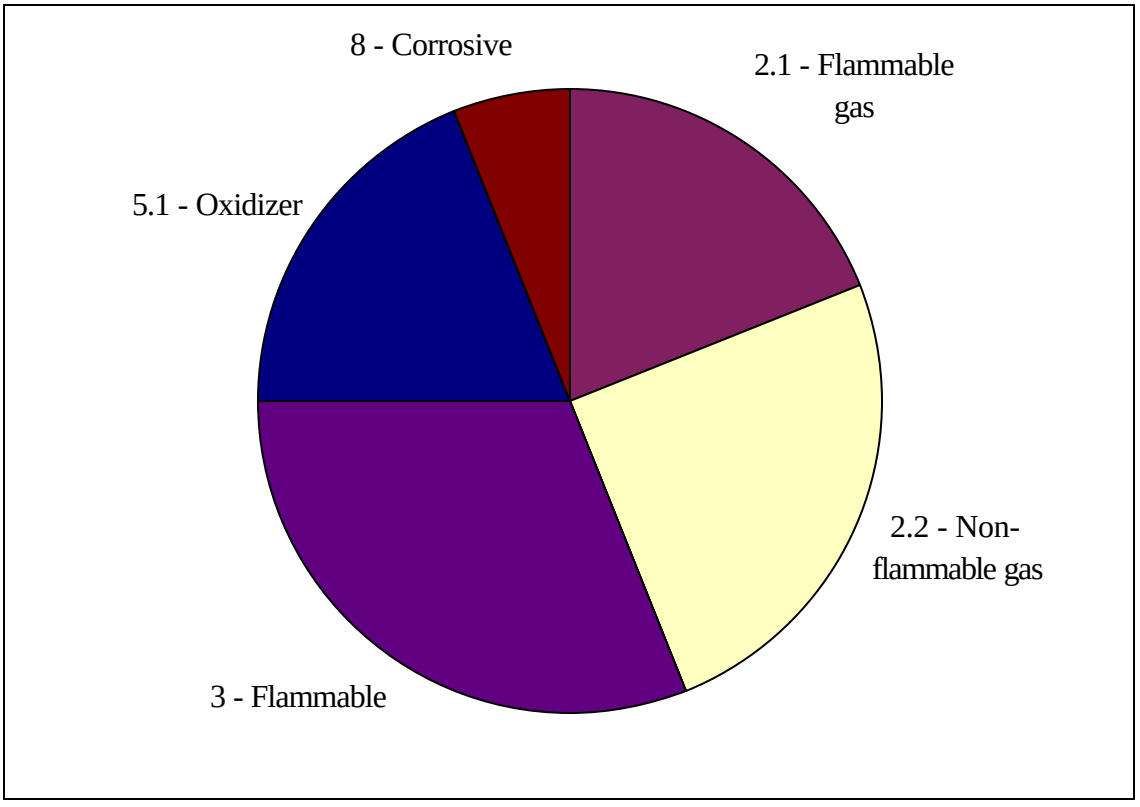

Figure A19: HWY 321 / Eastbound (9AM to 9PM)

Appendix A23: HWY 321 / Total HAZMAT Surveyed			
Hazard Class	**Number**	**% of total HAZMAT**	**% of total trucks**
1 - Explosives	0	0%	0.00%
2.1 - Flammable gas	9	10%	0.59%
2.2 - Non-flammable gas	15	17%	0.99%
2.3 - Poison gas	0	0%	0.00%
3 - Flammable	33	38%	2.17%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	17	20%	1.12%
5.2 - Organic Peroxide	0	0%	0.00%
6.1 - Poisonous	0	0%	0.00%
6.2 - Infectious	2	2%	0.13%
7 - Radioactive	0	0%	0.00%
8 - Corrosive	8	9%	0.53%
9 - Miscellaneous	1	1%	0.07%
Dangerous	2	2%	0.13%
Total	87	100%	5.72%

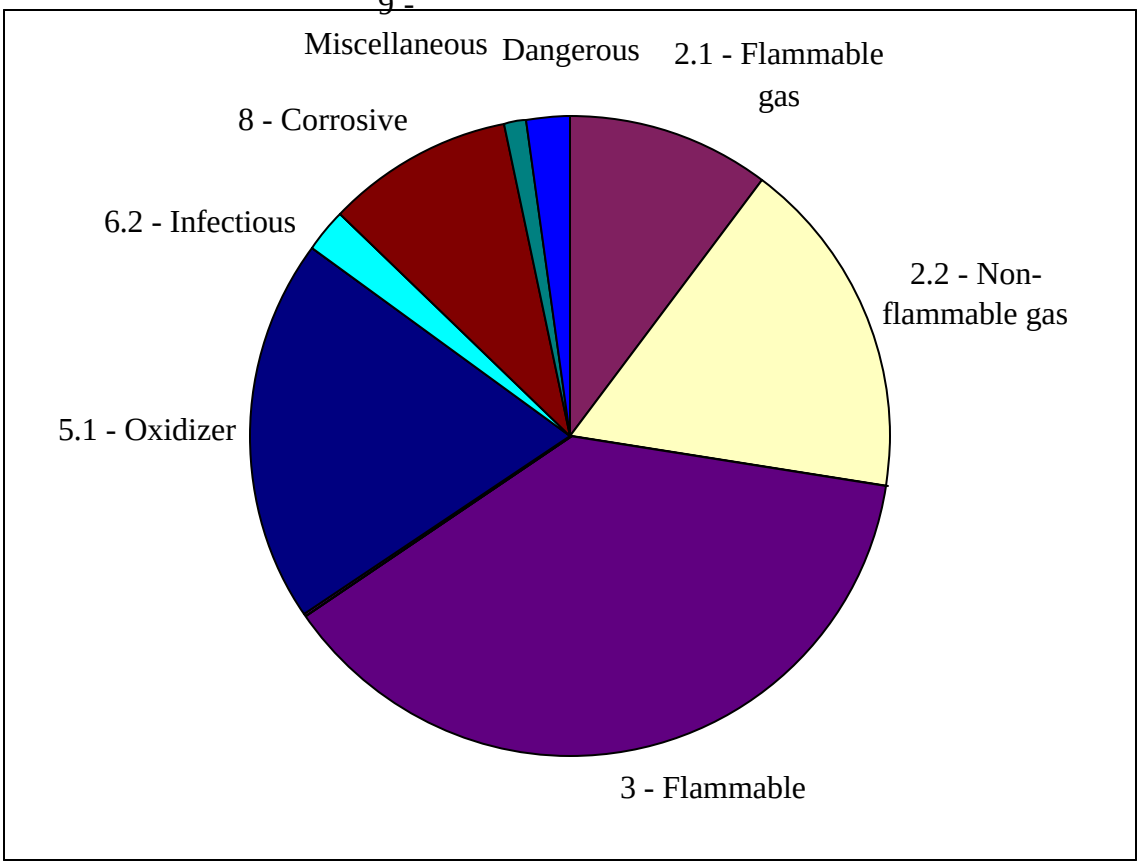

Figure A20: HWY 321 / Total HAZMAT Surveyed

Appendix A24: Hazard Classes Entering Washington County			
Hazard Class	**Number**	**% of Total Hazmat**	**% of Total Trucks**
1 - Explosives	7	2%	0.15%
2.1 - Flammable gas	37	12%	0.80%
2.2 - Non-flammable gas	37	12%	0.80%
2.3 - Poisonous gas	4	1%	0.09%
3 - Flammable	103	33%	2.23%
4.1 - Flammable solid	0	0%	0.00%
4.2 – Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	0	0%	0.00%
5.1 - Oxidizer	61	19%	1.32%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	4	1%	0.09%
6.2 - Infectious	2	1%	0.04%
7 - Radioactive	6	2%	0.13%
8 - Corrosive	36	11%	0.78%
9 - Miscellaneous	13	4%	0.28%
Dangerous	6	2%	0.13%
Total	316	100%	6.84%

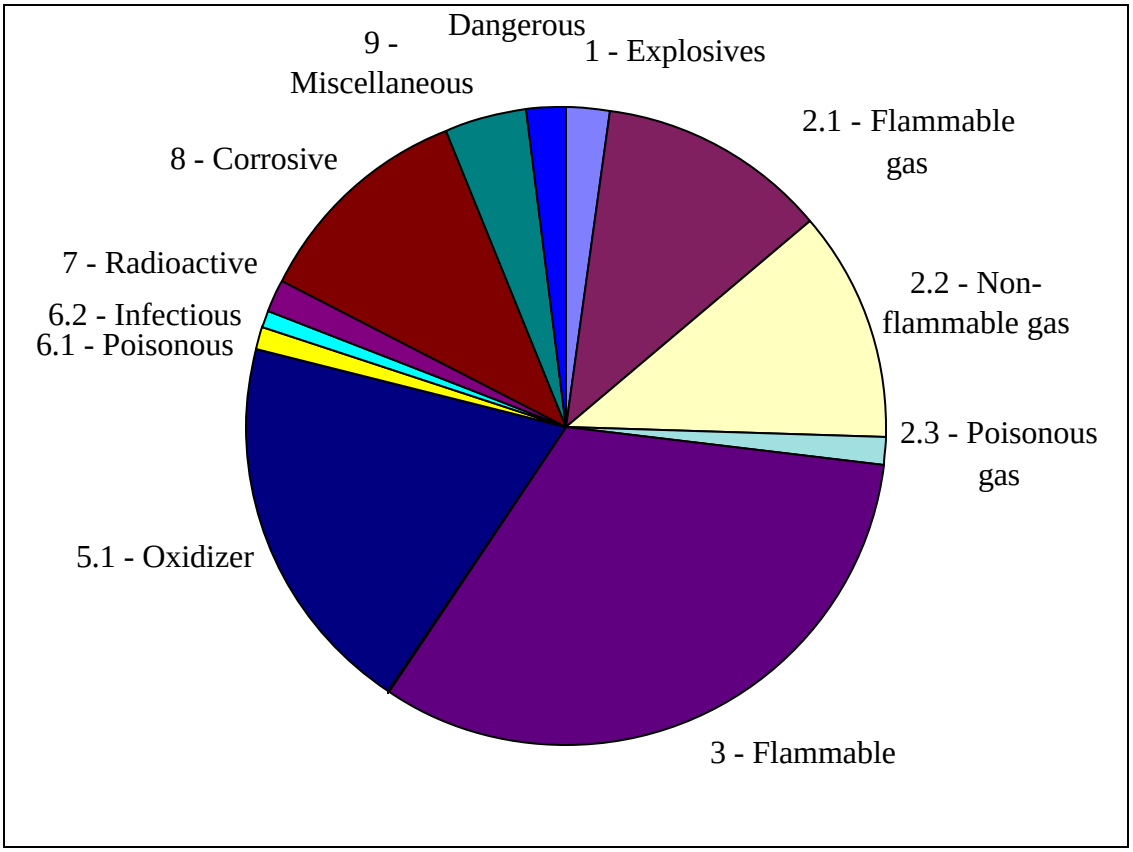

Figure A21: Hazard Classes Entering Washington County

Appendix A25: Hazard Classes Exiting Washington County			
Hazard Class	**Number**	**% Hazmat Vehicles**	**% Total Trucks**
1 - Explosives	3	1%	0.07%
2.1 - Flammable gas	30	13%	0.69%
2.2 - Non-flammable gas	37	16%	0.85%
2.3 - Poisonous gas	1	0.4%	0.02%
3 - Flammable	78	33%	1.80%
4.1 - Flammable solid	0	0%	0.00%
4.2 - Spontaneously combustible	0	0%	0.00%
4.3 - Dangerous when wet	2	1%	0.05%
5.1 - Oxidizer	38	16%	0.88%
5.2 - Organic peroxide	0	0%	0.00%
6.1 - Poisonous	1	0.4%	0.02%
6.2 - Infectious	3	1%	0.07%
7 - Radioactive	3	1%	0.07%
8 - Corrosive	28	12%	0.65%
9 - Miscellaneous	8	3%	0.18%
Dangerous	5	2%	0.12%
Total	237	100%	5.48%

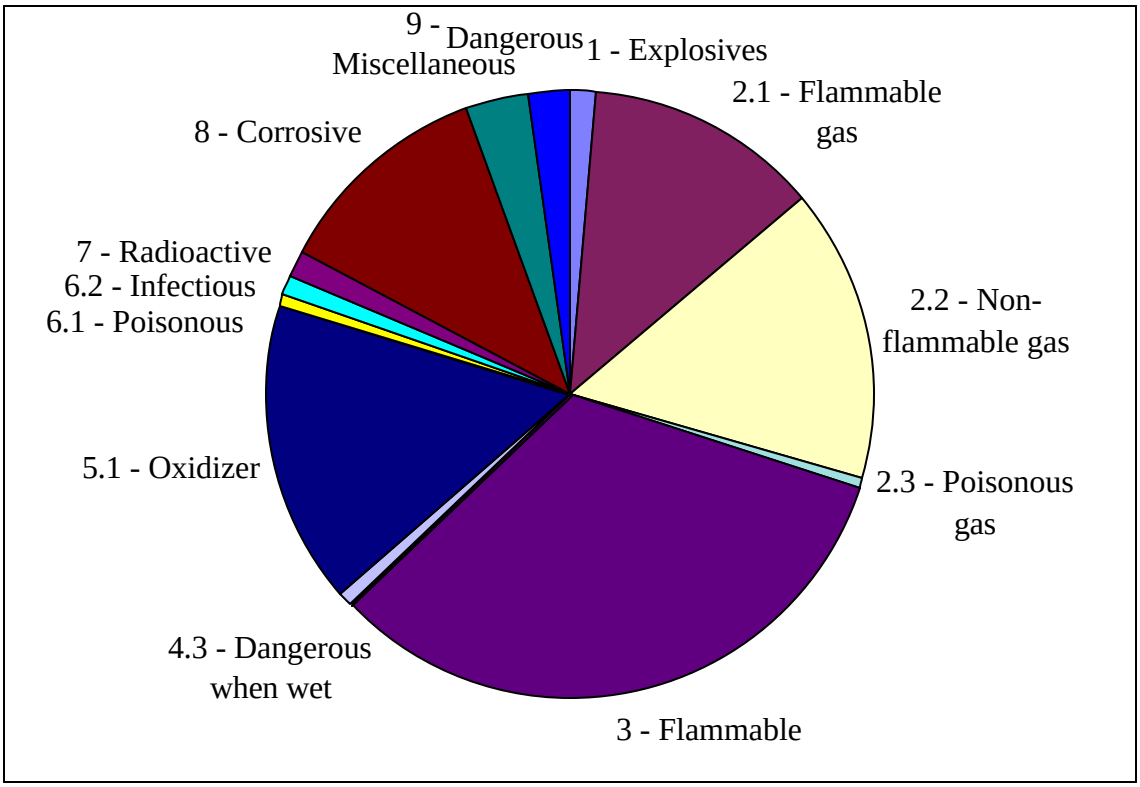

Figure A22: Hazard Classes Exiting Washington County

Appendix A26: I-181 @ Boones Creek / Southbound (6AM to 6PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	19	38.78%
1073	Oxygen	7	14.29%
1075	Propane	4	8.16%
3257	Elevated temperature liquid, n.o.s.	3	6.12%
2428	Sodium chlorate, aqueous solution	3	6.12%
1993	Flammable liquid, n.o.s.	2	4.08%
1760	Corrosive Liquid, n.o.s.	1	2.04%
2211	Polystyrene beads	1	2.04%
2302	5-methylhexan-2-one	1	2.04%
1267	Petroleum crude oil	1	2.04%
1133	Adhesives	1	2.04%
2794	Batteries, wet, filled with acid	1	2.04%
2031	Nitric acid, other than red fuming	1	2.04%
2834	Phosphorous acid	1	2.04%
3291	(Bio) medical waste, n.o.s.	1	2.04%
1680	Potassium cyanide	1	2.04%
1123	Butyl acetates	1	2.04%
	Total	49	100.00%

Appendix A27: I-181 @ Boones Creek / Northbound (6AM to 6PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	8	19.05%
1942	Ammonium nitrate w/ MNT 0.2% C.M.	7	16.67%
1075	Propane	5	11.90%
1073	Oxygen	2	4.76%
2428	Sodium chlorate, aqueous solution	2	4.76%
1993	Flammable liquid, n.o.s.	2	4.76%
1715	Acetic anhydride	2	4.76%
2982	Radioactive material, n.o.s.	2	4.76%
3257	Elevated temperature liquid, n.o.s.	1	2.38%
3264	Corrosive liquid, acidic, inorganic, n.o.s.	1	2.38%
1267	Petroleum crude oil	1	2.38%
1951	Argon, refrigerated liquid	1	2.38%
1824	Sodium hydroxide, solution	1	2.38%
1268	Petroleum products n.o.s.	1	2.38%
2491	Ethanolamine	1	2.38%
3291	(Bio) medical waste, n.o.s.	1	2.38%
1866	Resin solution	1	2.38%
3170	Aluminum processing by-products	1	2.38%
1110	Butadienes, inhibited	1	2.38%
3082	Environmentally haz. subs., liq., n.o.s.	1	2.38%
	Total	42	100.00%

Appendix A28: I-181 @ Boones Creek / Southbound (9AM to 9PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	17	39.53%
1073	Oxygen	4	9.30%
1075	Propane	3	6.98%
3257	Elevated temperature liquid, n.o.s.	3	6.98%
1993	Flammable liquid, n.o.s.	2	4.65%
2428	Sodium chlorate, aqueous solution	1	2.33%
1715	Acetic anhydride	1	2.33%
2982	Radioactive material, n.o.s.	1	2.33%
1942	Ammonium nitrate w/ MNT 0.2% C.M.	1	2.33%
2302	5-methylhexan-2-one	1	2.33%
1267	Petroleum crude oil	1	2.33%
2187	Carbon dioxide, refrigerated liquid	1	2.33%
1977	Nitrogen, refrigerated liquid	1	2.33%
1017	Chlorine	1	2.33%
1791	Hypochlorite solution	1	2.33%
3077	Hazardous waste, solid, n.o.s.	1	2.33%
1866	Resin solution	1	2.33%
1848	Propionic acid	1	2.33%
2794	Batteries, wet, filled with acid	1	2.33%
	Total	43	100.00%

Appendix A29: I-181 @ Boones Creek / Northbound (9AM to 9PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	8	21.05%
1942	Ammonium nitrate w/ MNT 0.2% C.M.	5	13.16%
1075	Propane	4	10.53%
1993	Flammable liquid, n.o.s.	3	7.89%
3264	Corrosive liquid, acidic, inorganic, n.o.s.	2	5.26%
1073	Oxygen	1	2.63%
3257	Elevated temperature liquid, n.o.s.	1	2.63%
1951	Argon, refrigerated liquid	1	2.63%
1715	Acetic anhydride	1	2.63%
2982	Radioactive material, n.o.s.	1	2.63%
1267	Petroleum crude oil	1	2.63%
3291	(Bio) medical waste, n.o.s.	1	2.63%
1824	Sodium hydroxide, solution	1	2.63%
1268	Petroleum products, n.o.s.	1	2.63%
1110	Butadienes, inhibited	1	2.63%
3082	Environmentally hazardous substance, n.o.s.	1	2.63%
3170	Aluminum processing by-products	1	2.63%
1866	Resin solution	1	2.63%
2491	Ethanolamine	1	2.63%
2218	Acrylic acid, inhibited	1	2.63%
1193	Methyl ethyl ketone	1	2.63%
	Total	38	100.00%

Appendix A30: I-181 @ Boones Creek / Total HAZMAT Surveyed			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	52	30.23%
1075	Propane	16	9.30%
1073	Oxygen	14	8.14%
1942	Ammonium nitrate w/ MNT 0.2% C.M.	13	7.56%
1993	Flammable liquid, n.o.s.	9	5.23%
3257	Elevated temperature liquid, n.o.s.	8	4.65%
2428	Sodium chlorate, aqueous solution	6	3.49%
1715	Acetic anhydride	4	2.33%
2982	Radioactive material, n.o.s.	4	2.33%
1267	Petroleum crude oil	4	2.33%
3291	(Bio) medical waste, n.o.s.	3	1.74%
1866	Resin solution	3	1.74%
3264	Corrosive liquid, acidic, inorganic, n.o.s.	3	1.74%
1951	Argon, refrigerated liquid	2	1.16%
2302	5-methylhexan-2-one	2	1.16%
1824	Sodium hydroxide, solution	2	1.16%
1268	Petroleum products, n.o.s.	2	1.16%
1110	Butadienes, inhibited	2	1.16%
3082	Environmentally hazardous substance, n.o.s.	2	1.16%
3170	Aluminum processing by-products	2	1.16%
2794	Batteries, wet, filled with acid	2	1.16%
2491	Ethanolamine	2	1.16%
2218	Acrylic acid, inhibited	1	0.58%
1193	Methyl ethyl ketone	1	0.58%
1760	Corrosive Liquid, n.o.s.	1	0.58%
2211	Polystyrene beads	1	0.58%
1133	Adhesives	1	0.58%
2031	Nitric acid, other than red fuming	1	0.58%
2834	Phosphorous acid	1	0.58%
1680	Potassium cyanide	1	0.58%
1123	Butyl acetates	1	0.58%
2187	Carbon dioxide, refrigerated liquid	1	0.58%
1977	Nitrogen, refrigerated liquid	1	0.58%
1017	Chlorine	1	0.58%
1791	Hypochlorite solution	1	0.58%
3077	Hazardous waste, solid, n.o.s.	1	0.58%
1848	Propionic acid	1	0.58%
	Total	172	100.00%

Appendix A31: 11 E South of Jonesborough / Northbound (6 AM to 6 PM)

U.N. Identification	Description	Number	% of total HAZMAT
1203	Gasoline	6	60.00%
1073	Oxygen	2	20.00%
1075	Propane	2	20.00%
1791	Hypochlorite solution	1	10.00%
1830	Sulfuric acid	1	10.00%
2215	Maleic acid	1	10.00%
	Total	10	100.00%

Appendix A32: 11 E South of Jonesborough / Southbound (6 AM to 6 PM)

U.N. Identification	Description	Number	% of total HAZM AT
1203	Gasoline	8	66.67%
1073	Oxygen	2	16.67%
1075	Propane	2	16.67%
1791	Hypochlorite solution	1	8.33%
1830	Sulfuric acid	1	8.33%
	Total	12	100.00%

Appendix A33: 11 E South of Jonesborough / Northbound (9 AM to 9 PM)

U.N. Identification	Description	Number	% of total HAZMAT
1203	Gasoline	8	44.44%
1075	Propane	6	33.33%
1073	Oxygen	1	5.56%
1966	Hydrogen, refrigerated liquid	1	5.56%
1999	Asphalt	1	5.56%
3264	Corrosive liquid, acidic,inorganic, n.o.s.	1	5.56%
	Total	18	83.33%

Appendix A34: 11 E South of Jonesborough / Southbound (9 AM to 9 PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	8	57.14%
1075	Propane	5	35.71%
1073	Oxygen	1	7.14%
	Total	14	100.00%

Appendix A35: 11 E / Total HAZMAT Surveyed			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	30	59%
1075	Propane	15	29%
1073	Oxygen	6	12%
1791	Hypochlorite solution	2	4%
1830	Sulfuric acid	2	4%
2215	Maleic acid	1	2%
1966	Hydrogen, refrigerated liquid	1	2%
1999	Asphalt	1	2%
3264	Corrosive liquid, acidic,inorganic, n.o.s.	1	2%
	Total	51	100%

Appendix A36: I-181 @ Okolono Road / Southbound (6AM to 6PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1075	Propane	2	13.33%
2428	Sodium chlorate, aqueous solution	2	13.33%
2187	Carbon dioxide, refrigerated liquid	2	13.33%
2215	Maleic acid	1	6.67%
1203	Gasoline	1	6.67%
1073	Oxygen	1	6.67%
2209	Formaldehyde, solutions (Formalin)	1	6.67%
3257	Elevated temperature liquid, n.o.s.	1	6.67%
2693	Ammonium bisulfite, solution	1	6.67%
1993	Flammable liquid, n.o.s.	1	6.67%
1486	Potassium nitrate	1	6.67%
1220	Isopropyl acetate	1	6.67%
	Total	15	100.00%

Appendix A37: I-181 @ Okolono Road / Northbound (6AM to 6PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1942	Ammonium nitrate w/ NMT 0.2% C.M.	12	36.36%
1993	Flammable liquid, n.o.s.	3	9.09%
3257 and 9259	Elevated temperature liquid, n.o.s.	3	9.09%
1203	Gasoline	3	9.09%
2187	Carbon dioxide, refrigerated liquid	2	6.06%
1075	Propane	2	6.06%
1073	Oxygen	2	6.06%
2428	Sodium chlorate, aqueous solution	2	6.06%
1715	Acetic anhydride	1	3.03%
2982	Radioactive material, n.o.s.	1	3.03%
1294	Toluene	1	3.03%
1050	Hydrogen chloride, anhydrous	1	3.03%
	Total	33	100.00%

Appendix A38: I-181 @ Okolono Road / Southbound (9AM to 9PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	2	25.00%
3257	Elevated temperature liquid, n.o.s.	2	25.00%
2428	Sodium chlorate, aqueous solution	2	25.00%
2187	Carbon dioxide, refrigerated liquid	2	25.00%
	Total	8	100.00%

Appendix A39: I-181 @ Okolono Road / Northbound (9AM to 9PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1942	Ammonium nitrate w/ MNT 0.2% C.M.	8	28.57%
2428	Sodium chlorate, aqueous solution	2	7.14%
1993	Flammable liquid, n.o.s.	2	7.14%
2187	Carbon dioxide, refrigerated liquid	2	7.14%
1977	Nitrogen, refigerated liquid	2	7.14%
3265	Corrosive liquid, acidic, organic, n.o.s.	1	3.57%
3257	Elevated temperature liquid, n.o.s.	1	3.57%
1203	Gasoline	1	3.57%
1715	Acetic anhydride	1	3.57%
2982	Radioactive material, n.o.s.	1	3.57%
1268	Petroleum distillates, n.o.s.	1	3.57%
1075	Propane	1	3.57%
1210	Printing ink related materials	1	3.57%
1220	Isopropyl acetate	1	3.57%
1987	Denatured alcohol	1	3.57%
1123	Butyl acetates	1	3.57%
2789	Acetic acid, glacial	1	3.57%
1224	Ketones, liquid, n.o.s.	1	3.57%
	Total	28	100.00%

Appendix A40: I-181 @ Okolono Road / Total HAZMAT Surveyed			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1942	Ammonium nitrate w/ NMT 0.2% C.M.	20	23.53%
2428	Sodium chlorate, aqueous solution	8	9.41%
2187	Carbon dioxide, refrigerated liquid	8	9.41%
1203	Gasoline	7	8.24%
3257 and 9259	Elevated temperature liquid, n.o.s.	7	8.24%
1993	Flammable liquid, n.o.s.	6	7.06%
1075	Propane	5	5.88%
1073	Oxygen	3	3.53%
1715	Acetic anhydride	2	2.35%
2982	Radioactive material, n.o.s.	2	2.35%
1977	Nitrogen, refigerated liquid	2	2.35%
1220	Isopropyl acetate	2	2.35%
2215	Maleic acid	1	1.18%
2209	Formaldehyde, solutions (Formalin)	1	1.18%
2693	Ammonium bisulfite, solution	1	1.18%
1486	Potassium nitrate	1	1.18%
1294	Toluene	1	1.18%
1050	Hydrogen chloride, anhydrous	1	1.18%
3265	Corrosive liquid, acidic, organic, n.o.s.	1	1.18%
1268	Petroleum distillates, n.o.s.	1	1.18%
1210	Printing ink related materials	1	1.18%
1987	Denatured alcohol	1	1.18%
1123	Butyl acetates	1	1.18%
2789	Acetic acid, glacial	1	1.18%
1224	Ketones, liquid, n.o.s.	1	1.18%
	Total	85	100.00%

Appendix A41: HWY 321 / Westbound (6AM to 6PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	8	47.06%
1073	Oxygen	3	17.65%
1075	Propane	1	5.88%
1993	Flammable liquid, n.o.s.	1	5.88%
1267	Petroleum crude oil	1	5.88%
3291	(Bio) medical waste, n.o.s.	1	5.88%
3264	Corrosive liquid, acidic,inorganic, n.o.s.	1	5.88%
1824	Sodium hydroxide solution	1	5.88%
	Total	17	29.41%

Appendix A42: HWY 321 / Eastbound (6AM to 6PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	8	53.33%
1073	Oxygen	1	6.67%
1075	Propane	1	6.67%
1993	Flammable liquid, n.o.s.	1	6.67%
1267	Petroleum crude oil	1	6.67%
2427	Potassium chlorate, solution	1	6.67%
3291	(Bio) medical waste, n.o.s.	1	6.67%
1824	Sodium hydroxide solution	1	6.67%
	Total	15	33.33%

Appendix A43: HWY 321 / Westbound (9AM to 9PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	5	26.32%
1073	Oxygen	5	26.32%
1075	Propane	3	15.79%
1993	Flammable liquid, n.o.s.	2	10.53%
1912	Methylene chloride mixture	1	5.26%
3082	Hazardous waste, liquid, n.o.s.	1	5.26%
3265	Corrosive liquid, acidic, organic, n.o.s.	1	5.26%
1824	Sodium hydroxide solution	1	5.26%
	Total	19	100.00%

Appendix A44: HWY 321 / Eastbound (9AM to 9PM)			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	5	50.00%
1073	Oxygen	3	30.00%
1075	Propane	2	20.00%
	Total	10	100.00%

Appendix A45: HWY 321 / Total HAZMAT Surveyed			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	26	42.62%
1073	Oxygen	12	19.67%
1075	Propane	7	11.48%
1993	Flammable liquid, n.o.s.	4	6.56%
1824	Sodium hydroxide solution	3	4.92%
1267	Petroleum crude oil	2	3.28%
3291	(Bio) medical waste, n.o.s.	2	3.28%
3264	Corrosive liquid, acidic,inorganic, n.o.s.	1	1.64%
2427	Potassium chlorate, solution	1	1.64%
1912	Methylene chloride mixture	1	1.64%
3082	Hazardous waste, liquid, n.o.s.	1	1.64%
3265	Corrosive liquid, acidic, organic, n.o.s.	1	1.64%
	Total	61	100.00%

Appendix A46: UN Identification Numbers Entering Washington County			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	67	31.31%
1073	Oxygen	24	11.21%
1075	Propane	22	10.28%
1942	Ammonium nitrate w/ MNT 0.2% C.M.	21	9.81%
1993	Flammable liquid, n.o.s.	12	5.61%
3257	Elevated temperature liquid, n.o.s.	10	4.67%
2428	Sodium chlorate, aqueous solution	8	3.74%
2187	Carbon dioxide, refrigerated liquid	5	2.34%

3257 and 9259	Acetic anhydride	3	1.40%
2428	Nitrogen, refrigerated liquid	3	1.40%
1993	Radioactive material, n.o.s.	3	1.40%
3264	Corrosive liq., acidic, inorganic, n.o.s.	2	0.93%
2302	5-methylhexan-2-one	2	0.93%
1267	Petroleum crude oil	2	0.93%
2794	Batteries, wet, filled with acid	2	0.93%
1123	Butyl acetates	2	0.93%
1791	Hypochlorite solution	2	0.93%
1760	Corrosive Liquid, n.o.s.	1	0.47%
2211	Polystyrene beads	1	0.47%
1133	Adhesives	1	0.47%
2031	Nitric acid, other than red fuming	1	0.47%
2834	Phosphorous acid	1	0.47%
3291	(Bio) medical waste, n.o.s.	1	0.47%
1680	Potassium cyanide	1	0.47%
1017	Chlorine	1	0.47%
3077	Hazardous waste, solid, n.o.s.	1	0.47%
1866	Resin solution	1	0.47%
1848	Propionic acid	1	0.47%
1830	Sulfuric acid	1	0.47%
2215	Maleic acid	1	0.47%
1966	Hydrogen, refrigerated liquid	1	0.47%
1999	Asphalt	1	0.47%
1294	Toluene	1	0.47%
1050	Hydrogen chloride, anhydrous	1	0.47%
1210	Printing ink related materials	1	0.47%
1220	Isopropyl acetate	1	0.47%
1987	Denatured alcohol	1	0.47%
2789	Acetic acid, glacial	1	0.47%
1224	Ketones, liquid, n.o.s.	1	0.47%
1912	Methylene chloride mixture	1	0.47%
3082	Hazardous waste, liquid, n.o.s.	1	0.47%
	Total	214	100.00%

Appendix A47: UN Identification Numbers Exiting Washington County			
U.N. Identification	**Description**	**Number**	**% of total HAZMAT**
1203	Gasoline	48	31.17%
1075	Propane	21	13.64%
1942	Ammonium nitrate w/ MNT 0.2% C.M.	12	7.79%
1073	Oxygen	11	7.14%
1993	Flammable liquid, n.o.s.	7	4.55%
2428	Sodium chlorate, aqueous solution	6	3.90%
3257	Elevated temperature liquid, n.o.s.	5	3.25%
3291	(Bio) medical waste, n.o.s.	3	1.95%
1715	Acetic anhydride	3	1.95%
2982	Radioactive material, n.o.s.	3	1.95%
3264	Corrosive liquid, acidic, inorganic, n.o.s.	3	1.95%
1267	Petroleum crude oil	3	1.95%
1824	Sodium hydroxide, solution	3	1.95%
1268	Petroleum products n.o.s.	2	1.30%
2491	Ethanolamine	2	1.30%
1951	Argon, refrigerated liquid	2	1.30%
1866	Resin solution	2	1.30%
3170	Aluminum processing by-products	2	1.30%
1110	Butadienes, inhibited	2	1.30%
3082	Environmentally haz. subs., liq., n.o.s.	2	1.30%
2187	Carbon dioxide, refrigerated liquid	2	1.30%
2218	Acrylic acid, inhibited	1	0.65%
1193	Methyl ethyl ketone	1	0.65%
1791	Hypochlorite solution	1	0.65%
1830	Sulfuric acid	1	0.65%
2215	Maleic acid	1	0.65%
2209	Formaldehyde, solutions (Formalin)	1	0.65%
2693	Ammonium bisulfite, solution	1	0.65%
1486	Potassium nitrate	1	0.65%
1220	Isopropyl acetate	1	0.65%
2427	Potassium chlorate, solution	1	0.65%
	Total	154	100.00%

Appendix A48: HAZARDOUS MATERIAL INCIDENTS (Unicoi and Washington County)											
1993											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
truck	J.C.	I-181 M41(S)	02/05/1993	JB Hunt	1993	acetone/methanol	3	0.01gal	spill	0	20
rail	Erwin	yard	04/06/1993	CSX	1255	naptha petroleum	3	2.5 gal	spill	0	10
rail	Erwin	yard	08/26/1993	CSX	1993	toluene	3	1 gal	spill	0	20
1994											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
truck	J.C.	Silverdale	03/15/1994	UPS	1133	adhesives	3	0.25 gal	spill	0	10
rail	Erwin	yard	03/20/1994	CSX	1230	methanol	3	5 gal	spill	0	20
1995											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
rail	Erwin	yard	05/18/1995	CSX	1230	methanol	3	5 gal	spill	0	10
truck	J.C.	Love St.	06/06/1995	C. Transport	1866	resin	3	0.25 gal	spill	0	20
rail	Erwin	unknown	07/01/1995	CSX	1993	propylene glycol	3	2 gal	spill	0	20
rail	Erwin	unknown	07/31/1995	CSX	1760	corrosive liquid	8	0.25 gal	spill	0	20
1996											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
truck	Gray	Bob Jobe Rd.	04/23/1996	AAA Cooper	1993	flammable liquid	3	25 gal	spill	0	20
rail	Erwin	yard	06/07/1996	CSX	2789	acetic acid	8	55 gal	spill	0	10
rail	Erwin	yard	09/21/1996	CSX	1307	xylenes	3	5 gal	spill	0	10
rail	Erwin	yard	09/22/1996	CSX	1307	xylenes	3	5 gal	spill	0	10

rail	Erwin	yard	11/12/1996	CSX	1805	phosphoric acid	8	1 gal	spill	0	10
1997											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
rail	Erwin	unknown	02/19/1997	CSX	1230	methanol	3	0.25 gal	spill	0	10
rail	Erwin	unknown	03/05/1997	CSX	1230	methanol	3	0.25 gal	spill	0	10
rail	Erwin	unknown	04/11/1997	CSX	1715	acetic anhydride	8	0.25 gal	spill	0	40
rail	Erwin	unknown	10/09/1997	CSX	2790	acetic acid	8	5 gal	spill	0	10
rail	Erwin	unknown	11/12/1997	CSX	3265	2-ethylehexanoic acid	8	57 gal	spill	0	10
truck	Gray	I-181 M38	11/14/1997	Amerigas	1075	propane	2.1	100 gal	vapor	0	30
rail	Erwin	unknown	12/08/1997	CSX	1294	toluene	3	0.25 gal	spill	0	10
truck	Jonesbor	11E	12/15/1997	Fleet Transport	2031	nitric acid	8	70 gal	spill	0	10
1998											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
rail	Erwin	yard	03/24/1998	CSX	1268	naptha	3	1 gal	spill	0	10
rail	Erwin	yard	05/03/1998	CSX	2790	acetic acid	8	1 gal	spill	0	20
rail	Erwin	yard	07/28/1998	CSX	2922	sodium hydrosulfide	8	2 gal	spill	0	20
rail	Erwin	yard	12/01/1998	CSX	1268	naptha	3	0.01 gal	spill	0	20
1999											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
rail	Erwin	yard	01/18/1999	CSX	1230	methanol	3	1 gal	Spill	0	10
rail	Erwin	yard	08/05/1999	CSX	1129	butyraldehyde	3	20 gal	Spill	0	10
rail	Erwin	yard	09/12/1999	CSX	1230	methanol	3	1 gal	Spill	0	10

2000											
Mode	**City**	**Route**	**Date**	**Carrier**	**UN #**	**Chemical**	**Hazard Class**	**Quantity**	**Incident**	**Inj.**	**Cause**
rail	Erwin	yard	02/25/2000	CSX	1307	xylenes	3	1 gal	spill	0	10
rail	Erwin	yard	06/18/2000	CSX	2790	acetic acid	8	1 gal	spill	0	20

Appendix A49: Chi-square test for I-181 @ Boones Creek (Southbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
1	5	3.40	1.60	2.56	0.75
2.1	7	7.19	-0.19	0.04	0.01
2.2	10	10.51	-0.51	0.26	0.03
2.3	2	1.11	0.89	0.80	0.72
3	27	30.99	-3.99	15.89	0.51
5.1	12	11.07	0.93	0.87	0.08
6.1	1	1.11	-0.11	0.01	0.01
6.2	1	0.55	0.45	0.20	0.36
7	2	1.66	0.34	0.12	0.07
8	11	8.85	2.15	4.61	0.52
9	4	4.43	-0.43	0.18	0.04
Dangerous	1	1.66	-0.66	0.44	0.26
1	2	3.13	-1.13	1.27	0.41
2.1	6	5.81	0.19	0.04	0.01
2.2	9	8.49	0.51	0.26	0.03
2.3	0	0.89	-0.89	0.80	0.89
3	29	25.01	3.99	15.89	0.64
5.1	8	8.93	-0.93	0.87	0.10
6.1	1	0.89	0.11	0.01	0.01
6.2	0	0.45	-0.45	0.20	0.45
7	1	1.34	-0.34	0.12	0.09
8	5	7.15	-2.15	4.61	0.64
9	4	3.57	0.43	0.18	0.05
Dangerous	2	1.34	0.66	0.44	0.33
Total	150.00			Chi-square =	7.00
				Chi-square dist.=	0.80
11 degrees of freedom and alpha=0.05, p-value=19.68					
19.68>7.00 There is no statistically significant difference observed in					
the time periods. Ho: 6 AM to 6 PM=9 AM to 9 PM with p>0.05					

Appendix A50: Chi-square test for I-181 @ Boones Creek (Northbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
1	1	1.07	-0.07	0.00	0.00
2.1	8	8.03	-0.03	0.00	0.00
2.2	7	6.96	0.04	0.00	0.00
3	16	17.66	-1.66	2.75	0.16
4.3	1	1.07	-0.07	0.00	0.00
5.1	14	12.31	1.69	2.87	0.23
6.2	1	1.07	-0.07	0.00	0.00
7	2	1.61	0.39	0.16	0.10
8	8	8.03	-0.03	0.00	0.00
9	2	2.14	-0.14	0.02	0.01
Dangerous	1	1.07	-0.07	0.00	0.00
1	1	0.93	0.07	0.00	0.01
2.1	7	6.97	0.03	0.00	0.00
2.2	6	6.04	-0.04	0.00	0.00
3	17	15.34	1.66	2.75	0.18
4.3	1	0.93	0.07	0.00	0.01
5.1	9	10.69	-1.69	2.87	0.27
6.2	1	0.93	0.07	0.00	0.01
7	1	1.39	-0.39	0.16	0.11
8	7	6.97	0.03	0.00	0.00
9	2	1.86	0.14	0.02	0.01
Dangerous	1	0.93	0.07	0.00	0.01
Total	114			Chi-square =	1.10
				Chi-square dist.=	0.99
10 degrees of freedom and alpha=0.05, p-value =18.31					
18.31>1.10 There is no statistically significant difference observed in					
the time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM with p>0.05					

Appendix A51: Chi-square test for 11E (Northbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
2.1	5	6.42	-1.42	2.01	0.31
2.2	5	3.67	1.33	1.78	0.48
3	6	6.88	-0.88	0.77	0.11
5.1	2	1.38	0.63	0.39	0.28
6.1	1	0.46	0.54	0.29	0.64
7	0	0.46	-0.46	0.21	0.46
8	3	2.29	0.71	0.50	0.22
Dangerous	0	0.46	-0.46	0.21	0.46
2.1	9	7.58	1.42	2.01	0.26
2.2	3	4.33	-1.33	1.78	0.41
3	9	8.13	0.88	0.77	0.09
5.1	1	1.63	-0.63	0.39	0.24
6.1	0	0.54	-0.54	0.29	0.54
7	1	0.54	0.46	0.21	0.39
8	2	2.71	-0.71	0.50	0.19
Dangerous	1	0.54	0.46	0.21	0.39
Total	48			Chi-squared =	5.48
				Chi-square dist.=	0.60
7 degrees of freedom and alpha=0.05, p-value=14.07					
14.07>5.48 There is no statistically significant difference observed in the two					
time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM p>0.05					

Appendix A52: Chi-square test for 11E (Southbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
2.1	2	4.86	-2.86	8.20	1.69
2.2	10	7.29	2.71	7.32	1.00
3	13	13.98	-0.98	0.96	0.07
5.1	3	2.43	0.57	0.32	0.13
8	3	1.82	1.18	1.38	0.76
Dangerous	0	0.61	-0.61	0.37	0.61
2.1	6	3.14	2.86	8.20	2.61
2.2	2	4.71	-2.71	7.32	1.56
3	10	9.02	0.98	0.96	0.11
5.1	1	1.57	-0.57	0.32	0.21
8	0	1.18	-1.18	1.38	1.18
Dangerous	1	0.39	0.61	0.37	0.94
Total	51			Chi-squared =	10.86
				Chi-square dist.=	0.054
5 degrees of freedom and alpha=0.05, p-value=11.07					
11.07>10.86 There is no statistically significant difference observed in the					
time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM p>0.05					

Appendix A53: Chi-square test for I-181 @ Okolono Rd. (Northbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
1	0	0.56	-0.56	0.32	0.56
2.1	2	2.81	-0.81	0.65	0.23
2.2	4	5.62	-1.62	2.61	0.47
2.3	2	1.12	0.88	0.77	0.68
3	7	5.62	1.38	1.91	0.34
5.1	16	14.60	1.40	1.95	0.13
6.1	0	0.56	-0.56	0.32	0.56
7	2	1.12	0.88	0.77	0.68
8	5	6.18	-1.18	1.39	0.22
9	3	2.81	0.19	0.04	0.01
1	1	0.44	0.56	0.32	0.72
2.1	3	2.19	0.81	0.65	0.30
2.2	6	4.38	1.62	2.61	0.60
2.3	0	0.88	-0.88	0.77	0.88
3	3	4.38	-1.38	1.91	0.44
5.1	10	11.40	-1.40	1.95	0.17
6.1	1	0.44	0.56	0.32	0.72
7	0	0.88	-0.88	0.77	0.88
8	6	4.82	1.18	1.39	0.29
9	2	2.19	-0.19	0.04	0.02
Total	73			Chi-square=	8.90
				Chi-square dist.=	0.45
9 degrees of freedom and alpha=0.05, p-value=16.92					
16.92>8.90 There is no statistically significant difference observed in the					
time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM with p>0.05					

Appendix A54: Chi-square test for I-181 @ Okolono Rd. (Southbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
1	1	0.68	0.32	0.11	0.16
2.1	1	1.35	-0.35	0.12	0.09
2.2	3	4.05	-1.05	1.11	0.27
2.3	1	0.68	0.32	0.11	0.16
3	6	5.41	0.59	0.35	0.07
5.1	4	4.05	-0.05	0.00	0.00
6.1	1	0.68	0.32	0.11	0.16
8	6	4.73	1.27	1.61	0.34
9	2	2.70	-0.70	0.49	0.18
Dangerous	0	0.68	-0.68	0.46	0.68
1	0	0.32	-0.32	0.11	0.32
2.1	1	0.65	0.35	0.12	0.19
2.2	3	1.95	1.05	1.11	0.57
2.3	0	0.32	-0.32	0.11	0.32
3	2	2.59	-0.59	0.35	0.14
5.1	2	1.95	0.05	0.00	0.00
6.1	0	0.32	-0.32	0.11	0.32
8	1	2.27	-1.27	1.61	0.71
9	2	1.30	0.70	0.49	0.38
Dangerous	1	0.32	0.68	0.46	1.41
Total	37			Chi-square =	6.47
				Chi-square dist.=	0.69
9 degrees of freedom and alpha=0.05, p-value=16.92					
16.92>6.47 There is no statistically significant difference observed in the					
time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM with p>0.05					

Appendix A55: Chi-square test for HWY 321 (Westbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
2.1	1	2.31	-1.31	1.71	0.74
2.2	3	4.15	-1.15	1.33	0.32
3	10	8.31	1.69	2.86	0.34
5.1	5	5.54	-0.54	0.29	0.05
6.2	1	0.46	0.54	0.29	0.63
8	3	2.31	0.69	0.48	0.21
9	0	0.46	-0.46	0.21	0.46
Dangerous	1	0.46	0.54	0.29	0.63
2.1	4	2.69	1.31	1.71	0.64
2.2	6	4.85	1.15	1.33	0.27
3	8	9.69	-1.69	2.86	0.30
5.1	7	6.46	0.54	0.29	0.04
6.2	0	0.54	-0.54	0.29	0.54
8	2	2.69	-0.69	0.48	0.18
9	1	0.54	0.46	0.21	0.40
Dangerous	0	0.54	-0.54	0.29	0.54
Total	52			Chi-square =	6.29
				Chi-square dist.=	0.51
7 degrees of freedom and alpha=0.05, p-value=14.07					
14.07>6.29 There is no statistically significant difference observed in the					
time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM p>0.05					

Appendix A56: Chi-square test for HWY 321 (Eastbound)					
Ho: 6 AM to 6 PM = 9 AM to 9 PM alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
2.1	1	2.35	-1.35	1.83	0.78
2.2	3	4.24	-1.24	1.53	0.36
3	10	8.47	1.53	2.34	0.28
5.1	5	5.65	-0.65	0.42	0.07
6.2	1	0.47	0.53	0.28	0.60
8	3	2.35	0.65	0.42	0.18
Dangerous	1	0.47	0.53	0.28	0.60
2.1	4	2.65	1.35	1.83	0.69
2.2	6	4.76	1.24	1.53	0.32
3	8	9.53	-1.53	2.34	0.25
5.1	7	6.35	0.65	0.42	0.07
6.2	0	0.53	-0.53	0.28	0.53
8	2	2.65	-0.65	0.42	0.16
Dangerous	0	0.53	-0.53	0.28	0.53
Total	51			Chi-square =	5.40
				Chi-square dist.=	0.49
6 degrees of freedom and alpha=0.05, p-value=12.59					
12.59>5.40 There is no statistically significant difference observed in the					
time periods. Ho: 6 AM to 6 PM = 9 AM to 9 PM p>0.05					

Appendix A57: Chi-square test for total HAZMAT surveyed						
Ho: I-181 @ Boones Creek = I-181 @ Okolono Rd. Alpha=0.05						
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**	
1	9	9.88	-0.88	0.78	0.08	
2.1	28	24.71	3.29	10.85	0.44	
2.2	32	33.88	-1.88	3.54	0.10	
2.3	2	3.53	-1.53	2.34	0.66	
3	89	75.53	13.47	181.46	2.40	
4.3	2	1.41	0.59	0.35	0.25	
5.1	43	52.94	-9.94	98.83	1.87	
6.1	2	2.82	-0.82	0.68	0.24	
6.2	3	2.12	0.88	0.78	0.37	
7	6	5.65	0.35	0.12	0.02	
8	31	34.59	-3.59	12.88	0.37	
9	12	14.82	-2.82	7.97	0.54	
Dangerous	5	4.24	0.76	0.58	0.14	
1	2	3.24	-1.24	1.53	0.47	
2.1	7	10.29	-3.29	10.85	1.05	
2.2	16	14.12	1.88	3.54	0.25	
2.3	3	1.47	1.53	2.34	1.59	
3	18	31.47	-13.47	181.46	5.77	
4.3	0	0.59	-0.59	0.35	0.59	
5.1	32	22.06	9.94	98.83	4.48	
6.1	2	1.18	0.82	0.68	0.58	
6.2	0	0.88	-0.88	0.78	0.88	
7	2	2.35	-0.35	0.12	0.05	
8	18	14.41	3.59	12.88	0.89	
9	9	6.18	2.82	7.97	1.29	
Dangerous	1	1.76	-0.76	0.58	0.33	Chi-square dist.
Total	374.00			Chi-square=	25.71	0.01
12 degrees of freedom and alpha=0.05, p-value=21.03 21.03<25.71 There is a stat. sig.						
difference observed. Ho: I-181 @ Boones Creek =I-181 @ Okolono Rd. with p<0.05						

Appendix A58: Chi-square test for total HAZMAT surveyed					
Ho: 11E Jonesborough = HWY 321 alpha=0.05					
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**
2.1	22	16.50	5.50	30.25	1.83
2.2	20	18.63	1.37	1.88	0.10
3	38	37.79	0.21	0.04	0.00
5.1	7	12.77	-5.77	33.34	2.61
6.1	1	0.53	0.47	0.22	0.41
6.2	0	1.06	-1.06	1.13	1.06
7	1	0.53	0.47	0.22	0.41
8	8	8.52	-0.52	0.27	0.03
9	0	0.53	-0.53	0.28	0.53
Dangerous	2	2.13	-0.13	0.02	0.01
2.1	9	14.50	-5.50	30.25	2.09
2.2	15	16.37	-1.37	1.88	0.11
3	33	33.21	-0.21	0.04	0.00
5.1	17	11.23	5.77	33.34	2.97
6.1	0	0.47	-0.47	0.22	0.47
6.2	2	0.94	1.06	1.13	1.21
7	0	0.47	-0.47	0.22	0.47
8	8	7.48	0.52	0.27	0.04
9	1	0.47	0.53	0.28	0.61
Dangerous	2	1.87	0.13	0.02	0.01
Total	186			Chi-squared =	14.97
				Chi-square dist. =	0.09
9 degrees of freedom and alpha=0.05, p-value=16.92 16.92>14.97 There is no					
stat. significant difference observed. Ho: 11E Jonesborough=HWY 321 with p>0.05					

Appendix A59: Chi-square test for total HAZMAT surveyed						
Ho: HAZMAT Enters County = HAZMAT Exits County alpha=0.05						
Hazard Class	**O**	**E**	**O-E**	**(O-E)2**	**(O-E)2/E**	
1	7	5.71	1.29	1.65	0.29	
2.1	37	38.29	-1.29	1.65	0.04	
2.2	37	42.29	-5.29	27.94	0.66	
2.3	4	2.86	1.14	1.31	0.46	
3	103	103.43	-0.43	0.18	0.00	
4.3	0	1.14	-1.14	1.31	1.14	
5.1	61	56.57	4.43	19.61	0.35	
6.1	4	2.86	1.14	1.31	0.46	
6.2	2	2.86	-0.86	0.73	0.26	
7	6	5.14	0.86	0.73	0.14	
8	36	36.57	-0.57	0.33	0.01	
9	13	12.00	1.00	1.00	0.08	
Dangerous	6	6.29	-0.29	0.08	0.01	
1	3	4.29	-1.29	1.65	0.39	
2.1	30	28.71	1.29	1.65	0.06	
2.2	37	31.71	5.29	27.94	0.88	
2.3	1	2.14	-1.14	1.31	0.61	
3	78	77.57	0.43	0.18	0.00	
4.3	2	0.86	1.14	1.31	1.52	
5.1	38	42.43	-4.43	19.61	0.46	
6.1	1	2.14	-1.14	1.31	0.61	
6.2	3	2.14	0.86	0.73	0.34	
7	3	3.86	-0.86	0.73	0.19	
8	28	27.43	0.57	0.33	0.01	
9	8	9.00	-1.00	1.00	0.11	
Dangerous	5	4.71	0.29	0.08	0.02	Chi-square dist.
Total	553			Chi-square=	9.11	0.62
12 degrees of freedom and alpha=0.05, p-value=21.03 21.03>9.11 No stat. sig. difference						
observed. Ho: HAZM AT Entering County = HAZMAT Exiting County p>0.05						

Appendix A60: HAZMAT Storage in Washington County			
Hazard Class	**Number of Chemicals**	**lbs./day Stored**	**% of Total HAZMAT Stored**
1 - Explosives	1	5000	0.04%
2.1 - Flammable gas	26	1640600	14.02%
2.2 - Non-flammable gas	43	640740	5.48%
2.3 - Poisonous gas	11	12100	0.10%
3 - Flammable	112	1846250	15.78%
4.1 - Flammable solid	9	115700	0.99%
4.2 – Spont. Comb.	1	100	0.00%
4.3 - Dangerous when wet	3	700	0.01%
5.1 - Oxidizer	9	1055900	9.02%
5.2 - Organic peroxide	2	600	0.01%
6.1 - Poisonous	32	88400	0.76%
6.2 - Infectious	0	0	0.00%
7 - Radioactive	3	5500100	47.01%
8 - Corrosive	71	793600	6.78%
9 - Miscellaneous	0	0	0.00%
Total	323	11699790	100.00%

Appendix A61: HAZMAT Storage in Washington County, Excluding Aerojet (Class 7)			
Hazard Class	**Number of Chemicals**	**lbs./day Stored**	**% of Total HAZMAT Stored**
1 - Explosives	1	5000	0.08%
2.1 - Flammable gas	26	1640600	26.46%
2.2 - Non-flammable gas	43	640740	10.34%
2.3 - Poisonous gas	11	12100	0.20%
3 - Flammable	112	1846250	29.78%
4.1 - Flammable solid	9	115700	1.87%
4.2 – Spont. Comb.	1	100	0.00%
4.3 - Dangerous when wet	3	700	0.01%
5.1 - Oxidizer	9	1055900	17.03%
5.2 - Organic peroxide	2	600	0.01%
6.1 - Poisonous	32	88400	1.43%
6.2 - Infectious	0	0	0.00%
7 - Radioactive	3	0	0.00%
8 - Corrosive	71	793600	12.80%
9 - Miscellaneous	0	0	0.00%
Total	323	6199690	100.00%

Appendix A62: Norfolk Southern (1999)				
Top 50 Commodities, Loaded Shipments, Bristol Through Johnson City, TN				
Chemical Shipping Name	**Hazard Class**	**UN#**	**Total**	**%**
elevated temperature material	9-miscellaneous	3257	2957	16.10%
alcoholic beverages	3-flammable	1824	1979	10.78%
sodium hydroxide	8-corrosive	2218	1890	10.29%
environmentally hazardous material	9-miscellaneous	3077	1806	9.83%
acrylic acid, inhibited	8-corrosive	2280	1337	7.28%
hexamethylenediamine	8-corrosive	3065	1036	5.64%
petroleum gases, liquified	2.1-flammable gas	1075	872	4.75%
acetone	3-flammable	1090	716	3.90%
carbon dioxide	2.2-non-flam. gas	2187	483	2.63%
sulfuric acid	8-corrosive	1830	461	2.51%
acetic anhydride	8-corrosive	1715	376	2.05%
acetic acid, glacial	8-corrosive	2789	356	1.94%
trichloroisocyanuric acid	5.1-oxidizer	2468	322	1.75%
hydrochloric acid	8-corrosive	1789	286	1.56%
anhydrous ammonia	2.2-non-flam.gas	1005	283	1.54%
combustible liquid, n.o.s.	3-flammable	1993	236	1.29%
flammable liquid, n.o.s.	3-flammable	1993	229	1.25%
ethanol	3-flammable	1170	223	1.21%
hydrogen peroxide	5.1-oxidizer	2015	218	1.19%
sulfur, molten	9-miscellaneous	2448	263	1.43%
corrosive liquid, acidic	8-corrosive	3265	201	1.09%
phosphoric acid	8-corrosive	1805	198	1.08%
methyl methacrylate	3-flammable	1247	178	0.97%
chlorine	2.3-poison gas	1017	178	0.97%
ethylene oxide	2.3-poison gas	1040	128	0.70%
ammonium nitrate	5.1-oxidizer	1942	110	0.60%
paraformaldehyde	4.1-flammable solid	2213	108	0.59%
ethyl chloride	2.1-flammable gas	1037	103	0.56%
battery fluid, acid	8-corrosive	2796	97	0.53%
corrosive liquids, n.o.s.	8-corrosive	1760	97	0.53%
vinyl chloride, inhibited	2.1-flammable gas	1086	94	0.51%
cartridges for weapons	1.4-explosives	0012	82	0.45%
butyl acetate	3-flammable	1123	68	0.37%
picolines	3-flammable	2313	60	0.33%
cases, cartridges, empty	1.4-explosives	0055	58	0.32%
isobutyraldehyde	3-flammable	2045	54	0.29%
waste (flammable)	3-flammable	1993	46	0.25%
fireworks	1.3-explosives	0335	46	0.25%

phosphorus pentasulfide	4.3-dang. when wet	1340	46	0.25%
organophosphorus	6.1-poison	2783	42	0.23%
batteries, wet, filled with acid	8-corrosive	2784	42	0.23%
	Total		18365	100%

Appendix A63: Norfolk Southern (1999)			
Distribution of Rail Transport by Hazard Class, Bristol Through Johnson City, TN			
Hazard Class	**Number**	**%**	
1 - Explosives	186	1.01%	
2.1 - Flammable gas	1069	5.82%	
2.2 - Non-flammable gas	766	4.17%	
2.3 - Poisonous gas	306	1.67%	
3 - Flammable	3789	20.63%	
4.1 - Flammable solid	108	0.59%	
4.2 - Spontaneously combustible	0	0.00%	
4.3 - Dangerous when wet	46	0.25%	
5.1 - Oxidizer	650	3.54%	
5.2 - Organic peroxide	0	0.00%	
6.1 - Poisonous	42	0.23%	
6.2 - Infectious	0	0.00%	
7 - Radioactive	0	0.00%	
8 - Corrosive	6377	34.72%	
9 - Miscellaneous	5026	27.37%	
Total	18365	100.00%	

Appendix A64: Norfolk Southern (1999)				
Top 50 Commodities, Loaded Shipments, Kingsport Through Johnson City, TN				
Chemical Shipping Name	**Hazard Class**	**UN#**	**Total**	**%**
combustible liquid, n.o.s.	3-flammable	1993	1495	14.05%
other regulated material	9-miscellaneous	3082	854	8.02%
xylenes	3-flammable	1307	1021	9.59%
acetic anhydride	8-corrosive	1715	738	6.93%
acetone	3-flammable	1090	563	5.29%
butanols	3-flammable	1120	481	4.52%
sodium hydroxide solution	8-corrosive	1824	471	4.43%
butyraldehyde	3-flammable	1129	371	3.49%
butyl acetates	3-flammable	1123	354	3.33%
acetic acid, glacial	8-corrosive	2789	342	3.21%
propionaldehyde	3-flammable	1275	334	3.14%
environmentally hazardous material	9-miscellaneous	3082	301	2.83%
ammonium nitrate	5.1-oxidizer	1942	294	2.76%
ethanol	3-flammable	1170	246	2.31%
octyl aldehydes	3-flammable	1191	227	2.13%
denatured alcohol	3-flammable	1987	226	2.12%
acetaldehyde	3-flammable	1089	221	2.08%
elevated temperature material	9-miscellaneous	3257	357	3.35%
n-propanol	3-flammable	1274	172	1.62%
isobutyl acetate	3-flammable	1213	138	1.30%
propanol	3-flammable	1219	137	1.29%
methyl amyl ketone	3-flammable	1110	129	1.21%
ethyl acetate	3-flammable	1173	119	1.12%
flammable liquid, n.o.s.	3-flammable	1993	106	1.00%
1-methoxy-2-propanol	3-flammable	3092	97	0.91%
n-propyl acetate	3-flammable	1276	90	0.85%
esters, n.o.s.	3-flammable	3272	88	0.83%
elevated temperature material	3-flammable	3256	66	0.62%
formaldehyde solutions	8-corrosive	2209	66	0.62%
corrosive liquid, n.o.s.	8-corrosive	1760	65	0.61%
methyl isobutyl ketone	3-flammable	1245	61	0.57%
isobutyraldehyde	3-flammable	2045	47	0.44%
butanol	3-flammable	1212	43	0.40%
ketones, liquid, n.o.s.	3-flammable	1224	39	0.37%
diethyl ether	3-flammable	1155	36	0.34%
isobutyric acid	3-flammable	2529	35	0.33%

isobutyl isobutyrate	3-flammable	2528	34	0.32%
aniline	6.1-poison	1547	34	0.32%
propionic acid	8-corrosive	1848	34	0.32%
crotonaldehyde	6.1-poison/3-flammable	1143	61	0.57%
petroleum gases, liquified	2.1-flammable gas	1075	26	0.24%
propyl acetate	3-flammable	1220	24	0.23%
	Total		10643	100.00%

Appendix A65: Norfolk Southern (1999)		
Distribution of Rail Transport by Hazard Class, Kingsport Through Johnson City, TN		
Hazard Class	**Number**	**%**
1 - Explosives	0	0.00%
2.1 - Flammable gas	26	0.24%
2.2 - Non-flammable gas	0	0.00%
2.3 - Poisonous gas	0	0.00%
3 - Flammable	7061	65.97%
4.1 - Flammable solid	0	0.00%
4.2 - Spontaneously combustible	0	0.00%
4.3 - Dangerous when wet	0	0.00%
5.1 - Oxidizer	294	2.75%
5.2 - Organic peroxide	0	0.00%
6.1 - Poisonous	95	0.89%
6.2 - Infectious	0	0.00%
7 - Radioactive	0	0.00%
8 - Corrosive	1716	16.03%
9 - Miscellaneous	1512	14.13%
Total	10704	100.00%

Appendix A66: CSX Transportation				
Hazardous Material Commodities, Loaded Shipments, Kingsport to Erwin				
Chemical Shipping Name	**Hazard Class**	**UN#**	**Total**	**%**
xylenes	3-flammable	1307	1753	34.64%
ammonium nitrate	5.1-oxidizer	1942	989	19.54%
methanol	3-flammable	1230	788	15.57%
acetic acid, glacial	8-corrosive	2789	319	6.30%
petroleum distillates	3-flammable	1268	243	4.80%
acetic anhydride	8-corrosive	1715	232	4.58%
petroleum gases, liquified	2.1-flammable gas	1075	175	3.46%
environmentally haz. subs.	9-miscellaneous	3082	167	3.30%
sodium hydroxide solution	8-corrosive	1824	126	2.49%
acetic acid solution	8-corrosive	2790	106	2.09%
corrosive liquids, flammable, n.o.s.	8-corrosive/3-flam.	2920	103	2.04%
sulfuric acid	8-corrosive	1830	57	1.13%
propionic acid	8-corrosive	1848	3	0.06%
		Total	5061	100.00%

Appendix A67: CSX Transportation		
Hazardous Material Commodities by Hazard Class, Loaded Shipments,		
Kingsport to Erwin		
Hazard Class	**Number**	**%**
1 – Explosives	0	0.00%
2.1 - Flammable gas	175	3.39%
2.2 - Non-flammable gas	0	0.00%
2.3 - Poisonous gas	0	0.00%
3 - Flammable	2887	55.91%
4.1 - Flammable solid	0	0.00%
4.2 - Spontaneously combustible	0	0.00%
4.3 - Dangerous when wet	0	0.00%
5.1 – Oxidizer	989	19.15%
5.2 - Organic peroxide	0	0.00%
6.1 – Poisonous	0	0.00%
6.2 – Infectious	0	0.00%
7 – Radioactive	0	0.00%
8 – Corrosive	946	18.32%
9 – Miscellaneous	167	3.23%
Total	5164	100.00%

VITA

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